Courses

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

A&VS 592. Directed Study. 1-6 Hours.
Directed Study, reading, and/or research.

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

A&VS 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

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

A&VS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture, forestry, and consumer science. 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.).

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A&VS 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.

A&VS 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.).

A&VS 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.

A&VS 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.

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ACCT 501. Accounting/Economic Decision Making. 3 Hours.
PR: Admission into the MAcc program. This course exposes students to the theory and application within the accounting profession of the topics of corporate governance, economic theory, financial management, cost accounting, and strategic planning, particularly as it relates to decision making.

ACCT 511. Financial Accounting Theory and Practice. 3 Hours.
PR: Consent. Comprehensive examination of financial accounting theory as established by the opinions, statements and interpretation of professional organizations with special emphasis on their application and problem solving.

ACCT 512. Mergers and Acquisitions. 3 Hours.
PR: Consent. Strategic perspectives of mergers and acquisitions, their valuation, and evaluation of their subsequent performance. Accounting for business combinations and foreign operations and related financial accounting and reporting issues.

ACCT 520. Advanced Technology for Accounting. 3 Hours.
The materials that will be covered are applicable to external auditing, internal auditing, financial accounting, and forensic accounting. The course covers the use of technology in matters related to the efficiency and effectiveness of the audit. Also covered is the use of technology in the accounting function since this function provides the source data and information for any audit.

ACCT 541. Federal Tax Research and Writing. 3 Hours.
PR: Consent. Study of federal tax authorities and hierarchy, the research resources available, development of federal tax research and writing skills, and the application thereof.

ACCT 542. Advanced Federal Corporate Tax. 3 Hours.
An advanced study of federal income taxation for corporations and shareholders, including: corporate operations, corporate formation and capital structure, distributions to shareholders, acquisitions and liquidations, and reorganizations.

ACCT 544. Taxation of Property Transactions. 3 Hours.
This course enables students to identify and apply the key principles of the taxation of property transactions including tax basis, basis adjustments, recognition and realization principles, cost recovery, debt, as well as dispositions of property including through sales, gifts, and bequests.

ACCT 561. Governmental and Not-for-Profit Accounting. 3 Hours.
PR: Consent. Theory and practice of accounting for governmental and not-for-profit entities with an emphasis on the conceptual foundation of fund accounting, budgetary control and accountability.

ACCT 580. Accounting for Forensic and Fraud Investigators. 3 Hours.
A basic introduction to financial and managerial accounting, auditing, and technology applicable to accounting, and the relationship of those areas with forensic accounting and fraud examination.

ACCT 581. Fraud Investigation. 3 Hours.
PR: Restricted to FAFI students. Types of fraud, documents, sources of evidence, and analysis of internal and external fraud schemes with an emphasis on the skills needed to identify and investigate fraud.

ACCT 582. Fraud Data Analysis. 3 Hours.
PR: Restricted to FAFI students. Computer-aided data analysis techniques for detecting and investigating fraud cases, issues related to the collection and use of digital evidence, and collection of data from electronic devices.

ACCT 583. Fraud: Criminology/Legal Issues. 3 Hours.
PR: Consent. Theories of criminal behavior, laws, rules of evidence, rights of persons under interrogation and interviewing, report writing and ethics, as these topics relate to forensic accounting with a focus on the behavioral aspects of fraud.

ACCT 584. Advanced Fraud Investigation. 3 Hours.
PR: ACCT 581 and ACCT 582. Major fraud case investigation with an emphasis on forensic and litigation support aspects, including presentation of cases in moot court setting.

ACCT 585. Forensic and Fraud Examination Advanced Analytical Techniques. 3 Hours.
PR: ACCT 580. An examination and use of advanced analytical techniques with respect to three forensic accounting and fraud examination special topics: civil litigation support and damage claims, valuations and financial statement fraud.

ACCT 586. Private Company Valuation. 3 Hours.
PR or CONC: ACCT 580 or ACCT 581 with a minimum grade of B-. This course provides students with the fundamental knowledge and skills needed to complete private company valuations.

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Directed study, reading, and/or research.

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A study of contemporary topics selected from recent developments in the field.

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ACCT 698. Thesis or Dissertation. 1-6 Hours.
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ACCT 699. Graduate Colloquium. 1-6 Hours.
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ACCT 710. Accounting Research Methods Seminar. 3 Hours.
PR: Accounting PhD Status. An introduction to common topics, theories, and methods used in the production of accounting research. We will consider both “classic” and “cutting edge” work from a variety of domains (i.e., auditing, financial, tax) and methodologies (i.e., archival, experimental). We will also consider a variety of other academic issues that are critical to your professional development.

ACCT 711. Behavioral Accounting Research. 3 Hours.
This is a doctoral-level course designed to familiarize students to various behavioral topics within the accounting literature. The goal of the course is to survey some of the major theories, issues, and empirical findings within the behavioral-accounting literature. This approach is designed to build a foundation upon which the student may consider their own areas of research.

ACCT 712. Archival Accounting Research. 3 Hours.
PR: Admission to PhD program and STAT 511. This doctoral-level course is designed to familiarize students to various capital markets topics within the accounting literature. The goal of the course is to survey some of the major theories, issues, and empirical findings within the archival literature. This approach is designed to build a foundation upon which the student may consider their own areas of interest.

ACCT 713. Forensic Accounting and Fraud Examination. 3 Hours.
This course familiarizes students with various special topics as it relates to forensic accounting and fraud examination. It surveys some of the major theories, issues, and empirical findings within and without the accounting literature.

ACCT 714. Auditing and Assurance. 3 Hours.
The purpose of this seminar is to introduce the theory of auditing and the empirical methodologies used to research audit and assurance. During the seminar, we will read and critique published research papers related to auditing. We will also discuss alternative ways in which the author(s) might have achieved their research objectives.

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

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

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

ACE 508. The Sport Coaching Profession. 3 Hours.
An interaction-based course pertaining to professional coaching, coaching theory, and the engagement in problem solving and critical thinking in the profession of sport coaching.

ACE 510. Training Theories for Coaches. 3 Hours.
This course is designed to promote critical thinking, problem solving and use of current training theories for best practice in coaching across all levels to develop and nurture talent.

ACE 518. Psychology of Coaching. 3 Hours.
In-depth understanding of the psychology of coaching athletes and application of this knowledge into coaching practices for optimal athlete development and performance. Contemporary issues also covered.

ACE 522. Motor Behavior for Sport Coaches. 3 Hours.
Designed to increase coaches' understanding of how athletes learn motor skills. Theories of motor learning, techniques to provide effective instruction, practice design, stages of learning, assessment, and coaching strategies to structure training and practice to optimize skill acquisition and performance.

ACE 524. Data Analytics in Sport Development & Performance. 3 Hours.
This graduate-level course explores data analytics theories and practices in sport. The modern sport team coach utilizes analytics that support individual and team development and performance across contexts.

ACE 525. Talent Development and Identification in Sport. 3 Hours.
This course explores both talent identification and talent development theories and practices in sport that support individual development and sport performance across contexts.

ACE 530. Coaching Education Administration. 3 Hours.
An administrative focus on leadership, finance, fundraising, planning, facility development, personnel supervision, public relations, rules and regulations, purchase and care of equipment and the conducting of athletic events.

ACE 539. Creating a Healthy Competitive Environment. 3 Hours.
Course explores topics related to health and safety related aspects of sport, coaching techniques of training, ergogenic aids, performance enhancement, and the coaches role and responsibilities in designing, creating and maintaining a safe and healthy environment for their athletes and teams.

ACE 541. Positive Youth Development in Sport. 3 Hours.
Students will be introduced to Positive Youth Development (PYD) as a field, as a movement, and as a philosophical approach to promoting adaptive developmental experiences and outcomes for youth sport participants.

ACE 568. Sport Movement Analysis. 3 Hours.
This course applies the laws of physics to sport activities with the objective of finding the most efficient use of the human body to achieve the highest levels of performance.

ACE 569. Strength and Conditioning Methods for Coaches. 3 Hours.
Present basic exercise performance methodologies to assist in coaching athletes. Types of training include speed drills, agility drills, conditioning workouts, flexibility exercises, balance-improvement drills, and proper training- environment safety techniques.

ACE 573. Advanced Strength and Conditioning Coaching Techniques. 3 Hours.
Present various exercises in hands-on setting to utilize in training. Proficiency is taught in Olympic movements, free weights, machine weights, and plyometrics. Speed and agility track exercises will be included.

ACE 580. Evaluation in Coaching. 1 Hour.
Key principles of research methods, evaluation, and planning to identify and organize instruments for data analysis and formulation of a Program Evaluation Strategy. Knowledge and skills needed to initiate a well-designed evaluation of their team, program, and self (as a coach). Course is online.

ACE 582. Program Evaluation for Coaches. 1 Hour.
PR: ACE 580. Integration of a Program Evaluation Strategy (PES) utilizing program materials and concepts in an applied professional setting. The PES will be implemented and evaluated over two full semesters. Students must have a position coaching in an applied sport setting. Course is online. (1 credit; repeated twice).

ACE 584. Evaluation Based Planning for Coaches. 1 Hour.
PR: ACE 582 with a minimum grade of B-. This course enhances coaches' understanding of their own coaching through reflection. Insights, limitations, and future coaching strategies to overcome limitations in students' coaching practices are presented as a way of reflecting to facilitate coach development.

ACE 585. Applied Professional Development. 3 Hours.
This is a graduate level course designed to enhance coaches' understanding of their own coaching through reflection.

ACE 587. Strength and Conditioning Program Design Coach. 3 Hours.
Students in this course will learn to design programs in athletic resistance training, plyometrics, conditioning, and agility, and students will learn to handle detraining, sports specificity, and periodization for offseason and competition programs.

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

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

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

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

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

ACE 602. Action-based Research for Coaching. 3 Hours.
Examination of action based research as applied to sport studies. Emphasis placed on learning the skills of disciplined inquiry to inform and change ones practices in the future.

ACE 645. Contemporary Issues in Sport. 3 Hours.
Contemporary issues in sport; to make you a more successful coach, expose you to situations in today's coaching profession, and prepare you to plan for situations that may arise.

ACE 671. Women in Sport. 3 Hours.
ACE Graduate: Study the history of women in sport, and investigate issues that are directly related to women in sport as participants, coaches, administration, parents and fans.

ACE 682. Program Evaluation for Coaches. 1 Hour.
PR: ACE 680. Integration of a Program Evaluation Strategy (PES) utilizing program materials and concepts in an applied professional setting. The PES will be implemented and evaluated over two full semesters. Students must have a position coaching in an applied sport setting. Course is online. (1 credit; repeated twice).

ACE 685. Coaching Internship. 1-6 Hours.
Students will complete a contract detailing terms of the learning experience. The levels of coaching include but are not limited to elementary schools, little league, secondary schools, and collegiate levels.

ACE 688. Coaching Techniques. 3 Hours.
Students will complete a contract detailing terms of coaching technique topics relevant to their individual coaching experience.

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Directed study, reading, and/or research.

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ACE 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.).

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

ACE 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate student 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 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.

ACE 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.

ACE 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.

ADPR 521S. Audience Insights and Analysis. 3 Hours.
PR: ADV 315 or ADV 315S or PR 324 or PR 324S or STCM 315 with a minimum grade of C- or consent. Strategic communications research builds upon an understanding of advertising and public relations fundamentals, theory and practice. This course is designed to introduce advertising and public relations graduate students to communication research methods that are commonly used to identify problems and issues of concern; guide strategic planning, message development and placement; and evaluate plans and campaigns.

ADPR 559S. Advertising and Public Relations Campaigns. 3 Hours.
PR: ADPR 421 or ADPR 421S or ADPR 521 or ADPR 521S or STCM 421 or STCM 521 with a minimum grade of C- or consent. This course is the graduate level section of the advertising and public relations campaigns capstone course. As such, it draws heavily on students' previous training in principles, techniques, writing, and research methods to help lead and implement the development of a strategic communications campaign for a real organizational client.

ADPR 593. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

ADV 521. Mass Communication Research. 3 Hours.
Introduction to use of marketing research as a campaign strategy, research methodologies, and the generation, understanding, and application of marketing and advertising research findings. Lecture, in-class exercises, outside projects, individual and team assignments.

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

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

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

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

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

AEM 545. Food Microbiology. 3 Hours.
PR: AEM 341. The relationships of micro-organisms to food-borne illness and intoxications, microbial food quality, food spoilage, food preservation and bio-processing. The emerging food preservation technologies and predictive microbiology will be introduced.

AEM 549. Food Microbiology Lab. 1 Hour.
PR: AEM 545. Laboratory training in methods used in microbiological examination of foods. This laboratory will provide hands-on experience for students who take or have taken AEM 545.

AEM 591. Advanced Topics. 1-6 Hours.
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Directed study, reading, and/or research.

AEM 593. Special Topics. 1-6 Hours.
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AEM 594. Seminar. 1-6 Hours.
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AEM 595. Independent Study. 1-9 Hours.
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AEM 748. Sanitary Microbiology. 3 Hours.
PR: AEM 341 or Consent. Microbiology and health hazards associated with food handling, water treatment, and sanitary waste disposal.

AEM 750. Current Concepts in Microbial Ecology. 1 Hour.
Emphasis on reading, criticism, and discussion of recent journal articles from the primary literature in microbial ecology/environmental microbiology.

AEM 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of applied and environmental microbiology. 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.).

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

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

AEM 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.).

AFCS 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture, forestry and consumer sciences. 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.).

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Directed study, reading, and/or research.

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AFCS 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 dissertation (798). Grading is normal.

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AGBI 512. Nutritional Biochemistry. 3 Hours.
PR: AGBI 410 or Consent. Nutritional biochemistry of domestic animals.

AGBI 512L. Nutritional Biochemistry Laboratory. 1 Hour.
PR: AGBI 410 and AGBI 410L and PR or CONC: AGBI 512. Experiments to determine the nutritional constituents in animal and plant tissues.

AGBI 514. Animal Biotechnology. 4 Hours.
PR: Corequisite of AGBI 514L. The course will introduce students to the concepts and techniques of molecular biology and the application of these technologies in animal research. It will give the students laboratory experience in many molecular biology techniques.

AGBI 514L. Animal Biotechnology Laboratory. 0 Hours.
PR: Corequisite of AGBI 514. Animal Biotechnology - AGBI 514 Laboratory.

AGBI 591. Advanced Topics. 1-6 Hours.
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Directed study, reading, and/or research.

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

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

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

AGBI 610. General Biochemistry. 4 Hours.
PR: 8 hours of Organic Chemistry. The first half of a general course of biochemistry designed for graduate students of biological sciences. The course emphasizes the chemical properties of cellular constituents.

AGBI 612. General Biochemistry. 4 Hours.
PR: AGBI 610 or Consent. The second half of a general course of biochemistry designed for graduate students of biological sciences. The course emphasizes reactions and control of intermediary metabolism.

AGBI 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agricultural biochemistry. 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.).

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

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

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

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

AGBI 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.

AGBI 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.).

AGEE 520. Laboratory Teaching Methods. 2 Hours.
Organization and preparation of teaching materials for middle and high school agriculture laboratory courses.

AGEE 521. Laboratory Teaching Methods Practicum. 1 Hour.
PR: AGEE 520. Organization and preparation of teaching materials for middle and high school agriculture laboratory courses.

AGEE 526. Leadership Development FFA/SAE. 2 Hours.
This course will focus on planning, advising, supervising and evaluating student educational experiences through youth organizations (FFA) and experiential learning programs (supervised agricultural experience).

AGEE 527. Leadership Development FFA/SAE Practicum. 1 Hour.
PR: AGEE 526. This course will focus on student demonstrations of planning, advising, supervising and evaluating student educational experiences through youth organizations (FFA) and experiential learning programs (supervised agricultural experience).

AGEE 530. Teaching Agriculture. 2 Hours.
Organization and preparation of teaching materials for middle and high school agriculture courses.

AGEE 531. Teaching Agriculture - Practicum. 1 Hour.
PR: AGEE 530. Practicum for the organization and preparation of teaching materials for middle and high school agriculture courses.

AGEE 534. Effective Learning Environments. 2 Hours.
Principles/processes in organizing and managing a positive and effective secondary agricultural education learning environment.

AGEE 535. Effective Learning Environments - Practicum. 1 Hour.
PR: AGEE 534. Practicum for demonstrating principles/processes in organizing and managing a positive and effective secondary agricultural education learning environment.

AGEE 538. Program Planning in HS AG Education. 2 Hours.
Development, organization, preparation and evaluation of materials/curriculum for teaching agriculture in middle and secondary schools.

AGEE 570. History and Philosophy of Land Grant Education. 3 Hours.
Students will complete an in-depth exploration of the purpose, history, and philosophies underlying modern land grant universities. Students will discuss the three pillars of land grants, and will assess their own roles as teachers, researchers, and community servants.

AGEE 580. Change Theory in Agriculture. 3 Hours.
This course will introduce students to principles of change theory, specifically examining Rogers' Diffusion of Innovations theory.

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

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

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

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

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

AGEE 631. Planning Agricultural Programs and Courses. 3 Hours.
PR: AGEE 430 or Consent. Formulating programs and courses for schools and communities.

AGEE 642. Agriculture Education Research Methods and Design. 3 Hours.
Explores definition of the problem, identification of related literature, selection of an appropriate research design, interpretation of results from data analysis procedures, and the reporting of research findings with emphasis on agricultural education.

AGEE 644. Data Analysis/Interpretation. 3 Hours.
Explores the selection of appropriate statistical methods, use of statistical software packages to analyze data, interpretation of results from data analysis procedures, and the report of research findings with emphasis on agricultural education.

AGEE 646. Instrumentation and Survey Research Methods Design. 3 Hours.
PR: AGEE 642. Principles, theories, techniques, and applications for developing survey questionnaires and conducting survey research in agriculture and social sciences; developing questions; constructing instruments; implementing surveys; reducing coverage and sampling errors. The purpose of survey research is to explore and/or describe a given population--typically from samples of the population.

AGEE 650. Program Development in Community Education. 3 Hours.
Planning, implementation and evaluation of programs in non-formal rural and community educational settings.

AGEE 651. Program Evaluation in Comm Ed. 3 Hours.
Evaluation principals, models, designs and procedures used in developing and analyzing agricultural and extension education programs. Evaluations role in needs assessments, implementation and marketing to stakeholders.

AGEE 670. Thesis and Dissertation Proposal Development. 1 Hour.
This course is designed to assist students in the preparation of their thesis or dissertation research proposal, specific to social science research. Students will submit an acceptable draft of the first three chapters of their thesis/dissertation proposal by the end of the course.

AGEE 680. Advanced Principles of Teaching and Learning. 3 Hours.
Theoretical exploration for those who will teach in formal learning environments, this course focuses on principles, theories, and philosophical issues common to educators in general. It will introduce learners to literature and research relevant to practicing educators. Delivered using a flipped classroom design, graduate students will engage in practical teaching to increase transfer and consumption.

AGEE 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agricultural and environmental education. 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.).

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

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

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

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

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

AGEE 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.

AGEE 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.).

AGEE 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.

AGEE 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.

AGEE 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.

AGEE 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.

AGRL 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture. 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.).

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

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

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

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

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

AGRL 660. Problem Report. 1-3 Hours.

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

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

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

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

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

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

AGRL 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.

AGRL 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.).

AGRL 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.

AGRL 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.

AGRL 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture. 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.).

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

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

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

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

AGRL 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.

AGRL 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.).

AGRN 502. Soil Science: Principles and Practices. 3 Hours.
PR: Graduate standing, Cannot receive credit for AGRN 502 and AGRN 202 or the equivalent. An in-depth examination of the microscopic and macroscopic properties of soils and how these interact to produce a fragile, non-renewable natural body on the landscape. Discussion of soils as an ecological resource and learn how the physical, chemical, and biological properties of soils impact plant growth, land use and management, and environmental protection.

AGRN 525. Forage Harvesting and Storage. 3 Hours.
PR: AGRN 454 or Consent. Advanced study of processes associated with harvesting and storage of forages. (3 hr. lec.).

AGRN 554. Pasture Management and Utilization. 3 Hours.
PR: ARGN 454 and ANNU 260 or consent. Advanced study of pastures and their management and utilization with emphasis on temperate species. (3 hr. lec.).

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

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

AGRN 593. Special Topics. 1-6 Hours.

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

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

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

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

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

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

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

AGRN 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.

AGRN 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.).

AGRN 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.).

AGRN 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.

AGRN 710. Soil Testing and Plant Analysis. 3 Hours.
PR: AGRN 210 and BIOL 350, or Consent. Influence of soil chemical and physical properties on availability of plant nutrients; intensive study of individual plant nutrients and interactions of nutrients in soils and crops; and intensive study of methods used to test soils and analyze plants for nutrients and other metals. (2 hr. lec., 1 hr. lab.).

AGRN 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agronomy. 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.).

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

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

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

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

AGRN 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.

AGRN 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.).

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

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

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

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

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

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

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

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

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

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

ANES 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.

ANES 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.).

ANES 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.).

ANES 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.

ANES 701. Basic Sciences Applied to Anesthesiology. 1-6 Hours.
PR: Consent. (Not offered during summer.) Examination and evaluation of date, decision-making, discussion of special procedures. (Max. enrollment: 10.).

ANES 731. Clinical Clerkship in Anesthesiology and Acute Medicine. 0 Hours.
PR: (Third year) CR. Preanesthetic evaluation, local and systemic anesthesia, airway management, cardiopulmonary resuscitation, respiratory care, clinical pharmacology, toxicology, fluid and blood therapy, and pain management. Seminars and practical exercises in emergency cardiac life support clinical experience in ICU or OR. (Duration: 2 weeks.).

ANES 780. Surgical Critical Care Medicine. 0 Hours.
Clinical rotation course. (See conjoined courses.).

ANES 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in the college teaching anesthesiology. 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.).

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

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

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

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

ANES 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.

ANES 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.).

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

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

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

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

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

ANNU 601. Principles of Nutrition and Metabolism. 3 Hours.
PR: AGBI 410 or consent. A basic course in principles of nutrition with emphasis on the major classes of dietary nutrients and their digestion and utilization.

ANNU 602. Nutrition and Physiological Function. 3 Hours.
PR: ANNU 601 or Consent. Sequence to ANNU 601. Techniques used in nutritional studies and the relationship of nutrient requirements to physiological function in species of laboratory and domestic animals and man.

ANNU 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of animal nutrition. 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.).

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

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

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

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

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

ANNU 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.

ANNU 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.).

ANNU 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.

ANNU 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.

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

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

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

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

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

ANPH 675. Reproduction Colloquium. 1 Hour.
PR: Graduate standing. Weekly discussions by graduate students and faculty in reproductive physiology program of current literature in the field, particularly of mammalian species.

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

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

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

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

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

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

ANPH 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.).

ANPH 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.).

ANPH 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.

ANPH 726. Endocrinology of Reproduction. 4 Hours.
(2 labs) PR: ANPH 424 or BIOL 413 or equivalent. Discussion of and laboratory experience in classical and current concepts of hormonal and neurohormonal regulations of reproductive phenomena with emphasis on species differences and similarities.

ANPH 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of animal physiology. 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.).

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

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

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

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

ANPH 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.

ANPH 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.).

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

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

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

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

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

ANPR 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of animal production. 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.).

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

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

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

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

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

ANPR 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.

ANPR 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.).

ANPR 698. Thesis or Dissertation. 1-6 Hours.
ANPR 698. Thesis or Dissertation. 1-6Hr. 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.

ANPR 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.

ANRD 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

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

ANRD 690. Teaching Practicum. 1-3 Hours.
ANRD 690. Teaching Practicum. 1-3 hr. PR: Consent. Supervised practice in college teaching of agriculture, natural resources, and design. 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.).

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

ANRD 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.).

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

ARE 540. Rural and Regional Development. 3 Hours.
PR: ARE 300 and ARE 321. Economic theories and quantitative techniques. Problems and goals for rural and regional planning; methods of policy analysis for community infrastructure development.

ARE 542. International Agricultural Economic Development. 3 Hours.
Current problems, theories, policies, and strategies in planning for agricultural and rural development for increased food production and to improve the well-being of rural people in the developing countries of the world.

ARE 580. Energy Industry Economics. 3 Hours.
PR: Graduate standing. Technical production and consumption methodologies, environmental concerns, and national and global economics and politics in making energy decisions.

ARE 581. Resource Appraisal and Decision Making. 3 Hours.
PR: ARE 500 or equivalent. Investment analysis, decision making under risk and uncertainty, and project analysis applied to resource exploration and utilization; mineral and energy reserve and resource estimation techniques.

ARE 585. Economics of Water Resources and Energy. 3 Hours.
PR: Calculus with a grade of B- or better or consent, introductory micro economics with a C- or better or consent. Allocation under scarcity, water institutions and management, risk, pricing, marketing, demand and supply estimation, interdependence between energy and water resources (Credit can not be received for both ARE 485 and ARE 585).

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

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

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

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

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

ARE 600. Research Methods. 1 Hour.
Research methods in agricultural, environmental, and resource economics. The application of scientific thinking in developing research proposals and critiquing published research.

ARE 601. Applied Microeconomics. 4 Hours.
PR: ARE 401 or equiv. Consumer and production economics applied to resource, environmental, and agricultural analysis.

ARE 620. Adaptation and Mitigation Strategies for Addressing Climate Change. 3 Hours.
This course identifies mechanisms that may be used to offset or reduce the effects of a changing climate. It addresses options that can help to protect agriculture and food production, protect human health, improve water resources and ecosystems services, and provide for the energy needed for continued economic activity. Students cannot receive credit for both ARE 420 and ARE 620.

ARE 621. Quantitative Methods in Resource Economics. 3 Hours.
PR: ARE 601 and ECON 421 or equivalents. Optimization techniques in economic analysis of natural resources; environmental and agricultural management problems; linear, nonlinear, and dynamic programming.

ARE 624. Econometric Methods in Resource Economics. 3 Hours.
PR: ECON 425. Application methods to natural resource, environmental, and agricultural economic problems; single and simultaneous equation models, specification problems, topics in time series, and cross-sectional analysis.

ARE 632. Natural Resource and Environmental Economics. 3 Hours.
PR: ARE 600 and ARE 621 or equivalent. Theory and institutions; market failure, externalities and property rights issues; renewable and nonrenewable resources, common property, environmental and resource management, and intergenerational decisions.

ARE 633. Natural Resource Policy Analysis. 3 Hours.
PR: ARE 600 and ARE 621, or equiv. Welfare economics applied to the analysis and evaluation of natural resources, environmental, agricultural, and energy policy issues.

ARE 643. Project Analysis and Evaluation. 4 Hours.
Analysis and evaluation of investment projects; economic and financial aspects of project analysis; risk analysis; preparation of feasibility reports.

ARE 644. International Markets and Trade. 3 Hours.
PR: ARE 600 and ARE 621. Causes and consequences of international trade and investment; commodity market structures, commodity price instability and international agreements; trade barriers and protection, export promotion, and impacts on developing countries.

ARE 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture research economics. 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.).

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

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

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

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

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

ARE 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.

ARE 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.).

ARE 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.

ARE 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.

ARE 703. Advanced Natural Resource Economic Theory. 3 Hours.
PR: ECON 710 and ARE 632. Allocation and distribution of natural resources in static and dynamic contexts; welfare economics, cost-benefit analysis, and optimal control approaches; applications to resource valuation, exhaustion, taxation, and regulation in theory and practice.

ARE 710. Advanced Environmental Economics. 3 Hours.
PR: ECON 701 and ARE 632 or Consent. Theory, efficient environmental design and analysis, modeling of economic and environmental systems, evaluation of non-market benefits and costs, and risk assessment.

ARE 729. Spatial Econometrics. 3 Hours.
Explores the various types of spatial econometric models and how they are estimated and interpreted. Maximum likelihood and Bayesian methodologies will be demonstrated both mathematically and in an applied setting.

ARE 730. Advanced Applied Econometrics. 3 Hours.
PR: ECON 701 and ECON 711 and ECON 721 and ECON 725 and ECON 726. Expands upon economic and econometric theory to develop further the research expertise in applied econometrics. This includes critical analysis of when certain methods are applicable given the research question or data available.

ARE 735. Resources of Development Planning. 3 Hours.

ARE 790. Teaching Practicum. 1-3 Hours.
Supervised practice in college teaching of agriculture. 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.).

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

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

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

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

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

ARE 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.

ARHS 501. Independent Study. 1-15 Hours.
(May be repeated for credit) PR: Consent. Independent research, closely supervised, on topics of student's selection. Proposal must be well-defined and contain historical, critical, and theoretical issues. Contractual course.

ARHS 504. Asian Art. 3 Hours.

ARHS 507. Native American. 3 Hours.
Advance investigation of the visual material culture of the First Peoples of North American north of the Rio Grande, pre-contract to present. Focus on formal analysis with careful contextual studies.

ARHS 510. Intro Curatorial Practice. 3 Hours.
PR: ARHS 120 and ARHS 160. Specifically the role of the curator. The objective is to assess exhibition display and develop a critical perspective on curatorial practice.

ARHS 517. Gallery Studies. 3 Hours.
This course provides a hands-on approach to professional gallery management. Beginning with the practical considerations of daily operations, the course covers art handling, condition reports, packing and shipping artworks, installation, lighting, writing exhibition proposals, press releases, and reviews. Other coursework includes readings, written projects, interviews and presentations on contemporary and historical gallery topics and issues.

ARHS 520. Greek and Roman. 3 Hours.
PR: Consent. The architecture, sculpture, and paintings of the Aegean world, c.2000 BCE, Greece and Rome to 400 CE. Critical and historical context of this time period will be considered.

ARHS 531. Medieval. 3 Hours.
PR: Consent. The arts of Europe from c. 312 to c. 1350. The theoretical, historical, and literary contexts will be established. Architecture, sculpture, painting, and portable arts will be included.

ARHS 533. Medieval Architecture. 3 Hours.
Advanced investigation into the architecture of western Europe and its builders, from 313 through the sixteenth century: monumental buildings, architectural ornament, and the fusion of sacred and secular, in context of medieval world views.

ARHS 538. History of Stained Glass. 3 Hours.

ARHS 541. Art of the Review. 3 Hours.
PR: Grade of C- or higher in ARHS 120 and ARHS 160, Junior or Senior standing, or graduate status. This advanced readings and discussion-based seminar is designed to introduce students to the role of art criticism in the arts professions and to develop skill with writing for the unique format of the short exhibition review.

ARHS 544. Art Theory. 3 Hours.
PR: Consent. Examination of the development and tradition of the literature of Western art theory and its relationship to artistic practice.

ARHS 545. Modern Art Theory. 1-12 Hours.
(May be repeated for credit.) PR: Consent. Studies in art education and related areas. The development of a master's degree project in conjunction with a faculty committee.

ARHS 546. Medieval Painting. 3 Hours.

ARHS 547. Romantic Painting. 3 Hours.
Advanced investigation into artistic movements and the underlying cultural and intellectual factors that inspire painters to use imagination and appeal to the emotions, reflecting the complexity of both the world and the self.

ARHS 548. Women in Art. 3 Hours.
Graduate-level study and research on the art of female artist and of women as subjects in art. There will be an historical view along with a strong theoretical component.

ARHS 550. Northern Renaissance. 3 Hours.
PR: Consent. The arts of Northern Europe from 1350 to 1560 will be studied in an historical and theoretical context. Painting and sculpture will be the focus of study.

ARHS 554. Italian Renaissance. 3 Hours.
PR: Consent. Early Renaissance through Mannerism. The course will emphasize both the historical context and theoretical foundation of 15th-and 16th-century Italian art and architecture.

ARHS 560. Baroque. 3 Hours.
PR: Consent. Art of the late 16th through the early 18th centuries, of both Northern and Southern Europe. Issues of historical context and theoretical interpretation will be emphasized.

ARHS 570. American. 3 Hours.
PR: Consent. The arts in the United States from the Colonial to the Modern era placed upon factors which define American art and the critical foundations for the works.

ARHS 575. Nineteenth Century. 3 Hours.
PR: ARHS 120 and ARHS 160. The course focuses upon European and American art from the late 18th century through 1900. Issues of theory, historical context, and literary foundation will be considered.

ARHS 580. Modern. 3 Hours.
PR: Consent. The revolutionary experience of visual art, from its foundation in 19th century European movements through the modern era. Critical theory and historical context will be stressed.

ARHS 581. Modern Architecture. 3 Hours.
Advanced investigation of architecture from the industrial revolution to the present. Theoretical consideration of style, form, technique, material, and meaning in the architecture of the modern and contemporary periods.

ARHS 582. GPS-Architect Frank Lloyd Wright. 3 Hours.
Advanced investigation of the life and work of America's most noted and controversial architect. Close examination of his work in the context of the development of modern architecture.

ARHS 585. Print, Propaganda and Art. 3 Hours.
Advanced investigation of the history and theoretical implications of printing, printmaking, and other forms of imaging in the western world from the earliest printed materials to present.

ARHS 588. The Art of Andy Warhol. 3 Hours.
Advanced investigation of the ground-breaking and controversial art of Andy Warhol. Examination of his work in the context of 1960's Pop Art movement and recent contemporary art.

ARHS 589. Contemporary. 3 Hours.
PR: Consent. Exploration of the various artistic movements from World War II to the present. Emphasis will be given to the change from modern to postmodern. Familiarity with images and critical texts will be expected.

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

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

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

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

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

ARHS 601. Thesis. 3 Hours.
PR: Consent. Topic selected by student in consultation with art history faculty. Research must indicate familiarity with primary and secondary sources and regard for evidence of art historical research, methodology, and criticism.

ARHS 602. History of Chinese Ceramics. 3 Hours.
Advanced investigation of pre-history to present with emphasis on historical development of ceramics and culture of important dynasties in Jingdezhen, China. Students will visit historical archaeological sites, traditional production centers, and museums.

ARHS 605. Chinese Language and Cultural History. 3 Hours.
Covers basic cultural and written Chinese, an introduction to China's many cultures and customs, and a brief history of China. Field trips offer experiential learning at sites discussed in class.

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

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

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

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

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

ARHS 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.

ARHS 697. 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.).

ARHS 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.).

ARHS 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.

ART 502S. Game Design. 3 Hours.
PR: First year graduate standing. Introduces the multiple components of a game environment and how to create meaningful interactive experiences on and off the computer. Focuses on core game design tasks in the professional practice of conceptualizing and prototyping board games and digital media-based games, including analytical and practical skills such as pitching, iteration, target audience identification, and planning for quality assurance.

ART 503. Game Theory. 3 Hours.
Critical theory and scholarship that addresses the idea of games as a form of designed human culture contained in complex aesthetic, immersive, and experiential artifacts. Addresses visual storytelling, temporal/spatial montage theory, and frameworks to understand player experience. Provides an overview of research methods and multi-disciplinary analytical paradigms for the study of games. Integrates the history of online and offline games.

ART 505S. Game Production. 3 Hours.
PR: ART 503. The technical creation of digital games, coding, game programming, and audio production for the game production pipeline. Hands-on development experience that transfers theoretical knowledge into the procedures and design decisions needed to production a functional game. Multiple game engines are employed in a series of game development project cycles.

ART 507. Focus Module. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many others.

ART 507A. Focus Module: Rigging 1. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507B. Focus Module: Materials & Lighting. 1 Hour.
PR: Acceptance into the MA Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507C. Focus Module: Orientation to Business of Game Design. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507D. Focus Module: 3D Modeling. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507E. Focus Module: Acting for Animation & Games. 1 Hour.
PR: Acceptance into the MA Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507F. Focus Module: Screenwriting for Games. 1 Hour.
PR: Acceptance into the MA Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507G. Focus Module: Animation 1. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507I. Focus Module: Animation 2. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A ampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507J. Focus Module: 3D Modeling 2. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507K. Focus Module: Rigging 2. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507L. Focus Module: Character Design. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507M. Focus Module: Basic User Interface Design. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507N. Focus Module: Sound Design for Games. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507O. Focus Module: Augmented Reality. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507P. Focus Module: Design of Virtual Environments. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507Q. Focus Module: Design for Mobile Devices. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 507R. Focus Module: Sound Design for Games 2. 1 Hour.
PR: Acceptance into the MA in Game Design program. Focus modules vary in topic to address state-of-the-industry expectations for game designers. The purpose of each single credit focus module is to provide game design MA candidates with the ability to develop a specific skill in game design and development. A sampling of topics include animation, 3-D modeling, digital photography, project management, sound editing, among many things.

ART 515. Arts Administration. 3 Hours.
This course provides a practical approach to understanding arts management in not-for-profit organizations. Topics include facilities management, leadership, programming, audience development, board relations, and fundraising.

ART 542S. CAD and 3D Printing. 3 Hours.
This course is an introduction to Computer Aided Design (CAD) and 3D Printing for students with no prior experience in the subject. Students will learn how to use CAD software and imaging equipment to design 3D models and fabricate their prototypes and artwork using 3D printing, laser cutting, and other digital tools.

ART 564. Intro to Art Education. 3 Hours.
PR: Limited to graduate students who are seeking certification for teaching art. Introduction to objectives, procedures, resources, and activities related to art education for the culturally responsive and creative elementary arts educator. Emphasis on content knowledge and student growth and achievement connected to self-motivation, emotional wellbeing and active engagement. Limited to students enrolled in art education majors, or consent of school. Online lectures and activities.

ART 565. Art Ed Elementary. 3 Hours.
Emphasizes child-centered, visual culture arts education at the elementary level. Concentrates on choice-based arts curriculum development. Course content is based on WV, ISTE, and national core arts standards.

ART 566. Art Education: Secondary. 3 Hours.
PR: ART 564. Forms a foundation for using arts as an active process for learning at the secondary school level. Offers experiential and theoretical tools for understanding creativity and critical thinking in arts education, beginning with critical theory, visual culture, and individual pre-service teachers' art studio practice. Pedagogical approaches include an introduction to social justice issues and an anti-bias education.

ART 567. Technology Methods in Art Education. 3 Hours.
PR: Any graduate art or education major. Examines multiple aspects of classroom technologies used in art and design education. The course combines hands-on computer techniques, critical analysis of digital art and practical experiences in the K-12 classroom and focuses on the integration and teaching of new and emerging technologies within elementary and secondary school classrooms.

ART 580. Art and Environment. 3 Hours.
PR: Registered graduate student. Interdisciplinary studio/seminar course investigating art's relationship to the environment through readings, field trips, presentations, and studio practice.

ART 590. Teaching Practicum/Professional Practice. 1-3 Hours.
PR: Consent. This course is designed to develop aspects of college teaching experience such as writing a syllabus, organizing a classroom, or improvising with materials or topical issues. Preparation for establishing professional practice as a studio artist will be addressed.

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

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

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

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

ART 595. Independent Study: Graduate Studio. 1-9 Hours.
PR: Consent. (May be repeated for credit.) Intensive, self-directed research involving special projects in studio production. Areas of study include, but are not limited to painting, drawing, intermedia, printmaking, sculpture, ceramics, and design.

ART 600. Graduate Exhibition and Thesis. 3-6 Hours.
PR: Consent. (May be repeated for credit.) Research will be directed towards the production of a solo exhibition and a written thesis which documents the processes and philosophical principles of the artwork.

ART 602. Master's in Art Education Project. 3-9 Hours.
PR: Consent. This course is designed to develop the master's project in art education. The in-depth project must be approved by the advising committee.

ART 603S. Thesis: Concept & Research. 3 Hours.
PR: (ART 502 or ART 502S) and ART 503 and (ART 505 or ART 505S). Develop the thesis game concept based on game industry, player experience, and artistic intention. Involves research of the digital games industry, identification of a design opportunity, development of a research question, systematic investigation, and formation of a game conceptual design in response to research conclusions.

ART 604S. Thesis: Design & Project Plan. 3 Hours.
PR: ART 603 or ART 603S. Design game and create the game design document, develop and document a detailed project plan to produce the game using original concept document and applying project management techniques. Define production team needs.

ART 606S. Thesis: Project Launch. 3 Hours.
PR: ART 604 or ART 604S. Begin thesis game production to create a functional game. Execute game development project plan to build a playable digital game. In order to complete the course, the game must receive faculty approval and be presented in demo format at a game conference.

ART 607S. Thesis: Production. 6 Hours.
PR: ART 606 or ART 606S. Complete thesis game and present for MA defense and professional conference. In order to complete the course, the game must receive faculty approval and be presented in demo format at a game conference.

ART 608. Game Design Residency. 1 Hour.
PR: Acceptance into the MA in Game Design program. Four-day all day on-campus annual game design conference; an online course frames and organizes the experience. Includes program orientation and on-boarding presentations for students newly accepted into the program, work-in-progress presentations by peers, and capstone project defense presentations by graduating students. Guest lecturers and game design competitions are included in residency activities.

ART 610. Introduction to Visual Arts Therapy. 3 Hours.
PR: Must have a bachelors degree in art, counseling, psychology, education, or special education. Introduces students to basic principles and practices of visual arts therapy through historical background, theoretical frameworks, and in-field issues. Provides information on pioneers in the field, how and where art therapists practice, training required for the profession, as well as interactive art explorations to incorporate art therapy principles into their own teaching and/or artistic practice. Online lectures and discussion.

ART 611. Theory of Art Education & Art Therapy. 3 Hours.
PR: Graduate standing. Introduces students to the historical, theoretical and philosophical foundations of visual arts therapy. Provides students with an overall understanding of how visual arts therapy relates to practice in art education. Specific theories relating to creativity development and visual literacy are explored.

ART 612. Art Methods/Materials for Special Populations. 3 Hours.
PR: ART 611. Provides students with in-depth understanding of art methods and materials used in artistic development of children, adolescents and adults, while using creative process of art making to enhance the physical, mental and emotional well being of individuals of all ages. Research, assigned readings, online discussions, and hands-on projects and critiques. On-campus art-making seminar is required.

ART 613. Art Assessments and Evaluations with Special Populations. 3 Hours.
PR: ART 611. Explores the assessment and evaluative practices of techniques, tools and concepts used in Visual Arts Therapy projects. Course consists of research, assigned readings, online discussions, written essays and visual explorations. A one day off-campus practicum is required.

ART 614S. Graduate Painting. 1-15 Hours.
PR: Consent. Encompasses the significant issues and developments of contemporary painting, including visual resources, critical and pictorial structures, and technical proficiency to establish a coherent aesthetic vision in the medium. (May be repeated for credit).

ART 620. Advanced Problems in Art Making. 3 Hours.
PR: ART 611 and ART 612 or students who have completed an MFA or an MA in Art Studio may waive this course per the consent of the instructor. Provides students with an in-depth understanding of advanced studio art experiences and practices used to enhance learning outcomes for students with physical, emotional or social disabilities. Students will teach individual lessons to a select population using the modified lesson plan developed in this course. On-campus seminar and off-campus practicum is required.

ART 623S. Graduate Graphic Design. 1-15 Hours.
PR: Consent. Integration of current and historic resources leading to the development of design projects while working within the independent and existing courses. Areas of special interest include the book arts and electronic multimedia. (May be repeated for credit.).

ART 624S. Graduate Graphic Design/Professional Practice. 1-6 Hours.
PR: Consent. Students assist and work on projects in a model studio setting, helping to coordinate and manage communication with clients, printers, and undergraduate students in graphic design studio. (May be repeated for credit.).

ART 626S. Graduate Sculpture. 1-15 Hours.
PR: Consent. Encompasses the significant issues and developments of contemporary three-dimensional form, including visual resources, critical theory, historic foundations and technical proficiency to establish a coherent comprehension of the media. (May be repeated for credit.).

ART 630S. Graduate Printmaking. 1-15 Hours.
PR: Consent. Encompasses the germane aspects of contemporary printmaking including visual resources, theoretical and historic structures, and comprehension technical processes, designed to establish a rigorous comprehension of the medium. Areas of specialization include lithography, intaglio, relief, serigraphy, and electronic media. (May be repeated for credit).

ART 632S. Graduate Photography. 1-15 Hours.
PR: Consent. Engages the essential issues and developments of contemporary photography, from traditional to digital photo processes, theoretical and pictorial foundations, and technical proficiency designed to afford a coherent aesthetic vision in the medium. (May be repeated for credit).

ART 634S. Alternative Media. 1-15 Hours.
PR: Consent. Engages the primary issues and developments of alternative and interdisciplinary media such as installation, video, performance art, or other media along with the critical foundation and technical proficiency to establish a comprehensive utilization of chosen forms. (May be repeated for credit.).

ART 640S. Graduate Ceramics. 1-15 Hours.
PR: Consent. Involves the essential concerns and developments of contemporary ceramics, including traditional and current practices. Emphasis is on technical processes designed to provide a rigorous comprehension and expression in clay. Area of specialization include both functional and sculptural ceramics. (May be repeated for credit.).

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

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

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

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

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

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

ART 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.

ART 697. 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.).

ART 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.).

ART 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 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.

ART 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.

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 667. 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 670. 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 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 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).

AT 511. Managing Athletic Medical Trauma. 2 Hours.
Provides a comprehensive approach to the identification of risk factors, preparation of emergency action plans, and recognition and care of emergency medical conditions including those that may lead to sudden death.

AT 512. Foundations of Professional Practice. 1 Hour.
An introduction to clinical decision making through an exploration of evidence-based practice frameworks, a team approach to healthcare, legal and ethical considerations, primacy of the patient, effective communication and concepts of professionalism and cultural competence.

AT 513. Foundations of Athletic Training. 5 Hours.
Foundational athletic training skills necessary for active participation in patient care and introduction to clinical decision making through exploring evidence-based practice frameworks, team approach to healthcare, legal and ethical considerations, primacy of the patient, effective communication and concepts of professionalism and cultural competence. Introduction to patient history and physical examination, skill development, pre-participation physical examinations, injury prevention concepts, and documentation.

AT 520. Musculoskeletal Assessment & Diagnosis 1. 3 Hours.
A comprehensive approach to the assessment and diagnosis of lower extremity, lumbar spine musculoskeletal injuries including the identification of risk factors, the role of clinical outcome measures, and appropriate referral decisions.

AT 521. Musculoskeletal Assessment & Diagnosis 2. 3 Hours.
A comprehensive approach to the assessment and diagnosis of upper extremity, cervical spine, thoracic spine musculoskeletal injuries including the identification of risk factors, the role of clinical outcome measures, and appropriate referral decisions.

AT 522. Clinical Decision Making 1. 2 Hours.
Instruction of the standard techniques and procedures for the evaluation and diagnosis of musculoskeletal injuries and common illnesses.

AT 523. Evidence Based Practice 1. 2 Hours.
Concepts of evidence-based practice as it relates specifically to musculoskeletal assessment and diagnosis with a primary focus on clinician-and patient-oriented outcome measures and appropriate referral decisions. Students will explore primary literature focused on clinical questions related to a comprehensive approach to injury evaluation.

AT 524. Pediatric Sports Medicine Clinical Rotation. 3 Hours.
This clinical education rotation focuses on the health care needs of pediatric/adolescent athletes. This 14-week rotation is completed concurrently with other weekly courses required in the first professional year of study. Students will engage in an inter-professional sports medicine team providing care to competitive high school athletes in the state of West Virginia.

AT 530. Therapeutic Interventions 1. 3 Hours.
Designing therapeutic interventions for patients with physical dysfunctions that stem from inflammation, pain, and limited movement patterns. The primary focus is on the use of therapeutic modalities, pharmacotherapy, and manual therapy techniques.

AT 531. Therapeutic Interventions 2. 3 Hours.
Designing therapeutic interventions and corrective exercise plans for patients with physical dysfunctions and limitations associated with orthopedic injuries, pathological movement patterns, and post-operative rehabilitation.

AT 532. Clinical Decision Making 2. 2 Hours.
Assessment of patient status using clinician-and patient-oriented outcome measures. Based on this assessment and with consideration of the stage of healing and goals, students will design and implement comprehensive therapeutic interventions to maximize the patient's participation and health-related quality of life.

AT 533. Evidence Based Practice 2. 1 Hour.
Concepts of evidence-based practice as it relates specifically to therapeutic interventions with a primary focus on clinician-and patient-oriented outcome measures. Students will explore primary literature focused on clinical questions related to the design, implementation, and modification of therapeutic interventions and outcome measures.

AT 534. Collegiate Sports Medicine Clinical Rotation. 3 Hours.
This clinical education rotation focuses on the health care needs of collegiate athletes. This 14-week rotation is completed concurrently with other weekly courses required in the first professional year of study. Students will engage in an inter-professional sports medicine team providing care to competitive collegiate athletes in the state of West Virginia.

AT 593. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

AT 595. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.

AT 610. General Medical Conditions. 3 Hours.
Explores the physical, mental, and social health problems seen in the physically active individual, emphasizing the recognition of signs, symptoms, and predisposing conditions related to the specific illness or disease and its recommended treatment. Students will learn how to evaluate common non-orthopedic conditions present in physically active patients across the lifespan.

AT 611. Pathophysiology. 2 Hours.
In-depth exploration of altered structural and physiological adaptation processes and how they apply to assessment and treatment of disease and injury with an emphasis on conditions encountered in sports medicine and health care.

AT 613. Sports Medicine Clinical Rotation 1. 2 Hours.
The first of three full-time clinical education experiences. This 4-week, full-time clinical immersion rotation provides the athletic training student the opportunity to gain experience in a specific area of clinical practice. The course is designed to facilitate synthesis and the integration of knowledge, skills, and clinical decision-making into patient care.

AT 620. Healthcare Administration in Athletic Training. 2 Hours.
Business management principles associated with athletic training clinical practice as well as leadership and professional development.

AT 621. Advanced Neuromuscular Concepts. 2 Hours.
Provides an in-depth exploration and application of the biomechanics and neuromuscular concepts of therapeutic interventions and corrective exercise plans for patients across the lifespan.

AT 622. Optimizing Athletic Performance. 2 Hours.
Explores the concepts of assessing, designing, and implementing specialize performance programs to address the health and performance goals of the athletes. The primary focus is on movement instruction, energy systems, and program design.

AT 623. Sports Medicine Clinical Rotation 2. 9 Hours.
The second of three full-time clinical education experiences. This 18-week, full-time clinical immersion rotation provides the athletic training student the opportunity to gain experience in a specific area of clinical practice. The course is designed to facilitate synthesis and the integration of knowledge, skills, and clinical decision-making into patient care.

AT 629. Professional Practice in Athletic Training 1. 1 Hour.
Serves as a formal venue for IPE attendance credit, understanding of interprofessional education and professional development activities.

AT 630. Professional Practice in Athletic Training 2. 1 Hour.
Serves as a formal review for the national Board of Certification, Inc. examination for certification as an athletic trainer.

AT 631. Clinical Topics in Sports Medicine. 2 Hours.
A comprehensive approach to advanced orthopedic concepts associated with physically active individuals across the lifespan. The focus will be on surgical techniques, radiological concepts and interpretation, and advanced treatment procedures used in diverse orthopedic settings.

AT 632. Evidence Based Practice 2. 2 Hours.
Synthesizes the concepts of evidence-based practice as it relates to clinical practice. Students will collect and analyze actual clinician-and patient-oriented outcomes generated in the context of their own clinical practice in order to improve patient care.

AT 633. Sports Medicine Clinical Rotation 3. 8 Hours.
The third of three full-time clinical education experiences. This 16-week, full-time clinical immersion rotation provides the athletic training student the opportunity to gain experience in a specific area of clinical practice. The course is designed to facilitate synthesis and the integration of knowledge, skills, and clinical decision-making into patient care.

AT 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

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

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

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

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

ATTR 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.).

ATTR 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.

BADM 503. Accounting Essentials. 3 Hours.
The course covers theory and practice with respect to accounting for liabilities and stockholder's equity; special problems peculiar to financial accounting; analysis of financial statements and changes in financial position; use of financial and managerial accounting concepts and techniques in planning, decision making, and controlling operations.

BADM 504. Economic Essentials. 3 Hours.
In this course in economics we use the “economic way of thinking” to help us understand how human systems of producing and distributing goods and services behave at the individual and aggregate levels. While much of the course involves the development of a theoretical underpinning to understand economic behavior, a significant portion is devoted to “real world” applications.

BADM 523. Decision Analysis. 3 Hours.
PR: Good standing in the MBA program. The central theme of the course is decision analysis through model-building and solving these decision models by utilizing certain tools in spreadsheets. Students will review real-world problems, formulate them in mathematical terms, and solve them through software tools.

BADM 525. Marketing Management. 3 Hours.
PR: Good standing in the MBA program. This is a case based course and provides an overview of the marketing discipline, focusing on managerial decision-making in marketing. It covers marketing decisions on strategy, marketing intelligence, consumer behavior, segmentation, branding, pricing, distribution, promotions, and ethics. The course reviews how marketing management works and how a marketing program should be developed and managed.

BADM 531. Supply Chain Design and Innovation. 3 Hours.
PR: Good standing in the MBA program. Successful and innovative companies show us that supply chain excellence allows a company to gain a competitive advantage. Visionary acumen and game-changing products can lead to market capitalization. Success depends as much on supply chain design as it does on innovative products. The role, foundational aspects, and integration of supply chain are critical components of managers or entrepreneur's education.

BADM 535. Organizational Behavior. 3 Hours.
PR: Good standing in the MBA program and consent from the program director and course instructor. Focus on understanding human behavior, primarily in an organizational context, with the applied purpose of helping the student to become a more effective manager, leader, team member, and organizational member. Examination of basic theories of human behavior and individual differences as a foundation for a study of the process of energizing and directing behavior (of both self and others).

BADM 536. Leading with Ethics. 3 Hours.
PR: Good standing in the MBA program. This course provides different perspectives and approaches to leadership practice. A central theme of the course will be going beyond traditional leadership practices to examine empowering and ethical leadership approaches and contemporary leadership challenges. The overall objective of this course is to increase students' understanding of and ability to apply contemporary ethical leadership knowledge in work situations.

BADM 551. Global Planning and Strategy. 3 Hours.
PR: Good standing in the MBA program and consent from the program director and course instructor. Explores the various strategic options available to companies in order to compete in the global marketplace and places emphasis on vision/mission identification and objective setting, business creation, global strategic development, business plan creation, venture capital financing, conducting operations, doing so successfully in face of competition from other firms, all in an effort to earn a profit for its shareholders.

BADM 555. Financial Management. 3 Hours.
PR: Good standing in the MBA program. In this course, we will examine the capital decisions of the firm. The foundation for corporate decisions is formed through principles of microeconomic theory, using the accounting principles underlying financial statements to organize information. The analysis includes a consideration of financial markets, intertemporal comparisons of opportunities, and the elements of the decision-making criteria for the financial manager.

BADM 556. Data Analytics for Management. 3 Hours.
PR: Good standing in the MBA Program. This course will examine critical aspects of Data Analytics for Management, allowing the student to inform and evaluate organizational decision making. The core components include obtaining a high-level overview of the topics of Business Intelligence, Data Collection, Data Management and Inquiry, Business Statistics, Data Modeling, Decision Science and Analytics, Simulation Modeling and Data Visualization.

BADM 557. Experiential 1. 3 Hours.
PR: Good standing in the MBA Program. The two-course cluster provides experiential learning opportunities through which students can develop and sharpen their professional skills. This is accomplished through consultative and advisory projects involving external clientele. Through client-based projects, students engage in teamwork, professional communication, and the direct application of academic knowledge, all of which is grounded in the reality of a bona fide organizational need.

BADM 558. Experiential 2. 3 Hours.
PR: Acceptance to the MBA program and BADM 557. The bulk of this course will be hands-on practical work experience with the internship employer and reports of progress to the internship coordinator. This course provides the MBA candidate with an opportunity to gain professional experience and complement the overall MBA curriculum with a real-world hand on experience.

BADM 571. Professional Development Practicum 1. 1 Hour.
PR: Acceptance to the MBA program. The course offers practicum experiences that provide professional and career development opportunities. The course is designed to build career management skill sets that will assist the student not only in obtaining a professional position upon graduation, but will be utilized throughout the evolution of his/her career. This course is a one credit hour course in a three-course sequence.

BADM 572. Professional Development Practicum 2. 1 Hour.
The course offers additional practicum experiences that provide professional and career development opportunities that are designed to build career management skills that will assist the student in obtaining a professional position and be utilized throughout the student's career. Particular emphasis is placed on resume refinement and interviewing and networking skill development. This is the second course in a three-course sequence.

BADM 573. Professional Development Practicum 3. 1 Hour.
This is the third course in a three-course sequence. The course offers additional practicum experiences that provide professional and career development opportunities that are designed to build career management skills that will assist the student in obtaining a professional position and be utilized throughout the student's career. Particular emphasis is placed on resume refinement and interviewing and networking skill development.

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

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

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

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

BADM 611. Management Information Systems. 3 Hours.
PR: Good standing in the MBA program. This course focuses on the managerial aspects of information systems for business development. The student is expected to learn, think and act as an executive level manager in understanding and assessing the use of information systems to promote success in organizations. The student will also learn how to assess emerging, new technologies from business management perspectives.

BADM 612. Managerial and Team Skills. 3 Hours.
PR: Good standing in the OMBA program. This course introduces, develops, and enhances managerial skills for complex organizations. The class will explore managerial philosophies, one's own managerial style, and the dynamics of working in groups and teams.

BADM 614. Health Services Management. 3 Hours.
This course offers students an introduction to environmental issues, organizational structures, and financial control mechanisms that affect the healthcare management process.

BADM 618. Macroeconomics and Managerial Economics. 3 Hours.
This course examines factors that affect firms' profitability in two theoretical framework analyses: microeconomic and macroeconomic. In the first half of the semester we use Managerial Economics to analyze factors and types of products. In the second half of the semester we use Macroeconomics to analyze factors that belong to the macroeconomic framework.

BADM 621. Business Research. 3 Hours.
Develops skills in data- driven, fact-based decision making; develops the ability to critically evaluate research proposals and studies which rely on business research; provides a basic understanding of reading and conducting empirical research.

BADM 622. Financial Statements Analysis. 3 Hours.
Provides an overview of the current financial reporting process. Includes discussion of the respective reporting vehicles, financial statements, and the alternatives available which affect the reporting process.

BADM 623. Strategy. 3 Hours.
Considers the relationship between the individual firm and the forces of the global economy; market research and strategy. Provides analytical tools and frameworks used for identifying and analyzing key strategic issues facing firms today.

BADM 626. Health Economics. 4 Hours.
The context of health care; the use of economic methods to understand the organization of the industry and the behaviors of its participants (consumers, producers, and regulators.).

BADM 630. Corporate Leadership. 3 Hours.
Corporate leadership emphasizes the ethical, legal, and managerial perspectives of leadership in the corporate workforce. Strategy and decision making will be integrated into developing understanding short-term and long-term and implications of policy.

BADM 633. Leadership. 3 Hours.
Topics include leadership concepts and practices designed to motivate and support an organization's workforce. Students discuss principles of leadership and explore how these principles affect traditional human resource management topics.

BADM 637. Organizational Processes and Medical Ethics. 4 Hours.
Behavioral and ethical issues confronted in health service organizations. Explores the changing organizational landscapes, group and team processes, organizational and medical ethics, and organizational change.

BADM 641. Decision Analysis for Executives. 3 Hours.
Applied mathematical course in solving business problems and decision making issues from a general managerial perspective with particular emphasis on the operations management area of the organization.

BADM 644. Legal Environment and Ethics. 3 Hours.
An overview of the legal system and the legal and ethical issues relevant to business decision-making, planning, and the interface between business, government, and society.

BADM 646. Management Science and Health Services. 3 Hours.
A quantitative course utilizing and building upon applied mathematical skills in solving managerial business problems and decision-making situations in a health service environment.

BADM 647. Market Strategies and Health Services. 3 Hours.
The application of marketing concepts to problems in health services management. Uses a computer simulation requiring sound creation, analysis, and implementation of marketing plans with a strong emphasis on thinking and analytical skills.

BADM 650. Global Trade and Supply Chain. 3 Hours.
Global trade and supply chain emphasizes the integration of global logistical systems in the operation of transportation, inventory, warehousing, facility location choice, customer service, and exchanges of information. Analysis of the legal, ethical, and cultural factors of trade.

BADM 652. Marketing Strategy. 3 Hours.
This is a case based course and provides an overview of the marketing discipline, focusing on managerial decision-making in marketing. We'll review how marketing management works. Primary emphasis is places on developing an understanding of central marketing concepts and applying them to real world problems.

BADM 653. Integrated Global Business. 3 Hours.
Explores the various strategic planning options available to companies in order to compete in the global marketplace.

BADM 655. Health Services Strategy. 3 Hours.
Course on strategic management and planning with a focus on the formulation, implementation, and evaluation of strategic decisions in health care organizations.

BADM 656. Law and Medicine. 2 Hours.
An overview of general principles of law applicable to the delivery of financing in health care and an analysis of specific applications to those principles.

BADM 657. Seminar: Not-for-Profit Issues. 3 Hours.
Advanced topics seminar covering up-to-date issues in the not-for-profit sectors of health services.

BADM 658. Communication & Public Relations for Executives. 3 Hours.
The course provides a study of public relations, reputation management and communication. The course includes an introduction to communication strategy, function and performance. Students will be introduced to the principles of executive and personal branding; media relations; community relations; multicultural and multigenerational communication; integrated marketing communication; crisis communication; social media; and how organizations manage relationships with important audiences.

BADM 661. Executive Project 1. 1 Hour.
This course provides an opportunity to develop and demonstrate project management skills through the preparation and presentation of a feasibility study of a proposed project/business implementation plan.

BADM 662. Executive Project 2. 2 Hours.
This course provides an opportunity to develop and demonstrate project management skills through the preparation and presentation of a full and complete project/business implementation plan.

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

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

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

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

BADM 700. Statistics Bootcamp. 3 Hours.
This bootcamp explores basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression and correlation.

BADM 701. Research Methods 1 - Introduction to Regression. 3 Hours.
This course reviews the most frequently used statistics concepts, discuss the quest for causality and good data practices, and introduces the Ordinary Least Squares (OLS) regression frameworks. Students will use SPSS/R to analyze data.

BADM 702. Research Methods 2 - Cross Section Data Analysis. 3 Hours.
This course introduces estimation and hypothesis testing in the multivariate Ordinary Least Squares (OLS) regression, dummy variables, transforming variables, regression discontinuity and discuss using experiments to deal with real-world challenges. Students will use SPSS/R to analyze data.

BADM 703. Research Methods 3 - Experimental Methods. 3 Hours.
Experimental methods are a useful tool set to engage in decision-making analysis using a controlled and causally identifying framework. This course will address different experimental techniques helpful in analyzing decision-making in a business setting with human subjects. Students will learn about survey instrument development, experimental design, randomization, and proper administration evaluation of these methods.

BADM 704. Research Methods 4 - Causal Inference. 3 Hours.
Course covers the theory and application of modern causal inference methods and emphasizes application of these methods using the R statistical package and analysis of actual economic data.

BADM 705. Research Methods 5 - Non Cross Section Data Analysis. 3 Hours.
This course introduces dummy dependent variables, time series, advanced topics in Ordinary Least Squares (OLS) regression, and advanced panel data. We will also discuss how to write an empirical paper and how to be an econometric realist as a conclusion for the DBA research method sequences. Students will use SPSS/R to analyze data.

BADM 706. Ethics, Diversity, and Inclusion for Business. 3 Hours.
PR: BADM 700 with a minimum grade of B-. This course offers an overview of ethics, diversity, and inclusion as they relate to business. First, the course examines questions relating to the social responsibility of business. Next, the course looks at the role of diversity in the firm, paying attention to the benefits as well as the potential drawbacks of diversity.

BADM 707. Business Pedagogy. 3 Hours.
PR: BADM 700 with a minimum grade of B-. The focus of the business pedagogy course is learning and teaching theory, its application in practice for teaching, innovation in teaching and linkages to creating pedagogical research. This includes planning, developing, and accessing learning for diverse student cohorts in line with subject specialization.

BADM 710. Introduction to Accounting Research. 3 Hours.
This research seminar is designed to provide doctoral students a broad introduction to accounting research, providing students with a foundational understanding of the field of study and of the standards and methods of the discipline for doing accounting research.

BADM 711. Behavioral Accounting Research. 3 Hours.
This research seminar reviews published research, major theories, research methods, research design and statistical tools relevant to behavioral (experimental and survey) accounting research.

BADM 713. Introduction to Applied Professional Accounting Research. 3 Hours.
This research seminar introduces students to publishing applied accounting research as distinct from academic research.

BADM 714. Advanced Professional Accounting Research. 3 Hours.
This course is designed to provide doctoral students a broad introduction to key management, organizational, and behavioral research issues, and challenges in topics of accounting information systems (AIS). The objective is to provide a foundational understanding of the field of study and of the standards and methods of the discipline for doing research.

BADM 715. Accounting Academic Research Intensive. 3 Hours.
This research seminar introduces students to publishing accounting academic research in high quality publication outlets, reviewing published research, research methods, research design and statistical tools.

BADM 716. Advanced Academic Accounting Research. 3 Hours.
This research seminar examines high quality academic accounting research by focusing on one or more accounting areas, such as auditing, data (accounting) analytics, financial, forensics, information systems, managerial, tax.

BADM 721. Public Finance. 3 Hours.
The objective of this course is for students to gain familiarity with topics in national, state, and local public sector expenditures and tax policies. This course explores issues related to the design and implementation of policies and programs, as well as views regarding the purpose of government and criteria for evaluating regulatory action.

BADM 722. Labor Economics. 3 Hours.
This course will analyze various labor market phenomena and problems using the tools of economic analysis. Wherever applicable the implications for public policy will be discussed in detail.

BADM 723. Public Choice. 3 Hours.
This course will focus on the way that individual preferences are aggregated into public sector policies through the political process. A general framework within which public sector policies and decisions can be evaluated is presented. Public choice is a dynamic field of economics that analyzes how individuals and groups interact in the realm of collective decision-making.

BADM 724. Regional Economics. 3 Hours.
The course will provide an in-depth exploration of the theories, methods, and empirical applications in the field of regional economics. This course is designed to provide doctoral students with a comprehensive understanding of the economic dynamics within and across regions, enabling them to conduct original research and contribute to the advancement of regional economic theory and policy.

BADM 730. Foundations of Organizational Behavior. 3 Hours.
Numerous leadership studies continue are published each year; the rate of publication seems to be increasing. Does leadership really make a difference? Have leadership researchers been able to develop clear theory that is empirically supported? Has leadership research yielded any general perspectives that can be applied to practice? This seminar is designed to provide insight and understanding about these issues.

BADM 731. Foundations of Strategy and International Business. 3 Hours.
This course provides a survey of the field of strategic management. The emphasis is on exploring concepts, theory, and empirical research to develop foundational knowledge in several key topical areas.

BADM 732. Management of Groups and Teams. 3 Hours.
This course provides a survey of organizational behavior research on groups and teams. Organizations have increasingly embraced teamwork as a way to structure, organize, and complete work tasks. We examine the empirical research to discover the promises and perils of groups and teams in organizational settings.

BADM 733. Advanced Topics in Strategy and Entrepreneurship. 3 Hours.
This advanced seminar aims to cultivate the next generation of management scholars by equipping doctoral students with a comprehensive understanding of seminal and contemporary theories in management research. Designed to foster quality academic research that advances the field of management, the course offers a deep dive into mainstream theories and their empirical applications.

BADM 741. Interfirm Relationships. 3 Hours.
This seminar involves the study of theory and empirical research as it relates to business-to-business marketing, channels of distribution, and interfirm relationships.

BADM 742. Marketing Management. 3 Hours.
This seminar is designed to introduce students to research topics on branding, pricing, promotion, distributions channels and new product development.

BADM 743. Consumer Behavior. 3 Hours.
This seminar is designed to introduce students to research topics on consumer behavior, decision making, and other psychological aspects such as attitude and emotions.

BADM 744. Marketing Strategy. 3 Hours.
This seminar is designed to introduce students to research topics on marketing strategy, international marketing and public policy in marketing.

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

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

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

BADM 900. Professional Development. 1-6 Hours.
Course provides 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 satisfactory or unsatisfactory grading scale and do not apply as graduate credit toward a degree program.

BADM 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). The continuing education courses are graded on a satisfactory or unsatisfactory grading scale and do not apply as graduate credit toward a degree program.

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 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.).

BIOC 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

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

BIOC 690. Teaching Practicum. 1-3 Hours.
PR: Consent of chairperson. Supervised practice in college teaching of biochemistry. (Graded as S/U.).

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

BIOC 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.).

BIOC 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.

BIOC 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 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.

BIOC 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of biochemistry. 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.).

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

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

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

BIOC 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.

BIOC 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 536. Comparative Animal Physiology. 3 Hours.
Exploration of physiological systems and underlying molecular mechanisms animals use to survive and cope with diverse environments. Analysis of major physiological processes, using a comparative approach, to understand how major organ systems work, maintain homeostatic balance, and provide adaptative advantages.

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 674. Neurogenetics and Behavior. 3 Hours.
PR: Consent. Overview of how researchers study complex human neurological disorders at the cellular, molecular, and behavioral levels using animal models and cutting edge basic research methods.

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 that 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 exams 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.

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

BIOS 501. Applied Biostatistics 1. 3 Hours.
Introduces parametric and nonparametric statistical methodology, including descriptive measures, elementary probability, estimation, hypothesis testing, confidence intervals, common nonparametric methods, and base contingency table analysis. Empirically demonstrates underlying theory. This course also introduces students to the use of statistical software to perform basic analyses.

BIOS 502. Applied Biostatistics Lab. 1 Hour.
PR or CONC: BIOS 501. This course, taken concurrently with BIOS 501, introduces students to the use of statistical software (e.g. Excel, R) to perform basic analyses.

BIOS 503. Applied Biostatistics 2. 3 Hours.
PR: BIOS 501 or BIOS 610. Addresses estimation and hypothesis testing within the context of the generalized linear model. Examines multiple linear regression, logistic regression, survival analysis, and select advanced techniques. Emphasis on applied data analysis of health care studies.

BIOS 604. Applied Biostatistics 3. 3 Hours.
PR: BIOS 503 or BIOS 610. Focus on advanced methodological tools important in public health contexts. Topics include structural equation models and hierarchical linear models (mixed models, random-effect models), categorical methods, survival analysis and clinical trials.

BIOS 605. Applied Biostatistics Capstone. 2 Hours.
PR: BIOS 601 and BIOS 602 and BIOS 603 and BIOS 604 and consent. Students will work on a dedicated data analysis stemming from their own research or the work of others, culminating in a final research paper.

BIOS 610. Biostatistical Methods and Inference. 3 Hours.
PR or CONC: BIOS 611 or permission of instructor. This course provides an accelerated overview of biostatistical methods including bivariate methods and statistical modeling strategies. These concepts include probability distributions, hypothesis testing, descriptive statistics, statistical tests, and statistical modeling strategies. Both unadjusted and adjusted modeling strategies are discussed. Some theory concepts are introduced. Methods are taught in SAS and/or R.

BIOS 611. Data Management and Reporting. 3 Hours.
Introduction to statistical software for data management and analysis. Focus is on SAS and R for data management and analysis.

BIOS 612. Biostatistical Theory. 3 Hours.
PR: BIOS 610 and BIOS 611 or permission of instructor. Build on concepts from BIOS 610 by further describing the theory underlying statistical methods including probability distributions, maximum likelihood, variance estimation, hypothesis testing, simulation studies, and related concepts. Theory concepts build on calculus knowledge. Bayesian and frequentist methods will be discussed in addition to multivariate models and multilevel modeling.

BIOS 620. Applied Linear Models HS. 3 Hours.
PR: BIOS 610 and BIOS 611 or permission of instructor. This course will teach the theory and practice of regression analysis. This includes but not limited to estimation, testing, confidence procedures, the geometry of least squares, regression diagnostics and plots, modeling, model selection, polynomial regression, and collinearity.

BIOS 621. Categorical Data Analysis HS. 3 Hours.
PR: (BIOS 603 or BIOS 610) and BIOS 611. Introduction to the analysis of categorized data with a Health Sciences. Discuss relative risk and odds ratio, Mantel-Haenszel methods, logistic regression, Poisson regression, and other models for categorical data.

BIOS 622. Analysis of Time-to-Event Data. 3 Hours.
PR: BIOS 610 and BIOS 611. Introduction to modern methods for the analysis of time-to-event data (eg. survival, cessation, and recidivism). Theory and application are emphasized; covering survival functions, hazard rates, inference, regression, model construction, stratification, time-dependent covariates, and clinical trials.

BIOS 623. Biostatistical Consulting. 3 Hours.
PR: (BIOS 610 and BIOS 611) or permission of instructor. Focuses on the responsibilities of the biostatistician as a consultant/research collaborator. Discussion topics include interpersonal communication, ethics, time management, presentation of statistics, and other issues.

BIOS 628. Biostatistics Practicum. 3 Hours.
PR: Consent. Students will work in a collaborative setting for a minimum of 180 hours, applying sophisticated biostatistical principles and skills learned in classes to address research questions that arise in that setting.

BIOS 629. Application of Biostatistics to Public Health Data. 2 Hours.
Students will develop research question(s) pertaining to an available public health related data set, determine the public health relevance of that question, plan analyses and implement that plan, and determine public health impact of analysis results. Students will gain practical experience integrating biostatistics concepts within a public health issue.

BIOS 660. Applied Bioinformatics 1. 3 Hours.
PR: BIOS 610 and BIOS 611. Foundational methodological tools for analyzing molecular and population genetics are discussed in detail including methods for modeling genetic inheritance, linkage analysis, genetic association studies, family designs, SNPs analysis, gene interactions, and genome wide association studies.

BIOS 661. Applied Bioinformatics 2. 3 Hours.
PR: BIOS 612 and BIOS 660. The course will cover the fundamental methods that have been successfully applied in bioinformatics, such as supervised learning, unsupervised learning and multiple testing. Students will learn relevant programming languages and software.

BIOS 662. Statistics in Clinical Trials. 3 Hours.
PR: BIOS 610 and BIOS 611. Introduces concepts relevant to the design and analysis of clinical trials. Topics covered include protocol development, quality control, ethical considerations, adherence, randomization, power analysis, and interim analysis.

BIOS 663. Introduction to Meta-Analysis. 3 Hours.
An introduction to the quantitative analysis (meta- analysis) of data from systematic reviews, including (1) effect size and precision, (2) fixed versus random- effects models, (3) heterogeneity, (4) complex data structures, and (5) bias.

BIOS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of biostatistics. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given collges teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

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

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

BIOS 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.

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

BIOS 698. Thesis. 1-6 Hours.
PR: Consent. This is an optional course for programs that believe that this level of control and supervision is needed during the writing of student's reports, theses, or dissertations.

BIOS 700. Foundations of Modern Statistical Inference. 3 Hours.
PR: Consent. The foundations and application of advanced statistical theory used in the field of biostatistics will be presented, including likelihood theory with related estimation, asymptotic and inferential theory, and theoretical and computational procedures for missing data.

BIOS 701. Modern Statistical Inference. 3 Hours.
PR: BIOS 700 or Consent. Advanced statistical theory for biostatistics will be presented, including estimation theory, semi-parametric theory, asymptotic and inferential theory, and algorithmically based estimators and inference.

BIOS 720. Theory and Application of Linear Models. 4 Hours.
PR: BIOS 700 or Consent. This is a theoretical course in linear models for continuous responses and their applications. Topics include matrix theory, the multivariate normal distribution, multivariate quadratic forms, estimability, reparameterization, linear restrictions, estimation theory, weighted least squares, multivariate tests of linear hypotheses, multiple comparisons, confidence regions, and missing data.

BIOS 721. Advanced Categorical Data Analysis for Health Sciences. 4 Hours.
PR: BIOS 700 or consent. This course offers an advanced examination of statistical theory and application of methods for models with categorical response data; concepts include likelihood theory and application, general linear models theory and application, estimating equations and contingency table methods.

BIOS 740. Advanced Longitudinal Data Analysis. 3 Hours.
PR: BIOS 720 or consent. This course gives an advanced understanding and approach to the analysis of longitudinal data; concepts include linear mixed effects models, generalized linear models for correlated data (including generalized estimating equations), computational issues and methods for fitting models, and dropout or other missing data. Knowledge of an appropriate software package and basic matrix algebra is assumed.

BIOS 745. Advanced Application of Linear Models. 1 Hour.
PR or CONC: STAT 645 or Consent. This course offers an understanding of advanced linear models as utilized in practice. Application of linear models across a range of research areas will be emphasized, covering computational techniques, practical issues that arise in utilizing linear models, and interpretation of results.

BIOS 764. Bayesian Biostatistics. 3 Hours.
PR: BIOS 700 or consent. This course examines fundamental aspects of the Bayesian paradigm and will focus on Bayesian inferential methods with emphasis on biostatistics applications. Topics covered include: principles of Bayesian statistics; single-parameter and multi-parameter models; Bayesian linear and generalized linear models; Monte Carlo approaches to model fitting; Prior elicitation, with illustrations of a variety of computational methods.

BIOS 765. Advanced Structural Equation Models. 3 Hours.
PR: (BIOS 610 and BIOS 611) or Consent. This course will focus on advanced structural equation modeling techniques important in public health contexts. Topics include basic psychometrics, path analysis and advanced structural equation modeling techniques, using relevant software packages.

BIOS 788. Biostatistical Grant Writing. 2 Hours.
This course gives an advanced conceptual and applied understanding of writing external grants in Biostatistics. Topics include writing grants as a principal investigator and assisting others in grant-writing as a co-investigator, with a focus on NIH grants.

BIOS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of BIOS. 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.

BIOS 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.

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

BLAW 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of business law. 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.).

BMEG 501. Principles and Applications of Biomedical Engineering. 3 Hours.
PR: Consent. Introduction to the principles of biomedical engineering from cells to systems. Biomedical engineering concepts and applications as related to biomaterials, drug delivery, tissue engineering, biohybrid devices, bioinstrumentation, bioimaging, and other areas. Emphasis on critical thinking and development of original research ideas.

BMEG 510. Drug Discovery and Delivery. 3 Hours.
This course will cover the drug discovery from ideation to testing through the lens of fundamentals of biomedical engineering. Course will focus on biomaterials, formulation, targeting, pre-clinical testing, clinical testing, and imaging considerations.

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

BMEG 601. Numerical and Statistical Methods for Biomedical Engineering. 3 Hours.
PR: Consent. Introduces analysis methods for research in biomedical engineering. Topics include numerical analysis, simulation of dynamic systems, statistical inference test and applications in clinical trials, time-series data analysis, machine learning, bioimaging, and acquiring physiological data. Through homework projects, relevant examples and extensive case studies, this course will equip students with the tools to conduct research in biomedical engineering.

BMEG 602. Interfacial Phenomena in Living and Non-Living Systems. 3 Hours.
PR: Consent. Introduces concepts related to the interfacial phenomena in living and non-living systems. Specific topics covered include the free energy of interface formation, intermolecular and surface forces, energetic processes, thermodynamics, statistical mechanics, and interfacial phenomena that emphasize the chemical natures of living and non-living systems.

BMEG 695. Independent Study. 1-9 Hours.
BMEG 695. Independent Study. 1-9 hr. Faculty-supervised study, reading, or research.

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

BMEG 795. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.

BMEG 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.).

BMM 531. General Biochemistry. 4 Hours.
PR: General chemistry, organic chemistry. (For pharmacy students; others by consent.) Consisting of the lecture portion of BMM 705, this course is designed to be a general introduction to biochemical compounds, processes and concepts for students in the pharmacy program. Master's program students and others by consent. Four lectures per week.

BMM 701. Biochemical and Oncogenic Signaling. 3 Hours.
This advanced course is designed for upper level graduate students. It will focus on the biochemical and oncogenic mechanisms of cellular signaling. Students will explore the experimental techniques required to understand the scientific literature in biochemistry and cancer cell biology. (cross listed as CCB 701).

BMM 705. General Biochemistry. 5 Hours.
PR: General chemistry, organic chemistry. (For dental students.) General introduction to biochemical compounds, processes and concepts as part of the training for the practice of dentistry, including passage of the Dental Board Exam. Four lectures and one clinical correlation or small group discussion per week.

BMM 715. Molecular Genetics. 1-3 Hours.
This course emphasizes general principles of molecular biology (the progression of information from the gene to the production of the active protein or the active RNA) and incorporates a literature-based journal club.

BMM 730. Current Topics in Cell Biology. 3 Hours.
PR: Consent. Provides advanced graduate students an opportunity to independently study a focused area of cell biology in considerable depth with the guidance of a faculty member as tutor. Over the course of the semester, the student will scrutinize the primary literature covering a topic of interest and draft an original review of the topic, under the guidance of the faculty tutor.

BMM 750. Protein Chemistry/Enzymology. 4 Hours.
PR: Consent. Advanced topics in protein structure function relationships and enzymology. Emphasis is placed on emerging topics in the literature.

BMM 751. Advanced Molecular Biology. 4 Hours.
PR: Consent. A study of contemporary topics in molecular biology. This is an advanced seminar-style class using material from the current literature.

BMM 753. Molecular Mechanisms of Human Disease. 3 Hours.
PR: BMS 730. Major breakthroughs in the aging field have generated the ability to extend healthspan significantly. This course will address molecular and cellular mechanisms underlying aging and three age-related chronic diseases, metabolic diseases (including diabetes), neurodegenerative diseases (including Alzheimers) and cancer. The disease modules will address disease pathogenesis with emphasis on the molecular role of cellular aging.

BMM 785. Biochemistry and Molecular Medicine Journal Club. 1 Hour.
(May be repeated for a maximum of 16 credit hours.) Guided reading and critiquing of the current scientific literature for graduate students in the Biochemistry and Molecular Medicine Graduate Programs.

BMM 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of biochemistry. 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.).

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

BMM 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.

BMM 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.).

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

BMP 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.).

BMP 741. Clinical Clerkship in Psychiatry. 6 Hours.
This is a clinical rotation course required for all third-year medical students. Students will be assigned to work with both in- and out-patient psychiatric care. Focus will be on making psychiatric diagnoses and implementing appropriate treatments. Students will become familiar with various types of psychiatric disorders as well as their treatment. Students will learn about psychopharmacology, psychotherapy, and other biological treatments. Students will also be on call for and involved in the treatment of emergency department psychiatric patients.

BMP 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of behavior medicine and psychiatry. 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.).

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

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

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

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

BMP 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.

BMP 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.).

BMP 830. Clinical Clerkship in Psychiatry. 6 Hours.
This is a clinical rotation course required for all third-year medical students. Students will be assigned to work with both in- and out-patient psychiatric care. Focus will be on making psychiatric diagnoses and implementing appropriate treatments. Students will become familiar with various types of psychiatric disorders as well as their treatment. Students will learn about psychopharmacology, psychotherapy, and other biological treatments. Students will also be on call for and involved in the treatment of emergency department psychiatric patients.

BMP 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 satisfactory or unsatisfactory grading scale and do not apply as graduate credit toward a degree program.

BMS 684. Journal Club and Seminar. 1 Hour.
PR: Students must be enrolled in the MS in Health Science Program. A study of contemporary topics selected from recent developments in the biomedical sciences and public health.

BMS 685. Professionalism in Health Care. 2 Hours.
PR: Students must be enrolled in the MS in Health Sciences Program. A discussion of the key elements of professionalism in the health care industry.

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

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

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

BMS 700. Scientific Integrity. 1 Hour.
A course in scientific ethics that is led by individual faculty and incorporates small and large group discussions of ethical issues in science presented as case studies.

BMS 701. Scientific Rigor and Ethics. 1 Hour.
This is the second half of the training in the Responsible Conduct of Research that is required by the National Institutes of Health. The course also incorporates required training in Rigor and Reproducibility.

BMS 702. Biomedical Lab Experience. 2 Hours.
Five week lab rotations within the laboratories of faculty affiliated with the biomedical graduate programs. They are designed for first year graduate students to gain laboratory experience and to pick a laboratory for their dissertation research.

BMS 703. Professional Development for Scientists 1. 1 Hour.
The purpose of this course is to provide the opportunity to learn and practice skills that are required for the successful professional throughout their scientific/research career. Areas of instruction will include managing the transition to graduate school, communication, scientific professionalism, cultural awareness, and resilience. The intended audience for this course is PhD students.

BMS 704. Professional Development for Scientists 2. 1 Hour.
The purpose of this course is to provide the opportunity to learn and practice skills that are required for the successful professional throughout their scientific/research career. Areas of instruction will include transitioning to a new research team, developing researcher independence, scientific writing, building networks, cultural awareness, navigating challenges, and emotional intelligence. The intended audience for this course is PhD students.

BMS 705. Cell Structure and Metabolism. 1-4 Hours.
This course emphasizes general principles of cell biology, membrane structure and transport, and signaling, proliferation, death and structure of cells and incorporates a literature-based journal club.

BMS 706. Biomedical Research Methods. 1 Hour.
A lecture-based survey of research techniques used in contemporary biomedical science. The emphasis is on the theory behind techniques. Students will learn about standard techniques used in biomedical research from in vitro to in vivo including the use of humans in research. An emphasis is placed on techniques using core facilities at WVU.

BMS 707. Experiential Learning for Biomedical Trainees. 1-2 Hours.
PR: BMS 700, 2 semesters with a grade of P and consent. Graduate students in the biomedical sciences gain experiences and/or skills outside of their dissertation laboratory that lead to more informed decisions regarding their research questions or their career goals. These experiences are organized by the student and then proposed and approved/disapproved by the Course Director or Course Coordinator prior to beginning the experience.

BMS 710. Fundamentals of Integrated Systems. 1-4 Hours.
This course emphasizes four areas of integrated biology - endocrinology, neurobiology, immunology and microbial pathogenesis, with an overview of pharmacology and incorporates a literature-based journal club.

BMS 720. Scientific Writing. 2 Hours.
This course introduces students to scientific writing and requires them to write a journal article and a pre-doctoral grant proposal, based on the format used by NIH.

BMS 730. Introduction to Disciplines in the Biomedical Sciences. 1 Hour.
This course will impart a fundamental understanding of the sub-disciplines and programs that are part of the biomedical sciences doctoral program. The knowledge base is developed in an interactive faculty-student environment that requires interpretation and rational speculation to apply general concepts to specific situations and stimulate creative scientific thought.

BMS 736. Immunology and Microbial Pathogenesis. 3 Hours.
PR: BMS 710. An expansion of the concepts and mechanisms of basic immunology and microbial pathogenesis previously introduced in "Fundamentals of Integrated Systems" BMS 710.

BMS 738. Muscle Structure and Function. 2-3 Hours.
This course examines in-depth the concepts in muscle structure and function with emphasis on normal physiology and applications to overload/exercise and disuse or aging.

BMS 747. Foundations for Contemporary Biomedical Research I. 4 Hours.
This course is the first of a two-part package that provides students with a foundation in cellular and molecular systems. It enables students to evaluate normal and pathological pathways while examining common issues that alter normal function. Students considering any research path directed toward human health and disease will find this course valuable.

BMS 777. Foundations for Contemporary Biomedical Research 2. 4 Hours.
PR: BMS 747. This course is the second of a two-part package that provides students with a foundation in cellular and molecular systems. It enables students to evaluate normal and pathological pathways while examining common issues that alter normal function. Students considering any research path directed toward human health and disease will find this course valuable.

BMS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of biomedical sciences. 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.).

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

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

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

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

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

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

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

BMS 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.

BMS 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.).

BUDA 510. Overview of Business Intelligence. 3 Hours.
This course provides the foundations for an understanding of Business Data Analytics, giving an overview of the field by covering key concepts including: foundations and technologies of business decision making, data mining, data warehousing, visual analytics, predictive modeling, text analytics, text mining, sentiment analysis, web analytics, business intelligence decision modeling techniques and solutions, expert systems, knowledge management and future technologies.

BUDA 515. Big Data Technologies for Business. 3 Hours.
This course aims to provide a broad and practical introduction to Data Science techniques to collect, process, and analyze all kinds of "Big Data, including Python data science tools, working with different sources of data (structured, semi-structured, and unstructured data), preliminary data processing, data science pipeline, and Hadoop and Spark for big data.

BUDA 520. Data Management. 3 Hours.
This course provides an understanding of database design concepts and logic, including data modeling, database design, and the logic of database queries. In order to analyze data, one must be able to access, organize and query databases. The course focuses on relational databases and queries, but also includes object-oriented databases, large volume databases, database performance, scalability and live streaming considerations.

BUDA 525. Business Statistical Methods 1. 3 Hours.
This course introduces students to the role of statistics in the context of applied business data analytics, providing a foundational review of data and relationships, probability distributions, sampling, hypotheses testing, confidence interval estimation, statistical inference, regression analysis and forecasting techniques. This course provides the foundational groundwork for making informed business decisions.

BUDA 530. Business Statistical Methods 2. 3 Hours.
PR: BUDA 525. This class introduces students to multiple regression, limited dependent variables methods, non-parametric regression, time series analysis and Monte Carlo estimation. This course will allow the student to be prepared to summarize and analyze large-scale data in a manner that facilitates making informed business decisions.

BUDA 535. Business Data Mining. 3 Hours.
PR: BUDA 515. Data mining holds great promise to address the problem of large data by providing efficient techniques to uncover useful information hidden in the large data repositories. Awareness of the importance of data mining for business is becoming widespread. This course intends to bridge the gap between data mining techniques and business applications.

BUDA 540. Decision Sciences and Analytics. 3 Hours.
This course exposes students to the decision sciences analytical tools used to solve business problems. A practical, managerial approach is used, building models that require describing the problem in terms of objectives, decision variables, uncertainties, outcomes, choice criteria, and feasibilities. Students will assess the significance of model outputs, using these to develop managerial insights and action.

BUDA 545. Business Simulation Modeling. 3 Hours.
This course introduces concepts and modeling of computer-based simulation to structure business decisions. Students define business problems by identifying variables and constraints, develop computer programs to simulate situations with decision parameters, and analyze the results for decision making, using simulation software. The course covers various simulation techniques, focusing on the application of simulations to business problems.

BUDA 550. Business Data Visualization. 3 Hours.
This course introduces students to data and information visualization, including both theoretical and practical aspects. In addition to basic visualization techniques, the course covers the application of multivariate techniques in an environment that includes large data sets. Students are involved in both the creation of visualizations, as well as their interpretation.

BUDA 555. Business Analytics Practicum. 3 Hours.
PR: BUDA 525 and PR or CONC: BUDA 550. The course allows students to apply business analytics tools to real-world problems from business, government, or non-profit organizations. Students will complete a final project holistically integrating their accumulated knowledge from the M.S. Business Data Analytics curriculum, potentially including data collection, data management, basic and advanced statistical analyses, data mining, data modeling, simulation, and data visualization.

BUDA 595. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.

C&I 501. Essential Topics for Teaching. 3 Hours.
This course provides an initial exposure for undergraduate and graduate students to themes in education to foster appreciation of the classroom experience by empowering teachers to be classroom leaders.

C&I 525. Middle School Number/Algebra Teaching 2. 1 Hour.
PR or CONC: MATH 525. Continuation of C&I 524. Issues involved with sets of numbers as examples of algebraic systems, properties of groups, rings, and fields. Properties of polynomials and polynomial rings. Mathematical modeling with finite differences and least squares.

C&I 526. Classroom Discourse & Inquiry. 3 Hours.
Analysis of recent trends and innovations in pedagogy and classroom-based inquiry. Readings and discussions will lead to the development of an instructional unit for secondary English and social studies classrooms. Students will analyze their teaching and student work in field placement.

C&I 528. Middle School Function/Change Teaching 1. 1 Hour.
PR or CONC: MATH 528. Teaching and Learning function concept operations on functions, limits, continuity, Intermediate Value Theorem, families of curves, optimization and area. Classroom applications, current research in learning. Applications in model curricula.

C&I 529. Middle School Functions/Change Teaching 2. 1 Hour.
PR or CONC: MATH 529. Continuation of C&I 528. Teaching and learning function concept, operations on functions, limits, continuity, Intermediate Value Theorem, families of curves, optimization, and area. Classroom applications, current research in learning. Applications in model curricula.

C&I 530. Mathematics in the Elementary School. 3 Hours.
PR: Consent. Addresses current issues and trends in elementary mathematics education. Designed for the practicing elementary teacher.

C&I 533. Corrective Techniques in Mathematics Education. 3 Hours.
PR: Consent. Materials and methods used in diagnosis and remediation of learning difficulties in mathematics.

C&I 581. Independent Research in Curriculum Studies. 1-6 Hours.
Faculty-supervised study of topics not available through regular course offerings.

C&I 584. Student Teaching: Elementary K-6. 6 Hours.
PR: C&I 588 with a minimum grade of B- and PR or CONC: C&I 594 and students must also meet all West Virginia Department of Education Policy requirements for student teaching, including but not limited to securing the Student Teaching Permit. The West Virginia Department of Education and West Virginia University require that all students seeking initial certification in teacher education, both elementary and secondary, complete supervised experience in a classroom setting. This course will provide practical experience to prepare future educators for their chosen profession.

C&I 585. Student Teaching: Secondary Education. 6 Hours.
PR: C&I 588 with a minimum grade of B- and PR or CONC: C&I 594 and students must also meet all West Virginia Department of Education Policy requirements for student teaching, including but not limited to securing the Student Teaching Permit. The West Virginia Department of Education and West Virginia University require that all students seeking initial certification in teacher education, both elementary and secondary, complete supervised experience in a classroom setting. This course will provide practical experience to prepare future educators for their chosen profession.

C&I 586. Field Experience 1. 1 Hour.
The WV Department of Education requires 125 hours of observation prior to student teaching. In this first semester field placement, you will have a 62.5-hour placement in either an elementary, middle or high school, depending on certification area. Each candidate will complete several assignments that help to focus observation time and provide a useful context for learning in the field.

C&I 587. Advanced Clinical Experience. 3 Hours.
PR: Consent. Clinical experience in teaching-learning situations at any level.

C&I 588. Field Experience 2. 1 Hour.
PR: C&I 586. The WV Department of Education requires 125 hours of observation prior to student teaching. In this second semester field placement, you will have a 62.5-hour placement in either an elementary, middle or high school, depending on certification area. Each candidate will complete several assignments that help to focus observation time and provide a useful context for learning in the field.

C&I 589. Technology Integration Through Capstone Experience. 3 Hours.
PR: C&I 588. This course is the culminating experience in the MA in Elementary and Secondary Education certification programs. The first half of the class will focus students to prepare and submit the edTPA (Teacher Performance Assessment). The second half of the course will focus on the National Technology Plan (NTP) and make connections between the plan and the technology learning standards.

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

C&I 592. Directed Study. 1-6 Hours.
Directed Study, reading, and/or research.

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

C&I 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

C&I 600. United States Education for International Students. 3 Hours.
PR: International students with graduate status and developing oral and written English skills. To assist international students in understanding the U.S. system of education. Included: dominant U.S. values related to education, structure of U.S. education at all levels, models and strategies, field trips, and international comparisons.

C&I 601. The Elementary-School Curriculum. 3 Hours.
PR: 20 hours of undergraduate credit in elementary education, or consent. Analysis of curriculum designs in elementary education with emphasis on methods and techniques of development.

C&I 602. Curriculum and Teaching Principles. 3 Hours.
This course will give the student a basic foundation in the principles, development, and design of curriculum and teaching models.

C&I 603. Counselors & Classrooms. 3 Hours.
Bridging theory and practice, this course helps P-12 school counselors create effective learning environments for all students specifically during their classroom-based lessons.

C&I 604. School Curriculum. 3 Hours.
PR: Teaching experience or consent. Emphasizes socioeconomic and cultural influences on curriculum; principles of curriculum development; curriculum building in various teaching fields; and techniques of experimentation and evaluation.

C&I 605. Twenty-First Century Teaching and Learning. 3 Hours.
Interdisciplinary content if a 3 credit hour course. This course examines new and emerging technologies as they relate to classroom integration and pedagogy.

C&I 606. Curriculum for Middle Childhood. 3 Hours.
Survey course which includes: historical, social, and cultural influences on the curriculum; the learner characteristics; curriculum and instructional organization and their relationship to facilities available; and evaluation and implementation of middle childhood curriculum.

C&I 608. Introduction to Alternative Learning Environments. 3 Hours.
This course will provide opportunities for educators to explore and analyze the trends and issues in alternative learning environments in public education.

C&I 609. Experiences in Alternative Learning Environments. 6 Hours.
PR: C&I 608 and SCFD 620 and consent. This course helps teachers to learn and practice skills that are needed to be an effective teacher in an alternative teaching environment. (Alternate years.).

C&I 612. Early Childhood Curriculum. 3 Hours.
PR: C&I 410 and C&I 411 or consent. Curriculum development for early childhood education Pre-K to 4th grade, including social, creative, cognitive, physical, and academic goals. Societal, historical, and theoretical influences on early childhood curriculum are examined.

C&I 614. Early Childhood Instruction. 3 Hours.
PR: C&I 410 and C&I 411 or consent. Design of instruction for continuous improvement toward mastery of curriculum goals for early childhood education Pre-K to 4th grade.

C&I 615. Issues in Holocaust Education. 3 Hours.
Course examines important issues related to the Holocaust, and their implications for inclusion in curriculum. It examines instructional procedures helpful to youth in trying to comprehend the Holocaust's meaning for living in the 21st century.

C&I 616. Early Childhood Program Development and Evaluation. 3 Hours.
PR: C&I 410 and C&I 411 or consent. Development, administration, and evaluation of facilities, programs, and support systems for early childhood education Pre-K to 4th grade. Includes a focus on family connections and support systems related to early childhood classrooms.

C&I 617. Language Arts in Early Childhood. 3 Hours.
Designing instruction for an integrated development of writing, reading, speaking and listening with an emphasis on literacy acquisition in early childhood education pre-K to 4th grade.

C&I 618. Storytelling in Early Childhood. 3 Hours.
This course will assist students in telling, reading, and creating stories for children. Techniques, methods, and research effective in the art of storytelling will be examined and applied as they relate to total child development.

C&I 623. Contemporary Issues in English Education. 3 Hours.
PR: Graduate standing. Provides the student with a knowledge of several contemporary issues in English teaching which have immediate and long-range ramifications for secondary-school English instruction. (1 hr. lec., 2 hr. sem.).

C&I 625. Leadership Field Experiences and Clinical Practice. 3 Hours.
Students engage in a sequence of field experiences and clinical practice. Activities emphasize school-based leadership focused experiences. Participants interview educational stakeholders and develop a data focused understanding of school improvement foci and efforts. Participants also develop, implement, and report on an inquiry project focused on the planning, enactment, and analytical reflection of an implemented professional development experience.

C&I 630. Problem Solving in Math. 3 Hours.
PR: C&I 602 and EDP 600. A capstone course designed to further develop student's conceptual understanding of mathematics.

C&I 631. Mathematics in the Elementary School. 3 Hours.
PR: Consent. Addresses current issues and trends in elementary mathematics education. Designed for the practicing elementary teacher.

C&I 632. Research in Math Curriculum and Technology. 3 Hours.
This graduate level course is designed to focus on research and trends associated with applications of technology and curriculum in mathematics settings. Class topics will span curriculum, technology, and assessment in math education.

C&I 633. Mathematics in the Junior High School and Middle School. 3 Hours.
A methods course designed to teach selected topics including lesson planning, developing appropriate teaching/learning methods, and evaluations from middle school mathematics.

C&I 634. Mathematics in the Secondary School. 3 Hours.
Designed to provide teacher candidates knowledge and skills for effective mathematics instruction in middle/high school classrooms, this course prepares teachers to enact “ambitious and equitable” visions of mathematics teaching and learning—providing students with access to rigorous and relevant mathematics, with opportunities to participate in academic work in the classroom, and with opportunities to be seen and positioned as mathematical thinkers.

C&I 635. Selecting, Designing, and Using Mathematical Tasks in K-6. 2 Hours.
PR: Consent. This is the first of four mathematics pedagogy courses in the elementary mathematics specialist endorsement program. Topics include identifying the cognitive demand of tasks, identifying influences of cognitive demand on student learning, instructional moves that maintain cognitive demand of tasks, and strategies for adapting tasks to increase cognitive demand. Tasks examined will cover a range of K-6 mathematics.

C&I 636. Learning Trajectories in Elementary Mathematics. 2 Hours.
PR: C&I 635. This is the second of four mathematics pedagogy courses designed for students pursuing the elementary mathematics specialist endorsement. This course examines research-based descriptions of learning trajectories for how children's thinking and understanding develop for specific mathematical content. Learning trajectories studied include those for quantity, counting, computation, and shape. Students will examine effective use of learning trajectories in instruction.

C&I 637. Classroom Practices for Effective Learning Environments in Elementary Mathematics. 2 Hours.
PR: C&I 636. This is the third of four mathematics pedagogy courses designed for students pursuing the elementary mathematics specialist endorsement. Students will examine strategies for developing a classroom environment that supports all students in learning mathematics. Emphasis will be placed on understanding teaching practices and pedagogical strategies identified in mathematics education research literature as being effective in supporting student learning.

C&I 638. Planning, Implementing, and Assessing Mathematics Instruction. 2 Hours.
PR: C&I 637. This is the fourth of four mathematics pedagogy courses designed for students pursuing the elementary mathematics specialist endorsement. This course provides opportunities for students to plan, implement, assess, and reflect upon their own mathematics instruction, drawing upon knowledge, skills, and practices developed in the prerequisite courses of the elementary mathematics specialist endorsement sequence.

C&I 639. Science Research and Technology Ethics. 3 Hours.
PR: Graduate Standing. Students learn basic concepts of responsible research conduct, public communication and teaching research ethics by way of on-line discussions, and peer-review of case-solutions/reasoning and application projects.

C&I 640. Science in the Elementary School. 3 Hours.
PR: 20 hours of undergraduate credit in elementary education or consent. Analysis of methods, curriculum patterns, and trends in elementary school science. Understanding and development of scientific attitudes appropriate at the elementary-school level.

C&I 643. Brain-Based Teaching and Learning. 3 Hours.
This course provides an integrative, interactive, and collaborative introduction to the emerging interdisciplinary field of brain-based teaching and learning. Through synchronous and asynchronous classroom discussions and applied exercises, students will draw on knowledge from neuroscience, cognitive psychology, biology, and education to explore the theoretical foundations, methods, and applications of teaching and learning from a brain-based perspective.

C&I 644. Science in the Secondary School. 3 Hours.
Through a dynamic process of investigation and collaboration, students will learn about planning for instruction, implementing lesson plans, and assessing student learning in the context of their content areas of Biology, Chemistry, General Science, and Physics.

C&I 645. Global Climate Change. 3 Hours.
A graduate-level web-based course that presents the scientific evidence related to global climate change and the implications for science, technology and society.

C&I 646. Science: Native American Views. 3 Hours.
This course examines the science and non-scientific views in areas of health and healing, environment, and technological applications in traditional Native American and Western cultures.

C&I 647. Science and Mathematics Applications for Nutrition and Energy Content. 3 Hours.
This course is designed for teachers (4-12) of science or math. The course integrates nutrition and physical activity content applicable to students' lives.

C&I 648. Science/Technology: Society Perspectives. 3 Hours.
Course provides students with an understanding of the characteristic relationships between science, technology, and society. Course examines impacts of these relationships on social and natural communities.

C&I 649. History/Philosophy of Science. 3 Hours.
Examines the nature of science and how social forces have interacted with the process of science to promote the dynamic development of the current body of scientific knowledge.

C&I 650. Social Studies in the Elementary School. 3 Hours.
This course comprehensively considers objectives, content, and methods, including unit procedures; materials including objects, models, exhibits, and museum items, as well as textbooks, collateral reading, maps, and graphs; and means of evaluating social growth and development related to teaching social studies at the elementary school level.

C&I 654. Social Studies in the Secondary School. 3 Hours.
Nature and function of social studies in the secondary school; utilization of community, state, national, and world resources in teaching; selection of content for teaching purposes; curriculum construction with emphasis on resource and teaching units.

C&I 656. Challenges in Teaching History. 3 Hours.
This course will provide an initial exposure for pre-service social studies teachers to address the challenge of teaching controversial public issues of recent history.

C&I 657. Principles of Economic Education. 3 Hours.
Workshop for principals, teachers, and supervisors with emphasis on the economic structure of our society and methods of integrating economics into the school program. (Sponsored jointly by College of Human Resources and Education and College of Business and Economics.).

C&I 660. Games, Learning, & Design. 3 Hours.
Play, gaming, and design are explored as they relate to constructionist views of learning, common in makerspaces, formal and informal learning environments, and project-based learning environments. Students will engage in an iterative design process as part of a team, while considering the pedagogical implications of integrating play and design into K-12 learning environments.

C&I 661. Computational Literacy and Coding for Learning. 3 Hours.
Students will engage in research- and project-based learning activities as well as online discussions to learn about computer science in ways that supports meaningful learning in both formal (K-12 classrooms, professional development) and informal (DIY communities, afterschool, camp, Makerspaces) learning environments.

C&I 662. Principles and Practices for Connected Learning. 3 Hours.
This course is designed as a collaborative exploration of the changing nature of teaching and learning in the digital and connected world. Students will consider how to transform existing classrooms and curriculum to support Connected Learning.

C&I 663. Media Literacy and Digital Citizenship. 3 Hours.
Design K-12 curriculum materials to support media literacy and digital citizenship.

C&I 670. Practitioner Inquiry. 3 Hours.
PR: Departmental approval. Engaging in inquiry enables students to explore the underlying assumptions, biases, values, and ideologies inherent in their curricula and pedagogies and the policies and practices of their contexts. In this course, students design and conduct studies and cultivate the tools and habits of mind necessary for transforming the ways we do school and improving the life chances of all students.

C&I 671. Assessing the Impact of Computer-Based Learning. 3 Hours.
Survey of the current findings in computer-based learning; couples statistical features and design scenarios.

C&I 672. Professional Learning Communities: Creating Spaces for Collaboration, Coaching, and Praxis. 3 Hours.
PR: C&I 670. This course introduces students to strategies for developing and engaging in professional learning communities and learning to teach through studying teaching. Students explore the philosophical/research-based foundations and practices of student-centered coaching; engage in analyzing children’s thinking and work/performances, explore connections between their current practice and student thinking/performance; and plan for and engage in a coaching cycle that addresses student needs.

C&I 673. Teacher Leadership: Transforming Identities, Contexts, and Practices. 3 Hours.
PR: C&I 670 and C&I 672. This course focuses on understanding the current scholarship of the leadership roles teacher leaders pursue (e.g., teacher as exemplary practitioner, curriculum decision-maker, researcher, change agent, facilitator of job-embedded professional development) as they facilitate teacher learning and school renewal. Students also identify and create possible action plans for the reform and transformation of the sacred stories of their place(s).

C&I 677. Children's Television: Problems and Potentials. 4 Hours.
PR: Consent. Provides parents and teachers with strategies for monitoring, evaluating, and directing television viewing habits of youth; pertinent research studies, school and community action programs, and home and school education programs are discussed and practiced.

C&I 681. Independent Research in Curriculum and Instruction. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

C&I 685. Supervision of Student Teachers. 3 Hours.
PR: Consent. For persons working or intending to work with education students in field experiences. Course focuses on the development and application of supervisory skills in effective guidance of student teachers and education students.

C&I 686. Teaching Strategies for Middle Childhood. 3 Hours.
Surveys instructional strategies appropriate for facilitating preadolescent learning. Includes the role of the teacher and how the teacher uses resources within and outside the classroom as they relate to instruction of the learner, age 10-14 years.

C&I 687. Advanced Teaching Strategies. 3 Hours.
PR: Graduate standing. Deals with methods as one critical variable in teaching. Examines ways and means to describe, plan the use of, implement, and evaluate teaching methods. Analysis and implementation of teaching methods and component skills of teaching.

C&I 688. Classroom Organization and Management. 3 Hours.
Discusses research identifying components of classroom organization and environment which influence learning; reviews teacher behaviors and learning activities which research indicates lead to more effective teaching. Stresses implementation strategies relevant to classroom settings.

C&I 689. Cultural Diversity in the Classroom. 3 Hours.
PR: Graduate standing or consent. Provides opportunities for educators to increase awareness of their own ethnic backgrounds, foster understandings of the inter-active effects of gender, race, ethnicity and socio-economic status, and develop appropriate teaching materials and methods.

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

C&I 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

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

C&I 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

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

C&I 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.

C&I 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.).

C&I 701. Curriculum Development. 3 Hours.
PR: Consent. The study of the concepts underlying school curriculum.

C&I 707. Theories, Models and Research of Teaching. 3 Hours.
PR: SCFD 620 or consent. The theories behind selected models of teaching as well as research in teaching and best practices.

C&I 708. Contemporary Determinants of Curriculum. 3 Hours.
PR: C&I 701 and SCFD 640 or consent. Contemporary determinants of curriculum development.

C&I 709. Curriculum Theories. 3 Hours.
PR: C&I 708 or consent. Theories underlying curriculum from the past to the present and projected to the future.

C&I 710. Advanced Supervision. 3 Hours.
PR: Consent. Exploring theories, research, and practices of pre-service and in-service instructional supervision in the classrooms of novice and mature teachers. (Also listed as EDLS 701).

C&I 738. Survey of Major Issues in Mathematics Education. 3 Hours.
PR: Consent. Individual and group research on selected topics in mathematics education.

C&I 757. Social Studies Curriculum Development, K-12. 3 Hours.
PR: C&I 601 or C&I 604 and C&I 650 or C&I 654. Stresses the application of principles and procedures pertinent to the development of social studies programs in elementary and secondary schools. Strong emphasis will be placed on the analysis of current social studies curriculum materials.

C&I 786. Curriculum Evaluation. 3 Hours.
This course enables students to develop skills and strategies necessary for curriculum evaluation and improvement of programs. Included will be a historical review of evaluation and analysis of approaches to curriculum evaluation.

C&I 787. Professional Development for Teaching Effectiveness. 3 Hours.
PR: Advanced graduate standing or consent. Explores professional learning tools that lead to effective teaching; investigates the conditions that facilitate professional learning and effective teaching by examining the teacher, learner, content and environment; examines how educators study and resolve problems.

C&I 788. Higher Education Curriculum. 3 Hours.
Analysis and evaluation of post-secondary curriculum with emphasis on organizing, translating, and applying findings. Topics include curriculum shaping forces; institutional patterns; policy, components and change; and principles and techniques of development, experimentation, and evaluation.

C&I 789. Teaching in Higher Education. 3 Hours.
PR: Graduate standing. A general methods course involving instructional concepts and strategies for present/prospective faculty in higher education. Comprehensive consideration of objectives, planning criteria and methods, teaching strategies, and evaluation in meeting the needs of adult learners.

C&I 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of curriculum and instruction. 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.).

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

C&I 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

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

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

C&I 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.

C&I 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.).

C&I 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.

C&I 931. 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.

C&I 932. Profession 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.

CAHS 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.).

CCB 700. Selected Topics in Cancer Cell Biology. 3 Hours.
PR: CCB 730 or consent. This course is designed for upper level graduate students. An expansion of the concepts and mechanisms of cancer biology through review of selected topics including cellular signals and tumor microenvironment, as well as diagnostics and therapeutic strategies.

CCB 701. Biochemical and Oncogenic Signaling. 3 Hours.
This advanced course is designed for upper level graduate students. It will focus on the biochemical and oncogenic mechanisms of cellular signaling. Students will explore the experimental methodologies needed to understand the scientific literature in biochemistry and cancer.

CCB 702. Cancer Pharmacologic and Therapeutics. 3 Hours.
This course is designed for upper level graduate students. Course will focus on the pharmacologic, diagnostic, and therapeutic basis of cancer care including therapeutic strategies, drug resistance/design and clinical trials.

CCB 705. Journal Club. 1 Hour.
PR: Consent. A study of contemporary topics selected from recent developments in the field of cancer research.

CCB 730. Cancer Cell Biology. 2-3 Hours.
This course emphasizes the cellular signals that direct tumor growth and invasive potential and explores how these same signals can be targeted for intervention to block tumor progression.

CCB 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.

CCB 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.).

CCMD 701. Problem-Based Learning. 2 Hours.
(May be repeated for a maximum of 8 credit hours.) Students work in facilitated groups to apply basic science concepts/principles to solve problems pertaining to clinical cases. Students are expected to develop/demonstrate independent learning/group communication skills. Students will also explore the roles of other health care practitioners, and learn to work in healthcare teams through the use of inter-professional education.

CCMD 713. Health of the Public. 2 Hours.
PR: Medical student or consent. An introduction to public health with an emphasis on West Virginia. Topics include occupational and environmental health, preventive medicine, social and behavioral aspects of health, and health services administration and management.

CCMD 721. Physical Diagnosis/Clinical Integration 2. 4 Hours.
This course will introduce clinical medicine topics, organized by organ system, as well as emphasize history and physical exam skills. Students will begin to use clinical reasoning techniques, integrating basic science and clinical knowledge. (Grading will be Pass/Fail.).

CCMD 722. Physical Diagnosis and Clinical Integration 2. 5 Hours.
This course will introduce clinical medicine topics, organized by organ system, as well as emphasize history and physical exam skills. Students will begin to use clinical reasoning techniques, integrating basic science and clinical knowledge. (Grading will be Pass/Fail.).

CCMD 725. Health Care Ethics. 2 Hours.
For medical students only. Integrated approach to medical-ethical, legal, and spiritual aspects of health care. Includes lectures about basic principles and concepts, small-group discussion of cases, and large-group interactive case discussions.

CCMD 730. Human Function. 16 Hours.
PR:For medical students and selected graduate students with instructor consent. Integrated approach combining biochemistry, genetics and physiology of the human body. Includes molecular, subcellular, and cellular components of the body, organ systems and whole body functions. Application of basic sciences to human health and disease. (Lec. 14 hr., other 2 hr., contact 16 hr.).

CCMD 740. Behavioral Science and Psychopathology. 4 Hours.
This course will introduce students to the biological, psychological, social, and spiritual dimensions of health care. Normal and abnormal human development. Psychopathology, ethical, legal, and spiritual aspects of health care will be explored in the content of health care decision making. (Grading will be Pass/Fail.).

CCMD 741. Behavioral Science and Psychopathology. 2 Hours.
PR: CCMD 741. Continuation of CCMD 740. Students will will build on skills and techniques learned in CCMD 740.

CCMD 746. Physical Diagnosis and Clinical Integration. 4 Hours.
This course will introduce the student to persons with health concerns. Students will begin development of skills of medical communication, data gathering, and physical examination techniques.

CCMD 750. Radiation Safety and Radionuclide Usage. 1,2 Hour.
PR:PHYS 101 and PHYS 102, CHEM 115 and CHEM 116, or consent. Chemical, physical, and biological aspects of radiation; safety; handling and storage of radioactive materials; NRC and WVU regulations and licensing; detection and instrumentation, research, and clinical use of radioisotopes.

CCMD 770. Medical Genetics. 2-4 Hours.
PR: Second-year medical student standing; graduate student in genetics and developmental biology; others by consent. Introduction to clinical genetics including molecular, biochemical, and cytogenetic aspects of human biology. Application of genetic principles to human health and disease. (Also listed as GEN 570.).

CCMD 775. Neurobiology. 7 Hours.
Introduction to basic structure and function of the human nervous system with a focus on clinical application of basic information. The course emphasizes the normal neurobiology (at the cell and system level) essential to understanding human behavior and to recognizing abnormality seen in clinical practice. (Grading will be Pass/Fail.).

CCMD 776. Step-One Board Preparation. 3 Hours.
The USMLE Step 1 is the first step in the licensure of becoming a physician and is a graduation requirement of the WVU School of Medicine. The comprehensive exam assesses students' overall knowledge of the basic sciences critical to the practice of medicine. (Grading will be Pass/Fail.).

CCMD 777. USMLE Step-2 Clinical Knowledge Examination. 2 Hours.
PR: Completion of all required courses and clerkships in years one through three. The United States Medical Licensing Step2 Clinical Knowledge(CK) examination assesses whether students can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision and includes emphasis on health promotion and disease prevention. Step2CK ensures that due attention is devoted to principles of clinical sciences and basic patient-centered skills.

CCMD 778. Basic Medical Science Exam. 2 Hours.
The NBME Comprehensive Basic Medical Science exam assesses second-year medical students' preparedness to sit for the USMLE Step 1. The comprehensive exam assesses students' overall knowledge of the basic sciences critical to the practice of medicine. (Grading will be Pass/Fail.).

CCMD 779. Clinical Performance Examination. 1 Hour.
The Clinical Performance Examination (CPX) assesses the clinical competency of fourth-year medical students based on the first three years of the curriculem. Successful completion of the CPX is a graduation requirement of the MD degree.

CCMD 780. Hospital Care. 4 Hours.
PR: 4th year status. Required for week rotation serving as a sub-intern in either Medicine, Surgery, Family Medicine, or Pediatrics. Competency is assessed in medical knowledge, patient care, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice.

CCMD 781. Rural Health. 4 Hours.
PR: 4th year status. Required four week non-campus based clinical rotation at an approved WV rural health clinic site. Competency is assessed in medical knowledge, patient care, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice.

CCMD 782. Critical Care Clerkship. 2 Hours.
PR: Students must pass all required MD program courses and clerkships in years 1 through 3. Two-week selective rotation in an Intensive Care Unit (ICU) component. Students may select from four intensive care rotations: Neonatal Intensive Care, Medical Intensive Care, Surgical Intensive Care, and Pediatric Intensive Care.

CCMD 784. Anesthesiology Clerkship. 2 Hours.
PR: Students must pass all required MD program courses and clerkships in years 1 through 2. The goal of this rotation is for medical students to learn and demonstrate basic acute care medical skills that are useful in any medical discipline. These skills include airway management and respiratory support, invasive and non-invasive monitoring, cardiovascular support and resuscitation, and ethical issues related to these environments.

CCMD 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of conjoined courses. 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.).

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

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

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

CCMD 795. Independent Study. 1-18 Hours.
Faculty supervised study of topics not available through regular course offerings.

CCMD 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.

CCMD 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.).

CCMD 801. Medical Biochemistry and Cellular Function. 8 Hours.
Medical Biochemistry combines the traditional subjects of biochemistry, human genetics and cell biology in one course. Information is presented in lectures, problem solving exercises, and clinical correlations. Accordingly, a considerable amount of instructional time will be devoted to self-directed learning activities.

CCMD 802. Professional Development. 1 Hour.
Introduction to professional behaviors for contemporary medical practice. Includes independent and group learning activities that target core competencies and program objectives related to accountability, lifelong learning, and interprofessional collaboration.

CCMD 803. Problem Based Learning 1. 1 Hour.
Students in this course work in facilitated groups to apply basic science concepts and principles to solve problems pertaining to clinical cases. Students are expected to develop and demonstrate independent and self-directed learning skills and group communication skills.

CCMD 811. Physical Diagnosis/Clinical Integration (PDCI) 1. 5 Hours.
PDCI 1 will introduce medical students to clinical medicine. Students will develop skills including medical communication, data gathering, and introductory physical examination techniques. Students will develop skills and knowledge that target comprehensive health issues, differential diagnosis, and detailed assessments while integrating basic science concepts into clinical medicine. Students will also learn the fundamentals of biostatistics and epidemiology.

CCMD 812. Physical Diagnosis and Clinical Integration (PDCI) 2. 3 Hours.
PDCI 2 will advance medical students' knowledge of clinical medicine. Students will develop skills including medical communication, data gathering, and strengthen physical examination techniques. Furthermore, students will further develop skills to generate comprehensive health issues, differential diagnosis, and detailed assessments while integrating basic science concepts into clinical medicine.

CCMD 813. Neuroscience and Human Behavior. 7 Hours.
Neuroscience and Human Behavior will advance students' knowledge and clinical skills related to the structure and function of the human central nervous system. Students will learn how to recognize and identify treatment options for neurological diseases and dysfunctions.

CCMD 814. Health Care Ethics. 2 Hours.
Health Care Ethics introduces medical students to an integrated approach to medical-ethical, legal, and spiritual aspects of health care. Learning events include didactic and online lectures about basic principles and concepts, small-group discussion of cases, and large-group interactive case discussions.

CCMD 815. Career and Professional Development Experiences. 7 Hours.
Students engage in self-directed learning experiences to meet the requirements of this course. These experiences may include research experiences, clinical experiences and community service experiences. Students select which experience(s) to complete. Students must reflect on how the experience(s) may inform their career and professional interests, which must be articulated in a reflection statement and submitted in their educational portfolio.

CCMD 816. Public Health. 2 Hours.
Public Health will introduce students to the basic concepts of population health. Students will advance their knowledge about epidemiology and public health systems, which impact the quality of patient care. Students will also advance their ability to interpret population health studies, which may inform strategies to target and reduce both regional and global healthcare disparities.

CCMD 821. Physical Diagnosis and Clinical Integration (PDCI) 3. 5 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. PDCI 3 will advance medical students' knowledge of clinical medicine. Students will further develop skills including medical communication, data gathering, and strengthen physical examination techniques. Additionally, students will improve skills in developing comprehensive health issues, differential diagnosis, and detailed assessments while integrating basic science concepts into clinical medicine.

CCMD 823. Problem Based Learning 2. 3 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. Students in this course work in facilitated groups to apply basic science concepts and principles to solve problems pertaining to clinical cases. Students are expected to develop and demonstrate independent and self-directed learning skills and group communication skills.

CCMD 824. Comprehensive Basic Medical Science Exam. 3 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. The Comprehensive Basic Science exam assesses second-year medical students' preparedness to sit for the United States Medical Licensing Examination (USMLE) Step 1, which is the first step in the licensure process of becoming a physician. The Comprehensive Basic Science Exam assesses students' overall knowledge of the foundational sciences.

CCMD 825. United States Medical Licensing (USMLE) Step 1 Prep. 6 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. This course includes students' independent study and preparation for the United States Medical Licensing Examination (USMLE) Step 1 examination, the first step towards medical licensure. Students must demonstrate their overall knowledge of the foundational sciences that are critical to the practice of medicine by earning a passing grade on the Step 1 examination.

CCMD 841. Electives. 1-20 Hours.
Faculty supervised study of topics not available through regular course offerings.

CCMD 842. Hospital Care. 4 Hours.
PR: 4th year status. Required for week rotation serving as a sub-intern in either Medicine, Surgery, Family Medicine, or Pediatrics. Competency is assessed in medical knowledge, patient care, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice.

CCMD 843. Anesthesiology Clerkship. 2 Hours.
PR: Students must pass all required MD program courses and clerkships in years 1 through 2. The goal of this rotation is for medical students to learn and demonstrate basic acute care medical skills that are useful in any medical discipline. These skills include airway management and respiratory support, invasive and non-invasive monitoring, cardiovascular support and resuscitation, and ethical issues related to these environments.

CCMD 844. Critical Care Clerkship. 2 Hours.
PR: Students must pass all required MD program courses and clerkships in years 1 through 3. Two-week selective rotation in an Intensive Care Unit (ICU) component. Students may select from four intensive care rotations: Neonatal Intensive Care, Medical Intensive Care, Surgical Intensive Care, and Pediatric Intensive Care.

CCMD 845. USMLE Step-2 Clinical Knowledge Examination. 2 Hours.
PR: Completion of all required courses and clerkships in years one through three. The United States Medical Licensing Step2 Clinical Knowledge(CK) examination assesses whether students can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision and includes emphasis on health promotion and disease prevention. Step2CK ensures that due attention is devoted to principles of clinical sciences and basic patient-centered skills.

CCMD 847. Clinical Performance Examination. 1 Hour.
The Clinical Performance Examination (CPX) assesses the clinical competency of fourth-year medical students based on the first three years of the curriculum. Successful completion of the CPX is a graduation requirement of the MD degree.

CCMD 848. Rural Health. 4 Hours.
PR: 4th year status. Required four week non-campus based clinical rotation at an approved WV rural health clinic site. Competency is assessed in medical knowledge, patient care, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice.

CDFS 541. Cognitive Development of the Child. 3 Hours.
Piaget's basic theory, including his view of perceptual, symbolic, motor and logico-mathematical development, across the life span.

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

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

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

CDFS 640. Survey of Family Studies. 3 Hours.
Comprehensive overview of theoretical and empirical literature of the family.

CDFS 645. Socio-Emotional Development of Children. 3 Hours.
A study and examination of contemporary theory and research into various facets of the socialization process in infancy and childhood.

CDFS 647. Comparative Study of Family. 3 Hours.
Family diversity and multiculturalism in an ever-changing U.S. society is examined using the comparative method for analysis.

CDFS 648. Theories of Child and Adolescent Development. 3 Hours.
Examination and comparison of theoretical perspectives of child and adolescent development including traditional and newly emerging theories.

CDFS 649. Socialization Processes. 3 Hours.
Examination of the contexts that affect infant, child, and adolescent development, including family, peers, schools, neighborhood, media, and large societal influences.

CDFS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of child development and family studies. 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.).

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

CDFS 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.

CDFS 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.).

CDFS 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.

CDFS 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.

CE 511. Pavement Design. 3 Hours.
PR: CE 451 or consent. Effects of traffic, soil, environment, and loads on the design and behavior of pavement systems. Design of pavement systems. Consideration of drainage and climate. Pavement performance and performance surveys. (3 hr. rec.).

CE 515. Flexible Pavements. 3 Hours.
Design, construction and mathematics of flexible pavements, including material characterization, mix design, construction methods, pavement design and evaluation, and maintenance procedures.

CE 517. Infrastructure Asset Management 1. 3 Hours.
PR: Graduate standing or consent. This course focuses on the maintenance stage of the lifetime of an infrastructure. This course is designed to provide the students with an understanding of the issues related to infrastructure asset management. The focus will be on the current problems facing constructed infrastructure systems as well as various techniques and analysis tools to solve the problems.

CE 518. Construction Estimating. 3 Hours.
PR: Graduate standing or consent. This course intends to prepare students with the knowledge and quantitative methods in professional evaluation of engineering design and site situation in order to predict time and cost for jobsite activities.

CE 519. Building Information Modeling. 3 Hours.
Introduce building information modeling and how to apply the tools to develop solutions in building design.

CE 520. Groundwater Dynamics. 3 Hours.
PR: Consent. Introduction to groundwater, formulation of equations for saturated and unsaturated flow, analytical solutions for steady and transient cases, transport of pollutants, and numerical techniques. (3 hr. lec.).

CE 522. Free Surface Hydrodynamics. 3 Hours.
PR: CE 322 or consent. The dynamics of liquid flow with a free surface under the influence of gravity; open channel hydraulics, wave motion, and buoyancy effects. (3 hr. lec.).

CE 524. Groundwater Engineering. 3 Hours.
PR:CE 322 or consent. Introduction to the nature, hydrology, mechanics, technology, and quality of groundwater. Well solutions in confined, leaky, and unconfined aquifers. Modeling concepts and public-domain computer programs.

CE 526. Environmental Systems Modeling. 3 Hours.
Theory and practice of systems thinking to understand the complexities of the hydrological cycle, analysis of hydrological time series for detection of trends and frequencies, stochastic and deterministic models for system dynamics, issues of equifinality and uncertainty.

CE 530. Probability, Reliability, and Statistical Methods in Engineering Design. 3 Hours.
PR: Consent. Accounting for influence of uncertainty and reliability in analysis and design of Civil Engineering systems.

CE 538. Highway Safety Engineering. 3 Hours.
PR: CE 431 or consent. Relationship between human, vehicular, and roadway factors which impact safety; functional requirements of highway safety features; legal aspects; accident analysis; evaluation of highway safety projects. (3 hr. lec.).

CE 539. Traffic Engineering Operations. 3 Hours.
PR: CE 534. Theory and practice of application of traffic engineering regulations; traffic control concepts for urban street systems and freeways; freeway surveillance and incident management; driver information systems; traffic control system technology and management. (3 hr. rec.).

CE 540. Environmental Chemistry and Biology. 3 Hours.
PR:CE 322 or consent. Study of physical and chemical properties of water. Theory and methods of chemical analysis of water, sewage, and industrial wastes. Biological aspects of stream pollution problems.

CE 542. Physicochemical Treatment. 3 Hours.
PR: CE 347 and CE 347L. Engineering topics on water and wastewater treatment based on pollutant's physical and chemical characteristics will be presented, including human health concerns related to water, regulations, reactor theory, transport phenomena, and various treatment technologies.

CE 543. Water Quality Modeling and Analysis. 3 Hours.
PR: CE 347 and CE 347L. Theories, methodologies and data analyses will be presented for water quality modeling in surface and groundwater, and for determining water quality distributions, trends, and compliance with regulatory standards.

CE 546. Principles of Biological Waste Treatment. 3 Hours.
PR: CE 540 or consent. The purpose of this course is to gain an understanding of the microorganisms that are used in the treatment of municipal wastewater, nutrient requirements, substrate requirements, environmental conditions for growth and control, and other factors that are important in biological wastewater treatment processes.

CE 547. Applied Wetlands Ecology and Management. 3 Hours.
The management and ecology of wetland vegetation, soils, hydrology, and wildlife. (Offered in fall of odd years. Also listed as WMAN 547 and PLSC 547.).

CE 548. Sustainable Development Engineering. 3 Hours.
Study of applying appropriate and sustainable engineering solutions in underserved communities. Concepts of sustainable development are covered, particularly the United Nations Sustainable Development Goals. Topics are drawn from interdisciplinary areas of engineering, public health, policy, and anthropology with an emphasis on engineering including water supply, water treatment, water storage, watersheds, wastewater treatment, materials, and solid waste management.

CE 549. Solid and Hazardous Waste Management. 3 Hours.
PR: Consent. Patterns and problems of solid waste storage, transport, and disposal. Examinations of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation. Analytical approaches to recovery and reuse of materials.

CE 550. Soil Properties and Behavior. 3 Hours.
PR: CE 451 or consent. Soil mineralogy and the physicochemical properties of soils and their application to an understanding of permeability, consolidation, shear strength, and compaction. Prediction of engineering behavior of soils in light of physicochemical concepts. (3 hr. lec.).

CE 551. Soil Testing. 3 Hours.
Experimental evaluation of soil properties and behavior. Emphasis is placed on the proper interpretation of experimental results and application of such results to practical problems.

CE 552. The Finite Element Method. 3 Hours.
PR: Graduate standing in CE or MAE or consent. Introductory treatment of theoretical basis of finite element method, mathematical formulation, different types of elements, stress analysis in solids, applications, and computer implementation.

CE 553. Advanced Finite Element Methods. 3 Hours.
PR: Consent. Formulation procedures and applications of finite element methods to two- and three-dimensional problems, techniques for nonlinear analysis, computer implementation, applications in field problems, flow, and dynamics.

CE 561. Statically Indeterminate Structures. 3 Hours.
PR:CE 461 or consent. Force and displacement methods of analysis; energy principles and their application to trusses, frames, and grids; effects of axial forces; influence lines for frames, arches, and trusses; secondary stress analysis. (3 hr. lec.).

CE 563. Introduction to Structural Dynamics. 3 Hours.
PR:CE 561 PR: CE 561. General theory for dynamic response of systems having one or several degrees of freedom. Emphasis on the application of dynamic response theory to structural design. (3 hr. lec.).

CE 564. Nondestructive Material and Structural Evaluations. 3 Hours.
PR: Consent. Nondestructive evaluation (NDE) using techniques based on mechanical and electromagnetic wave propagation; theory and applications of various NDE techniques including infrared thermography, dynamic characterization, seismic reflection and refraction, ultrasonics, acoustic emission, and radar. (3 hr. lec.).

CE 566. Advanced Materials for Infrastructure. 3 Hours.
PR:CE 462 and CE 463. Introduction to principles of material science; material structure, characterization at coupon and component level, practical information on fiber-reinforced shapes; establishment of failure analysis and standardization. (3 hr. lec.).

CE 567. Prestressed Concrete. 3 Hours.
PR:CE 461 and CE 462 or consent. Behavior and design of prestressed concrete members. Materials, bending, shear, torsion, methods of prestressing, prestress losses, deflections, compression members, composite members, and indeterminate structures. (3 hr. lec.).

CE 568. Building Design. 3 Hours.
This course focuses on the fundamentals of building design, investigating the structural behavior under combined gravity and lateral load effects (wind and earthquake) per the requirements of design standards. Advanced topics on structural analysis and design will be visited. Hand calculations will be verified by computer model outputs. Structural analysis and design software will be utilized for the project exercise.

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

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

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

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

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

CE 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.).

CE 721. Environmental Fluid Mechanics. 3 Hours.
PR: Consent. Equations of motion including buoyancy and Coriolis force; mechanics of jets and plumes; diffusion, dispersion, and mixing in rivers, lakes, reservoirs, and estuaries. (3 hr. lec.).

CE 722. Deterministic Hydrology. 3 Hours.
PR: Consent. An in-depth treatment of the dynamics of the accumulation of runoff, including the formulation of the unsteady surface flow equations and the unsteady saturated-unsaturated subsurface flow equations. Both analytical and numerical solutions are presented with applications. (3 hr. lec.).

CE 732. Transportation Systems Analysis. 3 Hours.
PR: Consent. Systematic examination of the interaction between transport technology, activity systems, and traffic flows. Quantitative analysis of the relationship among vehicle cycles, networks, congestion, choice behavior, cost functions, and resulting travel-market equilibration. (3 hr. lec.).

CE 751. Advanced Mechanics of Soils. 3 Hours.
PR: CE 351 and CE 351L and CE 551 and MAE 640. Stress invariants, stress history and stress path, elastic and quasi-elastic models for soils; soil plasticity, failure theories for soils; critical state soil mechanics, and determination of construction parameters.

CE 752. Advanced Foundation Analysis. 3 Hours.
PR: CE 451 or consent. Study of soil-structure interaction. Applications of principles of soil mechanics and numerical methods for analysis and design of geotechnical structures: strip footings, axially and laterally loaded piles, braced excavations, sheet pile walls, tunnel lining, and buried pipes and culverts. (3 hr. lec.).

CE 753. Advanced Earthwork Design. 3 Hours.
PR: CE 453 or consent. Application of the principles of theoretical soil mechanics to the design of embankments of earth and rock. In-depth study of compaction theory, and stability of natural and man-made slopes by limit equilibrium and deformation considerations. (3 hr. lec.).

CE 754. Groundwater and Seepage. 3 Hours.
PR: Consent. Flow of groundwater through soils and its application to the design of highways and dams and to construction operations. Emphasis is placed on both the analytical and classical flow net techniques for solving seepage problems. (3 hr. lec.).

CE 756. Soil Dynamics. 3 Hours.
PR:CE 550 and consent. Consideration of the simple damped oscillator, wave propagation in elastic media, dynamic field and laboratory tests, dynamic soil properties, and foundation vibrations. Introduction to geotechnical aspects of earthquake engineering. (3 hr. lec.).

CE 760. Finite Element Methods in Structural Analysis. 3 Hours.
PR: CE 561 or consent. Relationships of elasticity theory; definitions and basic element operations; direct and variational methods of triangular and rectangular elements related to plane stress, plane strain, and flat plates in bending; variational principles in global analysis.

CE 761. Bridge Engineering. 3 Hours.
PR: CE 561 or consent. Statically indeterminate trusses, continuous trusses; steel and concrete arches; long-span and suspension bridges; secondary stresses. (3 hr. lec.).

CE 763. Behavior of Steel Members. 3 Hours.
PR: CE 463 or consent. Elastic behavior of steel members subjected to axial load, bending, and torsion. Elastic and inelastic response of beams, columns, and beam-columns to load and the resulting design implications. Comparison with standard steel codes and specifications. (3 hr. lec.).

CE 765. Structural Design for Dynamic Loads. 3 Hours.
PR:CE 563 or consent. Nature of dynamic loading caused by earthquakes and nuclear weapons blasts; nature of dynamic resistance of structural elements and structural systems; criteria for design of blast-resistance and earthquake-resistant structures; simplified and approximate design methods. (3 hr. lec.).

CE 767. Behavior of Reinforced Concrete Members. 3 Hours.
PR: CE 462 or consent. Studies of actual member behavior; members in flexure, combined flexure, shear, and torsion; bond and anchorage; combined axial load and flexure; slender columns; deep beams; derivation of current code provisions. (3 hr. lec.).

CE 768. Behavior and Design of Fiber Reinforced Polymer Members. 3 Hours.
PR: Consent. Studies of fiber reinforced polymer (FRP) composite member behavior including rebars and wraps for concrete, under flexure, axial, shear forces, and combined effects; design, durability, and rehabilitation of FRP members and systems including field applications.

CE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of civil engineering. 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.).

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

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

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

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

CE 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.

CE 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.).

CE 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.

CHE 512. Advanced Topics in Process Systems Engineering. 3 Hours.
Introduction to advanced topics in Process Systems Engineering (PSE). Students will develop a fundamental understanding of advanced physics-based/data-driven modeling and optimization techniques for process synthesis, design, and analysis.

CHE 516. Oil & Gas Refining. 3 Hours.
PR: Graduate standing and instructor approval. The fundamental principles to analyze refining processes in modern petroleum refineries, chemistry and processes for the conversion of natural gas to products equivalent to those from petroleum.

CHE 518. Unconventional Catalytic Processes for Future Chemical Manufacturing. 3 Hours.
Fundamental principles by which one may analyze the catalytic processes not currently being practiced commercially. These processes include but not limited to microwave-enhanced catalytic reactions, electrocatalytic process, induction heating process, biological process. The course will also emphasize process intensification and distributed production for future manufacturing.

CHE 520. Electrical and Electrochemical Energy Technologies. 3 Hours.
Introduction to the fundamentals and applications of electrochemical energy conversion and storage devices. Covers a range of topics, including solid oxide fuel cells and electrolysis cells, solar cells, rechargeable batteries, and supercapacitors. Course delves into key aspects of these technologies, such as thermodynamic principles, electrochemical kinetics, materials, components, structures, as well as significant challenges and opportunities.

CHE 526. Kinetics & Catalysis. 3 Hours.
In this course, a variety of topics will be discussed related to both theoretical and experimental evaluation of heterogeneous catalysts, with an emphasis on thermocatalytic systems. Topics will include chemical kinetics, microkinetic modeling for heterogeneous catalysis, reaction rate theory, synthesis and characterization of solid materials, and topics related to measurement of experimental rate data.

CHE 528. Membrane Separations. 3 Hours.
Introduction to the fundamentals and applications of membrane separation processes. Covers a range of topics, including membranes for gas separation, membranes for water treatment, membranes for nanofiltration, reverse osmosis (OSRO) and pervaporation, and ion exchange membrane processes. Emerging and future directions for membrane technologies are also discussed.

CHE 531. Mathematical Methods in Chemical Engineering. 3 Hours.
PR: MATH 261 and consent. Classification and solution of mathematical problems important in chemical engineering. Treatment and interpretation of engineering data. Analytical methods for ordinary and partial differential equations, including orthogonal functions and integral transforms. Vector calculus. (3 hr. lec.).

CHE 565. Corrosion Engineering. 3 Hours.
PR:CHE 320 or CHEM 341 or equivalent. Basic mechanisms of various types of corrosion such as galvanic corrosion, pitting corrosion and stress corrosion cracking; methods of corrosion prevention such as cathodic and anodic prevention, by using coatings and inhibitors, and by selecting proper alloys. (3 hr. lec.).

CHE 566. Electronic Materials Processing. 3 Hours.
PR: Graduate standing in Engineering, Physics, Chemistry, or instructor consent. Design and application of thermal, plasma, and ion assisted processing methodologies; design and function of key process tools and components; vacuum technology; solid state, gas phase, surface, and plasma chemistry underpinnings; thin film nucleation, growth, and etching; effects of processing methods and conditions on materials properties.

CHE 580. Advanced Cellular Machinery. 3 Hours.
PR: Consent. Coverage and application of principles of cellular biology to enable the integration of cell components into biotechnological applications.

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

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

CHE 610. Fluidization Engineering. 3 Hours.
PR: Consent. Fundamentals of fluidization, two-phase flow theory and powder characteristics, structure and property of the emulsion phase and bubbles, mass and heat-transfer in fluidized beds with and without chemical reaction. (3 hr. lec.).

CHE 615. Transport Phenomena. 3 Hours.
PR: Consent. Introduction to equations of change (heat, mass, and momentum transfer) with a differential-balance approach. Use in Newtonian flow, turbulent flow, mass and energy transfer, radiation, convection. Estimation of transport coefficients. (3 hr. lec.).

CHE 620. Thermodynamics. 3 Hours.
PR: Consent. Logical development of thermodynamic principles. These are applied to selected topics including development and application of the phase rule, physical and chemical equilibria in complex systems, and nonideal solutions. Introduction to nonequilibrium thermodynamics.

CHE 625. Chemical Reaction Engineering. 3 Hours.
PR: Consent. Homogeneous and heterogeneous reaction systems, batch and flow ideal reactors, macro- and micro-mixing, non-ideal reactors, diffusion and reaction in porous catalysts, reactor stability analysis, special topics. (3 hr. lec.).

CHE 630. Linear and Nonlinear Programming. 3 Hours.
Fundamentals of optimization, Linear programming (Simplex and other algorithms) , Unconstrained nonlinear optimization (Direct search methods, Polynomial approximation methods, Newton and quasi-Newton methods, Line search method, Trust region method), Constrained optimization (Line search with merit functions, Trust region method with merit functions, Sequential quadratic programming, Interior point methods), Dynamic optimization (Simultaneous and sequential methods).

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

CHE 694. Seminar. 1-6 Hours.
Seminars on current research by visitors and graduate students.

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

CHE 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.).

CHE 716. Advanced Fluid Dynamics. 3 Hours.
PR: Consent. Analysis of flow of fluids and transport of momentum and mechanical energy. Differential equations of fluid flow; potential flow, laminar boundary-layer theory, and non-Newtonian fluids. (3 hr. lec.).

CHE 717. Advanced Heat Transfer. 3 Hours.
PR: Consent. Theory of transport of thermal energy in solids and fluids as well as radiative transfer. Steady state and transient conduction; heat transfer to flowing fluids; evaporation; boiling and condensation; packed- and fluid-bed heat transfer. (3 hr. lec.).

CHE 718. Advanced Mass Transfer. 3 Hours.
PR: Consent. Theory of diffusion, interphase mass-transfer theory, turbulent transport, simultaneous mass and heat transfer, mass transfer with chemical reaction, high mass-transfer rates, and multicomponent macroscopic balances. (3 hr. lec.).

CHE 720. Applied Statistical and Molecular Thermodynamics. 3 Hours.
PR: CHE 620 and consent. The connection between macroscopic phenomena (thermodynamics) and microscopic phenomena (statistical and quantum mechanics). Thermodynamics modeling for process analysis. Equations of state, perturbation theories, mixing rules, computer simulation, group-contribution models, and physical-property prediction. (3 hr. lec.).

CHE 726. Catalysis. 3 Hours.
PR: CHE 625 or consent. Physical and chemical properties of catalytic solids, nature and theories of absorption, thermodynamics of catalysis, theories of mass and energy transport, theoretical and experimental reaction rates, reactor design, and optimization. (3 hr. lec.).

CHE 730. Advanced Numerical Methods. 3 Hours.
PR: CHE 230 or consent. Methods for nonlinear algebraic equations, methods for initial and boundary value ordinary differential equations, methods for parabolic, hyperbolic, and elliptical partial differential equations, numerical stability and methods for stiff equations, optimization techniques. (3 hr. lec.).

CHE 731. Optimization of Chemical Engineering Systems. 3 Hours.
PR:Consent. Optimization in engineering design, unconstrained optimization and differential calculus, equality constraints optimization, search technique, maximum principles, geometric and dynamic programming, linear and nonlinear programming, and calculus of variations. (3 hr. lec.).

CHE 786. Professional Development Seminar for Chemical and Biomedical Engineering. 0 Hours.
This course is designed for graduate students to learn technical presentation skills. The class will have lectures and discussion on contemporary problems of interest to chemical engineers and biomedical engineers. The course consists of a one-hour lecture each week by visiting speakers as well as department graduate students.

CHE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of chemical engineering. 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.).

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

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

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

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

CHE 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.

CHE 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.).

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.
PR: CHEM 215 and CHEM 234 and CHEM 348. Study of the nature, reactions, transport and fate of chemical species in the environment.

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 519. Principles and Bioanalytical Applications of Microfluidics. 3 Hours.
Fundamental principles and state of the art applications of microfluidic 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 or 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.).

CHPR 507. Community Health: Human Sexuality. 3 Hours.
PR: Consent. Analysis of sex-related issues including parenting, sex education, sexual sanctions, pornography, sexual dysfunction, and sexual variance. Designed for teachers, health professionals, and interested lay people.

CHPR 509. Community Health:Drug Education. 3 Hours.
PR: Consent. Designed to help students learn appropriate components of a drug education program, gain an understanding of drug taking in this society, and acquire insights into dependent behaviors.

CHPR 613. Certified Health Education Specialist. 1 Hour.
This course addresses competencies of a certified health education specialist (CHES), and prepares students for the national credentialing exam.

CHPR 614. Injury Prevention and Control. 3 Hours.
The injury control problem is examined as a public health concern. Strategies and programs for injury prevention are studied for implementation with target groups who are overrepresented within the injury problem.

CHPR 650. Practicum. 1-12 Hours.
PR: Consent. Students are assigned to a field placement based on prior health promotion work experience. Under the supervision of faculty, students assume major responsibility for a program with a community health promotion organization. (Grading may be S/U.).

CHPR 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of community health promotion. 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.).

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

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

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

CHPR 697. 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.).

CHPR 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of health-related learning experiences. 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.).

CHPR 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

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

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

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

CHPR 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.

CHPR 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 will be S/U.).

CHPR 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.) These continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

CHPR 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.

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.

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

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

CMED 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

CMED 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.

CMED 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.

CMED 712. Medical Aspects of Environmental Health. 1 Hour.
PR: MD degree or consent. A review of issues illustrating the responsibilities and professional interaction of physicians in identifying, managing, and preventing casualties from environmental causes in air, water, soil, food, pesticides, and related subjects.

CMED 750. Statistics Biomedical Sciences. 1 Hour.
This introductory biostatistics course for biomedical graduate students covers variables and descriptive statistics as well as parametric and non-parametric statistics.

CMED 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of anatomy. 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.).

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

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

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

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

CMED 796. Graduate Seminar. 1-3 Hours.
PR: Consent. A one credit hour seminar is designed to assist students in identifying their career objectives and exploring opportunities to achieve their career objectives.

CMED 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.).

COMM 509. Health Comm Dissemination. 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 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 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 622. Gender and Communication. 3 Hours.
This graduate 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 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.).

COUN 501. Counseling Theory and Techniques 1. 3 Hours.
PR: Consent. Development and application of basic counseling skills including interviewing, clinical observations, and a general orientation to counseling theory and settings. Evaluation will be based on strengths and deficits in intra- and interpersonal skills and on demonstration of counseling skills in checkout situations. In-setting laboratory experience required.

COUN 505. Theory and Practice of Human Appraisal. 3 Hours.
An overview of standardized evaluation methods commonly utilized in educational and rehabilitation settings. Experience is provided in selection, administration, ethical standards, and interpretation of selected instruments.

COUN 512. Research & Evaluation in Counseling. 3 Hours.
PR: Admission to the Counseling Program. This course is designed to fulfill the CACREP education and training standards related to research and program evaluation. Basic concepts, strategies, methodologies, designs, and procedures of research in counseling will be addressed. Emphases are on integrating research designs, measurements, and statistics for initiating research projects, collecting and analyzing data, and interpreting and reporting findings.

COUN 536. Theories of Human Development. 3 Hours.
Theory and research on emotional, social, and intellectual development over the life span. Emphasis on application of developmental theories within educational and therapeutic settings.

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

COUN 606. Counseling Theory and Techniques 2. 3 Hours.
PR: COUN 501 and consent. A study of counseling approaches commonly used in public schools, colleges, and rehabilitation agencies. Application of theory emphasized.

COUN 608. School Counseling Services. 3 Hours.
PR: Consent. Applications of counseling theories and techniques appropriate to the school counseling setting will be explored. Students will develop needs assessments, review legal and ethical issues related to schools, and develop a professional school counseling portfolio.

COUN 609. Group Counseling Theory and Techniques. 3 Hours.
PR:COUN 606 and consent. Theories of group counseling and demonstrations of specific group techniques. Ethical standards. Evaluation will be based on expertise in group facilitation.

COUN 610. School Counseling Services 1. 3 Hours.
PR: Consent. Applications of counseling theories and techniques appropriate to the school counseling setting will be explored. Students will develop needs assessments, review legal and ethical issues related to schools, and develop a professional school counseling portfolio.

COUN 611. School Counseling Services 2. 3 Hours.
PR: COUN 610 with a minimum grade of B-. School-based field experience for school counseling majors. Skills covered include confidence in working with administrators, consultation with teachers, partnering with community and parents, sequencing class activities, budgeting, assessing needs and conducting program evaluation. This course offers students an overview of school operations as they relate to school counseling including an opportunity to observe the school setting.

COUN 619. Medical and Psychological Aspects of Disability. 3 Hours.
PR: Consent. An overview of medical aspects and implications of disability for the person in the rehabilitation process. Studies of the more common severe disabilities and their remediation also will be included.

COUN 620. Career Development & Job Placement. 3 Hours.
Principles and methods involved in career counseling as well as the placement of individuals with disabilities. Emphasis on the use of occupational and educational information, theories of career development and life-style planning, career choices, and lifelong work adjustment.

COUN 622. Introduction to Clinical Mental Health. 3 Hours.
PR or CONC: COUN 501 or consent. Role and function of the clinical mental health counselor; DSM categories and ethical standards, cognitive skills and practical experience necessary to understand client populations served by community agencies.

COUN 624. Case Management. 3 Hours.
PR: COUN 620 or REHB 620. The planning and management of client services focusing on serving the public and private sectors. This course will explore both career and independent living concerns within Human Service and Rehabilitation Service Systems.

COUN 630. Children/Adolescents/Parents. 3 Hours.
PR: COUN 501. Practical application of the principles of counseling children, adolescents, and parents.

COUN 634. Cultural Issues. 3 Hours.
PR: Program major or consent. The impact of cultural differences on the counseling process including gender, race, ethnicity, socioeconomic status, and counseling styles will be discussed. Racial identity development models will be discussed. Group and experiential activities are required.

COUN 640. Addictions Counseling. 3 Hours.
PR: COUN 501 and PR or CONC: COUN 606 or Consent. Specific techniques and models that apply to counseling the addicted client will be explored. Chemical addictions, food addictions, relationship addictions, sexual addictions, and ethics will be addressed. Demonstration of counseling clients with various addictions is required.

COUN 645. Couples and Family Counseling. 3 Hours.
PR: COUN 501, COUN 606 or Consent. Techniques and methods of couples and family counseling. Emphasis on ethics, diversity, theory and practice of couples and family counseling. Demonstration of counseling skills for couples and families is required.

COUN 660. Field Experience in School Counseling. 3 Hours.
PR: COUN 606 and COUN 630 and COUN 632 and PR or CONC: COUN 685 and consent and course enrollment in the Alternate School Counseling Program. Classroom-based field experience for school counseling majors enrolled in alternative certification programs. A review of classroom curriculum for elementary and secondary grades. Course will be graded on a satisfactory/unsatisfactory basis.

COUN 663. Counseling with Sexual Orientation. 1 Hour.
PR: Graduate standing. An overview of psychological, sociological and political aspects of sexual orientation as they impact counseling. Particular attention will be given to awareness and sensitivity toward gay and lesbian clients and effective intervention and education. Course will be graded on a satisfactory/unsatisfactory basis.

COUN 664. Ethical Issues in Counseling. 3 Hours.
PR: COUN 501 and COUN 606. Surveys the legal and ethical issues and professional ethics codes in the counseling profession. Ethical principles applied to schools, agencies, and private practice. Meets ethics content requirement for the LPC.

COUN 665. Diagnosis and Treatment Planning. 3 Hours.
PR: COUN 536 and COUN 606. Framework for exploring the range of personality and behavioral disorders as described in the DSM. Focus on: descriptive criteria, etiology, assessment, diagnosis, multicultural considerations, psychotropic treatments of, and understanding of the major diagnostic categories.

COUN 668. Crisis Trauma Grief Counseling. 3 Hours.
PR: COUN 501. Application of theories and techniques related to crisis, trauma, suicide, childhood trauma, disaster mental health issues, and all aspects of grief counseling will be explored.

COUN 684. Supervision Models/Counseling. 3 Hours.
PR: COUN 606. The current models of supervision that are commonly utilized by supervisors in the field and the techniques associated with the different models will be investigated.

COUN 685. Practicum. 1-12 Hours.
PR: Preregistration; liability insurance; cleared for internship at close of semester, or a M.A. degree, and consent of department practicum evaluation committee. An intensive supervised practical experience in public schools or agencies, in counseling with individual critique and appropriate small-group experiences. Demonstration of high professional standards, counseling skills, and personal characteristics appropriate to the counseling relationship are essential. (Due to the limited number of summer sites, there can be no guarantee of summer practicum placement.)(Practicum is a prerequisite for internship placement. Internship is a one-semester, minimum four-day per week field experience following practicum. This two-semester sequence replaces the previous one-semester practicum.).

COUN 686. Counseling Internship. 1-12 Hours.
PR: Preregistration, completion of COUN 685 Practicum and consent of department field work coordinator. A full-time supervised field experience. Demonstration of counseling program management skills and ethical conduct is required- ACA Ethical Behavior Standards will be used to determine appropriate professional conduct.

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

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

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

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

COUN 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.).

COUN 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.

COUN 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 satisfactory or unsatisfactory grading scale and do not apply as graduate credit toward a degree program.

CPE 520. Application of Neural Networks. 3 Hours.
PR: Consent. Theories, principles, techniques, and procedures used in design implementation of supervised and unsupervised neural networks. Algorithms and computer programming for software realization with engineering applications.

CPE 521. Applied Fuzzy Logic. 3 Hours.
PR: Consent. Theory and applications of fuzzy logic, fuzzy fundamentals, fuzzy rules, decision-making systems, control systems, pattern recognition systems, and advanced topics. Algorithms and computer programming for software realization with engineering applications.

CPE 523. Intelligent and Safe Robotics. 3 Hours.
The Intelligent and Safe Robotics course covers the fundamentals and synergy of sensing, perception, control, and intelligence for robotics and its applications, as well as hands-on experience with vehicles, drones, and related systems.

CPE 530. Hardware Security and Trust. 3 Hours.
This course explores techniques for securing hardware against malicious attacks, covering detection and prevention. Topics include hardware threats, vulnerabilities, and solutions such as Physical Unclonable Functions, True Random Number Generators, Trojan detection, obfuscation, side-channel attacks, cryptography, and FPGA security. Students gain skills to pursue security-focused research, including Machine Learning applications, and address challenges in hardware security.

CPE 536. Computer Data Forensics. 3 Hours.
PR: CPE 310 and CPE 435 or Consent. Provides students with a comprehensive overview of collecting, investigating, preserving, and presenting evidence of cybercrime; introduces topics of forensic data examination of computers and other digital storage devices.

CPE 538. Intro Computer Security Management. 3 Hours.
Develops management tools to build and maintain a secure enterprise. Includes policies, procedures, and the various management and auditing processes that are needed in a networked enterprise.

CPE 553. Advanced Networking Concepts. 3 Hours.
PR: Graduate standing. Design and analysis of network protocols; includes the TCP/IP protocol suite, wireless network protocols, mobility management protocols and ad-hoc network protocols; hands-on network programming using TCP/UDP sockets and discrete event simulations.

CPE 568. Computer Network Forensics. 3 Hours.
PR: CS 450 and CS 453 or consent. Introduction to threat assessment in modern networked computer systems. Techniques, methodologies and technologies for preventing, detecting, recovering from and collecting evidence of intrusions, with the intent of prosecuting the offending parties.

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

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

CPE 620. Deep Learning. 3 Hours.
PR: CPE 520. Review of neural network architectures; introduction to advanced deep neural network architectures that use many layers and large databases; application of deep learning to dimensionality reduction, latent feature extraction, and manifold representation; coupled deep neural networks for cross-modality object verification; use of multiple neural networks for data fusion; applications of deep learning in biometrics, computer vision, and data mining.

CPE 643. Fault Tolerant Computing. 3 Hours.
PR: CPE 310 or Consent. Introduction to reliability analysis and Markov modeling. Computer system reliability modeling. Fault tolerant design of computer systems. Reconfiguration strategies in VLSI and WSI arrays.

CPE 664. Sensor Actuator Networks. 3 Hours.
PR: Graduate standing in CS, CPE, EE or SENG. Introduces students to the state of the art in wireless sensor actuator networks. Provides hands on training in programming these networks.

CPE 670. Switching Circuit Theory 1. 3 Hours.
PR: CPE 271 or equivalent. Course presumes an understanding of the elements of Boolean or switching algebra. Study of both combinational and sequential switching circuits with emphasis on sequential networks. Advanced manual design and computer-aided design techniques for single and multiple output combinational circuits. Analysis and design of sequential circuits. Detection and prevention of undesired transient outputs. (3 hr. rec.).

CPE 684. Advanced Real-Time Systems. 3 Hours.
PR: CS 415 and CPE 484 or consent. Project-based course focused on analysis and design of real-time systems using the unified modeling language. Object-oriented development process based on design patterns and frameworks is described.

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

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

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

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

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

CPE 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 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.

CPE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of computer engineering. 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.).

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

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

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

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

CPE 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.

CPE 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.).

CPSY 701. Advanced Counseling Psychology Interventions. 3 Hours.
PR: Advanced standing and COUN 501 and COUN 606 and COUN 685 or equiv and Consent. Comprehensive development of counseling psychology techniques related to generic and specific theoretical models. In-setting laboratory experience and demonstration of therapy techniques required.

CPSY 709. Advanced Group Counseling / Therapeutic Interventions. 3 Hours.
PR: COUN 609 or equiv and consent. An overview of the formation, leadership techniques, research and ethical issues associated with group counseling and psycho-therapy in general and for specific populations. (Lec.).

CPSY 710. Cognitive-Affective Behavior. 3 Hours.
Review of contemporary theories of learning, memory, motivation, and emotion. Critical review of research and counseling practice. Increased understanding of self-behaviors.

CPSY 734. Multicultural Psychology. 3 Hours.
PR: CPSY advanced standing and CPSY 701. Interactive effects of cultural factors (race, ethnicity, gender, sexual orientation, social status, religious affiliation) as they relate to counseling psychology practice, competencies and roles. (Alternate years.).

CPSY 735. Social Psychology. 3 Hours.
Classic and contemporary readings/research in social psychology emphasizing the interface of social and counseling psychology and integrating social psychology and counseling psychology practice. Uses a student-centered model with emphasis on student-led discussion and demonstrations.

CPSY 738. Life Span Psychology. 3 Hours.
PR: CPSY 763. Overview of developmental psychology focusing on the physical, cognitive, emotional and social domains applied to the professional practice of psychology across the lifespan.

CPSY 740. Assessment of Psychopathology. 3 Hours.
PR: CPSY 701 and CPSY 769. Assessment and diagnosis of psychopathology, integration of case data, treatment planning from a developmental, multicultural perspective with emphasis on ethical and socially responsible interventions and collaboration of counseling psychology with other health care providers.

CPSY 745. History and Systems of Psychology. 3 Hours.
PR: CPSY 701 and CPSY 760. History of modern psychological thought and methodology including the social, political, philosophical, and cultural factors influencing the major schools and systems of psychology, particularly in relationship to counseling psychology.

CPSY 750. Physiological Psychology. 3 Hours.
PR: CPSY 701 and CPSY 760. Survey of neuroanatomical, neuroendocrinological mechanisms underlying psychological and behavioral processes. Motor, sensory, perceptual, behavioral, cognitive, and affective functional systems will be studied. Relevance to normal and pathological development will be reviewed.

CPSY 755. Applied Psychopharmacology. 3 Hours.
PR: CPSY 701 and CPSY 750 and CPSY 760. Review of contemporary theory and practice of psychopharmacology, diagnoses and syndromes warranting medication drug selection, putative mechanisms of action, dosage, side-effects, toxicity, contra-indications, and use of multiple medications. Critical research reviews and outcome comparisons with psychological treatment.

CPSY 760. Introduction to Counseling Psychology. 3 Hours.
PR: Consent. Overview of history, current status, and future trends associated with counseling psychology as a specialty area. Includes an introduction to counseling psychology research topics and practices.

CPSY 763. Advanced Theories of Counseling Psychology. 3 Hours.
PR: COUN 606 and COUN 685, or equivalent, admission to post-master's graduate study; and consent. A comprehensive study of the theoretical issues in contemporary counseling.

CPSY 764. Intellectual Assessment. 4 Hours.
PR: Advanced standing, COUN 505 and pre-registration with instructor. Administering, scoring, and interpreting individual intelligence tests.

CPSY 766. Vocational Theory and Assessment. 3 Hours.
PR: COUN 620 or equivalent, advanced standing, or Consent. Advanced study of theory development and research in vocational psychology and counseling; emphasis on counseling psychology, women's issues, and cross-cultural counseling.

CPSY 769. Personality Testing and Interpretation. 3 Hours.
PR: COUN 505 and Consent. Advanced study in the application of personality assessment procedures and consideration of alternative methods for measuring human behavior.

CPSY 770. Doctoral Practicum in Counseling Psychology. 1-9 Hours.
PR: CPSY 701 and CPSY 769 and CPSY 780 or equivalent and completed doctoral practicum application (due by March 1 of semester year preceding initial semester), and consent. Intensive clinical experience in which students, under supervision, see clients for individual and group counseling and psychotherapy. Offered at a variety of approved field-based sites. (Practicum).

CPSY 772. Internship. 1-12 Hours.
PR: Written approval from the Department Internship Committee, satisfactory completion of written doctoral comprehensive exams and approval of research prospectus. Full-time supervised practice in an approved counseling psychology internship training program; minimum duration one academic year.

CPSY 780. Professional and Ethical Issues in Counseling Psychology. 3 Hours.
PR: Advanced standing and consent. Overview of current ethical, legal, and professional issues in counseling psychology. Readings, discussion, and a written literature review of a topic related to the practice of counseling psychology.

CPSY 781. Research Practicum. 1 Hour.
Ninety clock-hours of documented hands-on research activity. Activity must be supervised by faculty, or in conjunction with faculty supervision.

CPSY 782. Research Methods and Design. 3 Hours.
An overview of research methods and design, statistical procedures and potential violations of ethical principles in the conduct of research in Counseling Psychology.

CPSY 783. Consultation and Supervision. 3 Hours.
PR: CPSY 701 and CPSY 780; one semester of CPSY 770 or equivalent, consent. Assumptions and techniques of consultation/ supervision include demonstrations of the models and relevant critical analysis.

CPSY 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of counseling psychology. 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.).

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

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

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

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

CPSY 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.

CPSY 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.).

CS 510. Formal Specification of Language. 3 Hours.
PR: CS 410. Specifications of language syntax and semantics by grammars and automata and by attribute grammars, denotational semantics, and action equations; algebraic, denotational, and operational semantics; application of formal specifications to construction of software tools.

CS 520. Advanced Analysis of Algorithms. 3 Hours.
PR: CS 320. Analysis and design techniques for efficient sequential and parallel algorithm design; NP-completeness, advanced analysis techniques, advanced algorithms, and parallel algorithms.

CS 525. Computational Complexity. 3 Hours.
PR:CS 422. Introduction to the theory of computational complexity. Topics include: turning machines, computability, complexity classes P, NP, and co-NP, the theory of NP_completeness, randomized complexity classes, inapproximability, and complexity classes beyond NP.

CS 530. Formal Methods in Software Engineering. 3 Hours.
PR:CS 430. Principles of rigorous specification, designing, implementation, and validation of sequential, concurrent, and realtime software; emphasis on reading current papers on these topics.

CS 533. Developing Portable Software. 3 Hours.
Issues, problems, and techniques in the practical development of portable software and in the adaptation of programs to new environments; development of a simple interactive application; porting to several diverse computing platforms.

CS 539. Computer Forensics and the Law. 3 Hours.
PR: CPE 435. Surveys the emerging field of computer law and how it applies to businesses and law enforcement, both to aid and to circumscribe the policies and procedures to tackle computer crime.

CS 540. Theory of Database Systems. 3 Hours.
PR: CS 440. Abstract and newer database models; introduction to database design techniques in the context of semantic data modeling; equivalence of different relational models; object-oriented databases.

CS 550. Theory of Operating Systems. 3 Hours.
PR: CS 450. Theoretical analysis of selected aspects of operating system design; topics include interaction of concurrent processes; scheduling and resource allocation; virtual memory management; access control; and distributed and real-time system issues.

CS 555. Advanced Computer Systems Architecture. 3 Hours.
PR: CS 455 or CPE 442. High performance techniques, pipelined and parallel systems, and high-level architectures; comparative evaluation of architectures for specific applications; emphasis on software implications of hardware specifications.

CS 556. Distributed and Pervasive Compt. 3 Hours.
PR: CS 350 or consent. An in-depth study of distributed computing paradigms, standards, and applications that can exploit this paradigm and the emerging pervasive computing infrastructure.

CS 558. Multimedia Systems. 3 Hours.
PR: CS 350 or EE 465 or consent, requirements and QOS; multimedia data acquisition, object decomposition, multimedia storage servers; multimedia communications-networking, traffic characterizations, traffic scheduling, multicasting; compression of images, video and audio; multimedia information systems-indexing and retrieval of multimedia data.

CS 560. Big Data Engineering. 3 Hours.
PR: LCSEE graduate standing, or consent. Survey of the algorithms, methods, and technologies involved in building, organizing and analyzing massive datasets. Explores the field of data science from a computational perspective.

CS 568. Computer Network Forensics. 3 Hours.
PR: CS 450 and CS 453 or consent. Introduction to threat assessment in modern networked computer systems. Techniques, methodologies and technologies for preventing, detecting, recovering from, and collecting evidence of intrusions, with the intent of prosecuting the offending parties.

CS 569. Cybersecurity and Big Data Analytics. 3 Hours.
PR: Consent. Scientific foundations for solving real-word security problems. Challenges and opportunities of big data. Typical big data analytic and modeling techniques for cybersecurity.

CS 572. Advanced Artificial Intelligence Techniques. 3 Hours.
PR: CS 472. Reasoning under uncertainty; nonmonotonic reasoning, statistical reasoning, fuzzy logic; planning, parallel, and distributed AI, natural language processing, learning, connectionist models, temporal logic, common sense knowledge and qualitative reasoning, AI techniques and robotics.

CS 573. Advanced Data Mining. 3 Hours.
PR: CS 330 and CS 330L and CS 350. We present the theory practice of industrial data mining. Combining pragmatics with theory, students will learn to select appropriate data mining methods for individual applications. Graduate students will learn to conduct data mining experiments.

CS 574. Responsible and Safe AI. 3 Hours.
PR: CS 330 or CS 472 or Instructor Consent. Artificial Intelligence - History, Fundamental Concepts, Trustworthiness, and Impact on Society, will be the focus of this course. This course will examine how AI is being used in a variety of applications including but not limited to Health Care, Education, Entertainment, Transportation, Law, Business, etc. For each of these applications, we will look at the trustworthiness and societal impact.

CS 576. Design of Immersive Media Systems. 3 Hours.
PR: Graduate student status in CS, or consent. Team-based development of a video game, demo reel, or other project demonstrating expertise in game development.

CS 589. Game Seminar. 1 Hour.
(May be repeated for a maximum of 3 credit hours.) A discussion of current topics in video game development.

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

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

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

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

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

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

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

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

CS 623. String Algorithms. 3 Hours.
PR: CS 221 or Consent. Algorithms on strings from traditional combinatorial pattern matchup to recent problems such as suffix sorting and string embeddings. Emphasis is on the data structures and algorithms required, their analysis, and optimal constructions.

CS 630. Empirical Methods in Software Engineering and Computer Science. 3 Hours.
An in-depth study of the scientific process and guidelines for empirical research. Particularly addressing surveys, case studies, and controlled experiments. Covers in detail the qualitative and quantitative data analysis methods commonly used in empirical investigations.

CS 665. Computer System Security. 3 Hours.
PR: CS 465 or Consent. Course describes modern approaches to information and system security including encryption techniques, secure communication protocols, operating system security principles, and network intrusion detection techniques.

CS 674. Computational Photography. 3 Hours.
Computational techniques used for the acquisition and processing of digital photographic data. Introduction to camera technology, image formation, filtering, warping, morphing, compositing, rendering, enhancement, and novel camera design.

CS 676. Machine Learning. 3 Hours.
Principles and techniques used in learning theory, regression, classification, instance-based methods, kernel methods, risk minimization, ensemble-based methods, graphical models, and deep models.

CS 677. Pattern Recognition. 3 Hours.
PR: Consent. Covers salient topics in statistical pattern recognition, including Bayesian decision theory, Bayesian learning and density estimation, linear discriminant functions, multilayer neural networks, support vector machines, and unsupervised learning. Working knowledge of Matlab is essential.

CS 678. Computer Vision. 3 Hours.
An introduction to low-level image analysis methods, image transformations, methods for reconstructing three-dimensional scene information, algorithms for motion and video analysis, and approaches to object recognition.

CS 689. Graduate Internship. 1-3 Hours.
PR: Completion of a minimum of 18 degree applicable graduate credit hours with an overall GPA of 3.0 or better. Employments in industry related to degree program. (Graded P/F. May be repeated twice. Cannot be counted toward graduation requirements.).

CS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of computer science. 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.).

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

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

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

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

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

CS 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.

CS 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.).

CS 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 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.

CS 726. Algorithmic Graph Theory. 3 Hours.
PR: CS 520 or consent. Introduction to algorithmic graph theory with emphasis on special classes of graphs, graph structure, efficient combinatorial algorithms, graph compositions/ decompositions, and graph representations, current research development trends and open questions on structured families and graphs.

CS 727. Information Dissemination. 3 Hours.
PR: CS 520. Research issues in information dissemination in graphs; emphasis on broadcasting and gossiping algorithms, including identification and solution of open research questions.

CS 750. Secure and Survivable Systems. 3 Hours.
PR: CS 680 or Consent. An in-depth study of principles, standards, practices, and architectures in the area of secure and survivable systems. Case studies, simulations, and games will be used to gain deep understanding of the issues.

CS 751. Digital Enterprises. 3 Hours.
PR: CS 680 or Consent. An in-depth study of principles, standards, practices, and architectures in the area of digital enterprise. Case studies and simulations will be used to gain deep understandings of the issues.

CS 757. Distributed Systems and Algorithms. 3 Hours.
PR: CS 320 and CS 550. Distributed and networked operating systems and the algorithms necessary to achieve such goals as transparency, sharing, fault tolerance, and efficient process and task scheduling.

CS 772. Global Knowledge Networks. 3 Hours.
PR: CS 572. Representational formalisms and effective retrieval techniques to obtain information from international knowledge repositories connected via high-speed networks.

CS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of computer science. 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.).

CS 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

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

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

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

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

CS 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.

CS 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.).

CS 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.

CS 930. Professional Development. 1-6 Hours.
Professional development courses provides 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.

CSAD 602. Communication Disorders. 3 Hours.
Survey of normal processes and communication disorders of speech, language, and hearing in children and adults; professions of speech language pathology and audiology; and job opportunities, designed for students not majoring in speech pathology and audiology.

CSAD 604. Seminars Clinical Practice 1. 1 Hour.
PR: Consent. Includes topics necessary for successful completion of clinical practicum.

CSAD 605. Seminars Clinical Practice 3. 1 Hour.
Examines profesional issues in Speech-Language pathology. Will be graded on a Pass/Fail basis.

CSAD 606. Seminars Clinical Practice 2. 1 Hour.
PR: Consent. Includes topics to enhance clinical skills of the beginning clinician.

CSAD 607. Seminars Clinical Practice 4. 1 Hour.
Explores employment settings and service delivery in Speech- Language pathology including medical and educational settings. Wil be graded on a Pass/Fail basis.

CSAD 608. Audiological Foundations. 2 Hours.
PR: Admission to the MS in Speech-Language Pathology program or consent. Develop knowledge and skills related to the screening of hearing and the assessment and treatment of secondary speech and language disorders for persons with hearing loss.

CSAD 609. Introduction to the Clinical Experience. 1 Hour.
PR: Admission to the MS Speech-Language Pathology program or consent. Development of foundational tools required for successful provision of services as a clinician for online Master of Science in Communication Sciences and Disorders students.

CSAD 610. Clinic 1. 3 Hours.
PR: Admission to MS in Speech-Language Pathology program or consent of instructor. Introduction to clinical practice of speech-language pathology including necessary clinic guidelines, policies, and procedures, as well as the foundational skills required to provide ethical, effective, and evidence-based services.

CSAD 611. Advanced Practice/Audiology 1. 1,2 Hour.
PR: Consent. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with hearing disorders.

CSAD 612. Clinic 2. 3 Hours.
PR: CSAD 610 and admission to the MS in Speech-Language Pathology program or consent. Clinical practice of speech-language pathology with supervised clinical experiences and seminars.

CSAD 613. Advanced Practice/Audiology 2. 3 Hours.
PR: CSAD 611 or consent. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with speech-language disorders.

CSAD 614. Clinic 3. 3 Hours.
PR: CSAD 612 and admission to the MS in Speech-Language Pathology program or consent. Clinical practice of speech-language pathology with supervised clinical experiences and seminars.

CSAD 615. Advanced Practice/Audiology 3. 4 Hours.
PR: CSAD 613 or consent. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with hearing disorders.

CSAD 616. Clinic 4. 3 Hours.
PR: CSAD 614 and admission to the MS in Speech-Language Pathology program or consent. Advanced clinical practice of speech-language pathology with supervised clinical experiences and seminars.

CSAD 617. Advanced Practice/Audiology 4. 4 Hours.
PR: CSAD 615 or consent. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with hearing disorders.

CSAD 618. Evidence-Based Practice in Communication Sciences and Disorders. 3 Hours.
An overview of evidence-based clinical practice in communication sciences and disorders with strategies for implementation. Application of the scientific method to clinical practice and critical review of the research literature is emphasized.

CSAD 620. Neurophysiological Bases of Speech and Language. 4 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. Basic and clinical applications of neuroanatomy and neurology. Includes lectures on neurophysiological basis of practice in individuals with disorders of speech, language, hearing and swallowing.

CSAD 622. Voice Disorders. 3 Hours.
PR: Admission to the MS in Speech-Language Pathology program or consent. The purpose of this class is to develop an understanding of normal phonation in comparison to a variety of laryngeal pathologies. Emphasis will be placed on the development of appropriate assessment procedures and evidence-based treatment approaches to voice disorders. Specific emphasis is placed on developing critical thinking skills related to clinical assessment and intervention of individuals with voice disorders.

CSAD 624. Speech Sound Disorders. 3 Hours.
PR: Admission to master's speech-language pathology program or consent. Development of knowledge and skills necessary to assess and treat developmental speech sound disorders of different etiologies. Apply concepts in transcription, phonetic analysis, and typical phonological development to implement evidence-based clinical practice and to mitigate secondary deficits in other domains of spoken and written language.

CSAD 625. Developmental Language Disorders: Early Stages. 3 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. Development of knowledge and skills to evaluate and treat persons with primary and secondary developmental language disorders who communicate nonverbally up to simple sentences. Assess and interpret data (testing and sampling results) to diagnose developmental language disorder and develop evidence-based treatment plans for persons communicating nonverbally up to simple sentences.

CSAD 626. Acquired Motor Speech Disorders. 3 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. The purpose of this class is to develop an understanding of the anatomy and physiology of speech production in relation to motor speech disorders and their treatment. Differential diagnosis will be stressed in discussion of etiology and basic characteristics of motor speech disorders across the age continuum. Specific emphasis is placed on critical thinking related to clinical assessment and intervention.

CSAD 628. Fluency Disorders. 2 Hours.
PR: Admission in the master's speech-language pathology program or consent. Study of the symptomatology, epidemiology, etiology, research findings, assessment, prevention, and remediation of stuttering and related fluency disorders.

CSAD 630. Acquired Language Disorders. 3 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. The purpose of this class is to develop an understanding of acquired language impairments associated with focal lesions to the left or right hemisphere, traumatic brain injury, and dementia. Emphasis will be placed on the development of assessments and evidence-based treatments with specific emphasis placed on developing critical thinking and analytical skills.

CSAD 632. Craniofacial Anomalies. 3 Hours.
PR: CSAD 624 or consent. Investigation of the etiology, diagnosis, nature, and therapy approaches of communicative disorders in persons with cleft palate.

CSAD 634. Language Disorders in Children: Assessment. 2 Hours.
PR: CSAD 324. Assessment procedures utilized to identify children with language disorders. Standardized tests and non-standardized analysis procedures are introduced.

CSAD 635. Developmental Language Disorders: Advanced Stages. 3 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. Development of knowledge and skills to evaluate and treat persons with primary and secondary developmental language disorders at advanced language stages (oral and written language). Assess and interpret data (testing and sampling results) to diagnose primary and secondary developmental language disorders and develop evidence-based treatment plans for persons in the advanced language stages (complex language, reading, and writing).

CSAD 636. Augmentative/Alternative Communication. 3 Hours.
Discussion of augmentative/alternative communication options for persons who are unable to meet their daily needs through natural modes of verbal, manual, or written communication. Demographics, assessment, and treatment of candidates for AAC interventions.

CSAD 642. SLP Service Provision: Education. 2 Hours.
PR: Admission to the MS SLP program or consent. Development of knowledge base and skills in speech-language pathology services provided in an educational setting with content focusing on educational terminology, policies, federal and state laws and legal mandates, interpretation of educational documentation, the design of service provision with alignment to educational curriculum standards, service delivery models, and other educational service delivery considerations.

CSAD 648. Central Auditory Disorders. 3 Hours.
PR: CSAD 642 or consent. Pathology and audiometric site-of-lesion testing of the central auditory nervous system.

CSAD 658. Auditory Processing Disorders. 3 Hours.
PR: Consent. A transdisciplinary approach to evaluation and management of auditory processing disorders in children and adults is presented. This course is for graduate students in speech-language pathology and audiology and professional speech-language pathologists and audiologists.

CSAD 660. Neuropathology of Speech and Language. 3 Hours.
PR: CSAD 620. Explores methods of identifying and treating speech and language problems associated with nonprogressive and progressive neurological disorders.

CSAD 662. Dysphagia. 3 Hours.
PR: Admission to the MS in Speech-Language Pathology program or consent. Assessment and treatment of feeding and swallowing disorders in children and adults.

CSAD 663. Principles of Intervention. 2 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. Development of knowledge and skills associated with the treatment of communication disorders regardless of disorder type or age of client. Includes instruction and assessment of effective development, implementation, evaluation and documentation of treatment.

CSAD 664. Principles of Diagnostics in Communication Sciences and Disorders. 2 Hours.
PR: Admission to the MS program in Speech-Language Pathology or consent. Development of knowledge and skills associated with the diagnosis and reporting (oral and written) of speech and language disorders, including reviewing of case histories/medical records, interviewing, observation, and evaluation using and interpreting standardized tests.

CSAD 665. Culturally Responsive Practices in Communication Sciences and Disorders. 2 Hours.
PR: Admission to the MS Speech-Language Pathology program or consent. Facilitate knowledge of diverse populations in our society and to examine how differences among both individuals and cultures can affect interpersonal and group communication, as well as clinical practice.

CSAD 666. Updating Trends in Augmentative and Alternative Communication. 2 Hours.
Recent research in augmentative and alternative communication assessment and intervention.

CSAD 668. Clinical Experience in AAC. 2 Hours.
Hands on AAC and AAC assessment and intervention experience at Camp Gizmo in Romney, West Virginia.

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

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

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

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

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

CSAD 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.

CSAD 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.).

CSAD 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.

CSAD 702. Anatomy/Physiology of the Ear. 3 Hours.
PR: Consent. Detailed study of the anatomy and physiology of the auditory and vestibular systems, and detailed investigation of physiological aspects of auditory and vestibular sensitivity.

CSAD 704. Instrumentation in Audiology. 3 Hours.
PR: Consent. A study of instrumentation utilized in the evaluation of hearing disorders, including calibration, maintenance, minor repair, and use of such instrumentation. The course includes foundational study of electricity and electrical components.

CSAD 706. Advanced Audiological Assessment 1. 4 Hours.
PR:CSAD 440 or consent. Audiological test procedures utilized in the evaluation of hearing loss including differential diagnosis, test administration and interpretation.

CSAD 709. Practical/Clinical Experience 1. 1 Hour.
PR: Admission to the AuD program or consent of the Chair. Enrollment includes supervised clinical experience, cases presented in weekly class meetings, and Department Grand Rounds during which students will use clinical knowledge and practice clinical skills in order to provide ethical, effective, interprofessional, culturally competent, and evidence-based services. Clinical experiences will be actual and simulated, including otoscopy; hearing, language and speech screening; and history taking.

CSAD 710. Psychoacoustics and Anatomy and Physiology. 3 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use project- and team-based activities and recent best evidence to examine the auditory processing of acoustic signals in typical and disordered human auditory systems, and will apply these principles to hearing screening and assessment measures and the advanced study of the anatomy and physiology of the peripheral and central auditory systems.

CSAD 711. Adult Behavioral Assessments. 3 Hours.
PR: Admission to the AuD program or consent from Chair. Students will use problem- and research-based activities, case studies, and recent best evidence to examine comprehensive behavioral and electrophysiological measurements used in the assessment of the human auditory system. Emphasis will be placed on cultural competence, differential diagnosis, test administration and interpretation, communicating results to patients, the patient and family roles in decision-making, and referrals, and recommendations.

CSAD 713. Adult Audiologic Rehabilitation. 2 Hours.
PR: Admission to the AuD program or consent from Chair. Students will use cases, project- and team-based learning and recent best evidence to examine a range of approaches to assessing and treating different degrees of audiologic disorders in adult populations; psycho-social and informational counseling; outcome measures of treatment efficacy; cultural competence; communicating results to patients and families; participating on interprofessional teams; patient and family roles in decision-making; referrals, and recommendations.

CSAD 714. Neurophysiological Bases of Hearing. 4 Hours.
PR: Admission to the AuD program or consent from Chair. Introduction to basic neuroanatomy and neurophysiology in a clinically meaningful format for audiologists.

CSAD 715. Communication Technologies for Adults 1. 3 Hours.
PR: Admission to the AuD program or consent of Chair. Students will use project- and team-based activities, case studies and recent best evidence to learn about communication technologies including ear-level, bone- and middle-ear implants, and hearing assistive technologies; comprehensive objective and subjective assessment protocol for determining technology candidacy; the process of selecting devices and their features; making earmold impressions; and cultural competence, communicating with patients, their families, and other professionals.

CSAD 716. Amplification Lab 1. 1 Hour.
PR: CSAD 706 and Coreq: CSAD 715. Demonstration and introductory experience selecting, fitting and servicing basic hearing aids for individuals with hearing impairment.

CSAD 717. Ototoxicity, Genetics, & Pharmacology. 1 Hour.
PR: Admission to the AuD program or consent from Chair. Students will use case studies, project- and team-based learning activities and recent best evidence to examine the role of genetics in auditory vestibular disorders, the diagnosis and management of genetic hearing losses; cultural competence; communicating with patients, families, and care providers; team management of syndromic and non-syndromic hearing loss; and the effect of ototoxins on auditory and vestibular function.

CSAD 718. Externship in Speech-Language Pathology. 4-9 Hours.
PR: CSAD 616 and Admission to the MS in Speech-Language Pathology program or consent. Clinical practice of speech-language pathology externship with supervised clinical experiences and seminars.

CSAD 720. Hearing Loss Prevention and Advocacy. 1 Hour.
PR: Admission to the AuD program or consent from Chair. Students will use cases, team-based and experiential learning and recent best evidence to examine role of audiologists in leading or participating in efforts to prevent hearing loss, and create and pass legislation to improve educational, vocational, and other opportunities for people with hearing loss; and how to provide education about the needs of individuals with hearing loss to various groups.

CSAD 721. Communication Technologies for Adults 2. 3 Hours.
PR: Admission to the AuD program or consent of Chair. Students will use case studies, project- and team-based learning activities, and recent best evidence to examine objective and subjective assessments used when fitting, verifying, and validating a range of communication technologies; instructing patients and families in technology care and use; referring and making recommendations; cultural competence and communicating results to patients, families, and other professionals.

CSAD 722. Amplification Lab 2. 1 Hour.
PR: CSAD 715 and CSAD 716 and Coreq: CSAD 721. Demonstrations and introductory experience selecting and fitting amplification systems for individuals with hearing impairment.

CSAD 723. Developmental Audiology & Pediatric Assessment. 2 Hours.
PR: Admission to the AuD program or consent from Chair. Students will use case studies, project- and team-based learning activities and recent best evidence to examine embryology; developmental, physiology and auditory perception; principles of behavioral and objective hearing screening and assessment techniques; test interpretation; effects of hearing loss on pediatric populations; collaborative team management; cultural competence; referring and making recommendations; and communicating results to patients, families and professionals.

CSAD 725. Electrophysiologic Assessments. 3 Hours.
PR: Admission to the AuD program or consent from Chair. Students will use case studies, team-based, or experiential learning and recent best evidence to examine electrophysiological properties and the anatomy and physiology of peripheral and central human auditory systems; stimuli and equipment used otoacoustic emission and auditory evoked response testing; test result interpretation; making referrals and recommendations cultural competence, and relaying results to patients, families and other providers.

CSAD 726. Physiological Measures Lab. 1 Hour.
PR: CSAD 711 and CSAD 714 and Coreq: CSAD 725. Demonstration and introductory experiences with otoacoustic emissions and evoked potential test procedures.

CSAD 729. Practical/Clinical Experience 2. 1 Hour.
PR: Admission to the AuD program or consent of Chair. Enrollment includes supervised clinical experience, experiential learning, cases presented in weekly class meetings and Department Grand Rounds and interprofessional education events. Clinical knowledge and skills will be practiced and solidified in order for students to provide ethical, effective, culturally competent, and evidence-based services. Clinical skills may include conducting an audiologic assessment and communicating with patients, families, and other professionals.

CSAD 731. Pediatric Audiologic Habilitation. 3 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, project- and team-based learning and recent best evidence to examine pediatric audiologic (re)habilitation assessment battery; candidacy for and application of different spoken and manual language interventions; working with families; educational audiology and classroom acoustics; cultural competence; communicating results to patients and families, patient and family role in decision-making, working with teams, recommendations, and referrals.

CSAD 734. Auditory Processing Disorders & Non-Organic Hearing Loss. 3 Hours.
PR: Admission to the AuD program or consent from Chair. Students will use cases, project- and team-based learning and recent best evidence to examine anatomy and physiology of central auditory nervous system; behavioral, physiologic, self-assessments and interventions for auditory processing disorders; behavioral and physiologic assessments for non-organic hearing loss; team management; cultural competence; communication of results to patients, families and other care providers, patient role in decision-making, recommendations, and referrals.

CSAD 735. Tinnitus & Hyperacusis. 1 Hour.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, project- and team-based learning and recent best evidence to examine the psychological and physical effects of tinnitus; objective and subjective assessments of tinnitus and hyperacusis; technological and psychological interventions and their efficacy and limitations; team management; cultural competence; communication of results to patients, families and other care providers, patient role in decision-making and recommendations, and referrals.

CSAD 736. Vestibular Disorders: Assessment. 4 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, team-based and experiential learning and recent best evidence to examine the anatomy and physiology of the mechanisms involved in maintenance of balance; techniques and interpretation of clinical vestibular system and balance function assessment; indicators for balance rehabilitation; cultural competence; team membership; communicating results to patients and families; patient and family role in decision-making; referrals, and recommendations.

CSAD 737. Vestibular Disorders: Intervention. 2 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, team- and research-based learning to interpret vestibular assessments in order to differentiate vestibular test abnormalities; use empirical data in treatment planning; manage and treat vestibular and balance system disorders; use outcome measures of treatment success; communicate results to patients and families; participate on interprofessional teams; patient and family roles in decision-making; referrals, and recommendations.

CSAD 738. Approaches to Care in Audiology. 1 Hour.
PR: Admission to the AuD program or consent from Chair. Students will engage in team- and project-based learning activities and case studies to discover how professional skills and issues, service-delivery models, licensure and certification, client characteristics, and other factors affect clinical practice.

CSAD 739. Practical/Clinical Experience 3. 2 Hours.
PR: Admission to the AuD program or consent from Chair. Enrollment includes supervised clinical experience, experiential learning with cases presented in class meetings, Grand Rounds, and interprofessional education events. Clinical knowledge and skills will be or students to provide ethical, effective, culturally competent, and evidence-based services, including conducting and interpreting audiologic assessments, technology selection and fitting, patient/family role in decision-making and communicating with patients, families and other professionals.

CSAD 741. Business Practices & Supervision. 3 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, project- and team-based learning and recent best evidence to examine business planning, financial and managerial accounting, marketing, human resources management, and other audiology practice management topics involved in daily operations of a private audiology practice; leadership and supervisory styles and practices, working with employees and supervisees; communication, cultural competence, and conflict resolution.

CSAD 743. Hearing Conservation. 2 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, project- and team-based learning and recent best evidence to examine the effect of noise on auditory and related systems; principles and practices of noise-induced hearing loss prevention in occupational, recreational, and other settings; regulations; hearing conservation programs; noise reduction technologies; outcome measures; cultural competence; communicating with workplace leadership employees, schools and individuals; referrals, and recommendations.

CSAD 745. Clinic Supervision Seminar. 2 Hours.
An investigation into methods and techniques for clinical supervision in audiology.

CSAD 747. Cochlear Implants. 2 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, project- and team-based learning and recent best evidence to examine implant manufacturers and their technologies; cultural competence in service delivery; programming; verification measures; implant orientation and troubleshooting; other follow up services; patient and family role in decision-making; the audiologists' role on related interprofessional teams; and communicating with the patient, family, and team members.

CSAD 748. Communication Technologies for Children. 2 Hours.
PR: Admission to the AuD program or consent from the Chair. Students will use cases, project- and team-based learning and recent best evidence to examine pediatric objective and subjective assessments for determining technology candidacy; process of selecting devices and their features; making earmold impressions; fitting, verification and validation measures for children, families and educators; cultural competence; patient and family roles in decision-making; communicating with patients, families and professionals; referrals, and recommendations.

CSAD 749. Practical/Clinical Experience 4. 2 Hours.
PR: Admission to the AuD program or consent from Chair. Enrollment includes supervised clinical experience, experiential learning and cases presented in weekly class meetings and Department Grand Rounds. Clinical knowledge and skills will be practiced in order for students to provide ethical, effective, culturally competent, and evidence-based services, including a range of assessment and intervention tasks, communicating results to patient, patient's role in decision-making, referrals, and recommendations.

CSAD 750. Information Literacy in Communication Sciences and Disorders. 3 Hours.
PR: Consent. Practical and theoretical issues in the use of the professional literature to advance research and practice in audiology and speech-language pathology.

CSAD 752. Research Design in Communication Sciences and Disorders. 3 Hours.
PR: Consent. Practical and theoretical issues in the selection and implementation of quantitative and qualitative research designs common in communication sciences and disorders.

CSAD 754. Teaching and Supervision in Communication Sciences and Disorders. 3 Hours.
PR: Consent. Principles, concepts, and processes involved in effective classroom instruction and clinical supervision of students in audiology and speech-language pathology programs.

CSAD 759. Practical/Clinical Experience 5. 2 Hours.
PR: Admission to the AuD program or consent from Chair. Enrollment includes supervised clinical experience, experiential learning and cases presented in weekly class meetings and Department Grand Rounds. Clinical knowledge and skills will be practiced in order for students to provide ethical, effective, culturally competent, and evidence-based services, including a range of assessment and intervention tasks, communicating results to patient, patient's role in decision-making, referrals, and recommendations.

CSAD 769. Practical/Clinical Experience 6. 3 Hours.
PR: Admission to the AuD program or consent from Chair. Enrollment includes supervised clinical experience, experiential learning, and cases presented in weekly class meetings and Department Grand Rounds. Clinical knowledge and skills will be practiced in order for students to provide ethical, effective, culturally competent, and evidence-based services, including a range of assessment and intervention tasks, communicating results to patient, patient's role in decision-making, referrals, and recommendations.

CSAD 770. Cultural Diversity in Communication Sciences and Disorders. 1 Hour.
PR: Consent and Suggested as CoReq: CSAD 771. Issues and differences related to communication sciences and disorders within diverse subcultures in the USA and Canada.

CSAD 771. Cultural Diversity Lab. 1 Hour.
PR: Consent. Suggested CoReq: CSAD 770. Hands-on experience related to practice in communication sciences and disorders within diverse cultural settings in the USA and Canada.

CSAD 779. Audiology Clinic 7. 6 Hours.
PR: CSAD 769. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with hearing disorders.

CSAD 780. Global Initiatives in Communication Sciences and Disorders. 1 Hour.
PR: Consent and Suggested CoReq: CSAD 781. Issues and differences related to communication sciences and disorders in settings outside the United States and Canada.

CSAD 781. Global Initiatives Lab. 1 Hour.
PR: Consent and Suggested CoReq: CSAD 780. Hands-on experiences related to professional practices and perspectives in communication sciences and disorders outside the United States and Canada.

CSAD 789. Final Year Clinical Experience. 7-9 Hours.
PR: Admission to the AuD program or consent from the Chair. Enrollment in the Final Year Clinical Experience includes the supervised clinical practice of audiology as well as participation in weekly online seminars that will address various advanced professional issues.

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

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

CSAD 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.).

CSAD 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.

CSAD 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.

CSEE 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.).

CSEE 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.

CSEE 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.).

CTS 600. Foundations of Scientific Integrity. 1 Hour.
PR: Enrollment in the Clinical and Translational Science MS or Certificate programs or permission of instructor. As a graduate student or trainee at West Virginia University, you are required to meet particular federal and University-wide standards regarding the responsible conduct of research. This course, which also includes training via the Collaborative Institutional Training Initiative (CITI) addresses this requirement for Master's programs and individuals with NIH Responsible Conduct of Research training requirements.

CTS 610. Clinical Research: Ethics and Regulatory Aspects. 2 Hours.
PR: Enrollment in the Clinical and Translational Science MS or Certificate programs or permission of instructor. Topics covered in this course includes ethical clinical research; IRB review, informed consent and investigator panel; subject selection, coercion and undue inducement and ethics of research with children; risks and benefits, research with adults who cannot consent and participant panel; ethics and international research; ethics of randomized clinical trials, the use of placebo in trials and conflicts of interest.

CTS 620. Scientific Manuscript Writing and Publishing. 2 Hours.
PR: Enrollment in the Clinical and Translational Science MS or Certificate programs, or permission of instructor. This course introduces students to scientific writing focusing on manuscript preparation, technical writing skills, the publication process, navigating peer review and ethical issues in publishing. Students will prepare their own manuscript during this course.

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

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

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

CTS 700. Fundamentals of Clinical and Translational Sciences. 3 Hours.
PR: Consent. Examination of the principles, theories, and current issues in conducting clinical and translational research.

CTS 707. Seminar: CTS Journal Club. 1 Hour.
CTS Journal Club.

CTS 780. Clinical and Translational Science Research Experience. 2-4 Hours.
Research rotations within the laboratories of faculty at WVU. They are designed for first year graduate students to gain laboratory experience within 3 different disciplines (i.e. basic science, clinical and population science) and to pick a laboratory for their dissertation research.

CTS 791. Advanced Topics. 1-6 Hours.
Investigation in advanced topics that are not covered in regularly scheduled courses.

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

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

CYBE 510. Advanced Cybersecurity Principles. 3 Hours.
An overview of the foundational areas of cybersecurity: data, software, system, human, and organizational security. Students will be required to apply cybersecurity principles in discussions about current cybersecurity-related events and complete assignments designed to reinforce computer security concepts and provide hands-on experience in both cyber-attacks and defenses.

CYBE 520. Ethics in Cybersecurity. 3 Hours.
Provide ethical frameworks to aid decision making; present the key ethical issues in relation to computer security and highlight the connection between values and beliefs and the professional code of ethics.

CYBE 564. Software Engineering of Mobile Applications. 3 Hours.
Software engineering of mobile applications and real-world development of mobile technology. Architecture of a simple mobile application. Industry leaders of mobile software engineering. Mobile economics. Mobile software engineering security practices. Mobile enterprise architectures.

CYBE 630. Security and Privacy of Biometric Systems. 3 Hours.
This course introduces students to the fundamental principles and methods used for analyzing the security and privacy of biometric systems. This course intends to teach students about biometric security, identity management, and ethical issues in modern enterprises and emerging Federated Identity Management solutions. This course will also provide students with the skills to explore ISO/IEC biometrics standards.

CYBE 640. Data Analytics for Secure Cyber-Power Systems. 3 Hours.
This course will cover the in-depth knowledge of important power system algorithms, power system physical and communication architectures, data analytics, cyber-attacks, and cyber security in general. This course will empower the learner with the knowledge required to acquire power system cyber security of the smart power grid. Knowledge of power system analysis course is must.

CYBE 650. Cloud Computing for the Internet of Things. 3 Hours.
Investigation of cloud computing techniques and architectures for the Internet of Things (IoT). Basic concepts and current practices of cloud computing and IoT. Topics include cloud computing models, technologies, security, and privacy. Exploration of example applications and patterns of IoT.

CYBE 660. Engineering Secure Software. 3 Hours.
This course covers principles of secure software engineering, focusing on risk assessment, threat mitigation, secure coding practices, and compliance. Students will design and document secure software architectures, apply security in deployment and maintenance, and synthesize comprehensive security documentation. Emphasis is placed on aligning practices with cybersecurity frameworks to protect software assets throughout the development lifecycle.

CYBR 510. Cybersecurity Information Systems Management. 3 Hours.
PR or CONC: CYBR 530 or consent made by the CYBR Program Coordinator. Course provides CYBR students an overview of the IT audit function from an information systems administration perspective. This course will examine in detail how to build and manage an effective IT audit operation capable of analyzing, assessing, and evaluating physical, technical, and operational cybersecurity controls using information systems auditing standards and frameworks such as COBIT, ISO, and ITIL.

CYBR 515. Software Security. 3 Hours.
This course focuses on the practices and aspects of designing secured software systems, throughout the different phases of the software development life cycle as well as developing software systems by employing security technologies and principles, and understanding new developments in secured systems design.

CYBR 520. Business Cybersecurity Analytics. 3 Hours.
PR or CONC: CYBR 510 or consent made by the CYBR Program Coordinator. Technical and management aspects of building and operating a security operations center (SOC) for an enterprise IT environment. Also focuses on data analysis methods and techniques for analyzing cybersecurity data, as well as an introduction to supervised and unsupervised machine learning/artificial intelligence classification algorithms which can be leveraged to provide insights on data analysis and detection problems in cybersecurity.

CYBR 525. Information Security Assurance Management. 3 Hours.
This course prepares graduate students to become effective leaders in the management of computer security risks and cyber threats in private and public sector organizations. This comprehensive course introduces students to information assurance strategies, managerial security frameworks, the management of security controls, and the protection of information systems and networks in business. Students are also provided with the managerial tools.

CYBR 530. Business Data Communications. 3 Hours.
Provides an overview of corporate data communications networks, the TCP/IP model and related technologies of the data communications corporate infrastructure as well as a survey of the essential tools and strategies for the management of secure, effective business networks. The course focuses on many related areas. Students will be encouraged to take and pass the Network+ Certification.

CYBR 535. Business Network Security. 3 Hours.
PR: Admission to MS in Business Cybersecurity Management. This course prepares graduate students to be effective leaders in business network security management. This course focuses on a practical, managerial approach to assessing and maintaining security in organizational networks and private and public cloud infrastructures. The student is expected to learn, think and act as an executive level manager applying network security technologies, controls and policies.

CYBR 540. Information Ethics and Legal Procedures. 3 Hours.
This course provides an introduction to information ethics, including privacy protection and control, surveillance, link analysis, personally identifiable and sensitive data, data anonymity, privacy, accessibility and sharing, censorship, intellectual property, accuracy, virtual reality and AI. Additionally, laws of data collection and storage, security and law enforcement investigations, compliance management for government, publicly held corporations and the healthcare sectors are covered.

CYBR 545. Business Cybercrime Management. 3 Hours.
PR: CYBR 530 and PR or CONC: CYBR 535. Learn the managerial skills to protect, defend, and audit the security of information systems by ensuring confidentiality, integrity, authentications, availability, and non-repudiation through liability assessments, statistical analysis, and risk-based decision making. Upon completion of the course, students should be able to ensure that appropriate business security controls are in place to safeguard digital files and critical electronic infrastructure.

CYBR 550. Business Enterprise Security Architecture. 3 Hours.
Strategies, techniques, and processes of securing information technology assets through developing and managing an enterprise-wide cybersecurity program that can defend against cyberthreats and risks relevant to modern business enterprise networks and information technology environments. Holistic approach to cybersecurity and emphasizes the development and usage of a comprehensive cyberdefense framework. Introduction into conducting research on current and developing cybersecurity threats.

CYBR 555. Business Cybersecurity Practicum. 3 Hours.
PR: CYBR 545. Students will apply business cybersecurity tools to real world information security issues found in a business or non-profit organization. The final project requires integration across the business cybersecurity management skills of business intelligence, data management, information security assurance, data communications, network security, information ethics, legal procedures, business cybercrime management, fraud data analysis and business data visualization using a holistic approach.

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

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

CYBR 595. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

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

DANC 697. 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.).

DANC 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.

DENT 600. Advanced Oral Surgery. 1-12 Hours.
PR: Consent. Advanced study of therapeutics, hospital protocol, and surgical aspects of oral surgery involving lectures, seminars, demonstrations, and clinical applications. (Grading may be P/F.).

DENT 601. Advanced Oral Microbiology. 1-3 Hours.
PR: Consent. Oral microbiology for dental specialties correlates science with evidence-based practice. Patient care is the primary focus linking oral health to systemic disease.

DENT 602. Special Studies in Oral Pathology. 2 Hours.
Advanced study of local or systemic disease processes affecting oral structures through seminars, assignment of specific topics, or research activities.

DENT 686. Applied Statistics in Dentistry. 3 Hours.
This course is designed to provide the dental post-graduate student with an understanding of basic biostatistical analysis and application, research study design, and ability to read and critique the literature effectively. It also forms the basis of the spring Research Methodology course, and in the preparation of the Master's thesis proposal.

DENT 687. Research Methods. 1 Hour.
PR: Consent. Methods and techniques of research in dentistry. Major emphasis on conducting oral health surveys, designed experiments, and critically analyzing results and development of a thesis.

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

DENT 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.).

DENT 700. Anesthesiology. 1 Hour.
Lectures on local anesthesia, including types, modes of action, indications, and contraindications for use. Premedication, toxic effects, and technics of administration are discussed.

DENT 701. Arts & Sciences of Preventive Dentistry. 2 Hours.
Lectures dealing with the philosophy and techniques of preventive dentistry.

DENT 703. Introduction to Patient Care. 3 Hours.
Lectures, laboratory, and clinical experiences designed to develop skill in performing thorough clinical assessments, defining ethical/legal issues in patient care, and performing procedures to prevent and control disease.

DENT 704. Operative Dentistry. 4 Hours.
PR: DENT 710. Preclinical course in principles of cavity preparation, manipulation of plastic restorative materials, and related instrumentation. Characteristics and treatment of caries emphasized.

DENT 706. Interprofessional Education. 2 Hours.
PR: Enrollment in the dental curricula. The IPE two semester course involves a series of activities aimed at promoting collaboration, communication and quality and safety among the health professions to ultimately improve patient care.

DENT 707. Introduction to Clinical Dentistry. 2 Hours.
Observing, assisting and actively participating in the provision of limited care to patients assigned to the student clinics in the School of Dentistry.

DENT 710. Dental Anatomy and Occlusion. 4 Hours.
Anatomy of individual teeth, both permanent and primary, in regard to form and function.

DENT 711. Periodontics. 2 Hours.
Introduction to periodontal diseases, their diagnosis and treatment. Laboratory instruction is included.

DENT 712. Dental Materials. 3 Hours.
Composition, physical, chemical, mechanical, and manipulative properties, and technical uses of dental restorative materials as related to dentistry.

DENT 713. Dental Radiology. 1 Hour.
This course will provide instruction in radiation biology, safety and protection; intraoral and extraoral exposure techniques; and the principles of film and digital imaging.

DENT 714. Oral and Maxillofacial Radiology. 1 Hour.
PR: DENT 713. An introduction to the principles of oral and maxillofacial radiology and provide instruction in the basic skills necessary to interpret any intraoral or extraoral images that might be used in dental practice.

DENT 715. Dental Public Health 1. 2 Hours.
PR: DENT 701. Preparation to conduct needs assessment of individuals and groups, and perform program planning, implementation and evaluation. Field experiences are included.

DENT 717. Physical Diagnosis and Urgent Care. 1 Hour.
This course provides preclinical students with an introduction to the diagnostic tools necessary to address the needs of clinical patients in an urgent care clinic. Attention will be made to patient interviewing, chart documentation, patient history, examination and diagnosis.

DENT 721. Endodontics. 2 Hours.
Preclinical lectures and laboratory exercises on basic technical and biological requisites in the treatment of diseases of the dental pulp and the periapical tissues.

DENT 722. Tooth-Colored Restorations. 4 Hours.
PR:DENT 710 and DENT 704. Preclinical course to include a variety of esthetic dental procedures. Teeth will be prepared for insertion of tooth colored restorations.

DENT 723. Advanced Restorations and Esthetics in Dentistry. 2 Hours.
PR: DENT 704 and DENT 722. This course will provide complex theory and preclinical instruction in the selection and fabrication of optimal restorations of varied materials that satisfy biologic, mechanical and esthetic requirements.

DENT 724. Advanced Treatment Planning. 2 Hours.
The goal of this course is aid students in complex and advanced treatment planning. Students will attend lectures and be assigned case-based scenarios in small groups in which they must comprehensively treatment plan utilizing fixed, operative, removable, endodontics, and periodontal knowledge. They will be attend case presentations presented by postdoctoral and predoctoral dental students.

DENT 725. Practice Management. 1 Hour.
A lecture course designed to prepare dental students in the concepts of four-handed dentistry.

DENT 726. Removable Partial Dentures. 5 Hours.
A didactic and laboratory course that provides the fundamental knowledge and psychomotor skills necessary for the treatment of the partially edentulous patient with a removable partial denture by the general dentist.

DENT 728. General Pathology. 5 Hours.
PR: Consent. A study of the pathophysiological changes associated with human disease and a study of disease of major organ systems.

DENT 729. Indirect Restorations. 3 Hours.
Lectures related to standard clinical procedures and laboratory instruction in direct and indirect cast gold restorations.

DENT 730. Dental Public Health 2. 2 Hours.
PR: DENT 715. Lectures provide the student with a basic knowledge of the principles of dental public health practice. Emphasis is placed on preparing students for their rural site rotation(s).

DENT 731. Occlusion. 2 Hours.
PR: Consent. Didactic and clinic/laboratory instruction in the basic techniques and procedures associated with the treatment of conditions related to faulty occlusion.

DENT 732. Advanced Endodontics 1: Biological Applications in Endodontics. 1 Hour.
PR: DENT 721. Lectures present current evidenced-based knowledge on the theory and practice of endodontics for the prevention, examination, diagnosis and treatment of pulpal and periapical disease.

DENT 733. Advanced Endodontics 2: Biological Applications in Endodontics. 1 Hour.
PR: DENT 721. Lecture and discussion concerning recognition and diagnosis of complex endodontic problems, emergency treatment, assessment of prognosis, and appropriateness of referral for specialty treatment.

DENT 734. Complete Dentures. 6 Hours.
Didactic and laboratory course which identifies, discusses, and develops the fundamental knowledge and psychomotor skills necessary for the treatment of the edentulous patient by the general dentist.

DENT 735. Pediatric Dentistry. 1 Hour.
PR: Consent. Didactic instruction foundational to the dental care to children presented in the following modules of instruction: oral diagnosis/treatment, planning/case presentation, prevention, restorative dentistry, pulpal therapy, management of the developing occlusion and trauma to the dentition and oral structures.

DENT 737. Treatment Planning. 3 Hours.
Introduction to the universal principles of professional treatment planning for adult patients.

DENT 738. Oral Pathology 1. 3 Hours.
This course is the first in a series of 3 required oral pathology courses. It is designed to provide students with a working knowledge of oral and maxillofacial pathology and experience in virtually managing these problems through case study simulation. A broad a broad spectrum of diseases of the oral and maxillofacial regions is covered.

DENT 739. Oral Surgery. 1 Hour.
Didactic instruction in basic surgical principles as applied to the extraction of teeth and Dentoalveolar-surgery.

DENT 740. Periodontics. 2 Hours.
Intermediate didactic instruction in periodontal therapy including basic surgery and post-operative care.

DENT 744. Orthodontic Diagnosis and Treatment Planning. 1 Hour.
Analysis of orthodontic diagnostic records, diagnostic skills for various malocclusions, and formulation of a treatment plan for orthodontic cases.

DENT 745. Principles of Orthodontics. 1 Hour.
Facial growth and development, the development of occlusion, and etiology and classification of malocclusions.

DENT 746. Orthodontic Techniques. 1 Hour.
Technical instruction in taking diagnostic records and constructing basic orthodontic appliances.

DENT 747. Management of Medical and Dental Emergencies. 1 Hour.
Assessment and treatment of the medical risk patient as related to the practice of dentistry. CPR instruction included.

DENT 750. Global Outreach in Dentistry. 1 Hour.
Provides dental students with hands-on diverse experiences managing the oral health needs of patients from diverse cultures and backgrounds. Travel is required.

DENT 752. Professional Communication in Dentistry. 2 Hours.
Seminars on statistics and scientific writing are presented during this three semester course with exercises in the interpretation of scientific articles; emphasis is placed on research project development, implementation and presentation of findings.

DENT 753. Oral Pathology 2. 2 Hours.
PR: DENT 738 or consent. This course is the second in a series of 3 required oral pathology courses. It is designed to provide students with a working knowledge of oral and maxillofacial pathology and experience in virtually managing these problems through case study simulation. A broad a broad spectrum of diseases of the oral and maxillofacial regions is covered.

DENT 754. Introduction to Dental Implantology. 2 Hours.
PR: Consent. Implant diagnosis, treatment planning, selection, placement, restoration, and maintenance are discussed utilizing a multidisciplinary team approach. Surgical and prosthetic experiences are gained during the laboratory sessions.

DENT 756. Fixed Prosthodontics: Part 1. 4 Hours.
PR: DENT 704 and DENT 712 and DENT 731. Lectures and laboratory exercises introduce students to the techniques of preparing and restoring teeth with single unit crowns. This includes areas of patient assessment and treatment planning.

DENT 757. Fixed Prosthodontics: Part 2. 4 Hours.
PR: DENT 756. Lectures and Laboratory exercises introduce students to the techniques of preparing and restoring teeth with fixed partial dentures. This includes assessment, planning, impression making, laboratory procedures and cementation procedures.

DENT 758. Senior Seminar. 2 Hours.
More complex and advanced techniques for clinical practice in all disciplines in dentistry with emphasis on new developments in oral surgery and endodontics.

DENT 759. Oral Surgery. 2 Hours.
PR: Consent. Didactic instruction in patient evaluation, complicated exodontia, pre-prosthetic surgery, diagnosis, surgical and adjunctive treatment of disease, injuries, and defects of human jaws and associated structures.

DENT 761. Special Needs in Dentistry. 1 Hour.
PR: Consent. Continued didactic instruction in dentistry for the child patient with particular emphasis on patients with special needs.

DENT 762. Anxiety and Pain Control. 1 Hour.
PR: DENT 700 and DENT 739 and PCOL 760 and PCOL 763. Emphasis on the use of oral agents in obtaining pain and anxiety control in Dentistry.

DENT 763. Periodontics. 2 Hours.
Advanced didactic instruction in periodontal therapy including special surgical procedures.

DENT 765. Orthodontics. 1 Hour.
Introduction to clinical orthodontics; lectures on case analysis, treatment planning, and clinical procedures involved in interceptive, preventive, and adjunctive treatment of malocclusions.

DENT 766. Applied Pediatric Dentistry. 2 Hours.
PR:DENT 719 and DENT 735. Didactic and pre-clinical instruction in the treatment of children's oral health. Includes treatment planning/case presentations, general restorative procedures, management of developing occlusion, and trauma to dentition and oral structures.

DENT 767. Community Dentistry. 1-15 Hours.
Field experience in various aspects of community health.

DENT 770. Clinical Oral Radiology. 6 Hours.
Clinical application of principles presented in DENT 703 with additional instruction in techniques and interpretation of radiographs with special emphasis to role played in oral diagnosis.

DENT 771. Practice Management. 2 Hours.
PR: DENT 725. A lecture series on the fundamentals of practice management, including the organization and development of the practice, personnel and financial management, and the introduction to TEAM dentistry.

DENT 772. Case Based Treatment Planning. 1 Hour.
This course will involve the comprehensive analysis of complex cases in order to formulate an appropriate ideal treatment plan with suitable alternatives. The student must assimilate patient information into the S.O.A.P format and present the case before faculty and peers.

DENT 774. Principles of Medicine. 2 Hours.
General diseases about which the dental student should have intelligent working knowledge. Students are assigned to specific hospitalized patients to review their findings with the class.

DENT 775. Practice Management. 6 Hours.
PR: Consent. Clinical practice using auxiliaries, including those trained in expanded functions.

DENT 776. Removable Prosthodontics. 6 Hours.
Continued application of the theory and practice of removable prosthodontics.

DENT 777. Periodontics. 6 Hours.
Clinical experience in the diagnosis and treatment of periodontal diseases.

DENT 778. Law & Ethics in Dentistry. 2 Hours.
Select legal concepts and the process of ethical decision making as related to the practice of dentistry. Case analysis is the primary method of instruction.

DENT 780. Endodontics. 6 Hours.
Clinical endodontic instruction in order to develop the skills and judgment necessary to treat diseases of the dental pulp and their sequelae.

DENT 781. Patient Management 1. 4 Hours.
This four semester course in the first year of the clinic curriculum develops professional responsibility and time management through monitoring of patient care activity, which includes treatment, diagnostic reviews and clinic service assignments. (Grading will be Pass/Fail).

DENT 782. Clinical Patient Management 2. 2 Hours.
PR: DENT 781. This two-semester course develops professional responsibility and time management through monitoring of patient care activity, which includes treatment, case presentations, diagnostic reviews and clinic service assignments.

DENT 783. Operative Dentistry. 6 Hours.
Instruction in the clinic setting includes comprehensive diagnosis and treatment planning, computer assisted records, plaque control, caries control, and single tooth restorations. Sufficient variety and depth of experience occurs to obtain competence for independent practice of operative dentistry.

DENT 784. Oral Surgery. 6 Hours.
Clinical instruction in outpatient and inpatient oral surgery necessary to provide comprehensive care for the dental patient.

DENT 785. Orthodontics. 6 Hours.
Clinical management of selected malocclusion problems.

DENT 786. Pediatric Dentistry. 6 Hours.
Instruction in the clinical setting with the goal of developing the psychomotor skills and judgment necessary to provide comprehensive care for the child patient.

DENT 787. Clinical Oral Diagnosis. 6 Hours.
Clinical application of principles presented in DENT 703 and DENT 737, providing opportunities for observation and analysis of clinical problems.

DENT 788. Clinic Completion Practicum. 15 Hours.
Supervised patient care in selected clinical areas specified for each individual student according to their clinical competency requirements. (Grading will be S/U.).

DENT 789. Fixed Prosthodontics. 6 Hours.
PR: Consent. Clinical application of the theory and practice of crown and bridge dentistry.

DENT 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of dentistry. 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.).

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

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

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

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

DENT 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.

DISB 580. Disability and the Family. 3 Hours.
This course is designed to familiarize students with developmental disabilities and their impact on families. Interdisciplinary, family-centered care is emphasized, along with how to access resources to meet the needs of children and families.

DISB 581. Lifespan Disability Policy. 3 Hours.
Overview of health, education, financial and related policies impacting individuals with disabilities across the lifespan and at the federal, state, and local levels.

DISB 585. Disability and Society. 3 Hours.
This course provides a global, interdisciplinary overview of issues and policies that are the concern of individuals with disabilities (e.g., public policy, health-related issues, employment, and social benefits).

DISB 682. Disability and the Community. 2 Hours.
This course offers service learning experience in the community with persons who have a disability.

DISB 686. Graduate Capstone: Disability. 1 Hour.
This capstone experience for the certificate in disability studies at the graduate level culminates with an essay, a presentation, and a portfolio.

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

DMC 561. Audience Segmentation. 3 Hours.
PR: DMC 460 or DMC 660 or IMC 440 or IMC 640. This course examines how data can be used to break down mass markets into specific, reachable target markets. Students explore demographic data and other key indicators that can inform successful campaigns, and which data best serve the development of unique market segments to support specific marketing communication goals.

DMC 562. Message Customization. 3 Hours.
PR: DMC 460 or DMC 660. This course examines how data enables marketing communicators to customize messages to target audiences as small as a single consumer. Students will examine how to motivate consumers by provided brand communications that are relevant, timely and personal.

DMC 563. Brand Data Collection & Visualization. 3 Hours.
PR: DMC 460 or DMC 660. This course examines the benefits of mining your own brand data for insights that could influence marketing communications decisions with an emphasis on how that data can be presented visually to key stakeholders. Students will examine the relevant merits of internal versus external data collection and the proper times, sources and processes to engage in either.

DMC 564. Social Media Optimization. 3 Hours.
PR: DMC 460 or DMC 660. This course examines how data from social media can be leveraged to ensure marketing communications messages reach intended target audiences. Students explore gathering data from social media and customizing messages for maximum impact.

DMC 565. Customer Engagement Ethics & Strategies. 3 Hours.
PR: IMC 440 or IMC 640. This course examines contemporary content strategies for engaging customers through the channels and at the times they prefer. Students will learn to recognize and facilitate customer journeys that provide seamless user experience and path to purchase utilizing omnichannel marketing strategies.

DMC 571. Data Management Platforms. 3 Hours.
PR: DMC 460 or DMC 660. This course explores database platforms and how data can be analyzed to develop specialized and highly targeted marketing communications. Students will examine the relative merits of various platforms based on their specific needs.

DMC 572. Campaign Planning & Programmatic Media Buying. 3 Hours.
PR: DMC 460 or DMC 660. This course examines the automated media buying landscape with a focus on the tools used, risks and rewards of automated media buys. Students explore software platforms available for automated buying to understand the connection between how data input affects media buying output.

DMC 573. Campaign Metrics and Assessment. 3 Hours.
PR: DMC 460 or DMC 660 or IMC 410 or IMC 440 or IMC 610 or IMC 640. This course explores how data informs key performance indicators that define a campaign’s success. Students examine how metrics can rely on data for maximum benefit and survey available metrics and assessment platforms.

DMC 574. Messaging for Customer Relationship Management. 3 Hours.
PR: DMC 460 or DMC 660. This course examines how data is leveraged for communications intended to retain current customers and acquire new ones. Students will explore how to accurately assess per customer lifetime value and utilize effective data-informed communications strategies to maximize and retain that value.

DMC 580. Data Marketing Communications Campaigns. 3 Hours.
PR: DMC 460 or DMC 660. This course is the capstone experience for the data marketing communications master's degree program. Students develop a cohesive marketing communications campaign that demonstrates both a conceptual and practical mastery of data driven marketing communications. This course must be completed in a student's final academic term.

DMC 660. Introduction to Data Marketing Communications. 3 Hours.
PR: Admission to the Data Marketing Communications program. This course is the introductory course experience for the data marketing communications master's degree program. Students will explore the fundamentals of using data to make marketing communications decisions, as well as topics including database marketing, loyalty programs, financial and marketing metrics, audience targeting and segmentation, data for digital marketing, data visualization and marketing automation.

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.

DSGN 520. Design Thinking. 3 Hours.
This course establishes the value of design thinking, identifies the components of the design thinking process, and helps students develop proficiency by using the process in multiple contexts.

DSGN 525. Design Ethics and Social Responsibility. 3 Hours.
The focus of this course is on personal and professional ethics as well as social responsibility. Throughout the course students will have an opportunity to formulate and evaluate a personal code of ethics and use that code as a guiding tool to understand, evaluate and propose socially responsible approaches in professional and personal settings.

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

DSM 512. Global Fashion Affairs. 3 Hours.
This course evaluates key issues facing fashion businesses in the global marketplace. It includes an examination of internal and external forces affecting political, economic, social, environmental and ethical production, and distribution of textile and apparel products.

DSM 535. Visual 3D Modeling and Rendering. 3 Hours.
PR: Consent. Develops students' abilities to apply digital three- dimensional instruments and techniques to effectively visualize and communicate the physical characteristics and phenomenal effects of existing and projected physical artifacts.

DSM 550. Precision Drawing and Modeling. 3 Hours.
PR: Consent. Develops student's working knowledge of the opportunities and constraints associated with using advanced digital representational instruments for precise design, visualization and construction of architectural environments.

DSM 560. Sustainability in Fashion. 3 Hours.
PR: Graduate student standing. This course examines sustainability in the context of cultural, economic, environmental, social, and technological policies and procedures of fashion industries. Factors analyzed include ethics, government policies, international labor standards, environmental regulations, company priorities, consumer responsibilities, economic impact, and worker rights.

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

DSM 620. Creativity, Innovation, and Design. 3 Hours.
Introduces students to the main concepts of creativity and innovation as related to design through experiential learning and theory evaluation.

DSM 622. Fashion Theory. 3 Hours.
PR: Graduate student status. This is an advanced readings course that examines the underpinnings of ‘fashion’ as a social phenomenon through a cultural studies and critical theory perspective. Students are introduced to fashion studies as a field including a review of the key theoretical works that have contributed to its evolution. Students will also reflect upon and articulate their 'why' for doing research.

DSM 650. The Creative Economies. 3 Hours.
PR: Consent. Provides theoretical underpinnings of the emerging creative economies and introduces analytical frameworks and models to evaluate the impact of creative industries and activities on sustainable economic development at community and regional levels.

DSM 673. Professional Development. 1-6 Hours.

DSM 673A. Professional Development. 1-6 Hours.

DSM 673B. Professional Development. 1-6 Hours.

DSM 673C. Professional Development. 1-6 Hours.

DSM 673D. Professional Development. 1-6 Hours.

DSM 673E. Professional Development. 1-6 Hours.

DSM 673F. Professional Development. 1-6 Hours.

DSM 673G. Professional Development. 1-6 Hours.

DSM 673H. Professional Development. 1-6 Hours.

DSM 673I. Professional Development. 1-6 Hours.

DSM 673J. Professional Development. 1-6 Hours.

DSM 673K. Professional Development. 1-6 Hours.

DSM 673L. Professional Development. 1-6 Hours.

DSM 673M. Professional Development. 1-6 Hours.

DSM 673N. Professional Development. 1-6 Hours.

DSM 673O. Professional Development. 1-6 Hours.

DSM 673P. Professional Development. 1-6 Hours.

DSM 673Q. Professional Development. 1-6 Hours.

DSM 673R. Professional Development. 1-6 Hours.

DSM 673S. Professional Development. 1-6 Hours.

DSM 673T. Professional Development. 1-6 Hours.

DSM 673U. Professional Development. 1-6 Hours.

DSM 673V. Professional Development. 1-6 Hours.

DSM 673W. Professional Development. 1-6 Hours.

DSM 673X. Professional Development. 1-6 Hours.

DSM 673Y. Professional Development. 1-6 Hours.

DSM 673Z. Professional Development. 1-6 Hours.

DSM 684. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture, forestry, and consumer sciences. 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.).

DSM 689. Research Methods in Family Resources. 3 Hours.
PR: Introductory statistics or written consent. Research methodology, experimental design, and statistical analysis as relevant to problems in family resources.

DSM 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of agriculture, forestry, and consumer sciences. 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.).

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

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

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

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

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

DSM 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.

DSM 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.).

DSM 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.

DSM 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.

DTHY 678. Dental Hygiene Teaching Methods. 2 Hours.
PR: Consent. Concepts and principles of administration, curriculum, and classroom teaching unique to dental auxiliary education. Emphasis on overall role of the dental hygiene educator.

DTHY 679. Clinical Evaluation. 2 Hours.
PR: DTHY 678. Preparation for clinical instruction and evaluation. Emphasis is placed on clinical evaluation procedures, proper instrumentation and the skills/strategies utilized to promote affective and psychomotor skill development in students.

DTHY 680. Dental Hygiene Seminar and Practice 1. 3 Hours.
PR: Graduate standing and consent. Examination of the critical environmental issues affecting the future of health care; particular impact on oral health care trends will form major focus. Dental hygiene clinical practice is also included.

DTHY 681. Dental Hygiene Seminar and Practice 2. 3 Hours.
Expanded services for the dental hygienist with emphasis on restorative and periodontal functions.

DTHY 685. Research Methods for the Dental Hygienist. 3 Hours.
PR: EDP 613. Methods and techniques of research in dental hygiene. Major emphasis on planning and evaluating health programs, conducting oral health surveys, designing experiments and critically analyzing research results.

DTHY 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of dental hygiene. 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.).

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

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

DTHY 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.).

DTHY 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.

DTHY 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 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.

ECON 501. Economic Decision Making. 3 Hours.
PR: ECON 201 and ECON 202. Theory of demand and supply including cost determination, markets and pricing, regulatory economics, national income accounting, the assessment of economics impacts via the multiplier principle, monetary policy, and taxation policy.

ECON 509. Research Design/Methodology. 3 Hours.
The purpose of this course is to translate what you are learning in your courses into publishable research. This research will take a number of different forms including: op-eds, policy papers, fiscal notes, data sets, and journal articles. The course will also provide insight into careers for economics graduate students in business, government, and the non-profit sector.

ECON 510. Microeconomic Theory. 3 Hours.
This is a course in microeconomic theory for students in the MS Economics program. The course's primary objective is to provide students with a strong foundation in microeconomic theory. Topics covered include costs and production functions, the theory of the firm, profit maximization, consumer choice and demand, market competition, consumer choice, and game theory.

ECON 520. Small Data Methods. 3 Hours.
This course is about understanding small data: these are datasets that allow interaction, visualization, exploration, and analysis on a local machine. The material provides an introduction to applied data analysis, with an emphasis on providing a conceptual framework for thinking about data.

ECON 521. History of Economic Thought. 3 Hours.
This course covers the great thinkers from the history of economics. We will focus on debates between the major thinkers, as well as how and why major elements of contemporary neoclassical theory developed.

ECON 522. Institutional Economics. 3 Hours.
Institutions are the rules of the game in society that constrain and incentivize our behavior. In the latter half of the twentieth century institutions once again became a central focus, resulting in the school of new institutional economics (NIE). This course offers a survey of NIE by looking at its major thinkers and their contributions.

ECON 523. American Economic History. 3 Hours.
This course covers United States economic history. Students will learn about the fundamental factors that led to explosive economic development throughout U.S. history, as well as factors that led to periods of economic stagnation. The economic impact of American institutions such as slavery and mass immigration will also be explored. Students will learn how to conduct original historical economic research.

ECON 525. Econometric Theory and Practice. 3 Hours.
This course provides an introduction to mathematical statistics including probability. Linear regression, ordinary least squares, and panel data methods are covered. Students will use R to analyze data.

ECON 526. Causal Inference. 3 Hours.
PR: ECON 525. This class introduces students to the modern theory of causal inference. Research designs included involve experimental approaches, propensity score matching, differences-in-differences, regression discontinuity, instrumental variables, and the synthetic control method. Students will gain competency at using R to execute these research methods.

ECON 541. Public Economics Theory and Practice. 3 Hours.
PR: BADM 511 or ECON 510. This course covers the economic role of government. Economic roles of state and local governments emphasizing empirical research and policy implications. Particular attention is paid to intergovernmental competition, government performance, service provision, revenue sources, and revenue estimation.

ECON 558. MS ECON Internship. 3 Hours.
PR: Acceptance to MS ECON program, qualifying internship, and permission of MS Coordinator. The purpose of this course is to provide the student with professional work experience further complementing their educational preparation in the MS in economics program.

ECON 561. Regional Economics. 3 Hours.
PR: ECON 525. This course covers a regional economy's spatial dimension, emphasizing interregional capital and labor mobility, the role of cities, objectives and issues of regional policy, lagging regions, and other matters of place-based policy. Students will be introduced to methods of regional analysis such as shift-share analysis, input-output analysis, and spatial econometrics.

ECON 565. Health Economics Theory and Practice. 3 Hours.
PR: ECON 525. Analyzes and evaluates critical questions in health, health care, and health care policy using economic theory and tools. Topics covered include: the demand for health and health care; economic approaches to studying healthy and risky behaviors; the economic causes and correlates of risky health behaviors and health disparities; the design and incentive structures of health care policy.

ECON 571. Economics of Labor. 3 Hours.
Analyze various labor market phenomena and problems using the tools of economic analysis. Wherever applicable the implications for public policy will be discussed in detail. Labor topics include wage and employment determination, human capital theory, discrimination, unemployment, migration, and the effects of unions and government labor regulation.

ECON 572. Economics of Education. 3 Hours.
PR: BADM 522 or ECON 525. This course is an introduction to the topics in the economics of education. The class uses a combination of economic theory, published economic literature, and economic analysis to examine US educational policy through the lens of economics. Education is a primary determinant in labor force productivity, economic growth and development, and individual economic mobility.

ECON 582. MS Economics Practicum. 3 Hours.
PR: Final semester of MS in Economics program. This course provides students the opportunity to apply applied economics tools and theories to data sets embedded in a non-profit or government organization. Students are expected to complete a final paper that uses R and the analytic skills obtained in the program to analyze a policy issue from multiple perspectives.

ECON 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of economics. 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.).

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

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

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

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

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

ECON 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.).

ECON 701. Advanced Micro-Economic Theory 1. 4 Hours.
PR: Consent. Theory of production and allocation, utility theory, theory of the firm, pricing in perfect and imperfect markets, models of firm's operations.

ECON 702. Advanced Macro-Economic Theory 1. 3 Hours.
PR: Consent. Classical, Keynesian and modern macroeconomic theories.

ECON 706. History of Economic Doctrines and Analysis. 3 Hours.
PR: ECON 701 and graduate standing or consent. Writings of the major figures in the development of economic doctrines and analysis.

ECON 709. Research Design and Methodology. 1-3 Hours.
PR: Consent. Basic research approaches based on examples from the student's own work, papers presented at the departmental research seminar series, and economics literature in general.

ECON 711. Advanced Micro-Economic Theory 2. 4 Hours.
PR: ECON 701. General equilibrium analysis, distribution economics.

ECON 712. Advanced Macro-Economic Theory 2. 3 Hours.
PR: ECON 702. Models of economic growth and fluctuations, and other advanced topics in macroeconomic theory.

ECON 721. Mathematical Economics. 3 Hours.
PR: Consent. Mathematics used in economics.

ECON 723. Dynamic Methods of Economics. 1 Hour.
PR: ECON 721. This course covers the basic techniques of dynamic economic analysis that economics graduate students will be working with in advanced economic theory and field courses.

ECON 725. Econometrics 1. 3 Hours.
PR: ECON 721. Mathematical statistics, including probability, mathematical expectation, distributions. Linear regression, ordinary least squares and simple extensions. Students will use a computer to analyze data.

ECON 726. Econometrics 2. 3 Hours.
PR: ECON 725. Econometric methods used by practicing economist. Includes simultaneous equations, asymptotic properties of estimators, and generalizations of and alternatives to least squares estimation. Also may include qualitative response, panel data, nonlinear, spatial, and time series models.

ECON 727. Econometrics 3. 3 Hours.
PR: ECON 726. Completes the graduate econometrics sequence. Topics may include computational methods and time series, spatial, nonlinear, qualitative response, and panel data models.

ECON 729. Spatial Econometrics. 3 Hours.
Explores the various types of spatial econometric models and how they are estimated and interpreted. Maximum likelihood and Bayesian methodologies will be demonstrated both mathematically and in an applied setting.

ECON 731. Monetary Economics 1. 3 Hours.
PR: ECON 702. Sources and determinants of supply of money; demand for money for transactions and speculative purposes; general equilibrium of money, interest, prices, and output; role of money in policy.

ECON 732. Monetary Economics 2. 3 Hours.
PR: ECON 731. Further topics in monetary economics.

ECON 739. Seminar in Financial Economics. 3 Hours.
PR: ECON 735 and ECON 736 or consent. Covers advanced topics in financial economics such as pricing of derivatives and issues in corporate finance.

ECON 741. Public Economics 1. 3 Hours.
PR: ECON 701. Economic role of government in a mixed economy with regard to topics such as resource allocation and distribution of income; social choice mechanisms; fiscal federalism; and revenue.

ECON 742. Public Economics 2. 3 Hours.
PR: ECON 741. Continuation of public economics.

ECON 743. State and Local Public Economics. 3 Hours.
PR: ECON 741 and ECON 742 or consent. Economic roles of state and local governments emphasizing empirical research and policy implications. Particular attention to intergovernmental competition, government performance, service provision, and revenue sources.

ECON 751. International Trade. 3 Hours.
PR: ECON 701. Contemporary theories of international trade; analysis of current problems in world trade.

ECON 752. International Macro-Economics. 3 Hours.
PR: ECON 702. Current theories and policies concerning balance of payments, international capital movements, and foreign exchange, and their relation to the macro economy.

ECON 754. Comparative Economic Systems. 3 Hours.
PR: ECON 701. Comparative study of economic systems, including planned and market socialism and capitalism and the experience of countries in transition from socialism to capitalism.

ECON 755. Development Economics. 3 Hours.
PR: ECON 701. This course explores why some countries are rich and others are poor. Class examines the major phases of thinking in development economics and themes in the contemporary development literature.

ECON 761. Advanced Regional Economics. 3 Hours.
PR: ECON 701 and graduate standing or consent. Regional income and flow of funds estimation, regional cyclical behavior and multiplier analysis, industrial location and analysis, techniques of regional input-output measurement, impact of local government reorganization on regional public service and economic development.

ECON 762. Advanced Urban Economics. 3 Hours.
PR: ECON 701. Theory, policy, and empirical research regarding growth and decline of cities, urban spatial structure and land-use patterns, intrametropolitan employment location, urban transportation, housing, housing market discrimination, local government structure, fiscal problems, and urban redevelopment.

ECON 764. Seminar in Regional Economics. 3 Hours.
PR: Consent.

ECON 765. Health Economics 1. 3 Hours.
PR: ECON 701 and ECON 725. Analyzes and evaluates critical questions in health and health care using tools and approaches in economics. Topics covered include: the demand for health and health care; economic approaches to studying healthy and risky behaviors; the economic causes and correlates of risky health behaviors and health disparities; and global health and economic development.

ECON 766. Health Economics 2. 3 Hours.
PR: ECON 701 and ECON 725. Analyzes and evaluates critical questions in health and health care using tools and approaches in economics. Topics covered include: demand for private health insurance; public and private health insurance; hospital ownership and competition among hospitals; markets for physician services; technology, innovation and the pharmaceutical sector; comparative health care systems; government's role, and economic evaluation of health and health care.

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

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

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

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

ECON 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.

ECON 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.).

ECON 930. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional fields 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.

EDLS 601. Dynamics of Educational Organizations. 3 Hours.
A foundation course which introduces students to school cultures, systems theory, hierarchy of school organizations, impact of global issues and forces, strategic planning, and the expanding role of technology as a learning and management tool.

EDLS 602. Human Resources Dynamics. 3 Hours.
An overview of personnel functions with a focus on recruitment, selection, orientation, evaluation, and development; interpersonal skills; motivational theories; and the utilization of technology in the personnel process.

EDLS 603. Principles of Educational Leadership. 3 Hours.
An exploration of the role of leadership in modern education. Topics and simulations include group processes, verbal and non-verbal communication, leadership styles, team building, interpersonal relations, conflict management, and ethical practices.

EDLS 610. School Business Administration. 3 Hours.
Efficient and effective operational procedures at the school and district level relating to the fiscal, spatial, physical conditions, safety and security, and information management systems are explored, including the use of technology.

EDLS 611. Principles of Supervision. 3 Hours.
Students develop instructional leadership skills in working with teachers to understand and improve classroom instruction. Topics include: developing a learning culture, supervisory theories and models, and integration of technology and best instructional practices.

EDLS 612. School: Policies, Politics and Laws. 3 Hours.
An overview of statutes, common law and court decisions. Topics include the politics of education, due process, policy development, the role of federal, state, and local government in public education, and the issues of diversity and equity in a school setting.

EDLS 613. Research-Evaluation-Assessment. 3 Hours.
PR: Consent. Research, evaluation, and assessment procedures related to administrative decision making and problem solving to increase the general effectiveness of educational institutions.

EDLS 614. Community and Media Relations. 3 Hours.
This course will explore community attitudes, cultures, and communication strategies. It will provide students with resources to understand, evaluate and improve internal and external school-community relations.

EDLS 620. Site-Based Leadership. 3 Hours.
PR: Consent. An overview course that focuses on the principal's active role of applying theory to practice with a special emphasis on emerging trends and issues, goal setting, testing, curricular alignment with goals, facilities management, and the change process.

EDLS 625. Topics in Supervision. 3 Hours.
Special knowledge and skills for supervisors K-12 including media, computers, reading, multicultural education, testing, and special education.

EDLS 691. Advanced Topics. 1-6 Hours.
Investigation of advanced topics not covered in regularly scheduled courses.

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

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

EDLS 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.).

EDLS 702. Superintendency: Role and Responsibilities. 3 Hours.
PR: M.A. in education leadership or equivalent or consent. This course is designed to examine the concepts of effective school district leadership. Students will examine the roles, relationship behaviors, and competencies which characterize an effective educational organization.

EDLS 703. Economics and Education Funding. 3 Hours.
PR: M.A. in education leadership or equivalent or consent. This course will focus on the macro and micro economics concepts and their application to financing education and its infra- structure. The content will incorporate forces of economic change, development of new societal and educational infra-structures, and implications for social spending.

EDLS 704. Education Facilities: Planning and Evaluation. 3 Hours.
PR: M.A. in education leadership or equivalent or consent. The planning, evaluation, and management of current and future school facilities.

EDLS 705. Public Education:Ethics/Laws/Policies. 3 Hours.
PR: M.A. in education leadership or equivalent or consent. This course will focus on ethics, educational responsibility, and the legal concepts relating to human resources management and student rights. The content is designed to develop an understanding of the judicial process and its effect on public school law and to understand the legal parameters within which the educational CEO operates.

EDLS 706. Learning Organizations: Culture, Technology and Change. 3 Hours.
PR: M.A. in education leadership or equivalent or consent. This course will focus on the concepts of results-based strategic planning, critical inquiry, and new assessment paradigms. The content will emphasize beginning where we are, authentic assessment of learning and horizontal assessment of processes, and broadening the base of responsibility for processes and results (outcomes). New knowledge about and use of information systems, integrating technology and high performance learning expectations.

EDLS 707. Politics and Education. 3 Hours.
PR: M.A. in education administration or equivalent or consent. The purpose of this course is to raise the student's awareness and comprehension of the role political processes play in shaping the fundamental governance and organizational structures of American education. A special emphasis will be placed on the role of the state and national government.

EDLS 708. Changing Organizations. 3 Hours.
PR: M.A. in educational leadership or equivalent or consent. Interdisciplinary study of the major concepts of educational administration theory and its application to educational settings. Topics include organizational change, understanding of organizational dynamics and relationships, motivation, empowerment, and responding to human resource needs.

EDLS 761. Prospectus Development in Higher Education. 3 Hours.
Students review an array of instruments designed to assess college students' perceptions, satisfaction, and learning. They will also critique these instruments to determine their quality.

EDLS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of education leader- ship 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 not on assistantships to gain teaching experience. (Grading will be S/U.).

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

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

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

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

EDLS 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.

EDLS 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.).

EDLS 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.

EDP 600. Educational Psychology. 3 Hours.
Designed for beginning graduate students. Psychological principles of learning and development as they relate to processes of instruction.

EDP 612. Introduction to Research. 3 Hours.
Basic concepts, strategies, methodologies, designs, and procedures of research in education. Major emphasis on integrating research designs, measurements, and statistics for initiating research projects, collecting and analyzing data, and interpreting and reporting findings.

EDP 617. Program Evaluation. 3 Hours.
PR: EDP 613 and SCFD 615. An awareness of the purposes, ethics, issues of design, methods, and models of program evaluation.

EDP 618. Mixing Research Methodologies. 3 Hours.
PR: EDP 612. Focus on choices available for and processes involved in mixing qualitative and quantitative research and evaluation methodologies.

EDP 640. Instructional Design. 3 Hours.
Introduction to the major components of the instructional design process, from needs analysis through evaluation and implementation. Students will demonstrate the elements of the process with a design plan for an instructional project.

EDP 680. Capstone Seminar in Program Evaluation. 3 Hours.
PR: EDP 617. Emphasis on initiating and completing a program evaluation at the local, region or state level under guidance of instructor. Application of evaluative concepts, methods and theories as they relate to practice in different professions. Exposure to differing evaluation literature focused on theory and practice.

EDP 690. Teaching Practicum. 1-6 Hours.
PR: Consent. Supervised practice in college teaching of educational psychology. 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.).

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

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

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

EDP 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.).

EDP 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.

EDP 700. Psychological Foundations of Learning. 3 Hours.
Psychological foundations of major learning theories and their implications for instructional procedures.

EDP 710. Thesis/Dissertation Bootcamp. 3 Hours.
PR: EDP 613 and SCFD 615. Identification of research problems in education, consideration of alternative designs and methods of investigation, and development of a thesis, dissertation, or other research proposal at the advanced graduate level.

EDP 711. Multivariate Methods 1. 3 Hours.
PR: EDP 614. General and generalized linear models; repeated measures analysis of variance for one- and two-way designs, split-plot/mixed analysis of variance, and profile analysis; multivariate analysis of variance, multivariate analysis of co-variance, and discriminant function analysis for one-way and two-way designs.

EDP 730. Cognition and Learning. 3 Hours.
Theories of knowledge representation including information processing models, learning strategies across content areas and transfer of learning strategies; additional focus on problem-solving, expertise, strategic reading, and strategy instruction.

EDP 790. Teaching Practicum. 1-3 Hours.
Supervised practice in college teaching of education psychology. 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.).

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

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

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

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

EDP 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.

EDP 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.).

EDP 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 Satisfactory or Unsatisfactory grading scale and do not apply as graduate credit toward a degree program.

EDUC 600. Teacher as Researcher. 3 Hours.
PR: Consent, EDUC 612. Preparation for action research; documentation of observations of researchable topics in school settings and completion of an extended classroom-based study.

EDUC 601. Context of Education. 3 Hours.
PR: EDUC 612 with a minimum grade of C-. Critical, analytical, and reflective thinking on schooling through the integration of social, cultural, historical, philosophical, and political perspectives; examination of the contexts of students' own educational practice.

EDUC 602. Professional Identity: Teacher as Leader. 3 Hours.
PR: EDUC 612 with a minimum grade of C-. Preparation for professional development as educational leaders. Examination, synthesis, and application of literature on teacher development, autonomy and school reform.

EDUC 604. Foundations of Education. 3 Hours.
Examines the social and cultural foundations of education. Analyzes interpretive, normative, and critical perspectives on education, both inside of and outside of schools.

EDUC 608. Research in Appalachian Contexts. 3 Hours.
This course invites master's and doctoral students to study in-depth the importance of the Appalachian and West Virginian context to their thesis and dissertation research. In the course, we will consider various qualitative research designs and opportunities to support research that explore assets, concerns, and conflicts specific to the region.

EDUC 612. Professional Internship/Technology Applications. 1-12 Hours.
PR: EDUC 411 and (EDUC 401 or SPED 203). Full-time professional internship in public school teaching including the integration of instructional technologies in teaching: satisfactory completion is required for recommendation for professional licensure and graduation with an educational degree.

EDUC 629. Curriculum Development and Reform in Educational Contexts. 3 Hours.
Provides an overview of the historical and philosophical bases for current K-20 education curriculum trends and debates. Examines contemporary contextual influences on the curriculum, as well as the major strands involved in academic planning, including learners, instruction, curriculum design and development, and assessment. Investigate current curricular reforms and movements in light of changing local, national, and global contexts.

EDUC 630. Strategic Leadership. 3 Hours.
In this course, students will learn how to develop a data-informed strategic plan that advances mission, vision, and values, attends to stakeholder needs. Further, students will design an implementation plan, including resourcing, and an evaluation plan for continuous cycles of improvement.

EDUC 631. Instructional Leadership. 3 Hours.
Educational leaders are the instructional leaders for their schools and districts. They must have the knowledge and skills necessary to lead data-driven instructional and curricular reforms to promote equity and student success. In this course, students will learn how to develop logic models for curricular and instructional interventions and assessments, design assessment plans, and provide professional learning opportunities for educators.

EDUC 632. Cultural Leadership. 3 Hours.
In this course, students will learn how to use schoolwide and districtwide data to recognize inequities and school culture challenges. They will learn contemporary influences on inequities and contributors to negative and positive school and district cultures. Finally, they will utilize a community of care framework to respond to climate and culture challenges and create safe, equitable, and inclusive schools.

EDUC 633. Ethical & Policy Leadership. 3 Hours.
In this course, students will engage in ethical and legally-responsive leadership reflection, case analysis, and develop opportunities to serve as advocates to promote student and staff well being and success.

EDUC 634. Organizational & Community Leadership. 3 Hours.
Educational leaders must be responsive to student, school, and community needs. In this course students will learn theories of organizations, community, and engagement, and apply these in leadership practice.

EDUC 635. Superintendent Seminar. 3 Hours.
In this course, aspiring superintendents will utilize leadership and organizational theories to respond to contemporary leadership challenges through authentic cases. Place-based theories will be integrated throughout the course.

EDUC 639. Leadership Internship 1. 3 Hours.
PR or CONC: EDUC 633. In the building-level internship course, students will work with a local mentor to navigate common leadership roles and responsibilities, including resource allocation for school improvement, teacher recruitment and retention, and promoting a safe school environment. The internship placement consists of 140 hours of fieldwork and culminates in a portfolio of practice.

EDUC 640. Leadership Internship 2. 3 Hours.
PR: EDUC 639 or departmental approval. In the district-level internship course, students will work with a local mentor to navigate common leadership roles and responsibilities, including equitable resource distribution, capacity building, communications, political leadership, and policy advocacy using place-based leadership strategies. The internship placement consists of 140 hours of fieldwork and culminates in a portfolio of practice.

EDUC 641. Place-based Leadership. 3 Hours.
Rural and urban leaders face similar challenges in their work. In this course, students will use place-based theories of leadership to locate and leverage local strengths to respond to context-specific leadership challenges.

EDUC 652. Statistical Methods 1. 3 Hours.
Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regressions, correlation, transformation, F and chi-square distributions, and analysis of variance and sample size.

EDUC 653. Statistical Methods 2. 3 Hours.
PR: EDUC 652. Covers analysis of variance models and extensions, including two-way, repeated measures, and mixed ANOVA and analysis of covariance, as well as correlation and multiple regression, foundations of mediation and moderation, and logistic regression. Major focus on applied practice, interpretation, and reporting. Emphasizes conceptual and procedural understanding.

EDUC 658. Survey Research Methods. 3 Hours.
PR: EDUC 652. Addresses how to develop, validate, and critically evaluate survey instruments. Covers item development, scaling and scoring procedures, methods of assessing and supporting validity evidence, factor analysis/analytic procedures, score reliability, and ethical issues associated with educational measurement.

EDUC 670. Writing Education Research. 3 Hours.
In this practical course, students will draft educational research, with a particular focus on prospectus writing. Topics will include: building an introduction, synthesizing literature, and justifying appropriate research methods.

EDUC 672. Instructional Design and Technology: Professional Internship. 4-6 Hours.
PR: EDUC 674. This course provides students a supervised learning experience central to applied roles in instructional design and technology. Experience will focus on: communication technology, education and corporate training, distance education, and multimedia design/production.

EDUC 674. Instructional Design and Technology Research and Development Seminar 1. 2 Hours.
PR: EDUC 605. The purpose of this seminar is to prepare effective instructional design consultants capable of identifying instructional problems, determining alternative solutions, and implementing appropriate changes within organizational systems.

EDUC 675. Instructional Design Technology Research and Design Seminar 2. 2 Hours.
PR: EDUC 394. This course provides participants with practice writing, presenting, and critiquing research. learn and practice professional skills including creating portfolios, constructing vitas or resumes, and interviewing.

EDUC 687. Instructional Practicum/Technology Application. 3 Hours.
PR: EDUC 612 and EDUC 600. Teaching and mentoring in public schools and university settings; collaborative design of individualized practicum contracts on topics of mutual interest and need including the exploration of instructional technologies.

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

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

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

EDUC 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.

EDUC 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.).

EDUC 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of education. 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.).

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

EDUC 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.

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

EDUC 930. Professional Development. 1-6 Hours.
Professional development course providing 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.

EE 513. Stochastic Systems Theory. 3 Hours.
PR: Consent. Probability distribution and density functions. Bayes rule and conditional probability. Stochastic process and linear systems. Gauss-Markov Process. Optimal linear estimation. Introduction to Wiener and Kalman filtering. Decision theory fundamentals. (3 hr. rec.).

EE 515. Linear Control Systems. 3 Hours.
PR: Graduate standing. Basic concepts in the theory of linear control systems, state variable representation, solution of state equations, controllability, observability, stability, transfer function descriptions, and design of controllers and observers.

EE 517. Optimal Control. 3 Hours.
PR: Consent. Methods of direct synthesis and optimization of feedback systems; Wiener theory; Pontryagin's maximum principle; dynamic programming; adaptive feedback systems. (3 hr. rec.).

EE 528. Biomedial Microdevices. 3 Hours.
Fundamentals of micro-manufacturing and micro-fluidics, microfluidic platforms and components, biosensors, drug-delivery systems, lab-on-a-chip devices, DNA microarrays, emerging applications in biomedicine and tissue engineering, and photolithography and soft lithography lab demonstration.

EE 531. Advanced Electrical Machinery. 3 Hours.
PR: Consent. Theory and modeling of synchronous, induction, and direct-current machines, and their steady-state and transient analysis. (3 hr. rec.).

EE 532. Power Distribution Systems. 3 Hours.
Load characteristics, feeder voltage calculation, subtransmission and distribution substations; primary and secondary distribution; secondary network systems; distribution transformers, voltage regulation and application of capacitors; voltage fluctuations; industry standard tools.

EE 533. Computer Applications in Power System Analysis. 3 Hours.
PR: EE 436. Steady state analysis by digital computers of large integrated electrical power systems. Bus admittance and impedance matrices, load flow studies, economic dispatch and optimal power flow, steady state security analysis, and fault studies.

EE 535. Power System Control and Stability. 3 Hours.
PR: EE 515. Review of stability theory, classical transient analysis, dynamical models of synchronous machines, power system stability under small and large perturbations, dynamic, and simulation of power systems. (3 hr. rec.).

EE 550. Advanced Semiconductor Electronics. 3 Hours.
PR: EE 450 or equivalent. Theory of electronic and photonic device. Semiconductors properties and their impact on devices behavior - p-n junctions, bipolar transistors, and MOS transistors. Quantum mechanical effects introduced. Development of models to simulate devices and simple circuits.

EE 551. Linear Integrated Circuits. 3 Hours.
PR:EE 355 and EE 355L and EE 450 or equivalent. Design and analysis of analog integrated circuits. Both linear and nonlinear transistor models are covered. Applications focus on linear analog circuits including simple amplifiers, operational amplifiers, and reference circuits. This course focuses on CMOS technology.

EE 561. Communication Theory. 3 Hours.
PR: EE 461 or Consent. Detailed study of probability theory and its use in describing random variables and stochastic processes. Emphasis on applications to problems in communication system design. (3 hr. rec.).

EE 562. Wireless Communication System. 3 Hours.
PR: EE 461 and EE 513. Architecture and design of cellular and wireless communication networks, electromagnetic effects of the wireless channel and corresponding statistical models, implementation and performance of diversity reception techniques, and multiple-access.

EE 564. Digital Signal Processing for Radio Astronomy. 3 Hours.
PR: Graduate Standing and/or consent. Digital signal processing as applied to radio astronomy. Filtering, Fourier transforms and correlation firmware are designed for Field Programmable Gate Arrays.

EE 565. Advanced Image Processing. 3 Hours.
PR: EE 465 or equivalent. Covers the theory of statistically modeling image source, algorithms for analysis and processing of image signals, new applications of image processing into computer vision and biomedical imaging, and MATLAB based image processing.

EE 567. Coding Theory. 3 Hours.
PR: MATH 375 or consent. Design, analysis, and implementation of codes for error detection and correction.

EE 569. Digital Video Processing. 3 Hours.
PR: EE 465. Covers basic theory and algorithmic aspects of digital video processing, along with latest video coding standards, multimedia streaming, security video, and biometrics. Hands-on experience in processing video signals under MATLAB in team-based projects.

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

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

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

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

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

EE 613. Detection and Estimation Theory. 3 Hours.
PR: EE 513 or equivalent. Study of detection, estimation, and signal representation, detection of signal in noise, estimation of signal parameters, linear estimation theory. Performance bonds on Estimation and Detection. Kalman-Bucy and Wiener filters. Modern optimal estimation and detection.

EE 650. Optoelectronics. 3 Hours.
PR: EE 450 or PHYS 471 or consent. Semiconductor physics theory of light-emitting diodes, homojunction lasers, single and double heterojunction lasers, separate confinement quantum well lasers, p-i-n and photo detectors and avalanche photo detectors. Optical and electrical analysis of epitaxial and device designs.

EE 668. Information Theory. 3 Hours.
PR: EE 513. Mathematical description of channels and sources; entropy, information, data compression, channel capacity, Shannon's theorems, rate-distortion theory, maximum entropy principle, and large deviations theory.

EE 689. Graduate Internship. 1-3 Hours.
PR: Completion of a minimum of 18 degree applicable graduate credit hours with a minimum GPA of 3.0 or better. Employment in industry related to degree program. (Graded P/F. May be repeated twice. Cannot be counted toward graduation requirements.).

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

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

EE 693. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

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

EE 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.).

EE 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 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.

EE 713. Large-Scale System Modeling. 3 Hours.
PR: EE 515. Characterization of large-scale systems, model simplification through aggregation and perturbation methods, optimal and chained aggregation, balanced realization and cost component procedures, optimal model reduction, simplification effects, decentralized control, and feasibility and design. (3 hr. lec.).

EE 731. Real Time Control of Power System. 3 Hours.
PR: EE 515 and EE 517 and EE 533. Application of computers to modern control theory for reliable and economic real-time operation of integrated power systems. (3 hr. rec.).

EE 733. Protection of Power Systems. 3 Hours.
PR: EE 436 or Consent. Principles of relay protection for faults on transmission lines and other devices. Use of overcurrent, differential distance, and pilot relaying systems. Special relay applications. Determination of short-circuit currents and voltages from system studies. (3 hr. rec.).

EE 735. HVDC Transmission. 3 Hours.
PR: EE 435 and EE 533. Line-commutated converter analysis, operation of two terminal and multiterminal dc systems, harmonics and filters, modeling of ac/dc system, and design of modulation controllers.

EE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of electrical engineering. 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.).

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

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

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

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

EE 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.

EE 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.).

EMCP 501. Cardio/Hematologic Emergencies. 2 Hours.
PR: PA-C, NP, DO, MD degree or by permission of the instructor. Clinical presentation, diagnostic evaluation, and management of cardiovascular and hematologic emergencies are covered.

EMCP 502. Neurologic, Psychiatric, Ophthalmologic, and Otolaryngologic Emergency. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by permission of instructor. Emergency management of neurologic, psychiatric, ophthalmologic, and otolaryngologic disorders are emphasized. Clinical presentation, diagnostic evaluation and treatment option are covered.

EMCP 503. Obstetric, Gynecologic, Pediatric, and Infectious Disease Emergency. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by permission of the instructor. Emergency management of obstetric, gynecologic, pediatric, and infectious disease disorders is emphasized. Clinical presentation, diagnostic evaluation, and treatment options are covered.

EMCP 504. Trauma and Musculoskeletal Emergencies. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by permission of instructor. Emergency management of the trauma patient is emphasized. Non-traumatic musculoskeletal disorders are also covered.

EMCP 505. Environmental Emergencies. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by consent. Management of environmental emergencies is emphasized. Clinical presentation, diagnostic evaluation, and treatment options are covered for a variety of environmental-induced disorders.

EMCP 506. Toxicology/Dermatology Emergencies. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by consent. Management of toxicologic and dermatologic emergencies is covered. pathophysiology, clinical presentation, diagnostic evaluation and treatment options are emphasized.

EMCP 507. Chest/Abdominal Emergencies. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by consent. Emergency management of gastrointestinal, thoracic and respiratory emergencies is covered. Pathophysiology, clinical presentation, diagnostic evaluation, and treatment options are emphasized.

EMCP 508. Renal/Endocrine/Immune Emergencies. 2 Hours.
PR: PA-C, NP, DO, MD degree, or by consent. Emergency management of renal, urogenital, endocrine, metabolic, and immunologic disorders are covered. Pathophysiology, clinical presentation, diagnostic evaluation and treatment options are emphasized.

EMCP 509. Evidence-Based Emergency Medicine. 1 Hour.
PR: PA-C, NP, MD, or DO degree, or consent. Students will synthesize material learned in pervious courses with the student's own clinical experiences. Evidence-based Medicine (EBM will be utilized in this course to facilitate achievement of this objective.

EMCP 510. Emergency Medicine Procedures. 1 Hour.
PR: PA-C, NP, MD or DO degree, or consent. Students will focus on procedures that fall within the scope of practice of the Emergency Medicine practitioner.

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

EMGT 501. Engineering and Systems Management. 3 Hours.
The concepts and knowledge of managing a technical organization. Topics include technical leadership, decision making, managing innovation, developing budgets, and understanding supply chain and logistical issues.

EMGT 502. Quality Management Systems. 3 Hours.
This course introduces students to the concepts, tools, and techniques used in deployment of Quality Management Systems (QMS) including, quality cultures, quality standards, and their relevancy with the overall customer experience. Students will gain knowledge in the application of quality management tools and techniques to assess and improve Quality Management Systems.

EMGT 503. Project Management. 3 Hours.
This course covers subjects within the Project Management Body of Knowledge (PMBOK), theory and practical aspects of project planning, organizing, scheduling, resources management, the project management processes, and project integration management.

EMGT 504. Operations and Supply Chain Engineering. 3 Hours.
This course deals with operations management topics related to forecasting, sales and operations planning, scheduling, and inventory management to improve and measure supply chain management by investigating logistics, global sourcing and procurement, and applying lean and Six Sigma ideologies. The course will also cover the sustainability aspects related to operations and supply chain management.

EMGT 506. Lean Six Sigma. 3 Hours.
This course introduces students to the concepts, tools, and techniques used in applying Lean Six Sigma (LSS) for process improvement, including lean culture, DMAIC steps, and team formation dynamics. Students will gain knowledge in the application of lean six sigma from a managerial perspective, enabling them to lead and execute continuous improvement activities in manufacturing and service settings.

EMGT 511. Analytics for Decision Making. 3 Hours.
PR: EMGT 501 with a minimum grade of B-. This course introduces how data is used to optimize the operational and financial performance of an organization, including selecting the best data for analysis, utilizing the most applicable tools and methods, and presenting the results in an effective format.

EMGT 513. Advanced Engineering Economic Analysis. 3 Hours.
This course introduces how financial resource management is used by engineering managers to optimize the performance of their enterprise, including accounting, finance, budgets, engineering economics, and cost/benefit estimating.

EMGT 521. Strategic Engineering Management. 3 Hours.
PR: EMGT 501 with a minimum grade of B-. This course integrates fundamental engineering principles with engineering management concepts. Theoretical framework for engineering management, including entropy and continuity. Systems approach to solve large-scale engineering management problems. Application of theory to practice.

EMGT 522. New Product and Services Development. 3 Hours.
This course introduces the new product and services development process including tools, methods, and techniques that are used by companies and innovators. Topics include the differences between B2B and B2C product development, impact of new technologies, as well as the multi-disciplinary nature of NPSD. The course is hands-on, and students apply their knowledge by developing a new product/service in teams.

EMGT 524. Leadership for Engineering Managers. 3 Hours.
Personal, professional, organizational, and technology leadership theory and application. Personal development, core values, culture, motivation, teams, knowledge work, change management, empowerment, and managing stress and discipline. Development of skills and knowledge to lead to success.

EMGT 593. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

ENDO 644. Clinical Management of Medically Compromised Patients. 1 Hour.
PR: Enrollment in the MS program in Endodontics. This course will provide an in-depth knowledge of various medically compromising conditions and their management during dental treatment. The course will also enable the participants to prevent, diagnose and respond to common medical emergencies appropriately.

ENDO 681. Fundamentals of Endodontics. 2 Hours.
The aim of this course is to provide first year Endodontic residents with foundational knowledge in endodontic diagnosis, treatment planning, treatment procedures, prognosis and contemporary research prior to starting patient care in the graduate endodontics clinic.

ENDO 682. Fundamentals of Endodontics Laboratory. 2 Hours.
This laboratory course is designed to mimic the technical skills required for patient care. Graduate students (residents) will practice the techniques discussed and demonstrated in ENDO 681. Residents will become familiar with the Graduate Endodontic Clinic, instrumentation, materials and the Surgical Operating Microscope. Instructors will be able to assess the resident as they observe the demonstration of technical skills required.

ENDO 683. Endodontic Classic Literature Review. 1 Hour.
Provides seminar discussions in the topics of: basic endodontic techniques, advanced endodontic techniques, endodontic literature review, case presentation, advanced endodontic theory and legal aspects of clinical practice.

ENDO 684. Endodontic Current Literature Review. 1 Hour.
Provides seminar discussions in the topics of: Current endodontic techniques, current endodontic literature review, and legal aspects of clinical practice.

ENDO 685. Endodontic Case Review and Analysis. 1 Hour.
PR: ENDO 682. Advanced education students in endodontics apply critical thinking skills while presenting comprehensive cases with endodontic conditions utilizing diagnosis and treatment planning options considered through a problem-based approach. Students are also expected to apply critical thinking skills to the review of endodontic books and current literature pertaining to the field of endodontics and pulp biology to justify treatment approaches.

ENDO 688. Clinical Endodontics. 1-5 Hours.
(May be repeated for credit.) PR: Graduate of an accredited dental school and admission to the advanced education program in endodontics or consent. Clinical endodontic practice in the areas of: ordinary endodontic cases, complex endodontic cases, hemisection, root amputation, replantation, transplantation, endodontic implantation, vital pulp therapy, apexification, and bleaching.

ENDO 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of dentistry. Note: this course is intended to insure that graduate assistants are adequately prepared and supervised when they are given colleges teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

ENDO 697. 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.).

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.
This 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.
Historical developments in the field of composition and rhetoric as it relates to current issues and practices.

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 majors 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 688. Creative Writing Mentoring. 3 Hours.
Supervised practice in mentoring advanced undergraduate creative writers.

ENGL 689. Writing and Editing Practicum. 1-3 Hours.
Supervised practice in writing and editing. (Grading will be S/U.).

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

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

ENGL 693. 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 697. Research. 1-9 hr. PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

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 797. Research. 1-9 hr. PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

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.

ENGR 588. Graduate Cooperative Experience. 1 Hour.
PR: Consent. Pre-arranged graduate co-op experience in student's major. Involves placement with a public or private employer. Includes employer supervision during employment and faculty evaluation after.

ENGR 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of engineering. 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.).

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

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

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

ENGR 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.).

ENGR 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper scholarly project, or a dissertation. Grading is S/U.

ENGR 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.

ENLM 500. Advanced Negotiations and Ethics for Energy Land Managers. 3 Hours.
Formation and delivery of detailed negotiation scenarios commonly encountered in energy projects. Focuses on negotiating positions, techniques, and styles in accordance with professional ethics and standards of practice.

ENLM 510. Water & Energy Systems. 3 Hours.
This course will cover the practice, use, and issues with water in energy systems ranging from the history of water usage to the current practices and the developing technologies for water treatment and use.

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

ENTO 503. Medical Entomology. 3 Hours.
Medically important arthropods affecting health of humans and domestic animals. Epidemiology of major arthropod-transmitted diseases of humans and animals. Identification, rearing, collecting, preparation and control of medically important arthropods.

ENTO 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of entomology. 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.).

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

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

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

ENTO 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.).

ENTO 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of Entomology. 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.).

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

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

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

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

ENTO 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.

ENTO 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.).

ENTR 540. Survey of Entrepreneurship. 3 Hours.
This course offers a study of the concepts necessary to become a successful small business entrepreneur. The course work includes practical application of marketing and management skills.

ENTR 580. Survey of Entrepreneurship and Small Business Management. 3 Hours.
This course explores entrepreneurship and provides an in-depth understanding of issues involved in planning and creating a new venture, while highlighting the various roles of the entrepreneur. Upon successful completion of this course, students will earn 3 credit hours.

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

ENVE 593. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

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

ENVP 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.).

ENVP 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.).

EPID 501. Epidemiology for Public Health. 3 Hours.
This course is a graduate level course designed to introduce epidemiologic concepts and methods and their role in public health. It provides an overview of fundamental epidemiologic study designs and methods used in public health research and practice to describe distribution and determinants of disease and health events in populations.

EPID 512. Applied Epidemiology for Public Health. 3 Hours.
PR: EPID 501. This course covers the derivation of epidemiological measures, assessment of relevant study designs, and drawing inferences from these sources of data to assess and respond to public health problems.

EPID 611. Concepts and Methods of Epidemiology. 3 Hours.
PR: BIOS 503 and BIOS 611 and EPID 501. This course will provide students an opportunity to apply epidemiologic concepts and methods to the analysis of public health data through both lecture and lab-based exercises using statistical software.

EPID 623. Epidemiology and Public Health Practice at the Health Department. 3 Hours.
An introduction to public health practice at the Health Department. The class will strengthen students' perspective and understanding of the work performed by epidemiologists at local and state health departments. Each class will cover a separate area of work for the Health Department. This class will consist of lectures, discussions, case based exercises and field experiences.

EPID 625. Principles of Clinical Trials. 3 Hours.
Students will understand the core elements and major challenges of clinical trials by learning the fundamentals of designing, conducting, and reporting clinical trials and critically evaluating clinical trial literature.

EPID 629. Epidemiology Capstone. 2 Hours.
The Epidemiology Capstone is the culminating experience for MPH students in epidemiology. It requires students to demonstrate their ability to synthesize and integrate the core public health and epidemiology knowledge and competencies via a paper and oral presentation. (Grading will be Pass/Fail.).

EPID 663. Public Health Surveillance. 3 Hours.
This course includes presentations and discussions of epidemiologic principles, basic statistical analysis, public health surveillance, field investigations, surveys and sampling, and epidemiologic aspects of current major public health problems in international health. The course will cover chronic and infectious diseases surveillance, and procedures and policies for data collection, compilation, and reporting. Metrics developed by the WHO will be used.

EPID 675. GIS Applications in Public Health. 3 Hours.
PR: PUBH 611 and PUBH 612. This course provides students with foundational GIS skills to access, store, manipulate, and descriptively analyze spatially referenced health data. Students will gain intermediate proficiency with ESRI ArcGIS software, and gain exposure to GIS capabilities within R.

EPID 676. Spatial Epidemiology. 3 Hours.
PR: EPID 675. The purpose of this course is to provide students with technical training in spatial epidemiology. A wide range of statistical methods and software packages for analysis of areal and point data are covered. Instruction is focused on the practical application of methodologies and concepts in spatial epidemiology in public health research.

EPID 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of epidemiology. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given collges teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

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

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

EPID 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.

EPID 711. Methodological Issues in Design & Analysis of Cohort Studies. 3 Hours.
PR: BIOS 610 and BIOS 611 and EPID 501 or instructor consent. An in-depth examination of methodological issues related to the design and analysis of epidemiologic cohort studies. Comparison of different approaches to the analysis of epidemiologic data. Investigation of the role analytic methods decisions play in determining the accuracy, validity, and meaningfulness of analytic outcomes.

EPID 712. Quantitative Methods in Epidemiology. 3 Hours.
PR: (BIOS 503 or BIOS 610) and (EPID 501 or EPID 711). Applied quantitative methods essential to core training of epidemiology majors. Prepares students to conceptualize and conduct epidemiologic research using secondary database. Develops an understanding of the underlying principles, practical application, and correct interpretation of the epidemiologic results using appropriate multivariable models.

EPID 740. Gene X Environmental Interactions and Chronic Diseases. 3 Hours.
The goal of this course is to inform students about the role of environmental factors in gene expression related to complex diseases such as CVD and cancer.

EPID 766. Physical Activity Epidemiology. 3 Hours.
PR: EPID 710. This course provides an in-depth examination of the epidemiology of physical activity. The course builds upon basic epidemiological methods and explores the relationship between physical activity and chronic diseases.

EPID 769. Occupational Epidemiology. 3 Hours.
PR: BIOS 610 for MPH students and EPID 710 for PhD students. Application of epidemiology to occupational disease and injury. Occupational hazards, including concepts of exposure and dose, as well as study design considerations unique to occupational studies, especially design challenges and analytic implications, will be covered.

EPID 770. Nutritional Epidemiology. 3 Hours.
This course addresses the role of nutrition and food components in primary, secondary, and tertiary disease prevention. Through cooperative learning, students will practice critical thinking skills in the study of nutrition in chronic disease prevention.

EPID 771. Infectious Diseases Epidemiology. 3 Hours.
PR: PUBH 611 or EPID 611 or consent of the instructor. This course is designed to cover the basic epidemiological, public health, economic, surveillance, prevention and other issues related to infectious diseases. The focus includes the major infectious diseases experienced globally as well as those specific to the United States.

EPID 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of (subject matter determined by department/division/college/school offering the course). 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.

EPID 791. Advanced Topics. 1-6 Hours.
Investigation of advanced topics not covered in regularly scheduled courses.

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

EPID 795. Independent Study. 1-9 Hours.
PR: Consent. Faculty-supervised study of topics not available through regular course offerings.

EPID 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.

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

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.).

ESWS 515. Hazardous Waste Training. 3 Hours.
PR: Corequisite of ESWS 515L. A course covering important aspects of hazardous waste training. Includes health and safety plan development, protective equipment, air monitoring, incident command, site characterization, toxciology, full scale disaster exercises, risk assessment and safety plan writing.

ESWS 515L. Hazardous Waste Training Laboratory. 0 Hours.
PR: Corequisite of ESWS 515. Hazardous Waste Training - ESWS 515 Laboratory.

ESWS 516. Soil Chemistry. 3 Hours.
PR: ESWS 410. An analysis of the important reactions that occur in soils; thermodynamic and kinetic aspects of these reactions and application to modern problems in soil chemistry.

ESWS 525. Principles of Water Resources. 3 Hours.
Geographic distribution/redistribution, quantity, and quality of water resources and their roles in human and environmental systems. Applies alternative policy frameworks to explore the decision-making challenges surrounding water resources.

ESWS 552. Pedology. 3 Hours.
PR: ESWS 417 or consent. Genesis and evolution of soils considered as natural bodies; including both macro-and micromorphological properties. Week-long field trip required at student's expense.

ESWS 555. Environmental Sampling and Analysis. 3 Hours.
PR: ESWS 155 or consent. Introduction to environmental sampling ans analysis. Lecture and hands-on experience will include sampling plan development, sampling point selection, sampling equipment use, containers, preservatives sample analysis, chain-of-custody, protective equipment and technical report development.

ESWS 575. Environmental Water Resources. 3 Hours.
This course provides background in the fundamentals of environmental water resources and will equip students with requisite knowledge to address complex contemporary water resources issues via focused curricula including (but not limited to): land use practices, water use, and the physical principles of precipitation, infiltration, evapotranspiration, overland and subsurface flow, stream flow, and water use management practices.

ESWS 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching.

ESWS 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

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

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

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

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

ESWS 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.

ESWS 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.).

ESWS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching.

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

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

ESWS 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.

ESWS 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.).

ETEC 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching.

EXPH 564. Applied Biomechanics. 3 Hours.
PR: Department approval. This course will provide students with the principles of the analysis of human movement biomechanics, including but not limited to: anthropometry, signal processing, kinetics, kinematics, electromyography, isokinetic strength assessment, and basic programming.

EXPH 567. Exercise Physiology 2. 4 Hours.
PR: Consent. Comprehensive knowledge of the functioning of body systems during exercise, the acute and chronic adaptations that occur, and the practical application of this to health and disease.

EXPH 583. Neuromechanics. 4 Hours.
Core concepts in Neuromechanics. Fundamental concepts in computational neuroscience and biomechanics with applications to the analyses of movement control.

EXPH 601. Tactical Performance Assessment and Monitoring 1. 2 Hours.
Tactical Performance Assessment and Monitoring 1 will cover the identification of key performance indicators and the implementation of technology in respect to external and internal load monitoring of Tactical athletes. EXPH 601 is offered in a blended format and students will be expected to attend a 4-day on-campus laboratory session.

EXPH 602. Tactical Performance Assessment and Monitoring 2. 2 Hours.
PR: EXPH 601 with a minimum grade of B-. Tactical Performance Assessment and Monitoring 2 will build upon the skills from Tactical Performance Assessment and Monitoring 1 and cover the identification of key performance indicators and the implementation of technology in respect to external and internal load monitoring of Tactical athletes. EXPH 602 is a blended course and students will be expected to attend a 4-day on-campus laboratory session.

EXPH 610. Environmental Exercise Physiology. 3 Hours.
PR: EXPH 567 with a minimum grade of B-. A survey of the effect of the physical properties of thermal, barometric, gravitational, and air pollutant conditions on the physical performance of humans. Both acute and chronic effects will be examined, with emphasis placed on physiologic limitations and adaptations. This course is offered in an online synchronous format and intended for graduate students who have completed Advanced Exercise Physiology.

EXPH 650. Advanced Anatomy for Exercise Physiology. 3 Hours.
Provides an advanced, in-depth, integrative understanding of human anatomy. A regional approach will be used to learn typical and atypical anatomical structures of the human body. Clinical correlations will made throughout each topical area.

EXPH 651. Advanced Gross Anatomy for Exercise Physiology. 2 Hours.
PR or CONC: EXPH 650. Provides graduate Exercise Physiology students with integrative advanced dissection experience, leading to a comprehensive understanding of human anatomy. The student will engage in dissection activities associated with the content of co-requisite lectures. A regional approach will be used to learn typical and atypical anatomical structures of the human body.

EXPH 661. Clinical Research Methods 1. 1 Hour.
Develops skills to understand, design, assess, and evaluate clinical techniques and research that are relevant to Clinical Exercise Physiologists, including pathologies resulting from lack of exercise. Students will evaluate clinical scientific literature and case studies of various disease conditions and incorporate exercise testing and prescription in small group, student-centered, problem-based learning activities.

EXPH 662. Clinical Research Methods 2. 1 Hour.
PR: EXPH 661. Advance the foundation knowledge from Clinical Research Methods 1. Advance skills to understand, design, assess, and evaluate clinical techniques and research, including pathologies resulting from lack of exercise. Students will evaluate clinical scientific literature and case studies of various disease conditions and incorporate exercise testing and prescription in small group, student-centered, problem-based learning activities. Completion of this course.

EXPH 667. Advanced Exercise Nutrition. 3 Hours.
Provides advanced scientific knowledge of nutrition for health science disciplines with a particular emphasis on sports nutrition.

EXPH 668. Diabetes and Exercise. 3 Hours.
PR: Graduate standing, consent. In-depth study of topics related to the comprehensive management of patients with diabetes mellitus, with special emphasis on the use of exercise in diabetes care.

EXPH 669. Advanced Strength and Conditioning Methods. 3 Hours.
Advanced Strength and Conditioning aims to develop expertise regarding adaptations to anaerobic training and practical knowledge in resistance training program design. Special emphasis will be given to the physiological needs and resistance training program design for tactical professionals (i.e., military, law enforcement officers, and firefighters).

EXPH 670. Lab Techniques and Methods 2. 3 Hours.
PR: Graduate standing, consent. This course teaches the techniques and methods used to monitor physiologic systems in humans during rest and exercise. It includes methods used to assess the health status of individuals desirous of exercise testing or prescription.

EXPH 671. Stress Testing. 3 Hours.
PR: EXPH 670, consent. In-depth study of graded exercise testing in laboratory or field situations. The course includes protocols for athletes, asymptomatic individuals, and special populations.

EXPH 672. Professional Field Placement. 1-18 Hours.
PR: Consent. Prearranged program to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development. (Internship.).

EXPH 673. Exercise Prescription. 3 Hours.
This course will provide graduate students an understanding of the exercise prescription process and the exercise management of patients with chronic diseases.

EXPH 680. Advanced Clinical Exercise Physiology. 3 Hours.
PR: Graduate Standing. Presentation of scientific techniques utilized by clinical exercise physiologists to assess fitness in healthy and disease populations. This course will refine clinical competencies needed to safely administering various fitness assessments in clinical populations in which the risk of untoward events increases.

EXPH 681. Clinical Exercise Prescription. 5 Hours.
This course will present current established exercise guidelines for the safe evaluation of functional capacities and the establishment of safe, effective exercise prescriptions for individuals with cardiovascular and/or metabolic diseases.

EXPH 682. Research Design and Methods. 4 Hours.
An advanced level of important concepts involved in the design of experimental studies in Exercise Physiology. The main focus will be on understanding the essential techniques for study design, data collection, its critical evaluation, and research reporting.

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

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

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

EXPH 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.

EXPH 697. 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.).

EXPH 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.

EXPH 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 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.

EXPH 777. Journal Club. 1 Hour.
PR: Instructor consent. An in-depth examination and discussion of recent publications, research ideas and research projects/data-encompassing topics and research relevant to Exercise Physiology or pathologies resulting from lack of exercise.

EXPH 780. Human Performance and Rehabilitation Engineering. 3 Hours.
This fast-paced course introduces a series of diverse methodology with practical demonstrations that provide experiential training for the research enterprise that is increasingly complex, interdisciplinary, and collaborative.

EXPH 786. Musculoskeletal Biology. 3 Hours.
Introduction to current research approaches in musculoskeletal biology of exercise physiology. This course will stress critical thinking, and refine skills related to research design and evaluation of research methods used in exercise physiology.

EXPH 787. Cardiopulmonary Physiology. 3 Hours.
An advanced survey of important concepts involved in cardiovascular/ cardiopulmonary physiology and pathophysiology. The main focus will be on understanding the changes to cardiovascular/pulmonary system brought about by physiological stimuli such as exercise, aging, and disease states.

EXPH 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in teaching exercise physiology. 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.).

EXPH 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

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

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

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

EXPH 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.

EXPH 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.).

FDM 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

FDM 693. Special Topics. 1-6 Hours.
FDM 693. Special Topics. 1-6 hr. Study of advanced topics that are not covered in regularly scheduled courses.

FDST 545. Food Microbiology. 3 Hours.
PR: ENVM 341. The relationships of microorganisms to food-borne illness and intoxications, microbial food safety and food quality, food spoilage, food preservation and bio-processing. The emerging food preservation technologies and predictive microbiology will be introduced.

FDST 545L. Food Microbiology Laboratory. 1 Hour.
PR or CONC: FDST 545. Laboratory training in methods used in microbiological examination of foods. This laboratory will provide hands-on experience for students who take or have taken FDST 545.

FDST 593. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

FDST 595. Independent Study. 1-9 Hours.

FDST 670. Advanced Muscle Foods. 3 Hours.
PR: FDST 365 and FDST 367. Theoretical and experimental aspects of muscle food science, muscle food production/process systems, and the quantitative biology of muscle systems used for food.

FIN 500. Corporate Finance. 3 Hours.
PR: BADM 511, BADM 522, and BADM 524. A practical consideration of the operation of financial markets, considerations for the inter-temporal comparisons of opportunities, and the elements of the decision-making criteria for the financial manager.

FIN 510. Investments and Portfolio Management. 3 Hours.
PR: BADM 532. The course provides theoretical understanding of how financial decisions are made under uncertainly. The topics include the securities market environment, modern portfolio theory, risk analysis, bond and stock valuations, and derivative securities.

FIN 511. Financial Economics. 3 Hours.
A survey of Microeconomic Markets in the U.S. economy. Examines how the U.S. System interacts with larger global economy.

FIN 512. Ethical Standards in Finance. 2 Hours.
An overview of the impact of legal, societal, and ethical considerations on business decision-making and strategic planning in the finance industry. Prepares participants to pass the Ethical and Professional Standards portion of the CFA and CBOK Exam.

FIN 513. Macroeconomics and Financial Markets. 2 Hours.
This course provides students with an understanding of how macroeconomic performance is measured, how monetary and fiscal policies influence macroeconomic performance, and how these relate to financial markets around the world.

FIN 520. Quantitative Finance. 3 Hours.
Examines statistical and probability concepts, statistical inference, regression analysis, time series analysis and financial modeling. Emphasizes financial applications, including portfolio optimization and analysis of financial time series.

FIN 521. Financial Reporting and Analysis. 3 Hours.
Fundamental security analysis requires that cash flows be evaluated primarily using external accounting data. This course provides students with the skills necessary to evaluate financial reports focusing on firm valuation.

FIN 522. Advanced Corporate Finance. 3 Hours.
Case study approach focusing on complex problems in the corporate forecasting, capital budgeting, cost of capital analysis, the financing of capital investments, and financial decisions on strategic investment.

FIN 523. Equity Investment. 3 Hours.
This course provides students with professional knowledge of investment tools in equity markets, industry and company analysis, valuation models, and equity portfolio management.

FIN 525. Derivative Securities. 3 Hours.
This course will extend the student's knowledge of derivatives markets for commodities and financial instruments. Particular attention will be given to the use of financial derivatives for risk management.

FIN 526. Portfolio Management. 3 Hours.
Examines the complete investment process from constructing investment objectives and policies to strategic asset allocation, security selection, trade execution, portfolio monitoring, and performance measurements.

FIN 527. Alternative Investments. 3 Hours.
Alternative investments are a growing presence in financial markets. These investments allow the investors to diversify their portfolios beyond rational debt and equity securities. This course provides students with the skills necessary to understand the risks and rewards in alternative investment markets.

FIN 528. Integrated Financial Analysis. 3 Hours.
This is a capstone course that brings together all elements of financial planning including ethical standards, quantitative methods, economics, financial reporting, corporate finance, equity and fixed income investments, derivatives, portfolio management, and wealth planning.

FIN 529. FinTech. 3 Hours.
Fintech (or financial technology) is one of the most fast-moving industries. The applications of fintech go over different areas in investments, banking, and other financial institutions. This course introduces students to the major topics of Fintech, including Blockchain, Bitcoin, Alternative Cryptocurrencies, FinTech Credit, InsurTech, Crowdfunding, Big Data, Machine Learning, Robo Advisers, and Algorithmic Trading.

FIN 530. Energy Financial Economics. 3 Hours.
Introduction to the ways in which legal/regulatory systems affect the energy industry and to important economic and political concerns that underlie the regulation of the production and trading of energy and the connections to the derivative markets for the energy sector.

FIN 531. Energy Law/Regulation/Ethics. 3 Hours.
Provides an understanding of energy markets and the ancillary markets, the legal and regulatory environments, and the ethical questions surrounding this business sector. Additionally, the course will help prepare participants to address the ethical standards of the finance profession.

FIN 532. Energy Financial Accounting. 3 Hours.
Provides the tools to interpret and analyze external financial information from the viewpoint of investors and creditors. The energy sector has a unique perspective from other industries. The role of mark to market accounting techniques will be emphasized.

FIN 533. Energy Financial Risk Management. 3 Hours.
Investigates the evolving and expanding practice of financial risk management in the energy sector. Risk management is a complex process of identifying, quantifying, and managing risk exposures. The course analyzes and discusses the various sources of risk.

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

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

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

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

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

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

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

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

FIN 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.

FIN 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.).

FIN 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.

FIN 735. Portfolio Theory. 3 Hours.
PR: ECON 701 and ECON 702. Basics of decision making under risk. Portfolio choice under various utility and returns specifications. Asset allocation over time.

FIN 736. Asset Pricing. 3 Hours.
Theories of the determination of prices and returns in financial markets. Properties of general static and intertemporal asset pricing models and determinants of equilibrium returns in specific general equilibrium models.

FIN 737. Corporate Finance Theory. 3 Hours.
A comprehensive examination of the foundational theories in corporate finance. Topics will include: finance theory under certainty and uncertainty, utility theory, capital structure, issuance, dividend policy, corporate governance, M & A theory, and financial distress.

FIN 741. Corporate Finance Seminar. 3 Hours.
This course acquaints students with theoretical and empirical research in corporate finance. Topics include capital structure, dividend policy, stockholder-manager and bondholder-stockholder agency conflicts, governance mechanisms, market for corporate control, bankruptcy and corporate restructuring.

FIN 742. Investments Seminar. 3 Hours.
PR: ECON 736. A comprehensive examination of the theoretical and empirical literature covering the foundational topics in investments. Topics include portfolio theory, performance evaluation, derivatives, market anomalies, investor behavior and other pertinent developments in the investment area.

FIN 743. Advanced Topics Seminar. 3 Hours.
Examination of the theoretical and empirical research in important areas of finance. Examples include financial institutions, international finance, behavioral finance and market microstructure.

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

FIN 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.).

FIN 930. Professional Development. 1-6 Hours.
Professional development course 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.

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.
PR: Corequisite of FIS 501. Foundations of Criminalistics - FIS 501 Laboratory.

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

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.

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.).

FMED 731. Clerkship. 8 Hours.
PR:Successful completion of first two years of medical school. An eight week rotation in the office setting; rotations of four weeks to clinics within the university system and four weeks to private practitioner offices throughout the state. Lecture, laboratory, conference, and patient care.

FMED 830. Clinical Clerkship in Family Medicine. 8 Hours.
PR: Successful completion of first two years of medical school. An eight week rotation in the office setting; rotations of four weeks to clinics within the university system and four weeks to private practitioner offices throughout the state. Lecture, laboratory, conference, and patient care.

FNRS 512. Silvicultural Practices for Hardwood Forest Types. 3 Hours.
PR: (FMAN 311 or (FNRS 311 and FNRS 311L). Designing proper silvicultural systems for managing Appalachian hardwood stands; reconstructing stand histories, recognizing problems, and prescribing appropriate silvicultural treatment.

FNRS 523. Sustainable Urban Forests. 3 Hours.
This course equips you with the knowledge and tools to manage urban trees as part of a sustainable environment. Through in-class discussions, we explore how urban forests contribute to local communities, offering sociological, environmental, economic, and aesthetic benefits.

FNRS 525. Vegetation of West Virginia. 3 Hours.
PR: (FNRS 205 and FNRS 205L) or FOR 205). Basics of plant taxonomy and community ecology, use of technical field keys, study of selected plant families, field trips to unusual and/or important plant communities and forest types in West Virginia.

FNRS 535. Fire Ecology. 3 Hours.
Effects of wildfire on various aspects of ecosystems. Topics include fire history and historic fire regimes; the physical processes of combustion, heat transfer and fire behavior; interactions with soil, water, vegetation, and climate; and how fire affects cultural resources and the economy.

FNRS 540. Advanced Physical Behavior of Wood. 3 Hours.
PR: WDSC 340 or equivalent or consent. Physical relationships of water and wood; fluid flow through wood; thermal, electrical, and acoustical behavior of wood. Theories of wood drying and their application.

FNRS 542. Current Issues in Forest Management. 3 Hours.
PR: Consent. Analysis of environmental issues in forest management and current controversies surrounding the management of forested lands. Emphasis on traditional and ecosystem-based forest management policy, philosophy, and practices.

FNRS 555. Computer Applications in Forest Resource Management. 3 Hours.
PR: Corequisite of FNRS 555L. Computer programming/system modeling in forest resource management. Emphasis on basic programming/modeling skills and application examples in forest operations, management, and engineering.

FNRS 555L. Computer Applications in Forest Resource Management Laboratory. 0 Hours.
PR: Corequisite of FNRS 555. Computer Applications in Forest Resource Management - FNRS 555 Laboratory.

FNRS 560. Tree Ecophysiology. 3 Hours.
The basic processes necessary for trees to survive, grow, and reproduce (e.g., carbon metabolism, water and nutrient uptake) with an emphasis on the impacts of abiotic stresses (drought, flood, elevated carbon dioxide, low light, nutrient depletion, low soil aeration) on these plant functions.

FNRS 575. Forest Soils: Ecology and Management. 3 Hours.
PR: AGRN 410 or AGRN 425 or consent. Properties, nutrient cycling processes, and sustainable management of forest soils, with examples from the most important wood fiber producing regions of the U.S.: the southeast, Pacific Northwest, and the central hardwood forest.

FNRS 585. Environmental Water Resources. 3 Hours.
This course provides background in the fundamentals of environmental water resources and will equip students with requisite knowledge to address complex contemporary water resources issues via focused curricula including (but not limited to): land use practices, water use, and the physical principles of precipitation, infiltration, evapotranspiration, overland and subsurface flow, stream flow, and water use management practices.

FNRS 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of forestry. 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.).

FNRS 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

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

FNRS 611. Advanced Forest Ecology. 3 Hours.
PR: (FMAN 212 or (FNRS 212 and FNRS 212L) or equivalent) and (FMAN 311 or (FNRS 311 and FNRS 311L). Ecological relationships in forests with emphasis on biogeochemical cycles.

FNRS 623. Anatomy of North American Wood. 3 Hours.
Anatomy and identification of commercially important North American woods. For students who have not completed a course in the anatomy of American woods.

FNRS 630. Forest Valuation and Investment. 3 Hours.
Asset valuation concepts, with special emphasis on forests. Financial analyses of forest operations. Concepts and strategies in forestland investment and portfolio management.

FNRS 631. Forest Stand Dynamics. 3 Hours.
PR: Undergraduate courses in ecology or silviculture, and statistics. Examination of the processes causing temporal and spatial changes in communities of trees including: stand establishment, growth, competition, disturbance and mortality. Labs focus on the quantification of stand development patterns.

FNRS 640. Advanced Forest Biometrics. 3 Hours.
PR: (FMAN 222 or (FNRS 222 and FNRS 222L) and STAT 511. Review and application of mathematical and statistical models used in forest volume, taper and height estimation procedures.

FNRS 641. Forest Growth and Yield Modeling. 3 Hours.
PR: FMAN 640 or FNRS 640. Review and application of mathematical and statistical models used in forest growth and yield modeling.

FNRS 644. Forest Growth and Yield Modeling. 3 Hours.
PR: FMAN 640 or FNRS 640. Review and application of mathematical and statistical models used in forest growth and yield modeling.

FNRS 645. Advanced Bio-Based Energy Systems. 3 Hours.
Introduction to biomass feedstock production for bioenergy applications, preprocessing and characterization, biofuel conversion technologies, economic and environmental impacts, and green house gas emissions.

FNRS 650. Economics, Environment and Education in West Virginia. 3 Hours.
This course is designed for K-12 classroom teachers with little previous background in economics. We introduce the principles of economics using the WV forest products industry to provide examples.

FNRS 655. Watershed Hydrology. 3 Hours.
PR: Prior course work/experience in hydrology, water, earth and atmospheric sciences or permission by the instructor. A qualitative and quantitative understanding of principles governing the occurrence, distribution, and circulation of water near the Earth's surface. Emphasis is on the physical understanding and parameterization of hydrologic processes and the water cycle.

FNRS 670. Human Dimensions of Natural Resource Management. 3 Hours.
PR: Graduate standing. This course applies social science theory and methods to solving natural resource management problems.

FNRS 693. Special Topics. 1-6 Hours.
Study of contemporary topics selected from recent developments in the field.

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

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

FNRS 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.

FNRS 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.

FNRS 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.

FNRS 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.).

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.

GEN 521. Basic Concepts of Modern Genetics. 3 Hours.
PR: 8 hours of biological sciences and one year of chemistry courses. Independent inheritance. Chemical nature of genetic material. Control of phenotype by genetic material. Gene action and coding of genetic material.

GEN 525. Human Genetics. 3 Hours.
PR: GEN 371 or GEN 521 or Consent. Study of genetic system responsible for development of phenotype in man.

GEN 535. Population Genetics. 3 Hours.
PR: GEN 371 or GEN 521 or Consent. Relationship of gene and genotype frequencies in populations of diploid organisms, and the effects of mutation, selection, assortive mating, and inbreeding in relation to single gene pairs. Application of these concepts to multigenetic inheritance of quantitative traits.

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

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

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

GEN 630. Conservation Genetics. 3 Hours.
Study of population genetic concepts relevant to small populations, with a focus on management implications of genetic data and current applications of conservation genetics. Cross-listed with WMAN 630.

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

GEN 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.).

GEN 724. Cytogenetics. 4 Hours.
PR: GEN 171 or GEN 321. Emphasis on macromolecules that carry information of the chromosomes, cell division, and the cytological and molecular basis of genetics. Special attention given to visible manifestation of genes, human cytogenetics of genomes and chromosome morphology, and their evolution.

GEN 726. Advanced Biochemical Genetics. 3 Hours.
PR: GEN 371 or GEN 521 and organic chemistry. Physiological and biophysical concepts of genetic material. Structure and arrangement of genetic units. Nucleic acids as carriers of genetic information. Gene action and amino acid coding. Biochemical evolution of genetic material. Genetic control mechanismsistry of mutation.

GEN 727. Genetic Mechanisms of Evolution. 3 Hours.
PR: GEN 371 or equivalent. Molecular genetic mechanisms which result in evolutionary change. Origin of life, origin and organization of genetic variability, differentiation of populations, isolation and speciation, role of hybridization and polyploidy, and origin of man.

GEN 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of Genetics. 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.).

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

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

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

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

GEN 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.

GEN 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.).

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 612. 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.
Coreq: GEOG 655. Remote Sensing Principles - GEOG 655 Laboratory.

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 790. Teaching Practicum. 1-3 Hours.
GEOG 790. Teaching Practicum. 1-3 Hr Supervised practice in college teaching.

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.).

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 506. Graphic Design for Scientists. 3 Hours.
A class focusing on figure design and ergonomics using computer software for professionals and scientists.

GEOL 509. Deep Time Earth Systems. 3 Hours.
Interrelationships of Earth Systems - the lithosphere, the hydrosphere, the atmosphere, and the biosphere - through space and time.

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. 3 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 C)2 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 601. Graduate Professional Development and Scientific Integrity. 3 Hours.
This course aims to prepare graduate students for work in professional geosciences settings and train them in the necessary skills required to successfully navigate their graduate program. Topics covered include grant applications and scientific publications, communication within a professional setting, and geoscience careers and applying for jobs.

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. 3 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. Paleoecology. 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 it's academic and cultural programs. NOTE: Graduate students not actively involved in course work or research or enrolled, through enrollment in his/her departments Graduate Colloquium, to consult with graduate faculty, participate in both formal and informal academic activities sponsored by his/her 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.

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.

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.).

GRAD 550. Grants and Grantsmanship. 2 Hours.
This course aims at teaching basic concepts and techniques on how to write a competitive grant proposal to any funding agency and maximize chances of being a successful grant seeker.

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

GRAD 594. Seminar. 1-6 Hours.
PR: Consent. Special seminars arranged for advanced graduate students.

GRAD 670. Readability in the Online & Blended Course. 1 Hour.
This course provides current or future instructors with practical strategies for displaying and writing textual content for online and blended courses that is visually inviting and encourages reading comprehension.

GRAD 671. Accessible Teaching Online. 1 Hour.
PR: Graduate student status. When preparing course materials, federal law requires that they be made accessible. This course will cover common accessibility challenges and techniques for accommodation. Learn about the challenges faced by students and instructors in an online environment.

GRAD 672. Designing Engaging Scenarios. 1 Hour.
PR: Must be a graduate student at WVU. Navigating through self-guided scenarios can help to effectively engage students in visualizing mental images of concepts and how to accomplish specific tasks. The purpose of Designing Engaging Scenarios is to identify and apply strategies to write dynamic branching and captivating scenarios that emphasize thinking critically about specific topics. Throughout the course, students will experience sample scenarios and examine best practices.

GRAD 673. Careers in Higher Education. 2 Hours.
This discussion-based hybrid seminar will prepare graduate students for the academic job search (primarily in faculty roles), acclimate them to promotion and tenure requirements, address current issues in higher education, and consider the possibilities for nonacademic careers.

GRAD 674. Teaching Different Cultures. 1 Hour.
PR: Graduate standing. This course provides insight on how to effectively teach all cultures. We will explore research on cultural learning styles and examine several learning style models. The knowledge you gain in this course not only will help you to recognize and better understand learners from different cultures, but will also help you devise more ways to help them learn.

GRAD 680. Classroom Assessment Techniques. 2 Hours.
Explores ways to create and implement classroom assessment techniques in ways that benefit both students and instructors. Attention is given both to formative and summative assessments.

GRAD 685. Teaching Capstone. 3 Hours.
Students will apply principles of effective course design to create a comprehensive teaching portfolio for the higher education job market. Fulfil;s the capstone requirement for the Certificate in University Teaching.

GRAD 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of graduate academy. 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.).

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

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

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

GRAD 710. Scholarly Teaching. 3 Hours.
Graduate study of the theory and practice of teaching. Students will experience and create teaching materials employing strategies for active learning, assessment, and consider diversity of learning styles.

GRAD 711. Online Teaching in Higher Education. 3 Hours.
Design and development of for-credit online courses within a higher education setting. Establishing regular and substantive student-student and student-instructor interaction in a learning community. Development of assessments and weekly units of instruction inside of a learning management system. Online teaching in both asynchronous and synchronous settings. Discussion of current topics in distance education.

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

HDFS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of (Subject matter determined by department/devision/college/school offering the course). NOTE: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. I also a mechanism for students not on assistantships to gain teaching experiences.

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

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

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

HIED 648. History of American Higher Education. 3 Hours.
The administrative development of American higher education from 1636 to the present, including internal trends and external forces.

HIED 649. Contemporary Issues in Higher Education. 3 Hours.
The purpose of this course is to explore critical, contemporary challenges facing American higher education. The course explores issues of access, accountability, academic freedom, financial aid, state and federal government policy, changing legal structures, teaching and learning in a digital age, student issues, diversity, and the influence of business models and values on institutional strategy and practice.

HIED 650. Higher Education Administration. 3 Hours.
Key concepts of organization and administration within higher education institutions, concentrating primarily on the non-academic components of the institutions, from the president to first-level supervisor.

HIED 651. College Student Development. 3 Hours.
Review of research and literature on college student development from beginning freshmen through graduate school. Emphasis on different student subgroups.

HIED 652. Assessment in Higher Education. 3 Hours.
Critical analysis of contemporary assessment issues; develop sophisticated plans to evaluate the quality of student learning and growth in academic programs and student affairs.

HIED 653. College Students and Courts. 3 Hours.
PR: Consent. A study of the major areas of higher education law from the perspective of the college student. A case study approach.

HIED 654. College Student Affairs. 3 Hours.
PR: Consent. A study of the organization, administrative functioning components, issues, and models of college student services using a historical and topical approach.

HIED 655. Institutional Advancement. 3 Hours.
PR: Consent. Studies in fund raising, alumni relations, and foundation management.

HIED 656. Higher Education Budget and Planning. 3 Hours.
Covers knowledge of such areas as budgeting systems, budget preparation and administration, resource reduction and reallocation, and grants/contracts preparation and administration.

HIED 657. Community College Leadership. 3 Hours.
An analysis of the historical/philosophical development of community colleges in the US. A specific focus on developing a critical understanding of the administrative and leadership issues.

HIED 658. Colleges and Communities. 3 Hours.
This course provides an introduction to engagement approaches in higher education institutions, including the contexts for outreach-engagement, engaged scholarship and service learning, and the special cases of public and land-grant institutions. Students will engage in service learning as part of the course.

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

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

HIED 710. Leadership and Organizations. 3 Hours.
This course provides an overview of the major theories that inform our understanding of higher education organizations and forms of leadership within those organizational contexts.

HIED 750. Diversity Issues in Higher Education. 3 Hours.
Diversity Issues in Higher Education is designed to facilitate understanding and appreciation for diversity within a higher education setting through the recognition of individual differences and their influence on the college experience by students, faculty, and administrators.

HIED 751. Academic Affairs Roles. 3 Hours.
PR: Consent. Management, leadership, and administrative roles of academic affairs offices in colleges and universities including academic personnel, program definition, research and teaching issues, and other functions of academic oversight.

HIED 752. Governance of Higher Education. 3 Hours.
PR: Consent. Formulation and implementation of state master plans and the roles of state governing bodies in public and private institutions.

HIED 753. Adult and Continuing Education. 3 Hours.
Principles, concepts, and processes involved in programming for adults in a community setting. Nature of adult learning, subject matter, and learning environment.

HIED 754. Women and Gender Issues in HIED. 3 Hours.
In this course students will utilize feminist and gender theories to explore historical and contemporary women’s and gendered issues and experiences in higher education, with a focus on students, faculty, and leaders.

HIED 755. Higher Education Law. 3 Hours.
Critical legal issues of higher education, public and private, using a case study approach.

HIED 756. Higher Education Finance. 3 Hours.
Financial concerns in higher education with emphasis on taxation and legislative actions, sources of income, budgeting, and cost analysis.

HIED 757. Education Policy and Politics. 3 Hours.
The purpose of this course is to explore federal and state-level policy processes in American education, with focus on testing and evaluation at the K-12 level, students' entry into and success in higher education, and funding of both K-12 school districts and higher education institutions.

HIED 759. Assessment Research in Higher Education. 3 Hours.
Students review an array of instruments designed to assess college students' perceptions, satisfaction, and learning. They will also critique these instruments to determine their quality.

HIED 762. College Student Research in Higher Education. 3 Hours.
Students will critique research articles pertaining to college student development and conduct research investigating a subpopulation's development.

HIED 763. International Higher Education. 3 Hours.
The purpose of the course is to expand understanding of higher education systems worldwide. Students will compare regional and nation-state systems in Europe, Asia, Africa, and the Americas. Countries / regions to be studied may include the Arab World, Brazil, Canada, China, France, Germany, Israel, Japan, Mexico, Nigeria, Russia, South Africa, Spain, and the United Kingdom.

HIED 785. Higher Education Internship. 3 Hours.
PR: Final year of study for master's students. The internship course is designed to prepare students for entry into the workforce, fostering the transfer of academic knowledge to practice. Course activities consist of field site placement, monthly group discussions, reflection journaling, and portfolio development and presentation. This course is taken during the last year of study.

HIED 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of HIED. Note: This course is intended to insure that graduate assistants are adequately prepaired and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

HIED 795. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

HIED 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis(698), problem report (698), research paper or equivalent scholarly project (698), or dissertation (798).

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 608. Introduction to Oral History: Methods and Practice. 3 Hours.
Students will learn the basics of oral history methodology. We will discuss the process of documenting, recording, and preserving oral history interviews following best practices, and we will discuss how to interpret and analyze oral sources in the fields of history and public history.

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 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.

HMBA 600. Healthcare Business Essentials. 3 Hours.
The Healthcare MBA Essentials course introduces students to the functional areas of business delivered with a healthcare lens. Students will be exposed to cases, assignments and real-world applications of the business of healthcare.

HMBA 611. Healthcare: Management Information Systems. 3 Hours.
PR: Admission to HMBA program or instructor approval. This course will cover three critical areas of the Healthcare Information Systems: fundamental technologies, management strategies related to economic drivers and legal themes, and current and new issues of healthcare information technology (HIT).

HMBA 612. Healthcare - Managerial and Team Skills. 3 Hours.
This course introduces, develops and enhances managerial skills for complex health care organizations. The class will explore managerial philosophies, one's own managerial style, and the dynamics of working in groups and teams in health care settings.

HMBA 621. Healthcare Analytics. 3 Hours.
PR: Admission into Healthcare MBA or instructor permission. This course develops student skills in data-driven, fact-based decision-making to support critical evaluation of business reports, research proposals, and other studies relying on business research. The course provides a basic understanding of reading and conducting empirical research in a healthcare setting.

HMBA 622. Healthcare Finance- Reporting and Analysis. 3 Hours.
PR: Admission to HMBA program or instructor permission. Course includes: Development and preparation of financial statements- balance sheet, income statement and statement of cash flows. Investigation of the underlying conceptual/theoretical foundation of accounting information. Analysis of business transactions and their effect on financial statements. Analysis of financial statements as a basis for decision making. Analysis of the association between accounting information and company valuation.

HMBA 626. Health Economics. 3 Hours.
PR: Recommended familiarity with Microeconomics and Statistics/Econometrics. Analyzes and evaluates critical questions in health, health care, and health care policy using economic theory and tools. Topics covered include: the demand for health and health care; economic approaches to studying healthy and risky behaviors; the economic causes and correlates of risky health behaviors and health disparities; the design and incentive structures of health care policy.

HMBA 633. Healthcare Leadership & Cultural Competency. 3 Hours.
PR: Must be enrolled in Healthcare MBA. This course is designed to develop cultural competencies in leaders to drive diversity as a core component of excellence in Healthcare. Diversity, equity, and inclusion in healthcare settings, especially in leadership roles, is emphasized. The course also focuses on the personal development of students as future healthcare leaders and managers.

HMBA 634. Healthcare Services Marketing. 3 Hours.
This course will focus on delivering value to patients and providing excellent quality and services in terms of both healthcare outcomes and patient/customer experience.

HMBA 638. Healthcare Supply Chain Management. 3 Hours.
The purpose of this course is to provide a solid foundation of key topics and tools of supply chain operations and on how they relate to business success. We will discuss analytical tools, major concepts, and contemporary techniques necessary to solve or be conversant about supply chain issues at the strategic and tactical levels.

HMBA 656. Law and Medicine. 3 Hours.
An introduction to the American legal system and theories that apply to the American healthcare system and the practice of medicine.

HMBA 661. Healthcare Innovation and Commercialization. 3 Hours.
PR: HMBA 622. This course will dive into the world of entrepreneurship, specifically focusing on healthcare and life science-based companies. We will spend a majority of the course walking through the business model canvas and learning the lean launch methodology approach to entrepreneurship. These processes and tools are well tested and have demonstrated success.

HMBA 693. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

HN&F 505. Dietetic Supervised Practice 1. 1-3 Hours.
PR: Instructor approval and acceptance into the Dietetic Internship is required. This course provides an introduction to supervised practice recognized by the Accreditation Council on Education for Nutrition & Dietetics (ACEND) at WVU. Practicum preceptors, sites and intern obligations will be reviewed. Interns will be required to develop social media portfolio to document their supervised practice experience.

HN&F 510. Advanced Medical Nutrition Therapy. 3 Hours.
PR: HN&F 473 and HN&F 474 or equivalent background in a medically-related field. Designed to provide students with the opportunity integrate the theories and principles of medical nutrition therapy into clinical practice. The etiology and pathophysiology of nutrient related-diseases and the role of medical nutrition therapy is critically evaluated. Case studies are used to practice critical thinking to effectively plan and manage the nutritional care of patients, with a variety of disease states.

HN&F 512. Maternal and Child Nutrition. 3 Hours.
PR: Consent. Physiological changes and nutritional requirements during pregnancy and lactation. Effects of growth and development on nutritional requirements during infancy, childhood and adolescence.

HN&F 548. Science of Food Preparation. 3 Hours.
PR: Corequisite of HN&F 548L. This graduate level course aims to develop in students an appreciation of food systems as complex biological and chemical materials by integrating biochemical principles into scientific theories and concepts related to food preparation. This course will challenge their understanding of ingredients and cooking methods and how these impact the nutritional and sensory properties of food.

HN&F 548L. Science of Food Preparation Laboratory. 0 Hours.
PR: Corequisite of HN&F 548. This graduate level course aims to develop in students an appreciation of food systems as complex biological and chemical materials by integrating biochemical principles into scientific theories and concepts related to food preparation. This course will challenge their understanding of ingredients and cooking methods and how these impact the nutritional and sensory properties of food.

HN&F 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of human nutrition and foods. 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.).

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

HN&F 592. Directed Study. 1-6 Hours.
Directed study, reading and/or research.

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

HN&F 610. Nutrition and Fitness. 3 Hours.
PR: HN&F 171 or equivalent. Upon completion of this course the student will understand the physiological and metabolic changes that occur during physical activity and the ways in which those changes alter nutritional requirements.

HN&F 614. Nutrition/Disease Prevention. 3 Hours.
This graduate level course covers the role of nutrition in the pathophysiology of chronic diseases, critical analysis, and translation of research into dietary recommendations for the prevention/treatment of chronic diseases.

HN&F 670. Human Nutrition Concepts and Application. 3 Hours.
PR: HN&F 460 or equivalent, and consent. Critical study of the nutrient evaluation methods and the nutrient requirements of the human in health and disease, and scope of its application.

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

HN&F 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

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

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

HN&F 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.

HN&F 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.).

HN&F 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 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.

HN&F 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). These continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

HN&F 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.

HORT 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of Horticulture. 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.).

HORT 692. Directed Study. 1-6 Hours.

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

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

HORT 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.

HORT 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.).

HPML 502. U.S. Healthcare Organization and Delivery. 3 Hours.
This course introduces graduate students to critical concepts in the organization and delivery of healthcare services in the United States.

HPML 510. Health Economics. 3 Hours.
This course focuses on how various incentives impact individual and organizations' health-related behaviors and decisions. It covers topics relevant for health services administration students through the lens of a microeconomic perspective, supply and demand of health care services, and health insurance.

HPML 520. Health Administration and Operations Management. 3 Hours.
Introduction to elements of organizational planning, management, and structure which create a resilient, learning public health organization. Effective public health organizational leaders understand how to provide trade-offs between efficiency, security, and equity, in a manner to optimize organizational value. This course provides an overview of human resources management, strategic planning, and operations planning to develop responsive and yet robust organizations.

HPML 522. Introduction to Data Analytics for Health Administrators. 3 Hours.
This course provides an overview of health information systems -e.g., electronic health records-, health data, and analytical tools used to inform decision making in health services management. The focus is on (i) the use of Epic, Excel and Tableau to conduct analyses needed by health administrators and (ii) interpret data from descriptive and inferential statistics to answer managerial questions.

HPML 523. Healthcare Finance. 3 Hours.
This course provides an overview of the financial management of healthcare organizations.

HPML 555. Health Services Project Management. 3 Hours.
Introduces the fundamentals of project management with an emphasis on the healthcare environment. Common project management tools and techniques that can be used throughout the project lifecycle to promote projects that are finished on time, within budget, and within scope are introduced. The critical importance of stakeholder management and tailoring leadership styles to project characteristics are discussed at length.

HPML 556. Managerial Epidemiology & Strategy. 3 Hours.
Introduction to the principles and tools of epidemiology as applied in the field of health care administration. Specific emphasis on strategic planning and management of health service organizations.

HPML 575. Health Insurance & Revenue Cycle. 3 Hours.
This course explores health insurance reimbursement, with a focus on value-based payments, and revenue cycle in the health sector. It provides an overview of health insurance, prospective payment models, managed care, and how claims are managed. With this course, students gain an appreciation for the complexity of the health services reimbursement processes and their impact on patients and providers.

HPML 582. Managing Quality Improvement in Healthcare. 3 Hours.
Introduces students to the latest healthcare quality and patient safety improvement thinking through didactic sessions, interactive exercises and case studies with direct relevance for public health practitioners, healthcare administrators or clinicians. Examines healthcare quality and patient safety from a strategic viewpoint to make healthcare administrators effective decision makers. Provides students necessary theoretical knowledge to obtain a Six Sigma green belt.

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

HPML 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.

HPML 601. Health Policy, Law, and Ethics. 3 Hours.
This course delves into health policy, law, and ethics within the US health services system. It provides an examination of the formulation, implementation, and assessment of health policy, elucidating the relationship between policy, public health, and health services delivery. The course examines the legal frameworks underpinning health services administration while exploring ethical dimensions that govern decision-making and address disparities.

HPML 622. Analytic Methods for Health Policy, Management, and Leadership. 3 Hours.
Students acquire a foundation in essential evaluation approaches and methods needed as professionals in health policy, management, and leadership including policy analysis, health services research, program evaluation, and decision analysis.

HPML 624. Advanced Issue Analysis for Health Policy. 3 Hours.
PR: HPML 601. Advanced study of the policy making process, breaking down essential components in the agenda-setting phase including problematization, claims making, policy framing theories, and media analysis. Students gain knowledge and experience in planning, executing and evaluating an agenda-setting campaign including media and policymaking components related to the social determinants of health.

HPML 626. Internship. 1 Hour.
The internship provides students the opportunity to develop their practical skills and professional competencies by applying the knowledge and techniques gained from their MHA courses in a health organization or similar.

HPML 629. Tools for Health Policy and Management Communication. 2 Hours.
PR: HPML 601. Students are provided with a set of tools utilized to analyze, predict, and communicate a variety of policy and management related tasks.

HPML 650. Professional Issues in Health Administration: Health Policy. 1 Hour.
This survey course examines foundational factors that influence and drive US public health policies. Further, this course will review the formation, implementation, and evaluation stages of policy from the past two decades.

HPML 652. Professional Issues in Health Administration: Law and Ethics. 1 Hour.
This survey course examines modern legal and ethical issues in public health. This course also examines the foundational public health practices as it relates to US law, ethics, healthcare systems, and patients.

HPML 653. Professional Issues in Health Administration: Talent and Culture. 1 Hour.
PR: Students must have completed all required core courses to fulfill the MHA degree requirements or consent. This course provides an overview of the current professional issues in management, strategic planning, and operations planning to develop responsive and robust organizations.

HPML 654. Professional Issues in Health Administration: Health Information and Management Systems. 1 Hour.
PR: Students must have completed all required core courses to fulfill the MHA degree requirements or consent. This course examines key contemporary issues and innovations in US health information and management systems to provide students with practical knowledge about the technological tools that healthcare leaders need to make informed decisions about the improvement the quality, cost, and health outcomes.

HPML 659. Comprehensive Experience in Healthcare Management. 3 Hours.
PR: Students must have completed all required core courses to fulfill the MHA degree requirements or consent. This course provides students the opportunity to demonstrate their command of the Master of Health Administration's core competencies through a culminating project. Additionally, this course requires students to independently synthesize and apply methods, concepts, skills and knowledge gained in previous coursework to develop, prepare, and present a substantive SWOT analysis.

HPML 660. Methods for Health Services Research 1. 3 Hours.
PR: BIOS 601 and HPML 622. Students acquire proficiency in health services research methodologies used to assess how health care services are organized, financed, assessed and delivered, and how these arrangements affect health care quality and outcomes, and population health.

HPML 661. Health Services Research Informatics. 3 Hours.
This course provides students with the applied practical understanding of and skills needed to access and use health care information systems used in performing health services research analysis.

HPML 670. Policy Analysis for Population Health 1. 3 Hours.
PR: BIOS 601 and HPML 601 and HPML 622. This course provides students an intermediate understanding of policy analysis approaches during the formation, implementation, and outcome stages of a policy's lifespan. A wide variety of healthcare and public health policies will be analyzed.

HPML 671. Population Health Policy Analysis Informatics 1. 3 Hours.
PR: BIOS 601 and HPML 601 and HPML 622. This course provides students with the applied practical understanding of and skills needed to access and use public health and policy information systems used in performing health policy analysis.

HPML 672. Global Health Policy. 3 Hours.
Using a health equity and social justice perspective, students will examine the major health issues facing the global health community, including health disparities, and the international institutions and policies developed to address these global health challenges.

HPML 675. Healthcare and Insurance Policy: Medicaid, Medicare, and the Affordable Care Act. 3 Hours.
Students will attain a thorough understanding of Medicaid, Medicare, and other healthcare delivery systems in the United States, with special attention paid to issues of Federalism, financing, and the political nature of health insurance delivery systems. The massive Patient Protection and Affordable Care Act legislation and its effect on the healthcare system in the United States will also be examined.

HPML 680. Performance and Economic Evaluation for Public Health. 3 Hours.
This course presents methods to demonstrate the business merit and worth of public health programs or policies. These commonly used techniques include measuring business performance, developing business case arguments, and performing economic evaluations.

HPML 681. Applied Health Care Leadership. 3 Hours.
An exploration of topics related to the theory and practice of leadership and activities designed to develop effective leadership skills that can be applied in both the healthcare management profession and society in general.

HPML 683. Ethical Leadership in Public Health. 3 Hours.
Students will explore contemporary theory on both leadership and ethics and apply these to Public Health service.

HPML 684. Foundations of Healthcare Leadership. 3 Hours.
PR: Instructor permission and open only to approved clinicians. Designed specifically for physician leaders, this course addresses foundational principles of healthcare leadership and management. The course introduces core concepts and competencies critical to successfully advancing organizational mission and goals and being an effective leader.

HPML 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of health policy, management, and leadership. 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.).

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

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

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

HPML 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.

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

HPML 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of health policy, management, and leadership. 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.).

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

HRL 503. Performance Management Systems & Strategies. 3 Hours.
This course presents a broad overview of theories, research, and practices as they relate to the development of individual employees within organizations. Drawing upon research in management and organizational psychology, this course provides students with the knowledge to strategically create and manage a performance management system.

HRL 510. Recruitment, Assessment, and Selection. 3 Hours.
This course focuses on theoretical, practical, and legal issues involved in talent acquisitions in organizations. Topics covered include legal compliance, sourcing, selection processes, selection measures, job analysis, and manpower planning.

HRL 520. Artificial Intelligence Management. 3 Hours.
This course focuses on the managerial process of adoption and implementation of artificial intelligence (AI) techniques in organizations. Students will acquire an understanding of the key concepts and techniques in machine learning from a managerial perspective. This course will also critically examine the ethical, legal, and organizational dimensions of managing AI.

HRL 541. Total Reward Systems. 3 Hours.
This course reviews compensation theory, research, and practice. You will acquire some of the technical skills needed to design and manage a compensation system.

HRL 551. Human Resource Development. 3 Hours.
The purpose of this course is to understand and apply, through theory and practice, an organization's training and organization development functions and processes. In short, this course well-covers the theory and scholarship surrounding the learning-teaching experience, as well as the "how-to" aspect of serving as a strategic leader and partner in organizational development and training within an organization.

HRL 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

HRL 595. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.

HRMG 505. Labor and Employment Law. 3 Hours.
This course will provide a basic overview of employment law as it relates to day-to-day hiring and firing practices. You will be guided through the entire employer-employee relationship—from the initial decision to fill a position to the ultimate decision to terminate the employer-employee relationship.

HRMG 506. Performance Management. 3 Hours.
Development of individual employees in an organization; performance evaluation, discipline of problem employees, identifying training needs, and design and delivery of training programs.

HRMG 507. Negotiation and Conflict Resolution. 3 Hours.
This course is designed to build your understanding, skill, and confidence so that you achieve better outcomes for your negotiations and conflicts at work, large and small.

HRMG 508. Organizational Change and Renewal. 3 Hours.
Organizational evolution as a result of multiple change process, including employee involvement, empowerment, high performance organizations, process consulting, and goal setting. Emphasis on organizational and union relationships.

HRMG 509. Talent Acquisition. 3 Hours.
This course focuses on the management of employee staffing and selection. Topics covered include legal compliance, sourcing, selection processes, selection measures, job analysis for manpower planning selection criteria, and management of the workforce flow.

HRMG 515. Business and Human Resource Integration. 3 Hours.
PR: Enrollment in the MSHRM program or permission of the instructor. Bridges the gap for the Human Resource (HR) Professional between functional HR knowledge and other key general management skills such as financial, accounting, and operations functions of an organization.

HRMG 522. International Industrial Relations. 3 Hours.
Analyzes the human resource and labor relations practices of firms and economies as they relate to the global market; basis of international business, legal/governmental environmental, labor movements, and industrial relations practices.

HRMG 525. HR Analytics. 3 Hours.
PR: Enrollment in MSHRM program or permission of instructor. This course introduces quantitative techniques related to human resource (HR) management. The primary objective is to expose and equip students with quantitative and statistical techniques used in the field of HR to make decisions related to workforce utilization, support employee development, and maximize organizational goals. Students will work with databases, collection of data, statistical packages, data interpretation, and data visualization.

HRMG 530. Compensation and Benefits. 3 Hours.
This course provides an overview of the compensation function in human resource management. It covers both direct (monetary) compensation as well as employee benefits. Focused attention is given to how compensation system objectives and strategies must align with the internal needs of the organization while also being responsive to external conditions.

HRMG 534. Work Group Dynamics and Leadership. 3 Hours.
Small group or individual research on topics related to leadership and group dynamics in the work environment including training and other human relations programs.

HRMG 544. Benefits Management. 3 Hours.
Considers employee benefits from the perspective of the human resource management specialist who is responsible for articulating and administering a corporate program. Includes study of all benefits covered by major federal legislation.

HRMG 545. Diversity and Inclusion Management. 3 Hours.
PR: Admission to MSHRM program. Covers theoretical, practical, and legal considerations related to diversity and inclusion initiatives in organizations. Students will think critically about their workplace experiences and interactions based on their own history and identity as well as think about how the broader workplace context may perpetuate bias, discrimination. Will elaborate on the ways diversity and inclusion initiatives intersect with other key HR functions.

HRMG 546. Training and Development. 3 Hours.
Survey of the domain and issues of the field of training and development and practical approach to designing and conducting training and development programs. Topics include both scientific issues and applied issues.

HRMG 548. Strategic Management for Human Resources. 3 Hours.
Stages and types of strategies; Formulation and implementation of strategies; human resource aspects of planning and strategic assessment; extensive case analysis and team projects.

HRMG 562. Labor Relations. 3 Hours.
Examination of the theory and practice of labor relations and collective bargaining. Topics include economic and historical environment, labor law, unionization, contract negotiation, patterns in contract content, conflict resolution, grievance handling, and an introduction to arbitration.

HRMG 571. Human Resource/Industrial Relations Practicum 1. 1 Hour.
PR: Enrollment in the MS HRMG program or consent. The first course in a series required one-credit hour courses that offers practicum experiences, delivers professional development opportunities, and provides exposure to contemporary topics in the field of HR/IR, (e.g., teambuilding, diversity issues).

HRMG 572. Human Resource/Industrial Relations Practicum 2. 1 Hour.
PR: Enrollment in the MS HRMG program or consent. The second course in a series of required one credit hour courses that offers practicum experiences, delivers professional development opportunities, and provides exposure to contemporary topics in the field of HR/IR (e.g., HR investigations, performance management systems).

HRMG 573. Human Resource/Industrial Relations Practicum 3. 1 Hour.
PR: Enrollment in the MS HRMG program or consent. The third course in a series of required one credit hour courses that offers practicum experiences, delivers professional development opportunities and provides exposure to contemporary topics in the field of HR/IR (e.g., outsourcing the HR function, HR impact on mergers and acquisitions).

HRMG 581. Collective Bargaining Practice. 3 Hours.
Examination of the development of the Collective Bargaining process from its legal and historical foundation through and including a simulated full contract negotiation similar to what students experience in Labor Relations and Human Resources when actually employed.

HRMG 585. Internship. 3 Hours.
The purpose of this course is to provide the student with professional work experience and application of classroom learning to further complement their preparation to enter the work world as a Human Resource Management professional upon graduation from the MSIRHR Program.

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

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

HRMG 595. Independent Study. 1-9 Hours.
PR: Consent. Faculty-supervised study, reading, or research.

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

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

IDT 600. Instructional Design and Technology Theories and Models. 3 Hours.
Introduces students to the knowledge base of instructional design and technology.

IDT 610. Distance Education. 3 Hours.
This course addresses the nature of technical communication systems in distance education, their configuration and behavior, and the organizational factors associated with their development, acquisition, use, evaluation, and maintenance.

IDT 620. Social Network Media. 3 Hours.
This course will address the fundamental mechanics of using computers to access information networks for application in elementary, secondary, and higher education classroom instruction, as well as other education/business teaching/learning environment.

IDT 630. Instructional Delivery System. 3 Hours.
Emphasis on the four elements of content development: presenting, engagement, integration and assessment using open source systems.

IDT 640. Visual Literacy. 3 Hours.
Introduce students to knowledge of how humans use visual and nonverbal communication, and how visuals can be used in educational settings.

IDT 650. Multimedia Learning. 3 Hours.
Understand the use and design of multimedia materials in educational settings.

IDT 655. Technology for Teachers. 3 Hours.
The course provides students with experiences to consider and make informed decisions regarding various emerging technologies for instructional purposes. As an in-service teacher, a preservice teacher, or a current or future technology integration specialist, students will have the opportunity to explore and discuss various emerging educational technologies, and design and reflect on learning activities incorporating such technologies.

IDT 660. Instructional Design and Technology Authoring Systems. 3 Hours.
Design and development of online instruction through the use of current authoring systems.

IDT 665. Game & Simulation Design for Instruction. 3 Hours.
This is a hands-on course about designing digital games for instruction. In this course the student will learn the theories and the instructional design strategies appropriate for making and using digital games in the classroom. The student will learn how to develop rules that constrain, create a playable learning environment, and how to situate the game in an instructional context.

IDT 670. Digital Tools and Web. 3 Hours.
Review, use and discussion of existing emerging web-based tools, and incorporate these tools in their instructional development.

IDT 675. Online Teaching and Learning. 3 Hours.
PR: Graduate standing. This course provides an overview of major teaching models and factors to be considered in creating and teaching an online course, and guides the learner through the process of actually developing a specific online course in a learning management system.

IDT 680. Computational Thinking. 3 Hours.
The main objective of the course is to provide students with an understanding of how to promote computational thinking as a learning approach. As an instructional designer, an education researcher, or a teacher in this course, students will have the opportunity to comprehend theoretical underpinnings and practice applications of computational thinking in education.

IDT 685. Practicum. 1-12 Hours.

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

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

IDT 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.

IDT 715. School Networks. 3 Hours.
Hands-on exploratory course in the design, development and deployment of a school network. Explore the issues of design, policy, and security by building and deploying your internet server.

IDT 720. Instructional Systems Design. 3 Hours.
The systems approach is used to design instruction, applying the principles of instructional design.

IDT 735. Technology Integration. 3 Hours.
Apply the latest theories of learning and instructional design to a range of learning contexts, including public school, higher education and corporate/institutional needs, and develop technology- based instructional products.

IDT 740. Design Studio. 3 Hours.
Apply principles of instructional design, knowledge of learning theories, and experience with technological tools to the design of instructional products and curriculum for actual clients.

IDT 750. Prototype Studio. 3 Hours.
(May be repeated for a maximum of 6 hours.) Implement and revise design of online educational materials developed in IDT 740.

IDT 790. Teaching Practicum. 1-3 Hours.
Supervised practice in college teaching of technology education. 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.).

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

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

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

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

IDT 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.

IDT 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.).

IDT 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.

IDT 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.

IDT 931. 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.

IENG 502. Advanced Manufacturing Processes. 3 Hours.
Metal cutting economic models, solidification processes, bulk deformation, sheet metal and drawing, joining design, and economics. Overall view of manufacturing systems. Introduction to numerical control programming and projects on numerical control equipment.

IENG 503. Additive Manufacturing Technology and Materials. 3 Hours.
This course provides detailed principles, engineering design, theories, materials and applications to advanced additive manufacturing (AM) processes-extrusion, material jetting, photopolymerization, powder bed fusion, binder jetting, sheet lamination, direct energy deposition and the latest state of the art. Problem-based learning (PBL) method will be used to increase student engagement and improve students' critical thinking, collaboration, and leadership skills.

IENG 505. Computer Integrated Manufacturing. 3 Hours.
PR: Graduate standing. Several aspects of computerized manufacturing systems will be covered. Emphasis will be placed on computer fundamentals, computer-aided design and manufacturing, numerically- controlled (NC) machine tools, part programming, system devices, and direct digital control.

IENG 506. Computer Aided Process Planning. 3 Hours.
PR: Consent. Computer aided process planning for manufacturing applications; selection of processes and parameters; machining, casting, and forming; development of process plans from design data; and analysis of effect of changes in design on manufacturability in concurrent engineering.

IENG 507. Robotics and Flexible Automation. 3 Hours.
PR: Graduate standing. This course will provide an understanding of the principles, capabilities, and limitations of industrial robots and other flexible automation tools. Emphasis will be placed on kinematic analysis, trajectory planning, machine vision, and manufacturing automation.

IENG 508. Advanced Problems in Manufacturing Engineering. 3 Hours.
PR: IENG 593 or IENG 502; Graduate standing. Special problems relating to one of the areas of manufacturing engineering, such as manufacturing processes, robotics, CAD/CAM, group technology, and manufacturing systems engineering.

IENG 513. Smart Manufacturing. 3 Hours.
Smart Manufacturing covers the technology being utilized in the recently introduced 4th industrial revolution, more commonly referred to as Industry 4.0. Topics include basic Smart Manufacturing principles, concepts, and enabling technologies, Industry 4.0 communications, sensors and their accompanying data, applications of industrial data, and manufacturing energy analytics.

IENG 514. Design of Industrial Experiments. 3 Hours.
PR: IENG 314 or Consent. Continuation of IENG 314. More complex experimental design especially useful to engineering and industrial researchers, including factorials and optimum-seeking design. Emphasis on use of existing digital computer routines and interpretation of results.

IENG 518. Technology Forecasting. 3 Hours.
PR: IENG 213 or Consent. Various procedures used in forecasting technical developments.

IENG 542. Advanced Production Control. 3 Hours.
PR: IENG 350. Different mathematical models useful in the design of effective production control systems. The various models include: static production control models under risk and uncertainty, dynamic models under certainty, and under risk.

IENG 551. Quality and Reliability Engineering. 3 Hours.
PR: Graduate standing. Introduction to quality and reliability engineering. Special emphasis on Taguchi Design and Markov Models for determining system reliability and availability.

IENG 553. Applied Linear Programming. 3 Hours.
PR: IENG 350 or Consent. Application of the assignment, transportation, and simplex algorithms to typical industrial problems. The methods and computational efficiencies of the revised simplex and other algorithms are also studied.

IENG 554. Applied Integer/Heuristic Programs. 3 Hours.
PR: IENG 350 or IENG 553 and knowledge of a computer programming language. Applications of integer and heuristic programming techniques for solving combinatorial optimization problems. Topics include computational complexity, relaxations, branch and bound, cutting planes, simulated annealing, tabu search, and genetic algorithms.

IENG 555. Scheduling and Sequencing Methods. 3 Hours.
PR: IENG 350. Theory and applications of analytical models used in the scheduling models; flow shop models; job shop models; and assembly line balancing methods.

IENG 556. Supply Chain Management. 3 Hours.
PR: IENG 350 or IENG 553. Principles and methods for designing and managing supply chain systems. Topics include: forecasting demand, strategies, aggregate planning, inventory control, outsourcing, transportation networks, and locating facilities within the supply chain network.

IENG 557. Geometric Programming. 3 Hours.
PR: IENG 350 or Consent. Introduction to the primal and dual solution techniques for geometric programming problems. Focus on the development of design relationships for cost optimization or profit maximization problems.

IENG 561. Industrial Hygiene Engineering. 3 Hours.
PR: Graduate standing. Introductory course in industrial hygiene with laboratory. Topics include: recognition, evaluation, and control of occupational and environmental contaminants and physical agents; basic IH quantitative analysis; PPE selection and evaluation.

IENG 564. Industrial Ergonomics. 3 Hours.
PR: IENG 360 or Consent. Practical experience in the application of ergonomic principles to industrial problems. Safety and production implications of work physiology, industrial biomechanics, and circadian rhythms, as well as current interest topics.

IENG 577. Advanced Engineering Economy. 3 Hours.
PR: IENG 377 or Consent. Special emphasis on depreciation, engineering and economic aspects of selection and replacement of equipment; relationship of technical economy to income taxation; and effect of borrowed capital and project cost control.

IENG 578. Costing and Estimating. 3 Hours.
PR: IENG 377 or Consent. Analysis of overhead, cost indexes, cost capacity factors; improvement curves; costing for materials with design considerations, conceptual cost estimating; costing for machining, joining, casting and forming; and facility cost estimation.

IENG 581. Applied Machine Learning for Industrial Engineers. 3 Hours.
Introduction to machine learning methods and tools tailored for industrial engineering graduates. Supervised and unsupervised learning techniques, including regression, classification, clustering, and forecasting. Fundamental concepts such as bias-variance trade-offs, model evaluation, resampling methods, regularization techniques, and tree-based models. Modern deep learning architectures, including convolutional and recurrent neural networks.

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

IENG 660. Human Factors System Design. 3 Hours.
PR: IENG 360 or Consent. Theoretical aspects and practical applications of man/machine relationships as they influence future system design. The student will examine human limitations with respect to acceptance of information, decision making, and ability to transmit the result of such decisions to controlled equipment systems to obtain design optimization. (2 hr. lec., 3 hr. lab.).

IENG 662. Systems Safety Engineering. 3 Hours.
PR: IENG 461 or Consent. Analysis of manufacturing methods, processes, and properties of materials from a system safety engineering viewpoint. Emphasis will be on hazard analysis techniques (fault tree, MORT, failure modes, and effects) and machine guarding methods.

IENG 681. Machine Learning for Design, Analysis and Prediction. 3 Hours.
Rigorous exploration of the theoretical foundations and applications of machine learning. Predictive modeling, sequential design, optimization, and probabilistic inference in industrial engineering. Key concepts including Lasso and Ridge regression, basis expansions, support vector machines, Gaussian processes, Bayesian optimization, data reduction, imputation, augmentation methods, matrix factorization, and generative models.

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

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

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

IENG 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.).

IENG 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.

IENG 754. Inventory Theory. 3 Hours.
PR: IENG 213 and IENG 350 or Consent. Techniques used in optimization of inventory systems. Elements of static, deterministic inventory models, and static, stochastic inventory models. Selected inventory models. Selected topics related to inventory analysis.

IENG 756. Applied Stochastic Processes. 3 Hours.
PR: Consent. Stochastic systems with emphasis on application to inventory and queueing theory. Conditional probability, Poisson processes, renewal processes, Markov chains with discrete and continuous parameters.

IENG 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of industrial and management systems engineering. 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.).

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

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

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

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

IENG 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.

IENG 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.).

IH&S 525. Aerosol Sciences for Industrial Hygienists. 3 Hours.
PR: Graduate standing or consent. This course explores exposure hazards due to airborne aerosols, which present toxicological, flammable and explosive hazards. Evaluating and remediating exposures also covered.

IH&S 689. Professional Experience in Industrial Hygiene. 2 Hours.
PR: Consent. Experiential learning program planned by the student and evaluated for credit by faculty. Involves field experience from an IH or safety job, or shadowing IH or safety personnel. Student must write an acceptable report on his or her experiences and defend it in a verbal presentation.

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

IH&S 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

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

IH&S 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

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

IH&S 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.

IH&S 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.).

IH&S 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.

IH&S 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 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.

IH&S 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.).

ILR 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of industrial labor relations. Note: This course in 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.).

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

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

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

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

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

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

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

ILR 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.

ILR 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.).

ILR 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.

ILR 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.

IMC 511. Marketing Research and Analysis. 3 Hours.
PR: IMC 410 or IMC 610. This course combines secondary and primary research design to examine the role(s) of marketing research within an IMC campaign. Students learn to identify research problems, craft research objectives, and select appropriate qualitative and quantitative methodologies to develop an effective research strategy and analysis.

IMC 512. Audience Insight. 3 Hours.
PR: IMC 410 or IMC 610. This course provides an in-depth look at consumer behavior and its role in IMC. Students examines consumer behavior in terms of internal influences, external influences, the consumer decision-making process, and consumers and culture.

IMC 513. Brand Equity Management. 3 Hours.
PR: IMC 410 or IMC 610. This course explores strategic and creative decisions in managing, building and measuring the equity of brands. Students will demonstrate mastery by conducting a comprehensive brand audit.

IMC 514. Integrated Marketing Communication Media Analysis. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the role of media analysis and planning in integrated marketing communications. Students review basic terminology, media math and how to allocate resources during media planning.

IMC 515. Creative Strategy and Execution. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the creative process and how it influences integrated marketing communications strategy. Students employ techniques to refine their own creativity to empower them to actively participate in the design aspects of IMC campaign planning.

IMC 516. Direct & Digital Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course examines direct and digital marketing from an IMC perspective. Students explore database marketing, direct marketing message strategies across multiple media, direct and interactive marketing metrics, and the role of direct and interactive marketing in IMC campaign planning.

IMC 517. Consumer Sales Promotion. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the role that sales promotion plays in integrated marketing communications. Students examine how sales promotion can be effectively incorporated into the IMC mix, as well as the legal regulations and ethical implications when utilizing sales promotion techniques.

IMC 518. Public Relations Concepts and Strategy. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the capabilities of incorporating public relations within an integrated marketing communications approach. Students learn about leveraging earned media, determination of key publics, the legal and ethical responsibilities of PR practitioners, and emerging trends in the industry.

IMC 519. Emerging Media and the Market. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course explores how modern industry uses novel technologies to enhance the integrated marketing communications process. Students examine the creative and ethical issues unique to emerging media.

IMC 520. Research Methods. 3 Hours.
PR: IMC 410 or IMC 610. This course examines data analysis in marketing research. Students learn core statistical techniques, the application of statistical software, and the interpretation of statistical outputs.

IMC 521. Current Topics in Integrated Marketing Communication. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course examines significant current issues and trends in integrated marketing communication. Students participate in this hybrid course during the Integrate conference. Topics explored vary by term.

IMC 522. Multicultural Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course explores culture and the diverse marketplace in the United States and globally. Students focus on understanding racial and ethnic groups, and how brands must engage different groups in appropriate and authentic ways through integrated marketing communications.

IMC 523. Global Brand Communication. 3 Hours.
PR: IMC 410 or IMC 610. This course examines key strategies needed to develop strong global brands. Students address the importance of understanding local culture in communication and positioning, and explore emerging issues in brand globalization.

IMC 524. Cause Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course examines the mutually beneficial partnership of a for-profit business and a nonprofit organization. Students review case studies to explore the potential of incorporating cause marketing in an integrated marketing communications approach and framework.

IMC 525. Advanced Creative Concepts. 3 Hours.
PR: IMC 410 or IMC 610. This course emphasizes the creative aspects of executing an integrated marketing communications strategy, including visual branding, verbal branding, creative direction, and art direction. Students focus on conceiving, developing, expressing, and executing a coherent visual identity using a comprehensive strategy.

IMC 526. Business-to-Business Direct Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course examines strategies and tactics for incorporating a business-to-business approach (B2B) into an integrated marketing communications framework. Students will explore the differences of a B2B approach from business-to-consumer (B2C), as well as the considerations marketing communicators must take into account in order to be successful in B2B.

IMC 527. Healthcare Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course explores integrated marketing communication planning for the healthcare industry. Students learn the types of health communication initiatives, theories of health behavior change, issues in design and evaluation of healthcare marketing campaigns.

IMC 528. Applied Public Relations. 3 Hours.
PR: IMC 410 or IMC 610. This course emphasizes the utilization of public relations theories and strategies within an integrated marketing communications framework. Students examine topics relevant to public relations management such as business literacy, organizational culture, reputation management and ethics.

IMC 529. Mobile Marketing. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course examines marketing communications tactics through mobile technologies. Students create real-life mobile campaigns in the ever-changing wireless industry, discuss keys to establishing a competitive advantage, and examine emerging trends that impact strategic marketing communications planning.

IMC 530. Sports Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course explores integrated marketing communications within the sports industry. Students analyze the field's key differentiators, including consumers (fans and participants), endorsements, sponsorships, and consumption and usage patterns.

IMC 531. Crisis Communication. 3 Hours.
PR: IMC 410 or IMC 610. This course examines how integrated marketing communications professionals address crises, both proactively and reactively. Students explore case studies and current events to prepare them to respond to the myriad of potential crisis situations that today's organizations and individuals encounter.

IMC 532. Political Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course examines political marketing strategies through an integrated marketing communications framework. Students strategize and apply a political marketing plan within the context of today's elections and political climate.

IMC 533. Entrepreneurship in Integrated Marketing Communication. 3 Hours.
PR: IMC 410 or IMC 610. This course explores what it takes to be a successful integrated marketing communications entrepreneur. Students learn how to assess risk, raise capital, position a new entity, organize, and generate and maintain sales.

IMC 534. Digital Storytelling. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course explores advanced thinking and strategies for concepting, developing and promoting digital content used in product marketing and is anchored in brand storytelling. Students create visual content (static & motion) that reaches targeted audiences across various channels.

IMC 535. Visual Information Design. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the power of imagery and how visual perception drives our memory. Students examine how to look at images, deconstruct layouts and apply color, design and typography to create effective verbo-visual messages for both print and digital channels.

IMC 536. Integrated Marketing Communication Campaigns. 3 Hours.
PR: IMC 410 or IMC 610. This course is the capstone experience for the integrated marketing communications master's degree program. Students produce a comprehensive campaign plan for a real-world client. This course must be completed in a student's final academic term.

IMC 537. Internal Brand Communication. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the role that internal communications can play in a company's integrated marketing communications framework. Students examine internal communication strategies and implementation, the use of consistent messaging, and company-to-employee crisis communication.

IMC 538. Public Affairs. 3 Hours.
PR: IMC 410 or IMC 610. This course explores ways to leverage public policy relationships and strategic partners to enhance an organization's brand and marketing strategy. Students examine case studies and industry trends to examine how government entities utilize public relations strategies and tactics.

IMC 539. Content Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the role of content in the evolving modern integrated marketing communications landscape. Students learn how to establish a content marketing plan and the steps necessary to achieve implementation.

IMC 541. Social Media and Marketing. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course examines the latest strategies for monitoring and engaging consumers in social media from a marketing perspective. Students explore popular platforms that brands use to connect with, engage and analyze target audiences.

IMC 542. Web Metrics and Search Engine Optimization. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course examines how marketers strategically gather online information to measure traffic, engagement and potential impact on ROI. Students explore search engine optimization (SEO) and social media optimization (SMO) strategies used to build a presence for clients.

IMC 543. Digital Video Production. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course introduces the technical, conceptual and creative skills needed to create and add videos into marketing communications campaigns. Students cover the basics of hardware and software for video projects. Students gain actual hands-on experience shooting and producing their own engaging video.

IMC 544. Digital Marketing Communication Campaigns. 3 Hours.
PR: IMC 440 or IMC 640. This course is the capstone experience for the digital marketing communications master's degree program. Students develop a creative, innovative, and complete digital campaign for a selected organization. This course must be completed in a student's final academic term.

IMC 545. Diversity & Inclusion in IMC. 3 Hours.
PR: IMC 410 or IMC 610. This course examines the practical application of diversity, equity, inclusion and belonging in integrated marketing communications. Students explore the impact of brand strategy focused to the diverse consumer, as well as the ethics and corporate social responsibility of marketing communicators when engaging diverse audiences.

IMC 546. Augmented Reality & Virtual Reality in IMC. 3 Hours.
PR: IMC 410 or IMC 440 or IMC 610 or IMC 640. This course examines how brands are using transformational Augmented and Virtual Reality (AR and VR) platforms to expand customer interaction and build brand affinity. Students explore how brands have effectively combined these technologies as part of a larger marketing communications approach.

IMC 547. Higher Education Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course examines the role of integrated marketing communications in an ever-increasingly competitive American higher education landscape. Students explore the role of market analysis, audience segmentation, value messaging, marketing mix, budget and ROI assessment on higher education marketing initiatives.

IMC 548. Executive Communication & Leadership. 3 Hours.
PR: IMC 410 or IMC 610. This course examines the principles of executive communication and leadership within an integrated marketing communications framework. Students explore implications for executive messaging in terms of an organization's media relations, crisis communication strategy, and social media.

IMC 549. Brand Evolution Strategy. 3 Hours.
PR: IMC 410 or IMC 610. This course explores strategies and tactics that are used to help brands innovate to compete within their marketplace. Students examine disruption and disruptive technologies, changing consumer demands, internal and external pressures from startups, talent erosion and changing market dynamics.

IMC 550. Influencer Marketing. 3 Hours.
PR: IMC 410 or IMC 610. This course explores the role of influencer marketing and how best to leverage individual tastemakers to fulfill marketing objectives. Students learn how to identify, qualify, and amplify the efforts of various influencer types available to marketers, and how to set accurate key performance indicators.

IMC 551. Podcast Production & Promotion. 3 Hours.
PR: IMC 410 or IMC 610. This course will focus on the essential skills for podcast production and promotion. Students will learn how to record, edit, and publish a professional podcast.

IMC 552. Personal Branding and Digital Portfolio. 3 Hours.
PR: IMC 440 with a minimum grade of C-. This course explores the importance of brand identity, positioning, communication, and management across various platforms, particularly in the realm of social media and public relations. Students will develop a personal and professional brand toolkit, including a comprehensive branding plan, social media strategy, and PR blueprint.

IMC 553. Content Creation for Digital Marketing. 3 Hours.
PR: IMC 440 with a minimum grade of C-. This course will provide the skills and knowledge necessary to create strategic digital content that effectively engages your audience and boosts brand visibility. Students will explore and learn how to use the latest trends in digital marketing to develop strategies centered around a content piece for a brand partnership that aligns with current integrated marketing communications.

IMC 554. AI in Digital Marketing Communications. 3 Hours.
PR: IMC 440 with a minimum grade of C-. This course examines the transformative role of artificial intelligence in the workplace. As early adopters and AI champions, marketing professionals are at the forefront of innovation, driving strategic advancements for their organizations and clients. Through this course, marketers will learn how to harness the power of artificial intelligence, gaining the skills and insights needed to stay ahead in their careers.

IMC 593. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

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

IMC 610. Introduction to Integrated Marketing Communications. 3 Hours.
PR: Admission to the program. Introduces students to the fundamentals of Integrated Marketing Communications (IMC). Students learn and apply the IMC planning process and examine the role of integration to ensure consistency of creative strategy and complementary use of traditional and digital media. This course also provides a comprehensive orientation to the WVU IMC graduate program.

IMC 611. Marketing Research and Analysis. 3 Hours.
PR: IMC 610. Examines the role of marketing research within an IMC campaign. Students learn to identify research problems and select appropriate quantitative and qualitative designs to address them. They will examine sampling, questionnaire design, data processing and how to communicate research needs and results.

IMC 612. Audience Insight. 3 Hours.
PR: IMC 610. Provides an in-depth look at consumer behavior and its role in IMC. Examines consumer behavior in terms of internal influences, external influences, the consumer decision-making process, and consumers and culture. Students also learn ethnographic research.

IMC 613. Brand Equity Management. 3 Hours.
PR: IMC 610. Explores strategic and creative decisions to manage, build, and measure brands. Brand management issues investigated include consumer perceptions, competitive analysis, new product development, crafting communication messages, crisis management, and development of marketing programs.

IMC 640. Introduction to Digital Marketing Communication. 3 Hours.
PR: Admission to the Digital Marketing Communication graduate program. This course is the introductory course experience for the digital marketing communications master's degree program. Students explore the fundamentals of digital media and the latest methods for collecting, creating and disseminating persuasive messages through digital media channels. This course must be completed in a student's first academic term.

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

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

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

IMMB 501. Scientific Integrity. 1 Hour.
PR: Departmental approval. Discussion and review of topics addressing fundamental issues in maintenance of scientific integrity in biomedical research.

IMMB 502. Immunology/Microbiology Journal Club. 1 Hour.
PR: Departmental approval. Review and discussions on current immunology and medical microbiology literature. Students are required to lead discussion sessions each semester.

IMMB 503. Research. 1-2 Hours.
PR: Departmental approval. Independent research projects.

IMMB 504. Contemporary Issues for Majors. 3 Hours.
PR: Consent. Detailed coverage for major issues of contemporary research in immunobiology.

IMMB 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching.

IMMB 593. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

IMMB 595. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.

IMMB 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

IMMB 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

JAPN 690. Teaching Practicum. 1-3 Hours.
JAPN 690. Teaching Practicum. 1-3 hr. Supervised practice in college teaching.

JRL 500. Introduction to Graduate Studies. 1 Hour.
(Open only to accelerated masters program students.) Designed to orient students to graduate study.

JRL 504. Mass Media and Society. 3 Hours.
(Open only to accelerated masters program students.) Study of mass media's role in society.

JRL 518. Advanced Reporting. 3 Hours.
Students write carefully researched stories using skills they acquired in previous classes while applying literary journalism techniques. Course emphasizes immersion reporting - spending extended time with one subject as well as peripheral theoretical readings. (Lab fees.).

JRL 520. Advanced Journalistic Writing and Research. 3 Hours.
(Open only to accelerated masters program students.) Study of advanced journalistic writing and research techniques.

JRL 527. American Journalism History. 3 Hours.
An intensive look at the development of media from seventeenth-century England and the American Colonies. Press freedom and its implications to the nation and world are considered on theoretical, economic, and cultural levels.

JRL 528. Media Ethics and Law. 3 Hours.
PR: Consent. How ethics and law work together to help create and maintain the media environment. Examines ethical paradigms within a legal framework, with special emphasis on morality.

JRL 530. Social Media and Journalism. 3 Hours.
PR: Consent. This lab course identifies and applies the principles behind social media applications such as blogs and networking sites.

JRL 531. Multimedia Reporting. 3 Hours.
PR: JRL 220 or consent. Reporting/production for online media. Ethics and role of visual journalist. Software basics and use of audio, video and still photography in online reporting.

JRL 540. Visual Storytelling. 3 Hours.
Development of advanced analytical skills in digital photojournalism, photo editing and cross-media design. Graduate students connect the theoretical and technical realms of the visual story to appreciate its broader scope.

JRL 545. International Media 1. 1-3 Hours.
PR: Consent. A combination of classroom theory and practical application of the function of media in an international setting.

JRL 546. International Media 2. 1-6 Hours.
PR: Consent. Centers around a trip that involves the study of media in the country students are visiting. Usually a continuation of International Media 1.

JRL 556. West Virginia Uncovered. 3 Hours.
PR: Consent. Student teams will work with the instructor and editors at a regional publication to report and produce multimedia news-feature packages.

JRL 559S. Multimedia News Publication. 3 Hours.
PR: Admission to MSJ program and JRL 428 and JRL 489. In this lab/workshop style class, graduate students will produce stories and write a paper based on information from editors/producers.

JRL 587S. Advanced Video Reporting and Producing. 3 Hours.
PR: (JRL 380 or JRL 380S or JRL 386 or JRL 386S) with a minimum grade of C-. This course is run as an actual newsroom to teach students how to produce, gather and report news. Students are assigned “beats,” and work individually and in teams to produce news for local broadcast. Students serve as the talent and/or technical crew during newscast tapings and learn how to promote their work and engage audiences via professional social media use.

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

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

JRL 594. Seminar. 1-6 Hours.
PR: Consent. Advanced study of methodological techniques. Research project chosen from area of student's major interest. A written report of the study undertaken is required.

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

JRL 600. Introduction to Graduate Studies. 1 Hour.
(Required of all graduate journalism students; accelerated master's program students must take JRL 500.) Designed to orient students to graduate study.

JRL 601. Research Methods. 3 Hours.
(Required of all graduate journalism students.) Study of quantitative methods common to research in communications. An introduction to sampling, measurement, analytic procedures, and data.

JRL 604. Mass Media and Society. 3 Hours.
(Required of all graduate journalism students.) Study of mass media and their role in and influence on society; includes analysis of the social, political, and economic determinants of media content and character.

JRL 620. Advanced Journalistic Writing and Research. 3 Hours.
(Required of all graduate journalism students.) Study of advanced journalistic writing and research techniques. Students will practice the writing and research techniques on topics of their own choosing. Academic or popular topics may be selected.

JRL 689. Ethics of Mass Communication. 3 Hours.
PR: Open to graduate journalism students; Consent. Introduction to ethical principles and their application in the development of mass media systems and societal changes; professional codes; case studies; current problems.

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

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

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

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

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

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

JRL 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.

JRL 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.).

JRL 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.

JRL 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework 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 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.

JRL 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.

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.

LARC 520S. Introduction to Design Studio. 4 Hours.
Theory, principles, and elements of site planning and design. Lectures, readings, short problems, and site visits dealing with site analysis, ecological considerations, circulation and parking, management, and cost factors. Also includes basic computer graphics.

LARC 532. Recreation, Trails, and Community Development. 3 Hours.
Using outdoor recreation as a facilitator of community development, this course will provide a preview of comprehensive trail planning strategies guiding sustainable trail development, including the benefits of trails (economic, health, and social), strategies for stakeholder engagement, funding, activation and programming, and evaluation. Online, 3-credit graduate course, cross listed with LARC 332 (for undergraduate students).

LARC 534. Sustainable Trails: Design Concepts. 3 Hours.
Plan trail networks according to current best practices, responding to site topography and aesthetics while incorporating skills progression and accessibility for trail users of all skill levels. Online, 3-credit graduate course, cross listed with LARC 334 (for undergraduate students).

LARC 535. Sustainable Trails: Design Detailing & Drainage. 3 Hours.
PR: LARC 534. Refine trail masterplans for costing, bidding and construction documentation with site-specific detailing and specifications, while incorporating stormwater management best practices and ecological restoration principles. Online, 3-credit graduate course, cross listed with LARC 335 (for undergraduate students).

LARC 537. Sustainable Trails: Practicum Experience. 1-3 Hours.
PR or CONC: LARC 535 and RPTR 536. Engage directly in a trail project’s design, construction, maintenance and/or monitoring, through a service-learning capstone project in sustainable trails development. Work with stakeholders and community representatives directly to support recreation economy development. Can be repeated for credit: students can enroll for 1, 2, or 3 credits at once. Online, graduate course, cross listed with LARC 437 (for undergraduate students).

LARC 550. Design Studio. 1 Hour.
PR: LARC 520 and PR or CONC: LARC 550S. Medium scale site design and development including planting, design and grading. Application of basic design principles, programming, and site analysis reinforcing design processes and visual thinking in the design of sites.

LARC 550S. Design Studio. 3 Hours.
PR or CONC: LARC 550. Design Studio.

LARC 570. Meanings of Place. 3 Hours.
PR: Consent Study of place as a psychological and social phenomenon with implications for community development, historic preservation, interpretation, design, management, natural and cultural sustainability, and human well-being. (equivalent to RPTR 570).

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

LARC 650. Land and Environment Planning and Design. 1 Hour.
PR: LARC 550 with a minimum grade of B- and PR or CONC: LARC 650S. Introduction to and understanding of environmental planning, design and management of natural and social landscape systems at a regional, watershed, or ecosystem scale. Studies focus on systems inventory, analysis and impact assessment. GIS and 3D modeling applications will be integrated into this course.

LARC 650S. Land and Environment Planning and Design Studio. 4 Hours.
PR or CONC: LARC 650. Land and Environment Planning and Design Studio.

LARC 651. Community Planning and Design. 1 Hour.
PR: LARC 650 and PR or CONC: LARC 651S. Design studies focused on community planning, community development, and community growth. Integration with a community design team or other outreach project.

LARC 651S. Community Planning and Design Studio. 4 Hours.
PR or CONC: LARC 651. Community Planning and Design Studio.

LARC 652. Land Development Princ. 1 Hour.
PR: LARC 650 and LARC 651 and PR or CONC: LARC 652S. Brief history of land development. Design studio involving large scale design; projects with extensive time implementation sequence.

LARC 652S. Land Development Principles/Practice Studio. 4 Hours.
PR or CONC: LARC 652. Land Development Principles/Practice Studio.

LARC 664. Designing Healthy Places. 3 Hours.
Examination and analysis of environmental design solutions that have positive impacts for individual and community health outcomes.

LARC 670. Research Methods in Design. 2 Hours.
A survey of the philosophies and methodologies of science and research as they apply to the field of landscape architecture. Development of research methods for terminal project.

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

LARC 694. Seminar. 1-6 Hours.
Seminars arranged for advanced graduate students.

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

LARC 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.

LARC 697. 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).

LARC 698. Thesis. 1-6 Hours.
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.

LAW 604. Natural Resources. 3 Hours.
A survey course that includes law, theory, and practical management challenges of natural resource policy, with a strong substantive foundation in a broad range of resources, including water, timber, minerals, and wildlife.

LAW 605. Post-Conviction Remedies. 3 Hours.
The examination of post-trial issues in an actual criminal case, identifying legal errors in all aspects; jury instructions, testimony, evidence to support the conviction, and decision.

LAW 608. Art Law. 3 Hours.
A thorough examination of various legal topics and issues through the prism of art. Topic include intellectual property concepts of copyright, fair use and parody, First Amendment issues, non-profit organizations, sales warranties, authenticity, and salvage.

LAW 609. Child Protection and the Law. 3 Hours.
A primary focus on child abuse and neglect civil protection proceedings as defined by West Virginia Code, Chapter 49; and an examination of both federal law and West Virginia's statues, rules, and case law.

LAW 611. Consumer Protection Law. 3 Hours.
A practical survey of various state and federal laws designed to protect consumers, including WV Consumer and Credit Protection, Fair Debt Collection, Fair Credit Reporting, Truth in Lending, Fair Credit Billing and Gramm-Leach-Bliley.

LAW 612. Agriculture & Food Law. 2-3 Hours.
A consideration of the impact of law and policy (e.g., environmental law, property rights, subsidies, alternative production methods) on agricultural and the food system.

LAW 613. International Environmental Law. 2-3 Hours.
An issue- based approach to IEL, identifying pressing problems such as global climate change, ozone depletion, biodiversity, and studying some of the instruments and tools that have been created to deal with them.

LAW 615. Elder Law. 3 Hours.
A thorough examination of various legal topics and issues relating to the special needs of the elderly. Topics include legal capacity, surrogate decision-making, guardianship, Medicare, Medicaid, elder abuse, nursing homes and advance directives.

LAW 616. Cultural Property. 3 Hours.
This course will focus on issues concerning the restoration of artworks displaced during World War II, as well as the protection and preservation of cultural heritage and artifacts.

LAW 617. Geneva Study Abroad. 1-3 Hours.
(May be repeated for a maximum of 3 credit hours.) A 2-component, study abroad course with initial classroom preparation and subsequent travel to Geneva. This course addresses key subjects and themes in modern international trade regulation.

LAW 618. Criminal Procedure: Investigation. 3 Hours.
A course designed to cover all facets of the investigatory stage of criminal procedure: the right to representation by counsel, rules surrounding police practices and procedures of search and seizure, interrogation and identification.

LAW 619. Criminal Procedure: Adjudication. 3 Hours.
A comprehensive examination of criminal procedure adjudication covering regulation of prosecutors, defense counsel, pretrial legal issues, pretrial motions, plea bargains, and sentencing.

LAW 621. Lawyers as Leaders. 2-3 Hours.
An exploration of topics related to the theory and practice of leadership by lawyers intended to develop effective leadership skills for application in both the legal profession and in society in general.

LAW 622. E-Discovery. 3 Hours.
An introduction to the basics of identification, preservation, collection, search and production of Electronically Stored Information and effective utilization of procedural and evidentiary rules, practice pointers, and admissible evidence.

LAW 623. Election Law and Policy. 3 Hours.
A survey of American political structure and legal process, exploring the constitutional, administrative, and policy-related aspects of the political framework, including the right to vote, redistricting, political parties, campaigns, and campaign finance.

LAW 624. Advanced Legal Research. 2 Hours.
The course focuses on advanced legal research methodologies and strategies within the context of federal, state, and local law. It is designed to prepare law students for research in practical settings.

LAW 625. Nonprofit Organizations. 2-3 Hours.
An analysis of various types of nonprofit organizations, as well as legal issues often faced in contemporary society. Formation options for the tax-exempt form, taxation law related to nonprofit organizations, and charitable planning options will be addressed.

LAW 626. International Trade Law. 3 Hours.
A study of laws that affect businesses buying and selling products or services beyond U.S. borders. Includes the structure of the WTO system, economic theories underlying free trade, and remedies for unfair trade.

LAW 627. Land Use/Sustainable Development Clinic 1. 6 Hours.
A course offered to select third-year law students who, with faculty supervision, will provide transactional representation to clients regarding land and water protection and land use planning initiatives.

LAW 628. Land Use/Sustainable Development Clinic 2. 6 Hours.
PR: LAW 627. A continuation of LAW 627 presenting an opportunity for a higher level of responsibility, finalization of matters, and continued assistance to clients regarding land and water protection and land use planning initiatives.

LAW 629. Advanced Family Law Advocacy. 2 Hours.
A focus on laws and issues of a domestic relations practice by using West Virginia domestic law as a framework, with emphasis on practical application.

LAW 630. Energy Law. 3 Hours.
An examination of law and regulatory policies that govern and impact the energy industry, including all energy sources and alternative fuel possibilities.

LAW 631. Cyberlaw. 3 Hours.
Cyberlaw explores the application of law to all aspects of internet activity and function. Topics such as privacy, consumer protection, trademarks, copyrights, on-line contracting and jurisdiction will be covered.

LAW 632. Advanced Labor Law. 3 Hours.
LAW 741 recommended. Advanced topics in labor-management relations under the general jurisdiction of the National Labor Relations Board (NLRB) and the courts.

LAW 633. International Business Transactions. 3 Hours.
LAW 729 recommended. A foundation for the pursuit of a career as a corporate attorney with an international focus.

LAW 634. Energy Reg, Markets and Environ. 3 Hours.
This course focuses on the legal basis for the economic regulation of energy, the environmental impact of energy production, and the development of policies promoting renewable energy and energy efficiency.

LAW 635. Land Use and Resilience Law. 3 Hours.
This course covers the multi-faceted nature of land use and resilience law, including common-law and private-law mechanisms and the regulatory state and planning. In addition, various topics in resilience law are introduced.

LAW 636. Copyright Law. 3 Hours.
PR: Student in College of Law. This course covers the basics of copyright, including copyrightable subject matter, formalities and copyright registration, and the substantive and procedural elements of infringement and defenses. Technological developments affecting copyright are also addressed (software/internet).

LAW 637. Transactional Skills. 3 Hours.
PR: LAW 779. A practical approach to transactional skills development with in-class simulation of all aspects including, planning, interviewing, negotiating, and drafting of business contracts.

LAW 639. Food and Drug Law. 3 Hours.
This course focuses on the historical development of food and drug law and issues involving carcinogens and risk assessment in food safety; regulation of nutrition, and approval of new drugs, devices, and vaccines for diseases.

LAW 640. Parent, Child, and State. 3 Hours.
An exploration of the role and responsibility of the state to protect children and appropriate legal intervention as based upon West Virginia laws.

LAW 641. Introduction to Legal Research. 1 Hour.
PR: Student in the College of Law. This course focuses on basic legal research methodologies and strategies within the context of federal, state and local law. It is designed to prepare law students for basic research in practical settings.

LAW 642. Law Practice Management. 3 Hours.
PR: Student in the College of Law. This course introduces law office business operations and simulates office decision making dynamics. Subjects include human resources, financial planning/management, marketing, project management, office design, technology, quality control and similar subjects.

LAW 643. Taxation of Business Entities. 4 Hours.
PR: LAW 719. A comparative survey of the federal income taxation of C corporations, S corporations, and partnerships.

LAW 644. Energy Siting & Permitting. 3 Hours.
This course involves a review of the statutes, regulations and administrative processes associated with the regulatory approvals necessary to develop various energy facilities.

LAW 645. Water Law. 3 Hours.
A survey of water allocation doctrines that apply to surface and ground water. The origins of federal power, controversies between governing bodies, public rights, water quality and water-energy nexus, and water rights will be studied.

LAW 647. Nuclear Law & Policy. 3 Hours.
An examination of the law and regulations governing nuclear power facilities in the U.S. and the policies related to such regulations.

LAW 648. Energy Business/Law & Strategy. 3 Hours.
An examination of how law and regulation are used for strategic purposes in the energy industry, including: multi-market case studies using law in business strategies and the business perspective on the evolution of energy law.

LAW 649. Trademark & Unfair Competition. 3 Hours.
A study of basic trademark and unfair competition law to include false advertising and the right of publicity, with a focus on federal trademark statutes, state law protection, and the Federal Trade Commission’s role.

LAW 650. Entrepreneurship Clinic 1. 7 Hours.
In a clinical setting, apply Intellectual Property and Business Law concepts to assist actual clients in entrepreneur endeavors, covering the basics of business organizations, IP protection, financing, and contracting and the effect on entrepreneurs.

LAW 651. Entrepreneurship Clinic 2. 7 Hours.
PR: LAW 650. A continuation of Entrepreneur Clinic 1 to assist actual clients in entrepreneur endeavors, covering the basics of business organizations, IP protection, financing, and contracting and the effect on entrepreneurs.

LAW 652. Jessup International Moot Court. 1,2 Hour.
PR or CONC: LAW 768. A required course for students selected for the Jessup International Moot Court Competition Team that provides oral advocacy instruction and training for the current year's Jessup competition.

LAW 653. Law and Public Service. 1,2 Hour.
PR or CONC: LAW 654. A practical course in which selected student will serve as externs to public service and government agencies. Classroom instruction and reflective writing requirements are included.

LAW 654. Public Service Externship. 2-5 Hours.
PR or CONC: LAW 653. The fieldwork component of LAW 653.

LAW 655. Law and Public Service Full-Time. 2-6 Hours.
PR or CONC: LAW 656. A practical course in which selected students will serve as externs to public service and government agencies on a full-time basis. Classroom instruction and reflective writing requirements are included.

LAW 656. Law and Public Service Externship Full-Time. 6-11 Hours.
PR or CONC: LAW 655. The field work component of LAW 655.

LAW 657. International Criminal Law. 1-3 Hours.
This course will cover the traditional areas of international criminal law and procedures, as well as international crimes and enforcement.

LAW 658. Science & Technology of Energy. 2-3 Hours.
This course provides an overview of the scientific principles and technology associated with the development of energy resources, as well as coverage of the procedures for handling scientific and technical testimony in legal proceedings.

LAW 659. Administrative Energy Law and Practice. 2 Hours.
A practical course designed to build skills in analysis, writing, research, and communication through energy-related administrative law scenarios. Students develop their professional identities, assess strengths and weaknesses, and confront moral and ethical challenges.

LAW 660. Law of Coal. 2-3 Hours.
An introduction to current legal issues relating to mineral conveyancing, and regulation of environmental and health and safety impacts of coal mining, reclamation of coal mines and coal combustion.

LAW 661. Forensic and Expert Evidence. 2-4 Hours.
A practical study of the appropriate usage of forensic and scientific evidence in court, effective direct and cross-examination of expert witnesses; drafting motions in limine specifically dealing with forensic evidence, scientific exhibits, or expert testimony. LAW 727 is recommended before taking this course.

LAW 662. Mine Safety & Health Law. 3 Hours.
Mine Safety and Health is a study of the laws, regulations, and court decisions impacting the mining industry, mine workers, and their families.

LAW 663. Renewable Energy & Alternative Fuels. 3 Hours.
This course examines the convergence of energy and environmental issues, and includes a review of renewable and low-carbon energy sources as well as the various incentives to encourage development of renewable energy and alternative fuels.

LAW 664. Multistate Performance Test Writing Workshop. 1-2 Hours.
Students will gain training in legal reasoning for law school exams, the bar exam, and legal practice, by focusing on the application of substantive law in the context of a Performance Test.

LAW 667. Multistate Bar Exam Skills Workshop. 2 Hours.
Provides in-depth training in the legal reasoning needed to successfully answer multiple-choice questions on the bar examination. Geared toward third-year students, and serves as a companion course to the Essay Writing Workshop.

LAW 668. Healthcare Fraud & Abuse. 3 Hours.
An examination of health care fraud and abuse laws from civil and criminal perspectives, with an emphasis on federal statutes, to include a review of governmental enforcement initiatives. Health care compliance programs for health care providers, fraud and abuse driven by Affordable Care Act changes, access to pharmaceuticals, quality of care, and patient abuse will be explored.

LAW 669. Scholarly Writing Workshop. 1 Hour.
PR: Students must be enrolled concurrently in a law school seminar of their choice. A course designed to help students develop scholarly writing skills and serves as a companion course to the seminar requirement. Emphasis is placed on identifying writing conventions specific to scholarly legal writing and on the scholarly writing process.

LAW 670. LLM Seminar. 1-4 Hours.
PR: LLM Major restriction. A wide range study related to the degree program, exploring diverse advanced topics and perspectives. Rigorous preparation for discussion, a writing project, and in-class presentations are required.

LAW 671. LL.M. Capstone. 1-4 Hours.
An advanced course requiring the completion of a research paper or fieldwork project in the area of energy and sustainable development in the LL.M. Program.

LAW 672. Social Media and the Law. 1 Hour.
A web-based course that will analyze foundational and current cases, building a base of knowledge to prepare students to serve future clients in this evolving aspect of law.

LAW 673. Seminar in Consumer Law Policy and Procedure. 2 Hours.
A seminar exploring the historic and modern underpinnings of consumer law and how those policy considerations have informed consumer law regulation and policy.

LAW 674. Environmental Law - Pollution. 3 Hours.
This course will provide students with a perspective of federal and state environmental regulatory regimes, common law claims and defenses commonly raised in response to environmental pollution, as well as legal strategies relating to air pollution, water pollution, toxic and hazardous waste issues.

LAW 675. Introduction to the Profession. 1 Hour.
Law students will engage in reflection about the legal profession, their professional identity, and what essential skills, habits, and traits are needed to succeed in the legal profession.

LAW 676A. Veterans Advocacy Clinic 1. 6 Hours.
A clinical introduction to the arts and skills of lawyering. Students may represent clients and also engage in simulated practice exercises.

LAW 676B. Veterans Advocacy Clinic 2. 6 Hours.
PR: LAW 676A. A continuation of the clinical introduction to the arts and skills of lawyering. Students may represent clients and also engage in simulated practice exercises.

LAW 677. United States Supreme Court Clinic 1. 4 Hours.
A clinical course that provides students with both instruction and practice in written and oral advocacy in appellate matters with emphasis on those before the United States Supreme Court.

LAW 678. United States Supreme Court Clinic 2. 4 Hours.
PR: LAW 677. A continuation of US Supreme Court Clinic 1 with additional emphasis on working with the government in Supreme Court mattes and amicus curiae (friend of the court) briefs.

LAW 679A. WV Innocence Project Clinic 1. 6 Hours.
PR: LAW 727. A clinical introduction to the arts and skills of lawyering. Students may represent clients and also engage in simulated practice exercises.

LAW 679B. WV Innocence Project Clinic 2. 6 Hours.
PR: LAW 679A. A clinical introduction to the arts and skills of lawyering. Students may represent clients and also engage in simulated practice exercises.

LAW 681. Cannabis Law. 2 Hours.
This course will provide a practical approach to hemp and marijuana law. It will provide an opportunity to understand the practice of law from initial client interview, to business creation, through regulatory compliance, banking, taxes and more.

LAW 682. Essay Writing Workshop 1. 1 Hour.
A bar review course focusing primarily on the Multistate Essay Exam (MEE); includes strategies for taking the Multistate Performance Test (MPT), Multistate Bar Exam (MBE), and Multistate Professional Responsibility Exam (MPRE).

LAW 683. Essay Writing Workshop 2. 1 Hour.
PR or CONC: LAW 682. Open by invitation only, a one-hour extension of LAW 682 for students who would benefit from additional review and who must register for LAW 682 concurrently.

LAW 684. Bill Draft & Leg Process. 2 Hours.
This course explores the role of lawyers as bill drafters and advocates for legislative solutions to policy problems.

LAW 686. Civil Procedure. 4 Hours.
In this course, students will study judicial opinions, read rules of civil procedure, and engage in a number of civil procedure exercises. Class discussion will center on these areas.

LAW 687. Civil Procedure 2. 2 Hours.
An advanced civil procedure course designed to review first-year course topics, MDL, class actions, discovery in complex cases (including e-discovery), issue and claim preclusion (res judicata and collateral estoppel), securing and enforcing judgments, and appellate review. Also, is a course of interest for those considering litigation as a career and wish to understand rules that govern complex litigation practice.

LAW 688A. Seminar in American Constitutional History. 2 Hours.
A historical overview of American constitutional law from 1786 to present day, focusing on that part of history that still influences present-day constitutional law decision making.

LAW 688C. Seminar in Corporate Governance. 2,3 Hours.
This seminar provides students an in-depth look at current laws and policies that affect corporate governance and corporate accountability systems.

LAW 688E. Seminar in Human Rights & the Environment. 2 Hours.
An examination of the disparate impact of environmental decision-making on minorities relating to enforcement of environmental laws and siting of toxic chemical and hazardous waste disposal by industrial facilities.

LAW 688F. Seminar in Hydraulic Fracturing. 2-3 Hours.
An examination of the impacts of hydraulic fracturing in shale deposits in the U.S. and abroad, considering economic, environmental, and social issues and how those issue impact laws and regulations.

LAW 688H. Seminar in Firearms Law and Policy. 2 Hours.
A survey introduction to U.S. firearms law and policy as related to the Second Amendment of the U.S. Constitution.

LAW 688I. Seminar in Sexuality and the Law. 2 Hours.
An exploration of legal issues relating to human sexuality. Current controversies in legal theory will be addressed, as well as consent, privacy, power, and normalcy in gender issues.

LAW 688J. Seminar in Disability and the Law. 2 Hours.
A survey of key legal, ethical, and social issues in contemporary disability policy, including exploration of disability rights movement in the U.S. and how disability is defined within our legal and social system.

LAW 688K. Seminar in Schools, Race, & Money. 2-3 Hours.
The interrelationship of law and policy in the administration of U.S. elementary and secondary public education. Topics affecting most K-12 students will be: 1) structure, hierarch, and governance of public education; 2) desegregation and resegregation; 3) school finance, the constitutional right to adequate and equitable educations opportunities; and 4) issues beyond schools, race, and money that affect educational outcomes.

LAW 688L. Seminar: Opioid Litigation. 2 Hours.
Analysis of causes and responses to the nationwide opioid epidemic including applicable laws, regulations; tort litigation strategies of pharmaceutical, federal and state law enforcement; role of the media; and rights and remedies of state/local government and private litigants in Multi-District Opiate Litigation (“MDL”).

LAW 688M. Seminar: Domestic and International Terrorism. 2 Hours.
In this course, we will examine the term terrorism and the laws surrounding it. Topics of discussion and readings will include domestic terrorism prevention, national and state-level antiterrorism laws, international conventions on the prohibition of terrorism, and the definitions of terror and terrorism in international criminal law.

LAW 688N. Seminar: Health Care Civil Rights. 2 Hours.
This seminar examines the body of law that redresses discrimination in health care and will explore general civil rights as they apply in health care settings, as well as civil rights laws drafted specifically for health care. The course will cover access to health care facilities, rights to receive medical care, discrimination in the delivery of care and much more.

LAW 689A. Seminar: Intellectual Property. 2 Hours.
Considers the economic and social role of intellectual property laws in American and world economics. Preparation of a research paper of publishable quality will be required.

LAW 689F. Seminar: Lawyers and Legislation. 2 Hours.
Explores the role of lawyers in the legislative process with practical exercise in bill drafting and presentation to legislators.

LAW 689G. Seminar: Religion and Constitution. 2 Hours.
Explores the major doctrinal issues in the interpretation of the First Amendment's religion clauses. Related statutory schemes affecting religious liberty such as RFRA and RLUIPA will also be discussed.

LAW 689H. Seminar: Bioethics and the Law. 2 Hours.
An examination of the theological, philosophical and scientific foundations of bioethics; the operation of bioethical principles in the context of current bioethical controversies; and the relations between bioethics and the law.

LAW 689I. Seminar: Environmental Justice. 2 Hours.
A broad view of environmental justice issues and their impact on minorities and disempowered citizens and communities.

LAW 689K. Seminar: Civil Disobedience. 2 Hours.
An examination of the justification and operation of civil disobedience.

LAW 689M. Seminar: Race/Racism and American Law. 2 Hours.
This seminar focuses on historical and current event issues regarding race, racism and American law. It offers students the opportunity to advance in research and writing on the subject.

LAW 689P. Seminar: Gender and Law. 2 Hours.
The examination of the multiplicities of identity regarding the categories of gender, sex, sexual orientation, race and class as used to confer benefits and determine constitutional rights.

LAW 689R. Seminar in Commercial and Business Law. 2 Hours.
The examination of various topics relating to commercial, business, or construction (contracting, architecture, engineering) law. A substantial research paper is required.

LAW 689S. Seminar: Law and Socioeconomic. 2 Hours.
Advanced topics in the interrelationship between law and economic/social processes.

LAW 689T. Seminar:Comparative and International Workplace Law. 2 Hours.
Comparative analysis of workplace laws across global jurisdictions.

LAW 689W. Seminar:Issues in Energy Law. 2 Hours.
This seminar provides an understanding of a variety of issues regarding energy law and policy, both past and present, in the United States. A research paper on an energy law issue is required.

LAW 689X. Seminar: National Security Law. 2 Hours.
The history and framework of U.S. national security law and policies, with a focus on national security in the context of the use of military force, the intelligence community, civil liberties, and counterterrorism efforts.

LAW 689Y. Seminar in Sustainable Development. 2 Hours.
Consideration and further development of concepts and methods relating to sustainable development, including methods for incorporating consideration of economic development, environmental conservation, and social equity in decision-making at the regional, national and global level.

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

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

LAW 700. Legal Analysis, Research and Writing 1. 3 Hours.
Introduction to legal analysis, research, and writing. Stresses basic law school skills including case briefing, statutory analysis, and synthesis. Drafting of various legal documents including an office memorandum.

LAW 701. International Human Rights. 3 Hours.
An examination of historical, philosophical and legal issues in defining, understanding, and enforcing fundamental rights in a world of conflict and diversity.

LAW 703. Contracts 1. 4 Hours.
The study of operation of contracts in society, what it means to have a contract, how contracts are made, and the manner and extent to which contracts and non-contract promises will be enforced.

LAW 704. Contracts 2. 2 Hours.
PR: LAW 703. Examines express and implied conditions precedent, subsequent, and concurrent determining the order and quality of required contract performance, legal excuses for non-performance including mistake, impossibility, impracticability and frustration, and rights of third parties as contract beneficiaries or assignees.

LAW 705. Criminal Law. 3 Hours.
Substantive law of crimes including: (1) the philosophical basis for penal systems, (2) the characteristics of particular crimes, and (3) conditions of exculpation.

LAW 707. Property. 4 Hours.
Law of real property in historical and theoretical context. Includes estates in land and future interest, concurrent ownership, methods of obtaining title, modern land transactions, recording, title examination, and the law of servitudes.

LAW 708. Uganda Study Abroad. 3 Hours.
A study-abroad experience in Uganda focusing on sustainable development to involve service learning and participation with secondary school students on community projects. Economic and social needs will be addressed in a variety of settings.

LAW 709. Torts 1. 4 Hours.
The basic civil common law response to injury. The fault-based liability system for intentional torts, privileges, and negligence. Consideration of fact and proximate cause, joint tortfeasors, and limited duty.

LAW 710. Torts 2. 3 Hours.
PR: LAW 709. A continuation of Torts 1. The tort law of land occupiers, damages, defenses, imputed negligence, strict liability, products liability, and modern statutory substitutes for tort law.

LAW 711. Legal Analysis, Research and Writing 2. 2 Hours.
PR: LAW 700. Continuation of LAW 700. Stresses research and writing. Drafting of various legal documents culminating in the preparation of a trial motion and memorandum and oral argument of the motion.

LAW 712. Analytical Methods for Lawyers. 3 Hours.
An introduction and overview of game theory, probability statistics, finance, accounting and economics, as they relate to the practice of law. Beneficial to students without undergraduate degrees in business or economics.

LAW 713. Toxic Torts. 3 Hours.
PR:LAW 709. An in-depth study of the law of toxic torts in the context of environmental harms.

LAW 714. Remedies. 3 Hours.
Equity, damages, and restitution. Survey of remedies available for harms.

LAW 715. Appellate Advocacy. 2 Hours.
PR: LAW 700 and LAW 711. Survey of appellate practice. Drafting of an appellate brief and an argumentation of the brief.

LAW 716. Wealth Transfers. 3 Hours.
This course introduces the law of trusts and estates. It covers intestacy distributions, wills, trusts, non-probate transfers, and other associated subjects.

LAW 717. Domestic Violence and The Law. 3 Hours.
(LAW 769 is recommended.) The examination of civil and criminal statues and case law, as applied to domestic violence, focusing on national trends and West Virginia state law.

LAW 718. Advanced Bankruptcy. 3 Hours.
PR: LAW 767. The exploration of bankruptcy code complexities with emphasis on Chapter 11 reorganization.

LAW 719. Income Taxation 1. 3-4 Hours.
Gross income, deductions, exclusions, and gains and losses from dealing in property; the four credit version of the class includes administrative law concepts.

LAW 720. Entertainment Law. 3 Hours.
A foundation for the pursuit of a transactional or corporate law career in the entertainment industry. Includes the law contracts, copyright, trademark, and agent representation issues.

LAW 721. Sports Law. 3 Hours.
A foundation for the pursuit of a transactional or corporate law career in sports law. Includes the practical application of law of contracts and the process of negotiation.

LAW 723. Immigration Law. 2,3 Hours.
Constitutional underpinnings for immigration power; categories of and requirements for employment-based, family-based, and diversity-based immigration; visas for temporary visitation; problems with illegal immigration; removal procedures; and special policy issues, such as terrorism.

LAW 725. Constitutional Law 1. 3,4 Hours.
Basic study of the principles of constitutional decision making. Areas of emphasis include the allocation of power within the federal system, procedural and substantive due process, and equal protection of the law.

LAW 726. Constitutional Law 2. 3 Hours.
PR: LAW 725. First Amendment freedoms of speech, press, assembly, association, and petition.

LAW 727. Evidence. 3 Hours.
Rules, principles, and practice of the law of evidence covering judicial notice; real, demonstrative, testimonial and circumstantial evidence; hearsay; and other exclusionary rules, privileges, confidential relationships, witnesses, and other related subjects.

LAW 728. West Virginia Constitutional Law. 2 Hours.
A study of the West Virginia Constitution, its history, and its judicial interpretation with special emphasis on the branches of state government.

LAW 729. Business Organizations. 4 Hours.
Basic introduction to business organizations, their formation, maintenance, and dissolution. Includes agency, partnership, and corporations.

LAW 730. Immigration Law Clinic 1. 6-7 Hours.
Under the supervision of attorneys, students will work to represent clients in a variety of immigration proceedings and supplement case work with study of law and practice materials for the immigration practitioner.

LAW 731. Immigration Law Clinic 2. 6-7 Hours.
PR: LAW 730. A continuation of Immigration Law Clinic 1 (LAW 730). Students will continue to work under the supervision of attorneys to represent clients in a variety of immigration proceedings and supplement case work with study of law and practice materials for the immigration practitioner.

LAW 733. Education Law. 3 Hours.
A survey of major topics in education law with a focus on public primary and secondary education. The course includes consideration of both constitutional and statutory law affecting schools.

LAW 734. Intellectual Property. 3 Hours.
Legal problems in the protection of ideas including copyright, trademark, patent, and law of unfair competition; and their interrelationship.

LAW 735. Patent Law. 3,4 Hours.
The application and interpretation of patent law, including the requirements for obtaining a patent, infringement action, and other patent related law and policy.

LAW 736. Legal Estate Planning. 3 Hours.
PR: LAW 716. The law in its relation to problems of intergenerational transfers, including federal transfer taxes (estate and gift tax), life insurance, revocable and irrevocable trusts, wills, and the probate process.

LAW 737. Property 2. 2 Hours.
This class will focus on exploring common property issues that arise during the planning and development stages of energy projects and build upon the knowledge gained in your 1L Property class. This includes ownership interests, conveyance of property interests, easements, and leasing property for solar and oil/gas development. Emphasis will be placed on the interpretation and application of WV law.

LAW 738. Business Torts. 3 Hours.
The study of trademark, trade secrets, and unfair competition law, with a strong emphasis on the development of these doctrines in American law from both a statutory and common law perspective.

LAW 739. American Legal History. 3 Hours.
The study of American law from the colonial period to the present with emphasis on the jurisprudential, social, economic, political and cultural influences that have shaped the development of a distinctively American legal system.

LAW 740. Conflict of Laws. 3 Hours.
Legal problems arising when an occurrence cuts across state or national boundaries, emphasizing questions of characterization, jurisdiction, foreign judgments, recognition and application of foreign law in selected fields of law.

LAW 741. Employment Law. 3-4 Hours.
The course primarily focuses on federal and state regulations of the employee- employer relationships and may include: wrongful discharge, employee discrimination, wage/hour issues, and occupational safety and health.

LAW 742. Professional Responsibility. 3 Hours.
Professional responsibility in the administration of justice in society; Code of Professional Responsibility examined in light of traditional and changing demands of the legal system.

LAW 743. Patent Prosecution. 3 Hours.
PR: LAW 735. The study of all stages of patent prosecution, with an emphasis on claims drafting and amendment of claims. Prosecution study emphasizes drafting responses to official actions.

LAW 744. Law and Economics. 3 Hours.
Legal rules and institutions from perspective of economics; basic assumptions and principles with application to private law (contract, tort, nuisance, litigation) and public law (regulations, taxation, redistribution.).

LAW 745. Artificial Intelligence and the Law. 2,3 Hours.
This course will help familiarize law students with the basics of artificial intelligence, including machine learning and algorithmic decision making. Students will study ideas from computer science, data science, and philosophy. Students will learn about the important ways artificial intelligence is being used in the criminal justice sector, difficulties of arguing a machine, if algorithms can be biased and more.

LAW 746. Lawyers and Literature. 3 Hours.
A course of literary readings (emphasizing fiction and novels) that involve lawyers and focus on the theme of reflection and introspection.

LAW 747. Health Care Law. 3 Hours.
This introductory course in health care law includes state and federal regulation of the business of health care, "system" managed care, fraud and abuse, and health care transactions.

LAW 750. Alternative Dispute Resolution. 3 Hours.
A theoretical and practical examination of negotiation, court-annexed and private mediation and arbitration, summary jury and minitrials, and other "alternative dispute resolution processes; an assessment of the appropriateness of ADR for particular legal disputes.

LAW 751. Empirical Legal Methods. 3 Hours.
A presentation of foundational core statistical concepts covering the substantive equivalent of a college-level introductory statistics course and exploring empirical legal policy issues through readings and class discussions. Will focus on mastering specific empirical issues in cases, policy proposals, legislation, and regulations. No mathematics above algebra required.

LAW 752. Jurisprudence. 3 Hours.
Introduction to legal philosophy. Major jurisprudential issues; definition of law, concept of justice, relation of law and morality considered in light of specific legal theories and contemporary issues.

LAW 753. Estate and Gift Taxation. 3 Hours.
Application of federal transfer taxes (estate and gift tax) and West Virginia inheritance tax; inter vivos transfers; joint interests; life insurance; valuation; exemptions, exclusions and deductions; marital deduction.

LAW 754. State and Local Taxation. 2,3 Hours.
Constitutional limitations; examination of specific taxes such as ad valorem, sales and use, business and occupation, and income taxes; tax exemptions; and tax procedure.

LAW 755. Partnership Tax. 2 Hours.
PR: LAW 719. The study of Partnership Tax with an emphasis on reading the appropriate sections of the Internal Revenue Code and applying them to various problems to instill in the students the fundamentals of partnership tax.

LAW 756. Trial Advocacy. 4 Hours.
PR: LAW 727. Introduction to techniques of, and moral and ethical questions associated with trial practice, jury selection, opening statement, direct and cross examination, closing argument. Lecture, discussion, and simulation.

LAW 757. Law Review 1. 1 Hour.
PR: Students in the College of Law. Legal research, writing, and editing involved in the production for publication of analytical and scholarly commentary on the law. (May be repeated for a maximum of 2 credit hours.).

LAW 758. Law Review 2. 1 Hour.
PR: LAW 757. (May be repeated for a maximum of 2 credit hours.) Continuation of LAW 757.

LAW 759. Civil Rights. 3 Hours.
Survey of federal civil rights and statutes; causes of action to vindicate constitutional rights and remedy discrimination; primary emphases on substance, procedures, and defenses under 42 U.S.C. 1983.

LAW 762. Federal Courts. 3 Hours.
Jurisdiction and procedure in federal courts. Federal question and diversity jurisdiction; removal jurisdiction and procedure; the law applied in federal courts, and procedural rules unique to the federal system.

LAW 763. Employment Discrimination. 3 Hours.
Survey of federal and state statutes prohibiting discrimination in employment practices on grounds of race, gender, national origin, religion, age, or disability.

LAW 764. Administrative Law. 3 Hours.
Creation and operation of administrative agencies, common procedural practices and requirements of administrative procedure acts, judicial control of administrative agencies.

LAW 765. ADR: Mediation Training. 1 Hour.
A practical, skills-based course where students actively participate in the mediation of civil cases in the Monongalia County Magistrate Court as student mediators. The student mediators will coordinate with court personnel to set schedules, work with involved parties to settle cases and explore mediation techniques for mediation sessions. No student mediator will serve as counsel the plaintiff or defendant.

LAW 766. Coal/Oil and Gas. 3 Hours.
Nature of ownership of subsurface minerals; methods of transferring ownership thereof, partition among co-owners, analysis of leasehold estates, and rights and duties thereunder, coal mining rights and privileges.

LAW 767. Bankruptcy: Creditors and Debtors Rights. 3 Hours.
Federal bankruptcy law including consumer and business liquidation in Chapter 7 and rehabilitation in Chapter 11 and Chapter 13. Actual preparation of filings and plans. Introductory coverage of state debtors in collecting debts and enforcing judgments.

LAW 768. International Law. 3 Hours.
The law governing the behavior of nations; overview of customary law, treaties, dispute resolution, armed conflict, and recent specific problems for the United States in the world community.

LAW 769. Family Law. 3 Hours.
The law in its relation to creation, stability, and breakdown of domestic relations including engagement, marriage, annulment, separation, divorce, alimony and child support, custody, and adoption (Based on national and West Virginia law.).

LAW 770. Insurance. 2 Hours.
A survey of the basic principles, rules, and issues from the formation of the insurance relationship including indemnity, protections afforded, claims, and payment.

LAW 771. Labor Law. 3 Hours.
Labor-management relations under the general jurisdiction of the National Labor Relations Board and the courts. Collective bargaining, administration, and enforcement of labor agreements and enforcement and protection of rights of employees, unions, and the public.

LAW 772. Consumer Law. 1-3 Hours.
Consumer Law studies the group of laws that protect the public at large from unfair and predatory business practices and unscrupulous ways of doing business, including product defects, privacy, debt collection, credit practices, unfair advertising, and a host of related issues.

LAW 774. Local Government. 2 Hours.
Distribution of governmental authority among local, state, and national governments; public office and employment, liability risks of local governmental action; taxing and budgeting.

LAW 775. Pre-trial Litigation. 3 Hours.
This course will immerse students in the daily work of civil litigators. Students will learn the procedural and substantive contours of litigating a hypothetical case from its inception through the eve of trial.

LAW 776. Secured Transactions. 2 Hours.
Functional approach designed to use the UCC for commercial and consumer problems. Focusing on the creation, perfection, priority, and enforcement of security interests. Through problem-solving and practical applications, students will develop an understanding of how secured credit operates in commercial and bankruptcy contexts.

LAW 777. Health Care Torts. 3 Hours.
Introduction to legal issues that arise in the U.S. health care system relating mainly to patient care; emphasizing topics such as medical malpractice, informed consent, patient confidentiality, quality and accessibility of health care to patients.

LAW 778. Antitrust. 3 Hours.
Federal and state controls of vertical and horizontal integration and the legal limits upon the concentration of economic power in the United States.

LAW 779. Business Transactions Drafting. 4 Hours.
Focuses on the process and principles of drafting documents used in connection with various types of business arrangements. Such documents establish norms, or rules of expected behavior between the parties in the business context.

LAW 780. Federal Judicial Externship 1. 2-8 Hours.
PR: LAW 727 and PR or CONC: LAW 780A. Strongly recommended that students take LAW 618 and LAW 762 prior to enrolling in this course. A two-component, practical course in which selected students will serve as regular, full-time clerks to federal district court and appellate judges for one semester. Classroom instruction and writing requirements are included.

LAW 780A. Federal Judicial Externship 2. 6-11 Hours.
PR: LAW 727 and PR or CONC: LAW 780. Strongly recommended that students take LAW 618 and LAW 762 prior to enrolling in this course. The field work component of LAW 780.

LAW 781. Child and Family Advocacy Clinic 1. 7 Hours.
PR or CONC: LAW 727 and LAW 769. The first of a two-semester clinical course in which students represent clients in child and family law matters under faculty supervision. It includes two weekly classes with a requirement to visit Chestnut Ridge Hospital monthly as part of a medical- legal partnership and attend Judge Aloi's drug court at least once. Students are expected to work 15-20 hours per week.

LAW 781A. Child and Family Advocacy Clinic 2. 7 Hours.
PR: LAW 781. The second semester of a two-semester clinical course in which students represent clients in child and family law matters under faculty supervision, including cases referred by WVU Student Conduct and through the medical-legal partnership with WVU Hospitals, Inc.

LAW 782. General Litigation Clinic 1. 6 Hours.
PR: LAW 686 and PR or CONC: LAW 727. A clinical introduction to the arts and skills of lawyering. Students may represent clients and also engage in simulated practice exercises.

LAW 783. General Litigation Clinic 2. 6 Hours.
PR: LAW 782. A continuation of LAW 782. Students are given increased responsibilities for cases and will try a case in a simulated and/or actual trial setting.

LAW 784. Securities. 3 Hours.
Federal and state regulations of the distribution of and trading in securities, including the Blue-Sky Laws and federal acts.

LAW 786. Lugar Trial Advocacy. 1,2 Hour.
PR: LAW 727 and LAW 756 with a minimum grade of B- in each. An extensive lecture series and trial simulation program designed to provide opportunities for students to develop advanced litigation skills. Students must participate in six full-scale mock trials and one outside trial competition.

LAW 787. Intercollegiate Moot Court. 1,2 Hour.
Appellate brief writing and argumentation for members of intercollegiate moot court teams.

LAW 788. Interviewing, Counseling, and Negotiation. 3 Hours.
This course provides instruction in the lawyering skills involved in interviewing and client counseling as well as negotiation on a client's behalf. Simulations are employed to develop and enhance these practical lawyering skills.

LAW 789. Law of Environmental Protection. 3 Hours.
Problems of identifying and evaluating scientific evidence of air and water pollution; weighting the benefits of economic and technological progress against resulting harm to the quality of life; choice among alternative forms of litigation and public regulation as methods of social control.

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

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

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

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

LAW 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.).

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

LE 603. Children Literature. 3 Hours.
This course provides information about different genres, topics, and aspects of children's literature in the elementary classroom.

LE 620. Specialized Literacy Professionals. 3 Hours.
This course investigates the history of the role of the reading specialist, adult learning theory, coaching. collaboration, professional standards, and contemporary research on specialized literacy professionals.

LE 621. Knowledge of Literacy Instruction. 3 Hours.
This course targets the following aspects of the reading process: phonemic awareness, word study (phonics and vocabulary), fluency, and comprehension and develops content, pedagogical and curricular knowledge along developmental continuums of learning.

LE 622. Disciplinary Literacy. 3 Hours.
The course targets comprehension, vocabulary and writing instruction and examines ways in which they may be developed in the K-12 disciplines including science, social studies, math, and English language arts.

LE 623. Early Literacy Instruction. 3 Hours.
This course focuses on young learner's oral language, reading and writing development and instructional approaches for fostering growth at home and in preschool and kindergarten classrooms.

LE 624. Foundations of Literacy. 3 Hours.
This course explores the relationship between theoretical, conceptual, historical, contemporary and evidence-based foundations of literacy and language (reading, writing, and oral language).

LE 627. Motivation and Engagement in Literacy Learning. 3 Hours.
Reading, writing, and technology are examined through theoretical constructs of learner motivation and engagement in this course.

LE 640. Literacy Intervention 1. 3 Hours.
PR: LE 621 or RDNG 621. This course emphasizes a learner-centered approach to literacy instruction. It focuses on how to effectively plan for developmentally appropriate differentiated literacy instruction for all students and specifically addresses student learning needs when reading difficulties arise. Candidates provide individualized instruction to a diverse learner who struggles and have opportunities to provide peer feedback in this course.

LE 682. Literacy Assessments. 3 Hours.
This course focuses on foundational knowledge, purposes, terminology, and analysis procedures associated with formal and informal literacy assessments.

LE 689. Literacy Intervention 2. 3 Hours.
PR: LE 640 and consent. This practical experience provides literacy education candidates' opportunities to apply learner-centered concepts to small group teaching contexts. Candidates plan for and provide developmentally appropriate literacy instruction with small groups of diverse students and provide instructional feedback to peers.

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

LE 726. Literacy Leadership. 3 Hours.
PR: LE 620 and consent. This course analyzes the foundations of literacy leadership, school culture, professional development, policy, advocacy, and coaching. In this course, candidates will be provided with an opportunity to complete an inquiry project in a school setting designed to evaluate the school's literacy program. Candidates will create and implement a professional learning plan for a school-wide literacy program.

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.

LEGS 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.

LEGS 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.

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

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

LEGS 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.

LEGS 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.

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

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.

MAE 515. Analytical Methods in Engineering. 3 Hours.
PR: Consent. Index notation for determinants, matrices, and quadratic forms; linear vector spaces, linear operators including differential operators; calculus of variations, eigenvalue problems, and boundary value problems.

MAE 516. Computational Methods in Engineering. 3 Hours.
PR: Knowledge of undergraduate-level Statics, Dynamics, Fluid Dynamics, Numerical Analysis, as well as MATLAB or any other basic programming language such as C++ or Python. Students will be introduced to essential concepts in computational methods; functional approximations, system of non-linear equations, curve fitting, numerical differentiation and integration. Explicit, implicit, and iterative techniques will be used in conjunction with finite difference, finite volume and finite element methods, with emphasis on applications in mechanical and aerospace engineering including aerodynamics, heat transfer, mechanics of materials, and so on.

MAE 521. Advanced Thermodynamics 1. 3 Hours.
PR: MAE 321 or MAE 426. First and second laws of thermodynamics with emphasis on entropy production and availability (exergy); Maxwell's relationships and criteria for stability; equations of state and general thermodynamic equations for systems of constant chemical composition.

MAE 525. Heavy Duty Vehicle Emissions. 3 Hours.
PR: Graduate student standing in engineering or instructor consent. Present research and development of advanced heavy-duty engines and their use in vehicle powertrains. Study emissions formation and control from existing and developing heavy-duty vehicle system designs using conventional and hybrid propulsion systems.

MAE 526. Advanced Internal Combustion Engine. 3 Hours.
PR: MAE 425 with a minimum grade of C- or consent. An intermediate to advanced examination of internal combustion engine thermochemical processes, instrumentation, diagnostics, data analysis and modeling, with focus on preparing the student for advanced engine research.

MAE 528. Introduction to Fuel Cell Technology. 3 Hours.
PR: Graduate student standing in engineering or consent. Fuel cells definition, types and application areas, thermodynamics of fuel cells, introduction of electrochemistry, Nernst Potential, Butler-Volmer and Tafel equations, experimental techniques, computational techniques, fuel cell materials, fuel processing and storage, stack, and system design.

MAE 531. Fluid Mechanics 1. 3 Hours.
PR: Consent. Advanced dynamics and thermodynamics of fluids. Basic laws of conservation of mass and momentum in differential, vector, and integral forms. Application to internal flows, fluid machinery, and structures.

MAE 532. Dynamics of Viscous Fluids. 3 Hours.
PR: Consent. Derivation of and exact solutions for the Navier-Stokes equations; laminar boundary-layer theory, similarity solutions, and integral methods.

MAE 534. Fluid Flow Measurements. 2 Hours.
PR or CONC: MAE 534L. Principles and measurements of static and dynamic pressures and temperatures, velocity, and Mach number and forces. Optical techniques and photography. Design of experiments. Review of selected papers from the literature.

MAE 534L. Fluid Flow Measurements Laboratory. 1 Hour.
PR or CONC: MAE 534. Laboratory for MAE 534.

MAE 543. Advanced Mechanics of Materials. 3 Hours.
PR: Consent. Shear flow and shear center; curved beams; unsymmetrical bending, energy methods in structural analysis; theories of failure; instability of structures; beams on elastic foundation.

MAE 561. Satellite Navigation. 3 Hours.
PR: MAE 411 and MAE 460 or consent. Examination of various segments of the Global Positioning System. Applications, error sources, and advanced methods for mitigating these errors sources. Estimation procedures, algorithms, and GPS processing will be introduced and utilized.

MAE 565. Artificial Intelligence Techniques in Mechanical and Aerospace Engineering. 3 Hours.
Introduction to solving complex problems in mechanical and aerospace engineering using genetic (evolutionary) algorithms, fuzzy logic-based modeling and control, and artificial neural networks.

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

MAE 621. Advanced Thermodynamics 2. 3 Hours.
PR: MAE 521 or Consent. Thermodynamics of multi-component inert and reacting systems; equilibrium analysis; introduction to irreversible processes involving diffusion and chemical kinetics; application of concepts to heterogeneous systems.

MAE 623. Conduction Heat Transfer. 3 Hours.
PR: MAE 423 or Consent. Analytical and numerical solutions of steady and non-steady heat conduction problems in one-, two-, and three dimensional bodies; solution of linearized equations; applications include extended surfaces, moving surfaces, moving heat sources, and instrumentation techniques.

MAE 624. Convection Heat Transfer. 3 Hours.
PR: MAE 423 or Consent. Laminar and turbulent flows in forced and free convection systems; external and internal flows with application to heat exchanger design; introduction to aerodynamic heating.

MAE 625. Radiation Heat Transfer. 3 Hours.
PR: MAE 423. Classical derivation of black body radiation laws; gray body and non-gray analysis; radiant properties of materials, radiant transport analysis, specular-diffuse networks, gas radiation, thermal radiation measurements; analytical, numerical solutions, and study of selected publications.

MAE 631. Gas Dynamics. 3 Hours.
PR: MAE 336 or equivalent. Nonsteady gas dynamics and shock interactions; compressible flow theory in subsonic, transonic, and supersonic regimes, and their numerical treatment.

MAE 633. Computational Fluid Dynamics. 3 Hours.
PR: MAE 532 or equivalent. Finite difference methods; convergence and stability; Navier-Stokes equations; discretization methods; grid distribution; solution of difference equations; pressure coupling; application to conduction/convection, boundary layers, and recirculating flows; introduction to general purpose CFD codes.

MAE 635. Turbomachinery. 3 Hours.
PR: MAE 320 or Consent. Flow problems encountered in design of water, gas, and steam turbines, centrifugal and axial flow pumps and compressors, design parameters.

MAE 636. Fundamentals of Turbulent Flow. 3 Hours.
PR: MAE 532 or consent. Statistical theories of turbulence and recent applications. Basic experimental data and length and time scale analysis. Application of semi-empirical theories to pipe, jet, and boundary-layer flow.

MAE 640. Continuum Mechanics. 3 Hours.
PR: MAE 242 and MAE 243. Mathematical preliminaries including index notation; analysis of stress; analysis of deformation; fundamental laws, field equations, and constitutive equations; application to fluids and solids.

MAE 641. Theory of Elasticity 1. 3 Hours.
PR: Consent. Cartesian tensors; plane stress and plane strain; 2-D problems in Cartesian and polar coordinates; stress and strain in 3-D; general theorems; torsion of noncircular sections.

MAE 642. Intermediate Dynamics. 3 Hours.
PR: MAE 242. Newtonian and Lagrangian mechanics. Dynamics of discrete systems and rigid bodies analyzed utilizing Newtonian and Lagrangian formulations.

MAE 643. Inelastic Behavior of Engineering Materials. 3 Hours.
PR: MAE 543 or Consent. Characterization and constitutive relations of engineering materials; nonlinear elasticity, plasticity, viscoelasticity and creep; numerical implementation.

MAE 644. Fracture Mechanics. 3 Hours.
PR: MAE 641. Linear-elastic and elastic-plastic fracture mechanics; fatigue, dynamic, and creep crack growth; fracture mechanics models for composite materials.

MAE 645. Energy Methods in Applied Mechanics. 3 Hours.
PR: Consent. Variational principles of mechanics and applications to engineering problems; principles of virtual displacements, minimum potential energy, and complementary energy, Castigliano's theorem, Hamilton's principle. Applications to theory of plates, shells, and stability.

MAE 646. Advanced Mechanics of Composite Materials. 3 Hours.
PR: MAE 446 or Consent. Manufacturing, testing, and diagnostics of composite materials. Anisotropic plates with cutouts. Inelastic behavior of polymer matrix composites. Analysis of advanced composites such as metal matrix, ceramic matrix, and textile.

MAE 648. Experimental Stress Analysis. 2 Hours.
PR or CONC: MAE 648L. Strain gage techniques and instrumentation; stress analysis using optical methods such as photoelasticity and interferometric techniques; NDE and NDT or problems involving stress analysis.

MAE 648L. Experimental Stress Analysis Laboratory. 1 Hour.
PR or CONC: MAE 648. Laboratory for MAE 648.

MAE 653. Advanced Vibrations. 3 Hours.
PR: Consent. Dynamic analysis of multiple degree-of-freedom discrete vibrating systems; Lagrangian formulation; matrix and numerical methods; impact; mechanical transients.

MAE 656. Advanced Computer Aided Design. 2 Hours.
PR or CONC: MAE 656L. Geometric modeling; finite element meshing; design approaches, case studies using CAD principles; projects utilizing state-of-the-art CAD packages.

MAE 656L. Advanced Computer Aided Design Laboratory. 1 Hour.
PR or CONC: MAE 656. Laboratory for MAE 656.

MAE 660. Feedback Control in Mechanical Engineering. 3 Hours.
PR: Consent. Emphasis on design of control systems using classical, frequency domain, and time domain methods; advanced mathematical modeling of physical systems, compensation, stabilization, pole placement, state estimation; extensive use of computerized design tools, especially Matlab.

MAE 662. Robot Mechanics and Control. 3 Hours.
Kinematic and dynamic behavior of industrial robot manipulators; formulation of equations of motion for link joint space and end effector Cartesian space; path planning and trajectory motion control schemes.

MAE 663. Instrumentation in Engineering. 2 Hours.
PR or CONC: MAE 663L. Theory of instrumentation suitable for measuring rapidly changing force, pressure, strain, temperature, vibration, etc.; computerized acquisition, analysis, and transmission of data; methods of noise reduction.

MAE 663L. Instrumentation in Engineering Laboratory. 1 Hour.
PR or CONC: MAE 663. Laboratory for MAE 663.

MAE 671. Graduate Capstone Project. 3 Hours.
A Graduate Capstone Project involves the formulation and solution of a meaningful practical (or industrial) engineering problem, in which advanced engineering methods (commensurate with the MS level) must be used to design, model, analyze, or test an engineering system to reach the specific project objectives.

MAE 672. Project Report. 3 Hours.
PR: Be officially registered in the “Project-Report” option and at least 18 credits of graduate coursework completed in good standing (GPA > 3), including at least one required MATH course and one required technical area (core) course. A Project Report involves the development of specific research tasks or technology innovation, in which students apply knowledge acquired through the graduate program (commensurate with the MS level) to achieve specific goals, applying advanced analytical, experimental, or computational methods to produced expected results.

MAE 687. Materials Engineering. 3 Hours.
A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CE 687, CHE 687, EE 687, MINE 687, and IMSE 687.).

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

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

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

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

MAE 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.).

MAE 721. Fundamentals of Combustion. 3 Hours.
PR: MAE 321 or MAE 426. Thermodynamics, chemical kinetics, and diffusion of reacting gases; laminar and turbulent flames; flame stability and ignition.

MAE 741. Theory of Elasticity 2. 3 Hours.
PR: MAE 641. Complex variable methods, stress couples, nonlinear elasticity, numerical methods, potential methods, boundary value problems, and various special topics.

MAE 743. Theory of Elastic Stability. 3 Hours.
PR: Consent. Stability of discrete mechanical systems, energy theorems, buckling of beams, beam columns and frames, torsional buckling, buckling of plates and shells, and special topics.

MAE 744. Theory of Plates and Shells. 3 Hours.
PR: MAE 543 or Consent. Classical and modern theories of plates; dynamic response, nonlinear effects, and exact and approximate solutions of plates; application to rectangular and circular plates; membrane shells; shells with bending stiffness.

MAE 760. Advanced Topics in Control Theory. 3 Hours.
PR: MAE 660 or MAE 465. State feedback through eigenstructure assignment; Observers and Kalman filters; multiple-model adaptive estimation and control; parameter estimation; direct and indirect model-reference adaptive-control algorithms; introduction to neural networks.

MAE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of Benjamin M. Statler College of Engineering and Mineral Resources courses. 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.).

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

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

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

MAE 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.).

MANG 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of management. 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.).

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

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

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

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

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

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

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

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

MANG 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.

MANG 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.).

MANG 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.

MANG 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.

MANG 709. Applied Univariate Statistics. 3 Hours.
PR: Must be enrolled in a WVU Business & Economics PhD program or permission of the instructor. This course is an advanced introduction to applied univariate statistics, emphasizing understanding statistical concepts and methods and building data analysis skills. The goal is to provide a foundation from which students can continue to develop statistics knowledge and skills. The course will cover foundational topics (descriptive statistics, sampling distributions, hypothesis testing, probability) and statistical analyses (chi-square, t-tests, correlation, ANOVA, regression).

MANG 710. Philosophy of Research. 3 Hours.
PR: Consent. This course provides an overview of the philosophical concepts that guide research in organizations, including overview of research process, scientific progress, theory and practice, and selection of research design.

MANG 711. Research Methods. 3 Hours.
PR: Consent. Graduate-level introduction to critical topics in research methodology relevant to the social sciences. Emphasis on theory-driven research design, data collection, measurement development and evaluation, and various quantitative data analytic issues with a particular focus on organizational research.

MANG 713. Structural Equation Modeling. 3 Hours.
PR: Consent. This course examines the role and application of structural equation modeling (SEM) in social science research. The overarching goal is to provide the student with an understanding of the rationale underlying SEM, the application of SEM to research endeavors, the interpretation of SEM analyses, and the evaluation of research using SEM.

MANG 720. Human Resource Management. 3 Hours.
PR: Consent. This course offers an overview of theories and research underpinning the strategic and functional human resource management literature by reviewing representative research published in top academic journals and generating original research proposals.

MANG 730. Leadership. 3 Hours.
PR: Consent. This course seeks to critically analyze and explain current and classic leadership literature, taking stock of the knowledge base developed to date and considering conceptual and methodological avenues for further advancement.

MANG 740. Org Behavior: Groups and Teams. 3 Hours.
PR: Consent. This course provides a survey of the field of organizational behavior, primarily at the group/team level. The emphasis is on exploring concepts, theory, and empirical research to develop foundational knowledge in several key topic areas and in the approaches used to study group- and team-level organizational behavior.

MANG 760. Organizational Theory. 3 Hours.
PR: Consent. This course provides a survey of modern developments in organizational theory and their connection to the field's roots. Modern organizational theory has several different sub-fields whose diverse theories this course will connect.

MANG 770. Strategic Management Theory. 3 Hours.
PR: Consent. This course provides a survey of theories and methods in strategy research. The emphasis is on the development of major theories, perspectives, and paradigms in the strategic management field.

MANG 780. Organizational Behavior: Individuals. 3 Hours.
PR: Consent. This course provides a survey of the field of organizational behavior, primarily at the individual level of analysis. The emphasis is on exploring concepts, theory, and empirical research to develop foundational knowledge in several key topic areas.

MANG 785. Contemporary Strategic Mgmt. 3 Hours.
PR: Consent. This course provides an evaluation and analysis of contemporary issues in the strategic management literature.

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

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

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

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

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.
PR: MATH 261. A rigorous study of ordinary differential equations including linear and nonlinear systems, self-adjoint eigenvalue problems, non-self-adjoint boundary-value problems, perturbation theory of autonomous systems, Poincare-theorem.

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 567. 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 present 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, 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 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 it 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.
PR: MATH 452. Cauchy-Kowaleski theorem, Cauchy's problem, the Dirichlet and Neumann problems, Dirichlet's principle, potential theory, integral equations, eigenvalue problems, numerical methods.

MATH 758. Theory of Partial Differential Equations 2. 3 Hours.
PR: MATH 757. Cauchy-Kowaleski theorem, Cauchy's problem, the Dirichlet and Neumann problems, Dirichlet's principle, potential theory, integral equations, eigenvalue problems, numerical methods.

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. 3 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 on 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.

MDIA 510. Disruptions & Trends in Media Enterprise. 3 Hours.
In this course students will analyze the current state of media, understand the complexities of social media algorithms and the impact that has on how news is distributed via various platforms. Students will also analyze online and offline journalism, business models and the political impact of media.

MDIA 514. Audience Development. 3 Hours.
This course looks into a publication's past, currently, and future audience. This course emphasizes an audience-first strategy for all facets of newsroom production — from story selection to storytelling and distribution. It will also look at new ways to engage the audience and community members.

MDIA 518. Community Journalism. 3 Hours.
This course focuses on understanding the role of local news as central to a healthy community with an informed citizenry. We will review the traditional roles of local journalism as well as focus on important new roles for local journalism such as hosting and moderating community dialogue, increasing news literacy, building trust and engaging with a community.

MDIA 519. Product Development for Newsrooms. 3 Hours.
Web programming and storytelling for digital audiences. Students will use HTML, CSS, PHP, and MySQL while learning how to operate and customize content management systems for digital publishing. Students will also design, storyboard, and script an interactive storytelling project that includes incorporating text, graphics and database information into interactive products.

MDIA 520. Next Gen News Analytics. 3 Hours.
Next Gen Analytics explores how news media are utilizing digital measuring tools, audience data, and metrics. Students will analyze data-centric trends in journalism, understand how analytical data is collected, and analyze and evaluate different metric types.

MDIA 528. Media Ethics and Law. 3 Hours.
This course is an in-depth exploration of the complex ethical and legal media landscape, with an emphasis on key historical precedents, new cases, and challenges related to emerging technology, digital disinformation, artificial intelligence, new problems in social media and other current issues in journalism, public relations, and advertising.

MDIA 555. Media, Identity, and Power. 3 Hours.
PR: Consent. This course explores the interrelated issues of media, identity, and power through various theoretical, historical, and ethical approaches.

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

MDIA 610. Disruptions & Trends in Media Enterprise. 3 Hours.
In this course students will analyze the current state of media, understand the complexities of social media algorithms and the impact that has on how news is distributed via various platforms. Students will also analyze online and offline journalism, business models and the political impact of media.

MDIA 614. Audience Development. 3 Hours.
This course looks into a publication's past, currently, and future audience. This course emphasizes an audience-first strategy for all facets of newsroom production — from story selection to storytelling and distribution. It will also look at new ways to engage the audience and community members.

MDIA 618. Community Journalism. 3 Hours.
This course focuses on understanding the role of local news as central to a healthy community with an informed citizenry. We will review the traditional roles local journalism as well as focus on important new roles for local journalism such as hosting and moderating community dialogue, increasing news literacy, building trust and engaging with a community.

MDIA 619. Product Development for Newsrooms. 3 Hours.
Product development and management for an audience-focused, digital-focused newsroom. Students will learn the best methods for managing new products and services across the organization to meet the needs of their internal and external audiences. Students will also design, storyboard, and script an interactive storytelling project that includes incorporating text, graphics and database information into interactive products.

MDIA 620. Next Gen News Analytics. 3 Hours.
Next Gen Analytics explores how news media are utilizing digital measuring tools, audience data, and metrics. Students will analyze data-centric trends in journalism, understand how analytical data is collected, and analyze and evaluate different metric types.

MDIA 689. Community Based Field Experience. 3 Hours.
This course focuses on identifying the best models for audience development, digital subscriptions, analytics, digital content strategy, community outreach and engagement that will lead to long-term sustainability within the media industry. Students will develop a cohesive acquisition proposal, an enhancement proposal or an industry-related playbook addressing a key problem in local media.

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

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

MDIA 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.).

MDS 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of multidisciplinary 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 not on assistantships to gain teaching experience. (Grading may be S/U.).

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

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

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

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

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

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

MDS 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.

MDS 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.).

MDS 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.

MDS 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.

MDS 900. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in a professional field or content area (e.g., education, com- munity 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.

MDS 930. Professional Development. 1-6 Hours.
Professional development courses provide skill renewal or enhancement in 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.

MED 731. Clinical Clerkship in Medicine. 8 Hours.
(Third year.) CR. Required of third-year medical students. The individual student is assigned responsibility for specific patients from the inpatient and outpatient services at West Virginia University Health Sciences Center or Charleston Area Medical Center service. The student is an integral part of the team providing diagnostic and treatment services needed by the patient, under direct supervision of members of the faculty of the department. The student elicits the patient's history, performs physical examinations, and performs or secures indicated laboratory and clinical studies. The student records findings and presents case reports for discussion by members of the faculty during hospital rounds or outpatient clinics. The student attends such conferences, as directed. Clerkship in medicine occupies 8 weeks. (Grading will be S/U.).

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

MED 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.).

MED 830. Clinical Clerkship in Internal Medicine. 8 Hours.
PR: Required of third-year medical students. The individual student is assigned responsibility for specific patients from the inpatient and outpatient services at West Virginia University Health Sciences Center or Charleston Area Medical Center service. The student is an integral part of the team providing diagnostic and treatment services needed by the patient, under direct supervision of members of the faculty of the department. The student elicits the patient's history, performs physical examinations, and performs or secures indicated laboratory and clinical studies. The student records findings and presents case reports for discussion by members of the faculty during hospital rounds or outpatient clinics. The student attends such conferences, as directed. Clerkship in medicine occupies 8 weeks. (Grading will be S/U.) (Third year.).

MICB 500. Medical Microbiology. 3 Hours.
Provides basic background in medical microbiology. Emphasis is on basic structure of all microorganism groups including bacteria, fungi, viruses, protozoa and helminths; epidemiology, immunology, and infectious disease.

MICB 522. Bioinformatics Resource for Epigenomic Data Analysis. 2 Hours.
The course introduces basic concepts in epigenomic data analysis for several commonly used genome-wide profiling techniques, such as RNA-Seq, ChIP-seq, and DNase-seq/ATAC-seq, and offers hand-on experience for a set of frequently used standalone GUI tools, online databases, and web servers.

MICB 581. Advanced Immunology. 3 Hours.
Students participate in a study of contemporary topics using primary literature selected from recent developments in the field of immunology.

MICB 582. Advanced Microbiology. 2 Hours.
Current methodologies and topics in microbial pathogenesis, pathophysiology of the disease, and host-pathogen interactions. Course involves active learning techniques, including critical assessment of primary research reports, designing and presenting lectures to faculty and peers, or interacting with invited outside seminar speakers.

MICB 583. Advanced Vaccinology. 3-4 Hours.
Students will explore vaccinology from theory, to models, to human uses.

MICB 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching.

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

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

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

MICB 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.).

MICB 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.

MICB 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 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.

MICB 702. Microbiology. 5 Hours.
(For dental students only.) PR: Organic chemistry. Detailed study of pathogenic microorganisms. Emphasis on oral flora.

MICB 720. Cellular Immunobiology. 3 Hours.
This course will study contemporary topics in immunology from a research perspective. The primary focus of this course is to examine the impact of significant research discoveries on shaping current knowledge in immunology and disease. Students are expected to have prior understanding of basic immunology.

MICB 721. Bacterial Pathogenesis. 4 Hours.
Examines cellular and molecular-level strategies used by pathogens to survive and multiply in host systems, as well as modern approaches for studying these processes.

MICB 722. Bioinformatics Resource for Epigenomic Data Analysis. 2 Hours.
The course introduces basic concepts in epigenomic data analysis for several commonly used genome-wide profiling techniques, such as RNA-Seq, ChIP-seq, and DNase-seq/ATAC-seq, and offers hand-on experience for a set of frequently used standalone GUI tools, online databases, and web servers.

MICB 781. Advanced Immunology. 3 Hours.
Students participate in a study of contemporary topics using primary literature selected from recent developments in the field of immunology.

MICB 782. Advanced Microbiology. 2 Hours.
PR: (BMS 777 and MICB 721) or MICB 801. Current methodologies and topics in microbial pathogenesis, pathophysiology of the disease, and host-pathogen interactions. Course involves active learning techniques, including critical assessment of primary research reports, designing and presenting lectures to faculty and peers, or interacting with invited outside seminar speakers.

MICB 783. Advanced Vaccinology. 3-4 Hours.
Students will explore vaccinology from theory, to models, to human uses.

MICB 784A. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784B. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784C. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784D. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784E. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784F. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784G. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784H. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784I. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784J. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784K. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784L. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784M. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784N. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784O. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784P. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784Q. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784R. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784S. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784T. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784U. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784V. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784W. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784X. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784Y. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 784Z. Special Problems in Microbiology. 1-6 Hours.
PR: Consent.

MICB 785. Immunology and Microbiology Journal Club. 1-2 Hours.
A review of contemporary topics selected from developments in the field during the current year.

MICB 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of microbiology. 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.).

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

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

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

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

MICB 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.

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

MICB 801. Immunity, Infection and Disease. 9 Hours.
An integrated approach to the study of infectious disease in humans, with focus on innate and acquired immunity, mechanisms of pathogenesis of infectious microorganisms, transmission, and treatment.

MICB 812. Immunity, Infection and Disease (MICRO) 1. 4 Hours.
The overall objective of this course is to understand the biology of diseases caused by microbial infection and the immune response that follows microbial infection in humans. The first section of the course will review the cells, tissues, and functions of the vertebrate immune system; the second section reviews the basic structure, physiology, and genetics of classes of infectious microorganisms.

MICB 820. Immunity, Infection and Disease (MICRO) 2. 4 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. The overall objective of this course is to understand the biology of diseases caused by microbial infection and the immune response that follows microbial infection in humans. The first section of the course will review the cells, tissues, and functions of the vertebrate immune system; the second section reviews the basic structure, physiology, and genetics of classes of infectious microorganisms.

MINE 505. Integrated Mining Systems. 3 Hours.
PR: Graduate standing or consent. Problem-based and integrative learning to solve problems on underground and surface mining systems based on engineering principles.

MINE 531. Advanced Mine Ventilation. 3 Hours.
PR: MINE 331. Advanced topics in mine atmospheric control including control of methane, dust, humidity, and heat. Also covers leakage characteristics, fan selection, analysis of ventilation networks, and planning of mine ventilation system.

MINE 582. Advanced Mine Power Systems. 3 Hours.
Advanced study of mine electrical power systems from theory to practice covering the vital aspects that go into planning and designing a mine power system.

MINE 588. Advanced Mine Control Systems Engineering. 3 Hours.
PR: MINE 682 with a minimum grade of B- or MINE 382. Specially focused on controls requirements in extraction industries, combining classic control theory with first and second order system response, assessing system stability, selection of appropriate and cost-effective field-level sensors and devices, and overall control system design using programmable logic controllers. Responsible charge managing design-build controls project team.

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

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

MINE 611. Advanced Ground Control-Coal Mines. 3 Hours.
PR: MINE 411 or consent. Ground and strata control for underground and surface coal mining, including slope stability and subsidence.

MINE 612. Surface Subsidence Engineering. 3 Hours.
PR: MINE 411. Elements of surface subsidence engineering due to underground mining: theories of surface subsidence, characteristics and prediction of surface movements, and effects of surface movements.

MINE 613. Ground Control Failures. 3 Hours.
PR: MINE 611 or consent. Case studies of ground control failures on coal pillar, roof bolting, roof fall, cutter, floor heave, multiple-seam mining, and longwall mining.

MINE 614. Hydrometallurgy. 3 Hours.
The course provides the principles and fundamentals of hydrometallurgy and its application in obtaining metals from ores. The course involves the use of aqueous solutions for the recovery of metals from ores, concentrates, and recycled or residual materials.

MINE 616. Advanced Rock Mechanics. 3 Hours.
PR: MINE 414 or consent. Testing techniques and interpretation, strength and fracture, classification, anisotropy, friction, jointed rock, fluid pressure, fragmentation, and excavation.

MINE 624. Numerical Analysis in Mineral Engineering. 3 Hours.
PR: Graduate standing or consent. Application of mathematical and numerical methods in metallurgy and mineral processing problems.

MINE 625. Advanced Mineral Processing. 3 Hours.
Theory and technology of separation. Triboelectrostatic and magnetic dry ore and coal separation. Engineering and scientific aspects of column flotation of fines in coal and mineral industries.

MINE 627. Advanced Coal Preparation. 3 Hours.
PR: MINE 427 or consent. Coal preparation design and analysis. Fine coal column flotation, agglomeration, and dewatering. Biotechnology and others for HAPs removal. Coking and coal utilization. Instrumentation for process control.

MINE 628. Computation Fluid Flow in Mineral Engineering. 3 Hours.
PR: Graduate standing or consent. Applications of appropriate theories for solving fluid transportation problems in mineral engineering. Newtonian and non-Newtonian slurries and applications to mineral engineering are emphasized.

MINE 629. Mine Wastes Management/Closure. 3 Hours.
PR: Consent. Planning and design to control, detoxificate and contain mine openings for mine and mill closure in mineral industry. Regulatory frameworks.

MINE 631. Mine Ventilation Network Analysis. 3 Hours.
PR: MINE 331 and MINE 381 or consent. Theory and computational techniques for mine ventilation network problems with emphasis on computer-aided analysis of complex mine ventilation systems.

MINE 633. Coal Mine Methane Control. 3 Hours.
PR: Graduate standing or consent. Control of explosive gas emissions in coal mines. Procedures for measurement, mitigation, capture, and utilization of mine-generated gases. Techniques for gas emission forecasting.

MINE 641. Advanced Mine Pollution Control. 3 Hours.
This course covers environmental pollution control as it applies to surface and underground mines in the context of sustainable development. Areas of study include environmental ethical considerations, stakeholder evaluation, mine permitting, and environmental law. Students will learn the engineering principles of several environmental monitoring and pollution control activities, including materials balance calculations, soil management, hydraulic evaluation, and fine waste disposal.

MINE 661. Numerical Analysis for Mine Design. 3 Hours.
PR:Graduate standing or consent. An introduction to the formulation and application of boundary-element, finite-difference, and discrete element methods for geomechanical design of mines and geologic structures.

MINE 662. Displacement Discontinuity Modeling in Mining. 3 Hours.
PR: MINE 661 or consent. An in-depth look into the formulation and application of the displacement discontinuity method for modeling stresses and displacements in single and multiple-seam coal mines.

MINE 663. Geomechanical Modeling with Fast Lagrangian Analysis of Continuum. 3 Hours.
PR: MINE 611 or consent. An in-depth study of the application of the finite- difference program, FLAC, for modeling static and dynamic scenarios in mining, geologic and soil structures.

MINE 687. Materials Engineering. 3 Hours.
A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CE 687, CHE 687, EE 687, IMSE 687, and MAE 687.).

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

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

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

MINE 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.).

MINE 711. Theories of Surface Subsidence. 3 Hours.
PR:MINE 612. Theories of surface subsidence due to underground coal mining including empirical, profile function, theoretical and physical modeling methods, and time factors. (3 hr. lec.).

MINE 713. Theory of Roof Bolting. 3 Hours.
PR: MINE 611 or consent. Review and discuss various theories of roof bolting. Review select papers representative of recent developments of design of roof bolts and selection of materials.

MINE 731. Mine Ventilation Network Optimization. 3 Hours.
PR: MINE 631 or consent. Application of mathematical optimization techniques to mine ventilation network problems, including linear and nonlinear optimization for controlled-flow and generalized networks.

MINE 769. Expert Systems in Mining. 3 Hours.
PR: Graduate standing. An overview of expert systems applications in mining, a detailed study of two mining applications, study of shells and their components, and study of a specific shell used to develop a project.

MINE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of mining engineering. 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.).

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

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

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

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

MINE 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.

MINE 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.).

MKTG 500. Seminar in Marketing. 3 Hours.

MKTG 510. AI and Marketing Research. 3 Hours.
This course introduces scientific approaches to the solution of marketing problems with an emphasis on AI-driven methods and techniques.

MKTG 515. AI and Consumer Behavior. 3 Hours.
This course explores the transformative impact of artificial intelligence (AI) on consumer behavior, providing students with advanced insights into how AI technologies are reshaping marketing strategies and decision-making processes.

MKTG 520. AI in Sales. 3 Hours.
This course explores the intersection of artificial intelligence (AI) and sales, providing students with a comprehensive understanding of how AI technologies can enhance sales strategies, optimize sales processes, and improve customer relationships.

MKTG 525. AI Marketing Project 1. 3 Hours.
PR: (MKTG 415 and MKTG 435 and MKTG 475 and MKTG 510 and MKTG 515 and MKTG 520) with a minimum grade of C- in all. This course provides an in-depth understanding of the application of artificial intelligence (AI) tools in marketing campaigns. Students can apply the knowledge and skills gained from previous AI Marketing coursework to create a comprehensive promotions campaign for an organization.

MKTG 530. Digitally Mediated UX. 3 Hours.
This course provides an overview of User Experience (UX) to consider a consumer's realized or anticipated interaction with a brand's digitally- mediated (e.g., AI, CMS) products, systems, and services.

MKTG 535. Management Distribution Systems. 3 Hours.

MKTG 540. AI Ethics. 3 Hours.
This course examines the ethical implications of leveraging artificial intelligence (AI) in marketing practices, providing a critical framework for responsible decision-making in the digital age. Students will explore topics such as data privacy, algorithmic bias, transparency, and the societal impacts of AI-powered marketing.

MKTG 545. AI Marketing Project 2. 3 Hours.
PR: MKTG 525 and MKTG 530 with a minimum grade of C-. This course is designed to provide an in-depth understanding of how artificial intelligence (AI) tools, particularly large language models (LLMs) like ChatGPT4, can transform marketing communications. Students will learn to develop an Integrated Marketing Communications (IMC) campaign using AI for prompt generation, content creation, and strategic decision-making.

MKTG 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of business and economics. 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.).

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

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

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

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

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

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

MKTG 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.).

MKTG 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.

MKTG 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.

MKTG 700. Seminar on Marketing Theory. 3 Hours.
Critical review of the literature with an emphasis on evaluating the structure of theories as well as the various schools of marketing thought. Additionally, students develop an understanding of social science and the scientific method.

MKTG 701. Foundations of Academic Research and Writing. 1 Hour.
This course focuses on the philosophy needed by researcher to explore important areas of marketing: philosophy of science and moral philosophy and logic. We will also cover the ethical requirements of a researcher conducting research, publishing research, and reviewing research. We will explore the tools a researcher must have to be successful.

MKTG 710. Philosophy of Research. 3 Hours.
This course provides an overview of the philosophical principles that guide research in organizations, ethical dilemmas and practical relevance of research, and factors that guide the selection of a research design and method of analysis.

MKTG 711. Advanced Topics in Marketing 1. 3 Hours.
this seminar involves the study of theory and empirical research as it relates to the following areas in Marketing: channels of distribution, sales and sales management, retail management, and services marketing.

MKTG 713. Multivariate Data Analysis. 3 Hours.
PR: MANG 712. This course discusses commonly used techniques (e.g., factor analysis, MANOVA, structural equation modeling) of analyzing multivariate data. The course will help students in choosing the appropriate methods for analyzing data in their own research.

MKTG 720. Seminar in Buyer Behavior. 3 Hours.
This course covers buyer behavior theories including information processing, attitude, behavior, decision making, social environment, and potential moderators from positivist and post-positivist perspectives.

MKTG 721. Special Topics in Marketing. 3 Hours.
A study of traditional and contemporary special topics in the field of marketing (e.g., channels of distribution, sales, services, sharing economy, branding, product strategy).

MKTG 730. Advanced Marketing Research. 3 Hours.
PR: MKTG 700 an MKTG 720. This seminar covers common research methods employed in marketing research, including: experimental design, sampling and survey research, measurement, meta- analysis, and validity issues to facilitate students' ability to critique marketing papers and to develop their own research.

MKTG 731. Trending Topics in Marketing Research Methods. 2 Hours.
The objectives of this course are twofold. The first objective is to familiarize you with trending, contemporary topics in marketing research methodology. Assigned readings and assignments will cover contemporary marketing research methodologies and tools. The second objective is to enhance your ability to evaluate critically marketing or management research methodologies.

MKTG 740. Seminar in Marketing Strategy. 3 Hours.
This seminar is designed to deepen the students' understanding of marketing strategy, international marketing and public policy in marketing. Topics include: measuring marketing outcomes, competition, foreign market entry mode, country of origin, consumer welfare, and sustainability.

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

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

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

MPGE 610. Introduction to Midstream Petroleum Engineering. 3 Hours.
Overview of operations, design and maintenance of midstream oil and gas facilities including pipeline, compressor, surface treatment, pressure/flow control equipment, and flow assurance systems. The regulations, compliance mechanisms, and support functions for safe, reliable, and environmentally conscious of midstream operation are reviewed.

MPGE 620. Design and Monitoring of the Petroleum Transportation Facilities. 3 Hours.
Application of engineering principles for designing transportation facilities including pipelines and compression for natural gas, LNG, and oil. The current and best practices for construction, monitoring, and operations of petroleum transportation facilities will be discussed.

MPGE 640. Fundamentals of Natural Gas Processing. 3 Hours.
Application of engineering principles relative to the design of the natural gas processing facilities. The fluid properties and how they pertain to processing facility design will be reviewed. The basic equipment used for natural gas processing will be discussed.

MPGE 650. Design and Operation of Underground Storage Facilities. 3 Hours.
Application Engineering principles for underground storage reservoir design, performance, and optimization. Natural Gas storage in depleted reservoirs, aquifers, and salt cavities will be discussed. Oil, LNG, and Hydrogen storage will be also reviewed.

MPGE 655. Introduction to Carbon Capture and Storage. 3 Hours.
Overview of the technical, environmental, economic, legal, and policy frameworks implications of Carbon Capture and Storage. CO2 capture, transport, and storge technologies and their role in promoting cleaner energy production are discussed. The best practices for site selection and Class VI well permits for effective carbon management are reviewed.

MPGE 680. Midstream Project Economic Analysis. 3 Hours.
PR: MPGE 610. The application of economic principles and analytical frameworks to assess the economic viability of projects and effective decision-making relative to midstream petroleum industry, capital expenditures, regulator rate cases, mergers and acquisitions, tariff structures, and gas day trading activities.

MSEN 580. Crystallography and Crystals. 3 Hours.
Introduction to the principles of structure of materials, and theory and applications of diffraction and imaging techniques for materials characterization using X-ray diffraction and transmission electron microscopy (TEM).

MSEN 583. Thermodynamics and Kinetics of Materials. 3 Hours.
Fundamental concepts of thermodynamics and kinetics of materials. Classical thermodynamics. Examples of the application of thermodynamic concepts to the analysis of material systems.

MSEN 649. Microscopy of Materials. 3 Hours.
Optical and electron microscopic principles and techniques. Sample preparation methods. Microstructures of engineering materials. Laboratory demonstrations of instruments.

MSEN 686. Materials Science and Engineering Seminar. 1 Hour.
Mandatory seminar series for all materials science and engineering (MS&E) majors. Recent developments in materials science and engineering.

MSEN 793. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

MUSC 500. Secondary Performance:Bassoon. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on bassoon, with emphasis on methods and materials for school music teachers.

MUSC 500A. Secondary Performance: Cello. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on cello, with emphasis on methods and materials for school music teachers.

MUSC 500B. Secondary Performance: Clarinet. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on clarinet, with emphasis on methods and materials for school music teachers.

MUSC 500C. Secondary Performance: Euphonium. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on euphonium, with emphasis on methods and materials for school music teachers.

MUSC 500D. Secondary Performance: Flute. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on flute, with emphasis on methods and materials for school music teachers.

MUSC 500E. Secondary Performance: Guitar. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on guitar, with emphasis on methods and materials for school music teachers.

MUSC 500F. Secondary Performance: Horn. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on horn, with emphasis on methods and materials for school music teachers.

MUSC 500G. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 500H. Secondary Performance: Oboe. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on oboe, with emphasis on methods and materials for school music teachers.

MUSC 500I. Secondary Performance: Percussion. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on percussion instruments, with emphasis on methods and materials for school music teachers.

MUSC 500J. Secondary Performance: Piano. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on piano, with emphasis on methods and materials for school music teachers.

MUSC 500K. Secondary Performance: Pipe Organ. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on pipe organ, with emphasis on methods and materials for school music teachers.

MUSC 500L. Secondary Performance: Saxophone. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on saxophone, with emphasis on methods and materials for school music teachers.

MUSC 500M. Secondary Performance: String Bass. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on string bass, with emphasis on methods and materials for school music teachers.

MUSC 500N. Secondary Performance: Trombone. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on trombone, with emphasis on methods and materials for school music teachers.

MUSC 500O. Secondary Performance: Trumpet. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on trumpet, with emphasis on methods and materials for school music teachers.

MUSC 500P. Secondary Performance: Tuba. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on tuba, with emphasis on methods and materials for school music teachers.

MUSC 500Q. Secondary Performance: Viola. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on viola, with emphasis on methods and materials for school music teachers.

MUSC 500R. Secondary Performance: Violin. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on violin, with emphasis on methods and materials for school music teachers.

MUSC 500S. Secondary Performance: Voice. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on voice, with emphasis on methods and materials for school music teachers.

MUSC 500T. Secondary Performance: Hand Percussion. 1,2 Hour.
PR: Consent. Group or individual instruction in performance on hand percussion and related traditions with emphasis on methods and materials for school music teachers. (May be repeated for credit.).

MUSC 500U. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 500V. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 500W. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 500X. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 500Y. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 500Z. Secondary Performance. 1,2 Hour.
(May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

MUSC 501. Music Ensemble. 2 Hours.
To rehearse and perform as part of one of the following WVU major ensembles: the Wind Symphony, the Symphonic Band, the Symphony Orchestra, the University Choir, and Big Band (Jazz Ensemble).

MUSC 561. Graduate Theory Review. 3 Hours.
Review of undergraduate basic musicianship (writing, ear training, sight singing, and analysis) for incoming graduate students with deficiencies. Not open to undergraduates.

MUSC 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of music. 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.).

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

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

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

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

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

MUSC 610. Foundations of Recording Industry. 3 Hours.
PR: MUSC 611. The course covers development of the recorded music industry system, methods, and operations from mid 1800s to the present, with emphasis on the development of independent and major record labels, commercial and creative practices, technological progress, and social, cultural, economic and legal influences.

MUSC 611. Music Industry Regulations. 3 Hours.
Advanced analysis of the current scope and content of music industry regulations and their impact on today's music industry commercial models and practices. Structure and methods of collective music rights administration and enforcement mechanisms. Regulatory responses to music digitalization and digital market place.

MUSC 612. Music Product Advancement. 3 Hours.
PR: MUSC 611. Practices, tools, and creative concepts of music product advancement in today’s music market place. Methods and organization of music product content, commercial communication, and distribution. Integrated music product advancement strategies and techniques.

MUSC 613. Music Performance Organization and Commerce. 3 Hours.
PR: MUSC 611. Advanced study of strategies, methods, and practices in the contemporary commercial music performance field. Regulations, organization and compliance procedures. Commercial production standards and processes.

MUSC 614. Advanced Recording Industry. 3 Hours.
PR: MUSC 611. Administration, regulations, and commercial strategies of today's recording industry. Recorded music product production planning, budgeting, organization, advancement, and sales in the digital and physical market place.

MUSC 615. Advanced Music Publishing. 3 Hours.
Main stream music publishing industry regulations, models, structures and organization. Current commercial practices, strategies, and procedures in music publishing. Catalog acquisition, administration and advancement methods and processes.

MUSC 617. Development of Music Technology. 3 Hours.
PR: MUSC 611. The course covers development of technological innovations and their influence on music industry production, reproduction, regulations, and commerce, from mid 19th century to present.

MUSC 619. Music in Multimedia. 3 Hours.
PR: MUSC 611. The course covers scope, development, creation, and production of music material for visual, interactive, and digital media applications, as well as regulations, licensing, and commerce of music in multimedia.

MUSC 620. International Music Industry. 3 Hours.
PR: MUSC 611. The course covers music industry systems, commerce, and regulations in major international music markets, as well as strategic options for entering and competing in foreign music markets, role of alliances with music industry partners from developing economies, and competing in emerging music markets.

MUSC 621. Artist Representation. 3 Hours.
PR: MUSC 611. The course covers practices, methods, and regulations of artist management in the music industry, including talent agencies, personal management, performance, publishing, and recording agreements, tours, and artist promotion.

MUSC 623. Recording Production. 3 Hours.
PR: MUSC 611. This course is an overview of music recording production theory and practice, including audio recording concepts, practices, equipment, software, standard professional recording techniques, and their implications on the production management.

MUSC 624. Live Music Production. 3 Hours.
PR: MUSC 611. This course is an overview of live music production theory and practice, including sound reinforcement concepts, practices, equipment, as well as standard professional live audio engineering and production techniques.

MUSC 626. Music Industry Project. 3 Hours.
PR: Taken after the completion of all the MA in Music Industry Program courses, or, by permission of the program director, during the last semester of the MA in Music Industry studies, concurrently with other courses. Comprehensive final project utilizing acquired competencies in creative, technical, and operational elements of the commercial music industry's methods and practices. The course involves initiation, creation, and execution of an approved professional music industry project. This course is taken when all the other courses in the MA in Music industry sequence are completed.

MUSC 630. Keyboard Performance and Pedagogy. 3 Hours.
(May be repeated for credit.) (Offered in one credit modules of which students may take one or more each semester.) Pedagogy, repertoire, interpretation, and other topics which will enhance preparation of private piano teachers.

MUSC 631. Survey of Orchestral Music. 3 Hours.
PR: 6 hours of upper-division music history or consent. Survey analysis of orchestral music from the late Baroque period to the present from the perspective of the conductor.

MUSC 632. Survey of Wind Music. 3 Hours.
PR: 6 hours of upper-division music history or consent. Survey and analysis of wind music from the late Baroque period to the present from the perspective of the conductor.

MUSC 633. Survey of Vocal Music. 3 Hours.
PR: 6 hours of upper-division music history. Survey of masses, oratorios, cantatas and opera from late Renaissance to the twentieth century. Sole repertoire will not be included.

MUSC 634S. Jazz Performance and Pedagogy. 3 Hours.
Methods and materials, observation. Offered in modules of which students may take one or more each semester: survey of jazz literature, survey of teaching technique, practical teaching/experience, or special topics. (May be repeated for credit.).

MUSC 640. Chamber Music: Brass. 3 Hours.
(May be repeated for credit.) Performance in small brass ensembles.

MUSC 641. Chamber Music: Guitar. 3 Hours.
(May be repeated for credit.) Performance in small guitar ensembles.

MUSC 642. Chamber Music: Jazz. 3 Hours.
(May be repeated for credit.) Performance in jazz ensembles, instrumental or vocal.

MUSC 643. Chamber Music: Percussion. 3 Hours.
(May be repeated for credit.) Performance in percussion ensembles.

MUSC 644. Percussion-Experiential Ensemble. 1 Hour.
Performance in percussion ensembles emphasizing music from non-Western cultures.

MUSC 645. Chamber Music: Percussion-Gamelan. 3 Hours.
(May be repeated for credit.) Performance in Gamelan ensembles.

MUSC 646. Chamber Music: Percussion Steel Band. 3 Hours.
(May be repeated for credit.) Performance in steel band ensembles.

MUSC 647. Chamber Music: Piano. 3 Hours.
(May be repeated for credit.) Performance in piano four-hand chamber music or performance by pianists in other ensembles.

MUSC 648. Chamber Music: String. 3 Hours.
(May be repeated for credit.) Performance in small string ensembles.

MUSC 649. Chamber Music: Voice. 3 Hours.
(May be repeated for credit.) Performance in small vocal ensembles.

MUSC 650. Chamber Music: Woodwind. 3 Hours.
(May be repeated for credit.) Performance in wind quintet and small woodwind ensembles.

MUSC 651. Chamber Music: Other. 3 Hours.
(May be repeated for credit.) Performance in small mixed ensembles.

MUSC 660S. Composition. 3 Hours.
PR: Consent. Primarily for candidates for graduate degrees in theory or composition. (May be repeated for credit.).

MUSC 670. Perspectives of Musicology and Ethnomusicology. 3 Hours.
A survey of western and non-western musics, with particular attention to historiographies, social contexts, and evolution of musical styles.

MUSC 671. Music History Pedagogy 1. 3 Hours.
Current and best practices in the teaching of undergraduate music history courses, including courses for non-majors and music majors (so-called survey courses). Topics include: Development of pedagogical models; learning objectives; syllabus design; textbooks/other teaching resources; and classroom technologies.

MUSC 672. Music History Pedagogy 2. 3 Hours.
PR: MUSC 670 with a minimum grade of C+. Continued study of current and best practices in the teaching of undergraduate music history courses, including courses for non-majors and music majors (so-called survey courses). Topics include: undergraduate writing; assessment design and implementation; performance and composition in music history courses.

MUSC 673. World Music Ensemble Pedagogy. 3 Hours.
An investigation of non-western instruments, ensembles, performance techniques, literatures, and pedagogies; the diverse scope of world music pedagogy, theory, and practice; materials commonly used in collegiate world music survey courses and world music ensembles.

MUSC 678. Masters Field Study. 2,4 Hours.
A school-based field study that demonstrates application of knowledge and skills from graduate study as a culminating project in music education.

MUSC 680. Music in the Elementary School. 3 Hours.

MUSC 681. Teaching Music Appreciation. 3 Hours.

MUSC 682. Contemporary Techniques in Classroom Music. 3 Hours.
PR:MUSC 382 or Consent. Principles and practice of contemporary techniques in elementary and junior high school classroom music, including those of Orff and Kodaly.

MUSC 683. Music Making in Middle School/Junior High. 3 Hours.
PR: MUSC 380, and MUSC 381, and MUSC 382 equivalent or Consent. Identification and sequencing of appropriate concepts and skills for general music class students. Selection and use of materials including popular music. Emphasis on student music-making activities. Evaluation procedures included.

MUSC 684. Music in Early Childhood. 3 Hours.
PR: MUSC 380, and MUSC 381, and MUSC 382, or equivalent, or Consent. Musical experiences for children three through ten years. Emphasis on intellectual, physical and social/emotional needs and characteristics of children. Materials and activities for developing music concepts, skills, and positive response.

MUSC 686. Instrumental Methods and Materials. 3 Hours.
PR: Consent. Methods, materials, and administration of K-12 instrumental music programs; sequential instruction; conceptual and skill development; aural and reading competencies in music. (Bi-weekly lab. 3 hr. lec.).

MUSC 687. Choral Music Methods and Materials. 3 Hours.
PR: Consent. Methods, materials, and administration of choral music programs; sequential instruction; conceptual and skill development; teaching aural and reading competencies. (Bi-weekly lab. 3 hr. lec.).

MUSC 688. General Music Methods and Materials. 3 Hours.
PR: Consent. Introduction to major pedagogical approaches used in K-12 general music classrooms; examination and development of materials and curricula; analysis of teaching and learning styles. (Bi-weekly lab. 3 hr. lec.).

MUSC 689. Master's Recital. 2-4 Hours.
PR: MUSC 499 Senior recital or consent. May be repeated for credit. Master's performance students shall be permitted to give a recital only after they pass a qualifying audition before a designated faculty committee at least six weeks before the recital is to be given.

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

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

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

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

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

MUSC 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.

MUSC 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.).

MUSC 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.

MUSC 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 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.

MUSC 700. Performance: Bassoon. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for course.

MUSC 700A. Performance: Cello. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours). Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700B. Performance: Clarinet. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700C. Performance: Horn. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700D. Performance: Percussion. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700E. Performance: Piano. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700F. Performance: Pipe Organ. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700G. Performance: Saxophone. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700H. Performance: Trumpet. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700I. Performance: Voice. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700J. Performance: Conducting. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700K. Performance: Euphonium. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700L. Performance: Flute. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700M. Performance: Guitar. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700N. Performance: Harpsichord. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700O. Performance: Oboe. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700P. Performance: String Bass. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700Q. Performance: Trombone. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700R. Performance: Tuba. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week), A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700S. Performance: Viola. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700T. Performance: Violin. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hour.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700U. Performance: Applied Jazz. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week.) A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700V. Performance. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum if 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700W. Performance. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700X. Performance. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700Y. Performance. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 700Z. Performance. 1-4 Hours.
PR: Open to qualified students in any field in performance. (May be repeated for a maximum of 24 credit hours.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute lesson per week). A student must demonstrate ability of grade-level 10 to receive credit for this course.

MUSC 704. Opera Theatre. 2 Hours.
Performance of major roles and advanced production techniques. Qualified students will undertake production-direction projects under supervision.

MUSC 710. Conducting. 3 Hours.
PR: MUSC 202 or equivalent. Instrumental and choral conducting. Major works are prepared and conducted through the use of recordings and music organizations.

MUSC 711. Conducting Seminar. 3 Hours.
PR: MUSC 710. Instrumental and choral conducting of major works under the supervision of the conductor of a major ensemble.

MUSC 720S. Applied Voice Teaching Technique. 1 Hour.
PR: Consent. Doctoral seminar intended to refine and further the skills acquired in MUSC 432 and MUSC 433. (May be repeated for a maximum of 6 credit hours.).

MUSC 721. Voice Acoustics/Teaching Technology. 2 Hours.
This course is designed to prepare students to have knowledge of, and be comfortable using, technical equipment that has become available for use in the voice studio. Detailed attention will be given to Voce Vista.

MUSC 722. Vocal Repertoire-Teaching: English and American. 1 Hour.
This course is designed to compile a database of repertoire, by language or style, for ease of use in voice studio. Repertoire will be examined for pedagogic usefulness and appropriateness.

MUSC 723. Vocal Repertoire-Teaching: Italian and Spanish. 1 Hour.
This course is designed to compile a database of repertoire, by language or style, for ease of use in the voice studio. Repertoire will be examined from a standpoint of pedagogic usefulness and appropriateness.

MUSC 724. Vocal Repertoire-Teaching: German. 1 Hour.
This course is designed to compile a database of repertoire, by language or style, for ease of use in the voice studio. Repertoire will be examined from a standpoint of pedagogic usefulness and appropriateness.

MUSC 725. Voice Repertoire-Teaching: French. 1 Hour.
This course is designed to compile a database of repertoire, by language and style, for ease of use in the voice studio. Repertoire will be examined from a standpoint of pedagogic usefulness and appropriateness.

MUSC 726. Vocal Repertoire-Teaching: Opera/Oratorio. 1 Hour.
This course is designed to compile a database of repertoire, by language and style, for ease of use in the voice studio. Repertoire will be examined from a standpoint of pedagogic usefulness and appropriateness.

MUSC 727. Vocal Repertoire-Teaching: Musical Theatre. 1 Hour.
This course is designed to compile a database of repertoire, by language and style, for ease of use in the voice studio. Repertoire will be examined from a standpoint of pedagogic usefulness and appropriateness.

MUSC 730. Master Class in Applied Repertoire: Keyboard. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in keyboard.

MUSC 730A. Master Class in Applied Repertoire: Voice. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in voice.

MUSC 730B. Master Class in Applied Repertoire: Percussion. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in percussion.

MUSC 730C. Master Class in Applied Repertoire: Organ. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in organ.

MUSC 730D. Master Class in Applied Repertoire: Woodwind. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in a woodwind instrument.

MUSC 730E. Master Class in Applied Repertoire: String. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in a stringed instrument.

MUSC 730F. Master Class in Applied Repertoire: Brass. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in a brass instrument.

MUSC 730G. Master Class in Applied Repertoire: Piano. 2 Hours.
PR: Consent. Designed to give coverage through performance of the literature of the D.M.A. in piano. (May be repeated for credit).

MUSC 730H. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730I. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730J. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730K. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730L. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730M. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730N. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730O. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730P. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A, Performance field.

MUSC 730Q. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730R. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730S. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730T. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730U. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730V. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730W. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730X. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730Y. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 730Z. Master Class in Applied Repertoire. 2 Hours.
(May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

MUSC 731. Keyboard Literature. 3 Hours.
PR: MUSC 434 and MUSC 435A. Intensive study of the literature for keyboard instruments and the history of the literature.

MUSC 732. Song Literature. 3 Hours.
PR: MUSC 434 and MUSC 435. Intensive study of the Art Song and the Lied and the history of their development.

MUSC 733. Choral Literature. 3 Hours.

MUSC 737. Percussion Practices, Representations, and Pedagogy. 3 Hours.
Examination of selected music from regions such as Africa, Asia, and Latin America; focus on music, instruments, and performance techniques and pedagogy.

MUSC 761. Theory Topics. 3 Hours.
(May be repeated for max. 8 hr. credit.) Various types of analytical and theoretical problems and approaches to their solutions.

MUSC 762. Pedagogy of Theory. 3 Hours.
PR: MUSC 264 or Consent. Consideration of various approaches to the teaching of theory.

MUSC 763. Analytical Techniques. 3 Hours.
Analytical techniques and their application to scholarship and performance, with emphasis on pre-twentieth century styles.

MUSC 764. Compositional Techniques in Contemporary Music. 3 Hours.
Analysis of twentieth-century music.

MUSC 765. Transcription and Arranging. 3 Hours.
(May be repeated once for credit.) PR: MUSC 266 or equivalent. Major projects in scoring for orchestra, band, or wind ensemble.

MUSC 766. Composition Pedagogy. 3 Hours.
PR: graduate composition major status. Seminar in teaching techniques, curriculum design, and assessment of talent of undergraduate composers. Teaching practicum included.

MUSC 771. Music Research and Bibliography. 3 Hours.
Introduction to research strategies to discover and critically evaluate print and electronic music resources in the search for new understanding of the field and related disciplines. Students will defray costs of a required field trip.

MUSC 779. Psychology of Music. 3 Hours.
Introductory study of musical acoustics and psychology of perception of music.

MUSC 780. Choral Techniques. 2 Hours.
PR: (MUSC 380 and MUSC 381 and MUSC 382) or equivalent. Advanced techniques and procedures involved in development of choral ensembles.

MUSC 781. Instrumental Techniques. 2 Hours.
PR: (MUSC 380 and MUSC 381 and MUSC 382) or equivalent. Advanced techniques and procedures involved in individual performance and instruction through lecture demonstrations by performance faculty.

MUSC 782. Historical Foundations of Music Education. 3 Hours.
Examination of the history of music education from classical antiquity to the present, with particular emphasis on practices in the United States; examination and application of historical research methods.

MUSC 783. Foundations of Music Education. 3 Hours.
PR: (MUSC 380 and MUSC 381 and MUSC 382) or equivalent. Survey and critical study of historical, philosophical, psychological, and sociological aspects of music education. Includes current trends in music education.

MUSC 784. Introduction to Research in Music Education. 3 Hours.
PR: (MUSC 380 and MUSC 381 and MUSC 382) or equivalent. Methods and measures necessary for conduct and understanding of research in music education.

MUSC 787. Vocal Pedagogy Internship. 2 Hours.
This course provides the opportunity for advanced study with a specialist in the student's chosen area of dissertation research. This may take place at WVU or externally after passing the comprehensive exams.

MUSC 788. Doctoral Recital. 1-5 Hours.
PR: MUSC 689 Master's Recital or consent. Number of credits depends upon length and content of the program; it must be approved in advance by the student's doctoral committee. Acceptance of the recital will be at the discretion of the doctoral committee.

MUSC 788B. DMA Graduation Recital. 1 Hour.
Final recital and culminating event in the DMA degree for Performance or Conducting. Program repertoire must be approved by DMA committee prior to performance.

MUSC 789. Lecture Recital. 2 Hours.
PR: MUSC 771.

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

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

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

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

MUSC 796. Research. 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.

MUSC 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.).

MUSC 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.

MUSC 930. Professional Development. 1-6 Hours.
Professional development course 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.

NAS 593. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

NBAN 706. Advanced Neuroanatomy. 2-4 Hours.
PR:CCMD 775 and Consent. (Course may be repeated.) Detailed study of selected areas of the nervous system.

NBAN 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of anatomy. 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.).

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

NBAN 792. Directed Study. 1-6 Hours.
Directed study, readings, and/or research.

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

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

NBAN 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.

NBAN 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.).

NEUR 741. Clinical Clerkship in Neurology. 2 Hours.
Required of third-year students. Basic fundamentals of the neurological evaluation and neurological diseases. Evaluation and treatment of hospitalized patients and patients seen at the physician office center. All evaluations are performed under supervision of attending and resident physicians. Conferences and correlative instruction in neuropathology and neuroradiology.

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

NEUR 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.).

NEUR 830. Clinical Clerkship in Neurology. 2 Hours.
PR: Required of third-year students. Basic fundamentals of the neurological evaluation and neurological diseases. Evaluation and treatment of hospitalized patients and patients seen at the physician office center. All evaluations are performed under supervision of attending and resident physicians. Conferences and correlative instruction in neuropathology and neuroradiology. (Third year.).

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

NSCI 748. Synaptic Structure and Function. 3 Hours.
This course delves into the intricate cellular and molecular mechanisms governing synaptic transmission, synaptic plasticity, and neural circuit function through an exploration of primary literature spanning classical to contemporary neuroscience. Students engage with seminal works to grasp foundational principles, understand the evolution of experimental techniques, and appreciate the contributions of key researchers in shaping the field.

NSCI 750. Behavioral Neuroendocrinology Proseminar. 3 Hours.
Exploration of the interactions among hormones, brain, and behavior through an integrative approach.

NSCI 752. Experimental Design & Analysis. 3 Hours.
The major goal of the Experimental Design and Analysis course is to teach students the methods and techniques necessary to formulate appropriate hypotheses and statistically test those hypotheses. A primary objective is for students to learn and understand the critical components of designing an experiment to yield valid, quantifiable, and analyzable data, primarily within biological and psychological disciplines.

NSCI 754. Neurodegenerative Diseases. 3 Hours.
This seminar-style course delves deeply into the etiology of neurodegenerative diseases, offering a comprehensive review of their clinical manifestations, neurobiology, neuropathology, and more. Faculty-led presentations provide a solid foundation outlining the unique pathology underlying these disorders, associated symptomology, and treatment options.

NSCI 756. Behavioral Neuroscience Proseminar. 3 Hours.
In this course students will read, analyze, and discuss classical and modern papers that investigate the neurobiological control of behavior. Covered topics will include Sensory Systems, Motor Control, Circuits and Behavior, Learning and Memory, Sleep/Biological Rhythms, Social Behavior, Addiction Stress/Anxiety.

NSCI 758. Bench to Bedside to Community Proseminar. 3 Hours.
In this course students with develop a working knowledge of stroke from the perspective of its impact on the community, the medical profession and the patient. The primary objective is for the student to obtain a working knowledge of the kinds of strokes, causes of stroke, its mechanism(s), its prevention and acute treatment as well as long-term rehabilitation.

NSCI 760. Neuroscience Journal Club. 1 Hour.
PR: Enrollment in Neuroscience Graduate Program. Current and topical research papers from the literature are reviewed in a student-centered presentation and discussion format. The Journal Club provides an opportunity to develop critical reading and presentation skills and to gain experience with current research topics in Neuroscience.

NSCI 761. Neuroscience Research Forum. 1 Hour.
PR: Enrollment in Neuroscience Graduate Program. Students prepare and present a formal research seminar based on their current dissertation project and provide formal critiques and constructive feedback on the presentations by other students.

NSCI 764. Human Functional Neuroanatomy. 3 Hours.
PR: Graduate level only. This course examines the basic structure of the CNS, from cellular neuroanatomy to gross anatomy of the spinal cord and brain, as well as clinically relevant CNS (dys)function as it pertains to sensorimotor systems, proprioception, memory, cognition, and neurobiological disease. A hands-on neuroanatomy lab complements the lectures throughout the semester.

NSCI 770. Fundamentals of Neuroscience 1. 6 Hours.
PR: BMS 747 and BMS 777. Core concepts in Cellular Neuroscience. Fundamental concepts in cellular, molecular, developmental neuroscience, hypothalamus and pituitary function, and neuroanatomy.

NSCI 772. Fundamentals of Neuroscience 2. 4 Hours.
PR: NSCI 770. This is the second course of a two-semester sequence covering core concepts in Neuroscience. Advanced concepts related to Sensory Systems, Motor Systems, Cognition and Disorders of the Central Nervous System are covered.

NSCI 774. Fundamentals of Neuroscience. 4 Hours.
PR: Must be accepted into the Neuroscience Graduate Program. This is a one-semester course covering core concepts in Foundational Neuroscience and taught by a team of neuroscientist researchers. The course consists of 5 Blocks: Neuronal Signaling, Sensory Systems, Motor Systems and Nervous System Development, Higher Brain Functions and Disorders of the Nervous System, 6 sessions in each block. Take-home exams, one per block, form the basis for grading.

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

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

NSCI 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.).

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

NSG 600. Financial Management in Healthcare Organizations. 3 Hours.
This course introduces concepts of economics and financial management for health care professionals. Course content includes principles of economics, fundamentals of managed care and health reform, budgets and budget preparation, financial analysis, preparation of business plans and health program grant proposals, and issues relevant to international settings and future trends.

NSG 611. System Based Decision Making. 2 Hours.
PR: NSG 616. Decision making grounded in an understanding of the organization as an open living system.

NSG 616. Role Seminar for Leadership MSN. 2 Hours.
Exploration, analysis, and evaluation of the role of the master's prepared nurse in leadership positions as guided by concepts, theories, and research.

NSG 617. Leadership Practicum 1. 3 Hours.
Supervised practicum designed to apply healthcare leadership principles to practice. Students participate in nursing leadership and administrative activities in a selected healthcare setting.

NSG 618. Leadership Practicum 2. 3 Hours.
PR: NSG 617. Supervised practicum designed to build on initial application of healthcare leadership principles. Students participate in leadership and administrative activities in a selected health care setting.

NSG 622. Theoretical Foundations and Disciplined Reasoning for Advanced Nursing Practice. 3 Hours.
An in-depth study of theoretical frameworks as the foundation of advanced nursing practice and research. Students will incorporate middle-range nursing theories and theories borrowed from other disciplines to inform and guide holistic care of patients, families, and communities.

NSG 623. Foundations of the Nurse Practitioner Role and Interprofessional Practice. 3 Hours.
This course introduces students to the various roles of the nurse practitioner including clinician, scholar, advocate, collaborator, leader, and lifelong learner.

NSG 625. Statistics for Advanced Nursing Practice. 3 Hours.
This course provides an introduction to the collection and analysis of nursing and health sciences data. Topics include sampling, data presentation, summary measures, probability, confidence interval, hypothesis testing, t-test and ANOVA, correlation analysis, simple/multiple linear regression, chi-square test, power and sample size calculation.

NSG 626. Advanced Practice Nursing Health Promotion and Disease Prevention Across the Lifespan. 3 Hours.
PR or CONC: NSG 622 and NSG 623. An in-depth study of theoretical foundations, epidemiological principles, and advance practice strategies for the promotion of health and prevention of disease across the life-span.

NSG 627. Evidence Based Practice Quality Improvement. 3 Hours.
PR: NSG 625. Application of EBP and QI frameworks to improve health outcomes, quality, and safety related to a practice or leadership issue.

NSG 628. Leadership/Policy/Ethics. 3 Hours.
PR: NSG 627. An exploration of the concept of leadership in the advanced practice role and application of these leadership behaviors to health care policy and ethical decision making.

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

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

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

NSG 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, or equivalent scholarly project, or a dissertation guided by a student-graduate faculty contact based on the course objectives and culminating in a written product. (Grading will be S/U.).

NSG 701. Advanced Pharmacology. 3 Hours.
PR: NSG 706. Examination of the relationship between pharmacologic principles and the APRN's selection of pharmacologic agents in altered health states across the lifespan.

NSG 702. Population Health Promotion. 3 Hours.
In depth study and analysis of clinical prevention and population health for individuals, aggregates, and populations utilizing advanced nursing practice and program evaluation strategies for the promotion of health and prevention of disease across populations.

NSG 703. Theoretical Foundations of Nursing Practice. 3 Hours.
Elaboration and integration of theories from nursing, the sciences, and the humanities to build a foundation for the highest level of nursing practice.

NSG 704. Foundations of Leadership for the Advanced Practice Nurse. 3 Hours.
Explore foundations of personal, professional, and leadership development within the role of the advanced practice nurse.

NSG 705. Advanced Lifespan Health Assessment. 3 Hours.
PR: NSG 706. The focus of this course is the advanced health assessment of individuals across the lifespan. Skilled interviewing and advanced assessment skills are emphasized.

NSG 706. Advanced Pathophysiology. 3 Hours.
Theoretical basis of pathophysiological changes in acute and chronic illnesses confronted across the lifespan is presented. The course serves as the foundation for clinical assessment, decision making, and management.

NSG 707. Evidence-Based Practice (EBP) and Quality Improvement (QI) Methods for the DNP. 3 Hours.
PR: NSG 724. This course provides an overview of research methods, evidence, and epidemiologic measures for understanding the translation of research into practice and the design of interventions to promote change in a variety of settings.

NSG 709. Informatics & Healthcare Technologies. 3 Hours.
Utilize technologies to gather data to drive clinical decision making, and support advanced nursing professionals in the delivery of healthcare services in accordance with best practice, and ethical and professional standards.

NSG 710. Advanced Nursing Practice Issues, Policy, and Ethics. 3 Hours.
An analysis of health policy and advanced nursing practice issues with a focus on advocacy for nursing leadership, ethics, and finance.

NSG 712. Primary Care of Families 1. 3 Hours.
PR: NSG 701 and NSG 705. An introduction to the knowledge and skills basic to the health maintenance, diagnosis, treatment, evaluation, and revision of care of individuals as members of family units in the primary care setting.

NSG 714. Primary Care of Families 2. 3 Hours.
PR: NSG 712. Further acquisition of knowledge and skills basic to the health maintenance, diagnosis, treatment, evaluation, and revision of care of individuals as members of family units in the primary care setting. The change in course hours reflects change in content.

NSG 715. NP Experiential Learning. 1 Hour.
This course provides nurse practitioner students an experiential learning environment for skills competency assessment prior to entering the clinical practice environment in the practicum course. Competencies include communication, promotion of caring relationships, employment of diagnostic reasoning and patient management.

NSG 717. Organization and Leadership. 3 Hours.
Provides a foundation for developing organizational and systems leadership skills critical to clinical care and health outcomes. Knowledge will help students to promote patient safety and excellence in health care organizations.

NSG 719. Health Care Policy. 3 Hours.
Provides a foundation for influencing, developing, implementing, and evaluating health care policies and legislation pertinent to issues in health care such as ethics, safety, costs, access, and quality.

NSG 720. FNP Primary Care Practicum 1. 5 Hours.
PR: NSG 712 and PR or CONC: NSG 714. Supervised practicum designed to facilitate the student's competency at the advanced practice level in the delivery of primary health care across the lifespan.

NSG 721. FNP Primary Care Practicum 2. 5 Hours.
PR: NSG 720. Supervised practicum that builds upon Family Practicum 1 and applies theory and evidence to the advanced practice of nursing. Further role and competency development at the advanced practice level of lifespan primary health care.

NSG 722. Topics in Global Health: Honduras. 2 Hours.
PR or CONC: NSG 720 or 721. Students are introduced to global health concepts through immersion in the culture of Honduras and utilize disciplined reasoning in the application of therapeutics and evidence-based advanced nursing practice in service learning experiences.

NSG 724. Health Research Statistics 1. 3 Hours.
This course provides development of statistical knowledge and skills needed for quantitative health research. Topics include descriptive statistics, probability, hypothesis testing, analysis of variance, chi square and regression techniques.

NSG 725. Health Research Statistics 2. 3 Hours.
PR: NSG 724. This course continues the development of statistical knowledge and skills needed for quantitative health research using SPSS, including nonparametric testing, advanced regression topics and diagnostics, ANCOVA, SPSS syntax, classification, and factor, survival and power analyses.

NSG 727. Contemporary Nursing Science. 3 Hours.
Focus is on an analysis of the state of the science for a phenomenon for study. Emphasis is placed on the application of the particular phenomenon to a population of interest.

NSG 728. Nursing Science Theory/Philosophy. 4 Hours.
Examination of the philosophical, theoretical, and conceptual foundations of nursing science.

NSG 729. Quantitative Methods. 3 Hours.
PR: NSG 724 and PR or CONC: NSG 725. Quantitative methods and measurement relevant to conducting research in nursing are studied.

NSG 731. Qualitative Research Methods. 3 Hours.
PR: NSG 728. An exploration of the philosophical foundation and methods of qualitative inquiry. Research designs, ethical issues, rigor, integrity, data collection, interpretation, and representation are studied.

NSG 732. Seminar in Nursing Scholarship. 3 Hours.
Exploration of the dimensions of scholarship in preparation for future roles as nurse scholars/scientists.

NSG 733. Research Grant Development. 3 Hours.
PR: NSG 729 and NSG 731. Analysis of the grant-writing process, including current federal application formats, provides students with the background to complete a submittal grant proposal in their own area of research.

NSG 734. Use of Data. 3 Hours.
PR: NSG 724 and NSG 725 and NSG 729. The uses of existing data in clinical, policy, and in research will be explored. This course focuses on the use of the following data bases: clinical, financial, health services, nursing, local, state and national.

NSG 735. Principles: Nursing Education. 3 Hours.
This course examines the research base of educational strategies in nursing education in the classroom and clinical settings and the scholarship of teaching. The course also examines external determinants on nursing curriculum and evaluation of nursing programs.

NSG 736. Advanced Health Policy and Ethics. 3 Hours.
PR: NSG 732. Examination of ethical issues of research and current health policy.

NSG 737. Leadership. 3 Hours.
This course facilitates the student’s exploration of leadership principles applicable to academic and research settings.

NSG 739. Scientific Underpinnings for the DNP-prepared Advanced Practice Nurse Role. 3 Hours.
This course introduces students to competencies necessary to practice at the highest level within the nursing discipline. The role of the Doctor of Nursing practice-prepared advanced practice nurse is examined in the context of historical, ethical, environmental, clinical, technological, and professional perspectives.

NSG 740A. Overview of the Nurse Anesthesia Profession, Role and Standards. 2 Hours.
This course provides perspectives on the history of the nurse anesthesia profession, professional roles, and standards guiding the curricula and regulations pertinent to nurse anesthesia practice.

NSG 740B. Professional Issues in Nurse Anesthesia. 2 Hours.
PR: NSG 740A with a minimum grade of B-. This course builds upon themes related to the role of the nurse anesthetist, which were presented in NSG 740A. Topics include safety, professional interactions, added value of a nurse anesthetist in a variety of arenas, legal issues, and future trends as related to the role of the CRNA.

NSG 741. Genetics, Chemistry, and Physics of Anesthesia. 3 Hours.
PR: NSG 706 with a minimum grade of C-. The student will examine science-based principles of genetics, chemistry, and physics that relate to the mechanisms and effects of anesthesia. Mathematics concepts such as converting systems of measurement and calculating drug infusion rates will be explored. Components and functions of the anesthesia gas machine will be introduced.

NSG 742A. Foundations of Anesthesia 1: Basic Principles of Safe Anesthesia Care. 3 Hours.
PR: NSG 741 and PR or CONC: NSG 743 and NSG 752A with a minimum grade of B- in each. Core anesthesia principles of preoperative assessment, monitoring, positioning, basic airway and fluid management, and administration and documentation of basic and safe anesthetics for adults are discussed in this course. Students will have the knowledge to prepare for workshops associated with NSG 743 and for clinical practicum, NSG 752A.

NSG 742B. Foundations of Anesthesia 2: Regional Anesthesia and Considerations for Common Procedures. 2 Hours.
PR: NSG 742A with a minimum grade of B-. This course addresses basic anesthesia principles for safe administration of regional anesthesia. Students are introduced to anesthesia considerations for patients across the lifespan, including pediatric and geriatric patients, and will examine management fundamentals for common surgical subspecialty procedures.

NSG 743. Foundations of Anesthesia Lab. 1 Hour.
PR or CONC: NSG 742A and NSG 752A with a minimum grade of B- in each. This course develops the necessary psychomotor and critical thinking skills to provide safe anesthesia care in clinical settings. Workshops include conducting a preanesthetic assessment, preparing the anesthesia workspace and gas machine, managing the airway, obtaining vascular access, monitoring, positioning, preparing anesthetic medications, and managing complications that arise during anesthetic inductions.

NSG 744A. Advanced Anatomy, Physiology, and Pathophysiology 1: Cardiac, Pulmonary, and CNS. 3 Hours.
PR: NSG 742A with a minimum grade of B-. The focus of this course is to address advanced concepts in anatomy, physiology, and pathophysiology, incorporating the effects of anesthesia, and discussing management principles for disorders associated with the cardiovascular, pulmonary, and central nervous systems.

NSG 744B. Advanced Anatomy, Physiology, and Pathophysiology 2: Hepatic, Renal, and Related Systems. 2 Hours.
PR: NSG 744A with a minimum grade of B-. The focus of this course is to continue addressing advanced concepts presented in NSG 744A. Anatomy, physiology, and pathophysiology are presented, incorporating the effects of anesthesia, and discussing management principles for disorders associated with the hepatic, renal, endocrine, gastrointestinal, immune, and related systems.

NSG 745. Clinical Immersion. 1-5 Hours.
PR: NSG 739 and at least one credit of clinical immersion must occur during the last year of the student's program of study. In this course, students will use the knowledge gained from core and specialty courses at a high level of complexity in clinical practice. This will include integrating the DNP Essentials (AACN, 2006) in leadership-oriented clinical practice experiences.

NSG 746. Advanced Pharmacology for Nurse Anesthetists. 3 Hours.
PR: NSG 701 with a minimum grade of C- and NSG 742A with a minimum grade of B-. This course applies principles of pharmacology to anesthesia practice. Pharmacologic properties of anesthetic agents and common adjunctive drugs are discussed to enable the student to develop advanced plans for anesthetic management.

NSG 747. Perioperative Assessment and Care. 1 Hour.
PR: NSG 705 with a minimum grade of C- and NSG 742B with a minimum grade of B-. Students in this lab course apply principles of advanced assessment to nurse anesthesia practice. Comprehensive health history, in-depth physical exam techniques, and evidence-based diagnostic skills are expanded to emphasize critical thinking and decision-making in the perioperative environment. Students will demonstrate use of advanced airway devices and ultrasound to improve patient care.

NSG 748A. Advanced Principles of Anesthesia 1: Cardiothoracic, Vascular, and Neuroanesthesia. 3 Hours.
PR: NSG 742B and NSG 744A with a minimum grade of B- in each. Advanced principles of anesthesia management for cardiac, thoracic, vascular, and neurosurgical procedures are presented in this course. Students examine techniques to administer anesthesia to patients undergoing procedures including coronary bypass grafting, lung resections, endovascular aortic repairs, and intracranial tumor resections.

NSG 748B. Advanced Principles of Anesthesia 2: Management Across the Lifespan. 3 Hours.
PR: NSG 748A with a minimum grade of B-. Advanced principles of anesthesia including obstetric and pediatric specialties are presented. Students examine anatomy, physiology, pathophysiology, and anesthetic management unique to the obstetric and pediatric populations. Simulations of induction and management for pediatric patients, aged from neonate to 18 years, and all levels of acuity will be conducted to reinforce didactic concepts.

NSG 748C. Advanced Principles of Anesthesia 3: Management of Special Populations. 2 Hours.
PR: NSG 748B with a minimum grade of B-. Advanced principles of anesthetic management including patients of trauma, abdominal transplant, burns, and pain management populations are presented in this course. Students will examine and apply techniques of difficult airway management, blood volume resuscitation, hemodynamic control, and acute and chronic pain management in this course.

NSG 749. Business, Management, and Finance in Nurse Anesthesia Practice. 3 Hours.
PR: NSG 704 with a minimum grade of C- and NSG 740B with a minimum grade of B-. Principles of business, management, and finance are applied to nurse anesthesia in this course. Students will analyze reimbursement and billing models, develop plans for business, and evaluate contracts for independent and hospital employment. Management relationships with staff, human resources, and other departments in a health organization will be evaluated. Health care and personal finance will be discussed.

NSG 751. Evidence-Based Anesthesia Review. 3-4 Hours.
PR: NSG 749 and NSG 810 with a minimum grade of B- in each. An evidence-based update and review of the body of knowledge necessary to enter nurse anesthesia practice is the focus of this course. Students will revisit basic sciences, basic and advanced principles of anesthesia, pharmacology, and age and procedure-related management concepts. Students will write a summative Comprehensive Exam and participate in an objective structured clinical exam based on the entire curriculum.

NSG 752A. Foundations Clinical Practicum 1. 1 Hour.
PR or CONC: NSG 742A and NSG 743 with a minimum grade of B- in each. This initial clinical practicum course is designed to integrate basic anesthesia principles into practice. The student will be introduced to anesthesia monitoring, procedures, technology, equipment, medications, and the perioperative clinical environment.

NSG 752B. Foundations Clinical Practicum 2. 2 Hours.
PR: NSG 752A and PR or CONC: NSG 742B with a minimum grade of B- in each. This second clinical practicum course is designed to increase the integration of basic anesthesia principles into clinical practice. The student will continue to develop skill with anesthesia monitoring, use of equipment, administration of medications, and gain greater experience in anesthesia management of uncomplicated surgical procedures and regional anesthesia in the perioperative clinical environment.

NSG 753A. Advanced Clinical Practicum 1. 2 Hours.
PR: NSG 752B and PR or CONC: NSG 748A with a minimum grade of B- in each. This third clinical practicum integrates advanced anesthesia principles into clinical practice. The student will continue to develop competency with monitoring, use of equipment, administration of medications, and gain greater experience in anesthesia management of increasingly complex cardiac, thoracic, vascular, and neurosurgical procedures.

NSG 753B. Advanced Clinical Practicum 2. 2 Hours.
PR: NSG 753A and PR or CONC: NSG 748B with a minimum grade of B- in each. This fourth clinical practicum continues the integration of advanced anesthesia principles into practice. The student will continue to develop competency with monitoring, use of equipment, administration of medications, and gain experience in anesthesia management including obstetric and pediatric patients.

NSG 753C. Advanced Clinical Practicum 3. 3 Hours.
PR: NSG 753B and PR or CONC: NSG 748C with a minimum grade of B- in each. This fifth clinical practicum is designed to integrate advanced anesthesia principles with preparation for clinical immersion. The student will continue to manage general and specialty anesthetic techniques for patients with complex comorbidities and broaden experience in care of special populations.

NSG 754. Advanced Informatics & Healthcare Technologies. 3 Hours.
Evaluation and utilization of information systems and technology to improve quality, safety, and system outcomes to improve health care.

NSG 770. Pediatric Primary Care 1. 3 Hours.
PR or CONC: NSG 767. An introduction to the knowledge and skills basic to the health maintenance, diagnosis, treatment, evaluation and revision of care of children in the primary care setting.

NSG 771. Pediatric Primary Care 2. 3 Hours.
PR: NSG 770. Further acquisition of knowledge and skills central to the assessment of health status, diagnosis, treatment and evaluation of children in the primary care setting.

NSG 772. Pediatric Practicum 1. 5 Hours.
PR or CONC: NSG 771. Supervised practicum designed to facilitate the student's competency in the delivery of primary health care to children.

NSG 773. Pediatric Practicum 2. 5 Hours.
PR: NSG 772. Supervised practicum that builds on NSG 772 [Pediatric Practicum 1] and applies theory and evidence to the advanced practice of nursing. Further role and competency development at the advanced practice level for the delivery of primary health care to pediatric populations.

NSG 774. Neuro-Psychopharmacology. 3 Hours.
PR: Admission to the PMHNP Program. A focus on principles of neurobiology including neurodevelopment, neuroanatomy, neurophysiology, neurochemistry, and advanced theories in the neuroscience of psychiatric illnesses across the lifespan. Psychopharmacologic agents including the pharmacodynamics, pharmacokinetics, and pharmacogenomics, and clinical uses in psychiatric illness will be reviewed in depth.

NSG 775. PMHNP Role and Foundations. 3 Hours.
PR or CONC: NSG 774. An investigation of foundational theories and the scope and standards of practice in order to provide care in the role of the PMHNP.

NSG 776. Psychotherapy Modalities. 3 Hours.
PR or CONC: NSG 774 and NSG 775. This course will provide students with a comprehensive exploration of selected evidence-based psychotherapeutic concepts, modalities, and interventions for individuals, families, and groups across the lifespan. Students will learn to integrate various psychotherapeutic approaches into a model that will guide their practice. The clinical practicum allows the student to integrate assessment skills and psychotherapeutic interventions into the clinical environment.

NSG 777. PMHNP Diagnosis and Management of Adults. 3 Hours.
PR: NSG 774 and PR or CONC: NSG 775 and NSG 776. This course focuses on the knowledge, skills, and attitudes required to perform advanced clinical differential diagnoses and management of adults and geriatrics with mental health disorders utilizing the diagnostic criteria of the DSM-5. Students will learn to apply the principles of psychopharmacology and psychotherapies to the care of adults of all ages.

NSG 779. PMHNP Diagnosis and Management of Child/Adolescent. 3 Hours.
PR: NSG 777. This course focuses on the knowledge, skills, and attitudes required to perform advanced clinical differential diagnoses and management of children and adolescents with mental health disorders evolving from the diagnostic criteria of the DSM-5. Students will also learn to apply principles of psychopharmacology and psychotherapies to the care of children and adolescents.

NSG 781. Research Mentorship. 1 Hour.
PR: NSG 785. In this guided practicum, the student's research skills are developed and cultivated through participation in the mentorship process with an experienced researcher (the chairperson or his/her designee).

NSG 782. PMHNP Clinical Practicum. 1-5 Hours.
PR or CONC: NSG 777 and NSG 779, in order to see children/adolescents in the clinical setting, students must be enrolled in or have previously completed NSG 779. This clinical course allows students to practice the knowledge, skills, and attitudes attained in foundational PMHNP courses. It focuses on the application of neuro-psychopharmacology, assessment, and psychotherapeutic treatments. Students perform advanced clinical differential diagnoses and management of patients across the lifespan with mental health disorders, utilizing the diagnostic criteria of the DSM-5.

NSG 783. Dissertation Seminar. 2 Hours.
PR: NSG 785. This seminar provides an opportunity for discussion of the dissertation process. Students will participate in proposal presentation and critique.

NSG 785. Qualifying Examination. 1 Hour.
PR: Students must complete all courses except one cognate and NSG 781 prior to taking NSG 785. The Qualifying Exam (QE) allows students to demonstrate the ability to synthesize knowledge gained in coursework in order to be able to progress to dissertation. It is comprised of written and oral components. All elements of the QE must be successfully completed no later than the first semester of the fifth year.

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

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

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

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

NSG 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.

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

NSG 810. Nurse Anesthesia Clinical Immersion 1. 3 Hours.
PR: NSG 753C with a minimum grade of B-. This sixth clinical practicum is designed to immerse the student in advanced professional practice as a nurse anesthetist. Students develop clinical leadership skills in experiences ranging from a team-oriented academic trauma center to a community hospital with nurse anesthetists in independent practice.

NSG 812. Nurse Anesthesia Clinical Immersion 2. 2 Hours.
PR: NSG 810 with a minimum grade of B-. This seventh clinical practicum is designed to conclude the student’s clinical immersion and marks the transition from student to advanced professional practice as a nurse anesthetist. Clinical experiences range from team-oriented, academic trauma centers to community hospitals with independent CRNA practitioners.

NSG 829. Clinical Data Analysis and Visualization. 3 Hours.
This required course provides students with the skills to collect, manage, analyze, and interpret clinical data to evaluate quality improvement and evidence-based practice initiatives. Students will apply data analysis techniques and use data visualization tools to support clinical decision-making and dissemination.

NSG 830. Doctor of Nursing Practice Project Development. 2 Hours.
PR: NSG 724 and PR or CONC: NSG 707. This course provides the Doctor of Nursing Practice (DNP) student with a framework for developing an evidence-based DNP Project. Types of projects include quality improvement, policy analysis, demonstration, clinical inquiry, translation of evidence-based practice, and program evaluation. The student applies principles of business, finance, economics, and health policy to address the identified problem.

NSG 831. Doctor of Nursing Practice Project Implementation. 1,2 Hour.
PR: NSG 830. This course provides the Doctor of Nursing Practice (DNP) student with a framework for implementing and evaluating the outcomes of a proposed DNP project. The student will present a project proposal, apply for institutional approval, implement an initiative, and collect and analyze data in preparation for the DNP Project presentation.

NSG 832. Doctor of Nursing Practice Project Presentation. 1,2 Hour.
PR: NSG 830 (for 2 credits) and NSG 831 (at least 2 credits). This course requires the Doctor of Nursing Practice (DNP) student to present the DNP project. The student will demonstrate mastery of the DNP Essentials and DNP program outcomes through a portfolio, a presentation of the project, and a manuscript describing the project.

OBST 741. Clinical Clerkship in Obstetrics and Gynecology. 8 Hours.
(Required of third-year medical students) Presents core knowledge of obstetrics and gynecology with small group instructional seminars, ward rounds, didactic teaching sessions and grand rounds conducted by faculty, house officers, visiting faculty, and students. Students participate in the care of all inpatients and attend all departmental clinics.

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

OBST 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.).

OBST 830. Clinical Clerkship in Obstetrics & Gynecology. 8 Hours.
PR: (Required of third-year medical students). Presentas core knowledge of obstetrics and gynecology with small group instructional seminars, ward rounds, didactic teaching sessions and grand rounds conducted by faculty, house officers, visiting faculty, and students. Students participate in the care of all inpatients and attend all departmental clinics.

OEHS 520. Industrial Hygiene. 3 Hours.
PR: Enrolled in Industrial Hygiene. Lecture experience to understand occupational and environmental hazards related to the workplace. Principles from chemistry, physics, biology and engineering are used to quantify and control occupational exposures. This course provides an overview of various industrial hygiene concepts.

OEHS 521. Industrial Hygiene Laboratory. 1 Hour.
PR or CONC: OEHS 520. This course provides an overview from a Laboratory experience standpoint to understand occupational and environmental hazards related to the workplace. Principles from chemistry, physics and biology are used to demonstrate various industrial hygiene concepts of the occupational and environmental hazards covered in OEHS 520.

OEHS 526. Ergonomics. 3 Hours.
PR: Consent. Study of physical and cognitive ergonomics of industrial and manufacturing processes. Focus will be on providing a technical foundation required to analyze, design, and develop human-technological system with a primary emphasis on the humans.

OEHS 528. Industrial Ventilation Design. 3 Hours.
PR: Senior or graduate standing. Design of industrial exhaust ventilation for contaminant control. Includes dilution ventilation, hood design, duct system design, selection of fans and air- cleaning devices, and measurement of flows and pressures.

OEHS 593. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

OEHS 601. Environmental Health. 3 Hours.
A review of issues illustrating responsibilities and roles of public health work force in identifying, managing and preventing casualties from environmental causes in air, water, soil, food, pesticides, and related subjects. WV policy dilemmas.

OEHS 610. Environmental Practice. 3 Hours.
The course involves application of Public Health principles to the planning and operation of drinking water, sewage disposal, solid and hazardous waste management, air pollution and general community sanitation.

OEHS 622. Public Health Toxicology. 3 Hours.
This interdisciplinary course will survey the principles of toxicology that pertain to human health and the environment, and the integration of these principles into public health practice.

OEHS 623. Occupational Injury Prevention. 3 Hours.
This course introduces students to the problem of occupational injury. It covers the epidemiology of occupational injury and provides a critical perspective on injury causation and the strategies used to prevent occupational injury. This course is also listed as OEHS 732 - students may not count both toward degree requirements.

OEHS 625. Advanced Toxicology. 3 Hours.
PR: OEHS 622 or BIOC 531 or PCOL 547 or PHYS 743 or consent. This interdisciplinary course will provide detailed information about toxicology in the instructors areas of research.

OEHS 626. Internship. 1-6 Hours.
PR: Consent. (May be repeated for a maximum of 6 credit hours.) The internship provides students the opportunity to develop their practical skills and enhance professional competencies by applying the knowledge and techniques gained from their MPH coursework to public health practice.

OEHS 627. Physical Hazards Measurement and Control. 3 Hours.
PR: OEHS 520 or OEHS 620 or instructor consent. This course presents students with the fundamentals of the physics of sound, effects of noise on hearing and well-being, noise exposure regulations, noise exposure assessment, and the design of control strategies for controlling noise exposure including engineering, administrative and personal protection controls. In addition, the course covers the fundamentals, exposure assessment and basic control strategies for other physical hazards.

OEHS 629. Capstone. 2 Hours.
This course is the culminating experience for OEHS Master's students through which they will demonstrate their ability to integrate and synthesize the MPH and OEHS competencies in relation to the occupational/environmental public health problem on which their Practice-based Experience (PBE) was focused.

OEHS 630. Public Health Biology. 3 Hours.
This course will provide students with a fundamental understanding of Public Health Biology, which comprises a wide range of concepts including: human physiology, infectious and non-infectious disease, mechanisms of disease pathology, toxicology, and population health disparities. The students will learn underlying and advanced knowledge of human physiology and its role in public health.

OEHS 635. Industrial Hygiene Air Sampling and Analysis. 3 Hours.
PR: OEHS 520 and OEHS 521 or Instructor Consent. This course exposes students to the basic aspects of developing exposure assessments and impresses upon them their responsibility as health and safety professionals to assemble information and data from the scientific literature and to evaluate that information and data to make professionally and scientifically sound decisions about the potential of or actual exposure to a worker or group of workers.

OEHS 641. Occupational Safety and Health Awareness Seminar. 1 Hour.
This course presents students with practical knowledge on OSHA standards and regulations pertaining to occupational safety and health awareness in the General and Construction Industries.

OEHS 642. Exposure Assessment Seminar. 1 Hour.
This course presents students with a systematic description on several vertical and horizontal OSHA standards some applicable by federal OSHA and others by OSHA state programs.

OEHS 643. OSHA Standards Seminar. 1 Hour.
This course focuses primarily on a systematic description of several vertical and horizontal OSHA standards applicable to workplaces covered by federal OSHA or some other OSHA state programs. Each standard is described based on its requirements on written program, medical surveillance, permissible exposure limit/action level if applicable, exposure sampling parameters and frequency and accepted control measures.

OEHS 645. Air Sampling and Analysis Laboratory. 1 Hour.
PR: OEHS 520 and OEHS 521 or Instructor Consent. This course exposes students to the basic aspects of conducting exposure assessments. It will teach them their responsibility as health and safety professionals to be able to assemble information and data from the scientific literature and to evaluate that information and data to make professionally and scientifically sound decisions about the potential of or actual exposure to worker(s).

OEHS 647. Physical Hazards Measurement and Control Laboratory. 1 Hour.
PR: (OEHS 520 or OEHS 620) and PR or CONC: OEHS 627 or Instructor consent. This course presents students with applied laboratory practices on the evaluation and control for noise and other physical hazards such as noise ionizing radiation, hand-arm and whole-body vibration, and heat stress.

OEHS 648. Industrial Ventilation and Respiratory Protection Laboratory. 1 Hour.
PR: (OEHS 520 or OEHS 620) and PR or CONC: OEHS 528 or Instructor consent. This course presents students with applied laboratory practices on respirator qualitative and quantitative fit testing, as well as on evaluation, commissioning, and troubleshooting of local exhaust ventilation systems.

OEHS 665. Worksite Evaluation. 1 Hour.
PR: Public Health major, Graduate standing. Students are introduced to health and safety hazards associated with industrial operations through in-plant inspections, interaction with plant medical and safety staff, and in-class discussions.

OEHS 685. Internship. 1-6 Hours.
PR: OEHS 527 or OEHS 627 or Instructor consent. Professional internship providing on-the-job training under supervision of a previously approved environmentalist in settings appropriate to professional objectives.

OEHS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of occupational and environmental health sciences. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given collges teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

OEHS 693. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

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

OEHS 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.

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

OEHS 721. Environmental Sampling. 2 Hours.
PR: OEHS 734 or consent. This course is designed to be a summer immersion experience for PhD Students. The students will participate in field location sampling for particulate matter working with a community partner.

OEHS 723. Emergency and Disaster Response. 3 Hours.
This course addresses the basics of how public health practitioners respond to disasters, develop response protocols, and perform as skillful public health leaders.

OEHS 725. Industrial Hygiene Sampling and Analysis. 4 Hours.
PR: OEHS 520 or OEHS 620 or consent. Calibration and use of sampling and analytical equipment used by industrial hygienists to evaluate the work environment. Advantages and disadvantages of different equipment under various conditions. Biological monitoring as an evaluation tool.

OEHS 732. Occupational Injury Prevention. 3 Hours.
This course introduces students to the problem of occupational injury. It covers the epidemiology of occupational injury and provides a critical perspective on injury causation and the strategies used to prevent occupational injury.

OEHS 733. Organizational Theories of Injury and Disaster Prevention. 3 Hours.
This course will discuss how aspects of work organization shape workplace injury patterns and modify the risk of organizational disasters. Social and organizational theories and contemporary perspectives of safety will be presented and used to illustrate how to reduce the occurrence of work-related injuries as well as the risk of organizational disasters.

OEHS 734. Aerosols and Health. 3 Hours.
This course will give an understanding of the basic principles behind aerosol generation, measurement, mechanics and toxicity for aerosols found in the environment and their application to health effects caused by exposure to these aerosols.

OEHS 742. Outbreak Assessment. 3 Hours.
This course covers environmental and epidemiologic principles and concepts within the context of case studies associated with disease outbreaks.

OEHS 770. Molecular Diagnosis Public Health. 3 Hours.
This course gives an overview of the interdisciplinary approaches in molecular diagnosis and prognosis for personalized patient care. Knowledge of genome-wide association studies will guide hypotheses-driven experimentation and aid clinical decision-making.

OEHS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of OEHS. 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.

OEHS 795. Independent Study. 1-9 Hours.
PR: Consent. Faculty-supervised study of topics not available through regular course offerings.

OEHS 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.

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

ORTH 616. Biomechanics. 2 Hours.
PR: Consent. Design and function of the teeth and their surrounding structures, and response of these tissues to orthodontic procedures.

ORTH 617. Orthodontic Technique. 2 Hours.
PR: Consent. Laboratory course in techniques related to fabrication and manipulation of orthodontic appliances.

ORTH 618. Orthodontic Materials. 1 Hour.
PR: Consent. Physical properties of materials used in orthodontic appliances.

ORTH 619. Orthodontic Diagnosis. 1-3 Hours.
PR: Consent. Seminar-type class on technique of patient examination, acquiring diagnostic records, and analyzing and correlating this information to the treatment of clinical problems.

ORTH 620. Cephalometrics. 1-3 Hours.
PR: Consent. Use of radiographic cephalometry in studying growth of the human face, analysis of dentofacial malformations, and evaluation of orthodontic treatment.

ORTH 621. Orthodontic Mechanics. 1-4 Hours.
Seminar and laboratory course on basic orthodontic mechanical properties.

ORTH 623. Growth and Development. 1-5 Hours.
PR: Consent. Seminar-type course on normal and abnormal growth of the human head and its application to orthodontics.

ORTH 625. Orthodontic Seminar. 1-8 Hours.
PR: Consent. Discussions including all branches of dental science, with special emphasis on the orthodontic interest. Assigned topics and articles in the literature discussed.

ORTH 626. Orthodontic Clinic. 1-12 Hours.
PR: ORTH 616 and ORTH 617. Clinical treatment of selected patients.

ORTH 627. Surgical Orthodontics. 1 Hour.
PR: Consent. Diagnosis and treatment of patients that require surgical orthodontic treatment.

ORTH 628. Early Orthodontic Treatment. 1 Hour.
PR: Consent. Diagnosis and treatment of young patients that require early orthodontic and orthopedic treatment.

ORTH 629. Orthodontic Patient Management. 1 Hour.
PR: Consent. Addresses the skills needed to effectively manage an orthodontic practice.

ORTH 630. Craniofacial Anomalies. 1 Hour.
PR: Consent. Diagnosis and treatment of patients presented with craniofacial anomalies.

ORTH 631. Journal Club. 1 Hour.
PR: Consent. Review of literature in the orthodontic journals.

ORTH 632. Dentofacial Orthopedics. 1 Hour.
PR: Consent. Detailed study of the variety of appliances and their respective modalities in orthodontic treatment.

ORTH 633. Orthodontics-Periodontics Seminar. 1 Hour.
PR: Consent. A series of seminars on the diagnosis and treatment of oral conditions requiring interdisciplinary care by the specialties of periodontics and orthodontics.

ORTH 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of dentistry. Note: This course is intended to insure that graduate teaching 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.

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

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

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

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

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

ORTH 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.

ORTH 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.).

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

OTH 500. Health Care Issues in Occupational Therapy. 3 Hours.
PR: OTH student status. Occupational therapy practice models in diverse health care delivery systems are discussed, including hospital based, home health, outpatient/private practice, long term care settings, and public schools. (2 hr. lec., 2 hr. other.).

OTH 501. Management for Occupational Therapy Practice. 4 Hours.
PR: OTH student status. This course reviews the structure and recent changes in the United States health care system with attention to those aspects of managed care of importance to the entry-level occupational therapist. (3 hr. lec., 2 hr. lab.).

OTH 502. Foundations of OT Intervention. 3 Hours.
PR: OT Student Status. Clinical reasoning, goal writing, documentation, and intervention planning utilizing activity analysis and grading as a foundation for the occupational therapy process. Implement strategies for grading activity to facilitate the use of occupation as intervention, while incorporating client factors, performance skills, performance patterns, contexts and environments, and practice settings across the lifespan.

OTH 503. Occupational Therapy in Pediatrics. 3 Hours.
PR: OTH student status. This course reviews the medical and developmental conditions of pediatric populations commonly encountered by occupational therapists. Emphasis is placed on OT assessment and interventions. (2 hr. lec., 2 hr. lab.).

OTH 504. Anatomic Foundations in OT. 4 Hours.
PR: OT Student Status. A study of human gross anatomy with major emphasis on the musculoskeletal system, with a functional anatomical correlation of human movement and occupational performance.

OTH 505. Disruptions in Occupational Performance. 4 Hours.
PR: OTH student status. An overview of the effects of human disease and disability to include inflammatory and immune conditions, musculoskeletal disorders, cardiovascular disorders, neurodegenerative disease, genetic and developmental disorders, mental health disorders, neurological conditions, and chronic conditions on the occupational performance of humans across the lifespan.

OTH 506. Functional Movement Across the Lifespan. 2 Hours.
PR: OTD Student Status. Instruction on acquisition of developmental patterns, motor control, motor skill acquisition. This course also provides an overview of the effects of normative processes of aging on neuromotor patterns in occupational performance.

OTH 507. Functional Kinesiology in Occupational Therapy. 2 Hours.
PR: OT Student Status. Develop enhanced understanding of functional anatomical correlations and the use of the principles of kinesiology including statics, dynamics, and biomechanics to conduct functional movement analyses of occupational performance.

OTH 508. Developmental Life Tasks. 3 Hours.
PR: OTH 703 and OTD Student Status. Life-span human development across cognitive, psychosocial and neuromotor domains with particular emphasis on applications to physical or occupational therapy interventions. Includes focus on cultural influences in health and illness.

OTH 509. Neurobiologic Foundations. 4 Hours.
PR: OTH Student Status. Basic and clinical applications of neuroanatomy and neurology. Includes lectures on neurophysiological basis of occupational therapy practice.

OTH 510. Occupational Performance Evaluation 1. 3 Hours.
PR: OTD Student Status. Standardized and non-standardized screening and assessment of occupational performance in basic and instrumental activities of daily living, work, and rest and sleep, incorporating performance patterns, and contexts and environments across the lifespan.

OTH 511. Occupational Performance Evaluation 2. 4 Hours.
PR: OTH 515 and OT Student Status. Standardized and non-standardized screening and assessment of motor skills including but not limited to range of motion, strength, coordination, balance, endurance and pain inclusive of values, beliefs, and spirituality as they impact occupational performance across the lifespan.

OTH 514. Occupational Performance Eval 3. 4 Hours.
PR: OTH 511 and OT Student Status. Standardized and non-standardized screening and assessment of the following areas: sensory neurobehavioral, cognition, psychological/ emotional, developmental, play, leisure, social participation and education inclusive of values, beliefs, and spirituality as they impact occupational performance across the lifespan.

OTH 515. Interventions Across the Lifespan 1. 4 Hours.
PR: OTH Student Status. Critical reasoning, goal writing, documentation, and intervention planning to address basic activities of daily living incorporating client factors, performance skills, performance patterns, and contexts and environments across the lifespan.

OTH 516. Interventions Across the Lifespan 2. 4 Hours.
PR: OTH 515 and OTD Student Status. Intervention planning of occupational performance in instrumental activities of daily living, work, education, social participation, performance patterns, and contexts and environments across the lifespan.

OTH 517. Interventions Across the Lifespan 3. 4 Hours.
PR: OTH Student Status. Critical reasoning, goal writing, documentation, and intervention planning for client factors and performance skills addressing neuromusculoskeletal and movement related functions, cardiovascular and respiratory functions, motor skills incorporating performance patterns, and contexts and environments across the lifespan.

OTH 518. Interventions Across the Lifespan 4. 4 Hours.
PR: OTH Student Status. Clinical reasoning, goal writing, documentation, and intervention planning for education, play, leisure, and social participation, inclusive of client factors and performance skills that address mental functions, sensory functions, social interaction skills, developmental milestones, and motor skills incorporating performance patterns, and contexts and environments across the lifespan.

OTH 520. Occupational Therapy in the Work Environment. 3 Hours.
PR: OTH student status. Provides students with insight into the role of the worker as an occupation. A holistic approach to evaluation and treatment interventions commonly practiced by Occupational Therapists with workers will be explored. This course will investigate anthropometrics and ergonomics within an occupational environment as well as the global impact of work related injury and illness.

OTH 521. Professional Development Seminar 1 Fieldwork Prep. 1 Hour.
PR: MOT Student Status. A seminar style class designed to provide a forum for discussion and instruction on the philosophy, purpose, and practice of fieldwork. A focus is placed on student professional growth, insight, and readiness for Level 2 Fieldwork Placement.

OTH 522. Professional Development Seminar 2. 1 Hour.
PR: OT Student Status. Preparing for second Level II Fieldwork and developing essential skills for entry to the profession. Includes NBCOT exam prep and job search skills. Experiences within the professional organization and ongoing plan for professional activity. Conduct a personal professional development assessment and address professional development needed for second Fieldwork rotation.

OTH 523. Professional Development Seminar 3. 1 Hour.
PR: OT Student Status. Addressing skills necessary for entry into the profession while completing the 2nd Level II fieldwork. Includes NBCOT exam prep, prep for state licensure, job search skills including resume, cover letter, and interview skills. Student experiences within the professional organization and ongoing plan for professional activity. Develop a professional development plan to ensure continuing competence.

OTH 524. Interventions Across the Lifespan 4. 4 Hours.
PR: OTH 423 with a minimum grade of C- and MOT Student Status. Critical reasoning, goal writing, documentation, and intervention planning of education, play, leisure, and social participation, inclusive of client factors and performance skills that address mental functions, sensory functions, social interaction skills, developmental milestones, and motor skills incorporating performance patterns, and contexts and environments across the lifespan.

OTH 532. Clinical Reasoning for Groups 3. 3 Hours.
PR: OT student. Using the Occupational Therapy Practice Framework, integrating occupation-based models, theory, frames of reference, and public health data sets, students will apply principles of critical thinking to case-based problem solving. This course integrates context from prior courses in the professional curriculum with a focus on case-based problem solving related to social health determinants, and interventions for groups and populations.

OTH 533. Clinical Reasoning for Populations. 3 Hours.
PR: OT Student. Identify, analyze, and evaluate the contextual factors; current policy issues; and socioeconomic, political, geographic, and demographic factors on the delivery of occupational therapy services for populations. Analysis of unmet occupational needs of populations and propose real world solutions to improve, to advocate for, and influence health policy to reduce occupational deprivation.

OTH 540. Level 2 Fieldwork 1. 1-6 Hours.
PR: OTH student status. Students are placed in one 12-week, or 2 6-week placement(s) depending on the facility and the needs of the student. Students will be placed in facilities where individualized instruction can occur. (Course will be graded S/U.).

OTH 550. Education in Occupational Therapy. 1 Hour.
PR: OT Student status. Principles of academic instruction and theory in occupational therapy education are presented. Students prepare instructional materials and assess learning consistent with OT specialty accreditation requirements.

OTH 551. Occupational Therapy in Prevention & Wellness. 3 Hours.
PR: OTH student status. Students are taught occupational therapy principles and strategies to develop community health promotion and wellness programs in a variety of settings.

OTH 570. Advanced Theory in Occupational Therapy. 3 Hours.
PR: OTH grad student standing. This course will provide a holistic approach to theory in occupational therapy including theory development and application of theory to occupational therapy practice.

OTH 584. Level 1 Fieldwork 1 Clinical Skills. 2 Hours.
PR: OTD Student Status. The first in a series of three clinical instruction courses in the occupational therapy program. OT documentation, basic measurement skills, and clinical skills, experiences with people with disabilities and participation in professional activities.

OTH 585. Level 1 Fieldwork 2. 2 Hours.
PR: OTD Student Status. Clinical instruction in the occupational therapy process, OT documentation, basic evaluation and assessment skills. Experiences with people with disabilities and participation in professional activities.

OTH 586. Level 1 Fieldwork 3. 2 Hours.
PR: OT Student Status. A 32 hour, 4 day rotation focused on the psychosocial factors that influence occupational engagement and interpreting the role of Occupational Therapy in non-traditional settings.

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

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

OTH 600. Assistive Technology Assessment in Childhood. 2 Hours.
PR: Consent. Online materials are paired with service learning at the West Virginia Department of Education’s annual Camp Gizmo. Course includes experience with a range of AT devices and work on interdisciplinary teams. There is a focus on the assistive technology assessment process in order to effectively identify an appropriate disciple specific action plan.

OTH 601. Disruption of Occupational Performance. 4 Hours.
PR: OTD Student Status. An overview of the effects of human disease and disability to include inflammatory and immune conditions, musculoskeletal disorders, cardiovascular disorders, neurodegenerative disease, genetic and developmental disorders, mental health disorders, neurological conditions, and chronic conditions on the occupational performance of humans across the lifespan.

OTH 602. Clinical Reasoning in OT 1. 2 Hours.
PR: OTD Student Status. Critically interpret evidenced based data, theory and frames of reference to evaluate and justify occupational therapy clinical reasoning in applied clinical and case-based contexts, integrating context from courses in the professional curriculum.

OTH 603. Foundations of OT Intervention. 3 Hours.
PR: OTD Student Status. Clinical reasoning, goal writing, documentation, and intervention planning utilizing activity analysis and grading as a foundation for the occupational therapy process and intervention. Implement strategies for grading activity to facilitate the use of occupation as intervention, while incorporating client factors, performance skills, performance patterns, contexts and environments, and practice settings across the lifespan.

OTH 607. Management and Supervision in OT. 3 Hours.
PR: MOT Student Status. Develop a business/program plan that highlights the distinct value of occupational therapy's role in promoting health, wellness, and quality of life through occupational participation. Students will also develop an occupation-based program evaluation that meets the needs of population health.

OTH 612. Functional Kinesiology in Occupational Therapy. 2 Hours.
PR: OTD Student Status. Develop enhanced understanding of functional anatomical correlations and the use of the principles of kinesiology including statics, dynamics, and biomechanics to conduct functional movement analyses of occupational performance.

OTH 630. Clinical Reasoning in OT 1. 2 Hours.
PR: OTD Student Status. Critically interpret evidenced based data, theory and frames of reference to evaluate and justify occupational therapy clinical reasoning in applied clinical and case-based contexts, integrating information from courses in the professional curriculum.

OTH 631. Clinical Reasoning in OT 2. 2 Hours.
PR: OTH 630 and OTD Student Status. Using the Occupational Therapy Practice Framework, integrating occupation-based models, theory and frames of reference, students will apply principles of critical thinking to case-based problem solving. This course is designed to integrate context from prior courses in the professional curriculum.

OTH 640. Level 2 Fieldwork 2. 1-6 Hours.
PR: OTH student status. Students are placed in one 12-week, or two 6-week placement(s), depending on the facility and the needs of the student. Students will be placed in facilities where individualized instruction can occur. (Grading will be S/U.).

OTH 660. Scientific Inquiry in OT 1. 3 Hours.
PR: OTD Student Status. Integrates student prior knowledge of the research process into the scholarship of the profession. Students will survey methodological considerations in the design of research, ways of evaluating research and practice, and ethical considerations in research.

OTH 661. Scholarship & Inquiry in OT 2. 3 Hours.
PR: OTH 660 and OTD Student Status. Advances student understanding of theory-based research, methodological considerations in the design of research, ways of evaluating practice, and approaches to analyzing data.

OTH 670. Theories and Science of Occupation. 3 Hours.
PR: OTD Student Status. Through an introduction and understanding of the concepts of occupational science and history of occupational therapy, view the world through an occupation perspective. Introduction to the process of theory development and basic theories from occupational therapy and a variety of related fields including psychology, sociology, anthropology, etc. and how they are applied to occupational therapy.

OTH 693. Special Topics. 1-6 Hours.
OTH 693. Special Topics. 1-6 hr. Study of advanced topics that are not covered in regularly scheduled courses.

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

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

OTH 708. Leadership in Occupational Therapy. 2 Hours.
PR: OTD Student Status. Leadership in the profession of occupational therapy, characteristics of quality of leaders and personal characteristics that impact leadership effectiveness. Includes the doctoral comp exam which is needed to progress to the clinical component of the curriculum.

OTH 732. Clinical Reasoning in OT 3. 3 Hours.
PR: OTH 605. Using the Occupational Therapy Practice Framework, integrating occupation-based models, theory and frames of reference, students will apply principles of critical thinking to case-based problem solving. This course is designed to integrate context from prior courses in the professional curriculum with a focus on case-based problem solving related to advocacy and clinical management.

OTH 733. Clinical Reasoning in OT 4. 3 Hours.
PR: OTH 709. Identify, analyze, and evaluate the contextual factors; current policy issues; and socioeconomic, political, geographic, and demographic factors on the delivery of occupational therapy services for persons, groups, and populations. Focus on analysis of unmet occupational needs of persons, groups, and populations and propose real world solutions to improve, to advocate for, and influence health policy to reduce occupational deprivation.

OTH 788. Doctoral Capstone Planning 1. 2 Hours.
PR: OTD Student Status. Directed study, reading, and/or research. Work in collaboration with the Capstone Coordinator to identify potential capstone sites and projects. Students will then complete a individualized study plan to prepare for capstone. Students may not proceed to capstone courses OTH 789, 809 & 810 until the objectives of this course are met.

OTH 789. Doctoral Capstone Planning 2. 2 Hours.
PR: OTD Student. Collaboration with faculty and Capstone Coordinator to develop, present, and defend a scholarship and/or service project to be completed during the doctoral experiential component.

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

OTH 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

OTH 807. Entrepreneurship and Innovation in Occupational Therapy. 3 Hours.
PR: OT Student. Provides a model of creativity, resourcefulness, and effective leadership skills to develop a business/program plan that highlights the distinct value of occupational therapy's role in promoting health, wellness, and quality of life through occupational participation. Development of an occupation-based program evaluation that meets the needs of population health.

OTH 809. Doctoral Thesis Capstone. 2 Hours.
PR: OTH 789 and OTD Student Status. Completion of the student designed doctoral capstone project including final written report for scholarly dissemination and oral presentation and defense. The doctoral capstone project is completed during the doctoral experiential.

OTH 810. Doctoral Experiential. 7 Hours.
PR: OTH 789 and OTD Student Status. A full time 14 week experiential provides students with an in-depth learning opportunity during which they are exposed to advanced learning in areas of clinical practice, research, education, policy development leadership, administration, program development, advocacy, education, or theory development.

OTH 812. Professional Development Seminar 2. 1 Hour.
PR: OTD Student Status. Preparing for the second Level II Fieldwork and developing essential skills for entry to the profession, including NBCOT exam prep and job search skills. Experiences within the professional organization and ongoing plan for professional activity. Conduct a personal professional development assessment and address professional development needed for the next Level II Fieldwork rotation.

PA 507. Human Anatomy 1. 3 Hours.
Lecture and lab based human anatomy course covering back, upper limb, thorax, abdomen, and pelvis.

PA 510. Physician Assistant Practice. 1 Hour.
Introduction to the physician assistant profession, including history, scope of practice, physician collaboration, overview of the US healthcare system, ethics and risk management.

PA 511. Evidence-Based PA Practice 1. 2 Hours.
PR: Good standing in physician assistant studies program. Introduction to evidence-based practice. Covers principles of epidemiology and research, including ethics, the IRB, and applications to quality improvement.

PA 512. Physical Diagnosis. 3 Hours.
Medical background and associated skills practice in history taking and medical examination. Includes preparation for clinical practice with HIPPA, OSHA, and BLS requirements. Principles and practice of medical documentation.

PA 515. Pathophysiology 1. 2 Hours.
Embryology, histology, immunology overview, principles of inflammation and healing; pathophysiology of cancer and introduction to infectious disease.

PA 517. Genomic Medicine. 1 Hour.
Review of genetics and cell biology. Introduction to genomic applications in medicine. With other concurrent courses, illustrates genetic basis of diseases such as cancer.

PA 518. Health and Disease Across the Lifespan. 3 Hours.
Study of life-span human development across cognitive, psychosocial and neuromotor domains with particular emphasis on applications to physician assistant practice in health, disease and disability.

PA 522. Clinical Procedures 1. 3 Hours.
Introduction to specific skills necessary in clinical practice settings primarily through experiential learning. Includes Orthopedics, Surgery and Emergency Medicine, and ACLS. Documentation practice and simulation experiences will be used.

PA 523. Clinical Medicine & Pharmacotherapeutics 1. 4 Hours.
PR: Good standing in physician assistant program. First in a series of courses designed to prepare the physician assistant for the assessment and clinical management, including pharmacologic, of various diseases and conditions. Emphasis is on diseases of the dermatologic, musculoskeletal, and psychiatry/behavioral organ systems. Pathophysiologic processes relevant to each organ system will also be presented.

PA 524. Diagnostic Medicine 1. 2 Hours.
Principles of imaging and specific applications to body organs and systems for the purpose of clinical diagnosis.

PA 527. Human Anatomy 2. 3 Hours.
PR: Successful completion of PA 507 and good standing in the physician assistant program and pathologists' assistant program. Lecture and lab based anatomy course covering head, neck, and lower limb.

PA 528. Principles of Behavioral Health for PA. 1 Hour.
Application of biopsychosocial model of health to human health. Principles of behavior and behavior change are introduced. Includes overview of techniques, including counseling, motivational interviewing and cognitive behavioral therapy.

PA 530. Physician Assistant Practice 2. 1 Hour.
Introduction to members of the health care team, including mandatory inter-professional education experience. Experiential practice in clinical setting.

PA 531. Evidence-Based PA Practice 2. 2 Hours.
PR: Good standing in physician assistant studies program. Principles of epidemiology and research including ethics, the IRB and applications to quality improvement. Application of principles of evidence-based practice to answer a clinical question through development of a research proposal.

PA 533. Clinical Medicine & Pharmacotherapeutics 2. 4 Hours.
Second in a series of courses designed to prepare the physician assistant for the clinical management, including pharmacologic, of various conditions. Includes infectious disease and disorders of the cardiovascular, hematologic, pulmonary and GI systems.

PA 534. Diagnostic Medicine 2. 2 Hours.
PR: Good standing in physician assistant studies program. Principles and applications of medical tests which guide clinical interventions. Includes laboratory medicine and physiologic tests. Exposure to normal and abnormal laboratory findings as well as reading and interpretation of EKG.

PA 535. Pathophysiology 2. 3 Hours.
Concurrent with study of human physiology, pathophysiology of various body systems.

PA 536. Clinical Reasoning for PA. 1 Hour.
PR: Good standing in physician assistant studies program. Utilizes a case-based approach to provide instruction in the cognitive steps involved in describing, framing, and solving medical problems. Includes discussion of common errors in the medical diagnostic process.

PA 537. Acute Care Medicine for PA. 1 Hour.
PR: Good standing in physician assistant studies program. Clinical medicine topics relevant to the practice of acute care medicine are presented using a symptom-based framework.

PA 538. Obstetrics/Gynecology & Surgery for PA. 2 Hours.
PR: Good standing in physician assistant studies program. PA practice in obstetrics and gynecology and surgery. Includes management of complicated and uncomplicated pregnancy and essentials of pre-operative, intraoperative, and post-operative management.

PA 540. PA Practice in the US Health System. 2 Hours.
Description of the US Health system, including billing, coding and reimbursement. Medicare and Medicaid are covered. Regulations regarding PA scope of practice are included.

PA 541. Evidence Based PA Practice 3. 1 Hour.
Students design and propose a research or quality improvement project, including literature review.

PA 542. Clinical Procedures 2. 2 Hours.
Introduction to specific skills and procedures necessary in clinical practice settings primarily through experiential learning. Includes Obstetrics and Gynecology, ENT and Neurology. Involves case based and simulated practice.

PA 543. Clinical Medicine & Pharmacotherapeutics 3. 4 Hours.
Third in a series of courses designed to prepare the physician assistant for the assessment and clinical management, including pharmacologic, of various diseases and conditions. Emphasis is on ENT, urogenital, and neurologic disorders.

PA 544. Clinical Medicine & Pharmacotherapeutics 4. 4 Hours.
PR: Good standing in physician assistant studies program. Fourth in a series of five courses designed to prepare the physician assistant for the clinical management, including pharmacologic, of various conditions. Pathophysiologic processes relevant to each organ system will also be presented. Includes disorders of the Neurologic and Endocrine systems.

PA 545. Clinical Medicine & Pharmacotherapeutics 5. 4 Hours.
PR: Good standing in physician assistant studies program. Fifth in a series of five courses designed to prepare the physician assistant for the assessment and clinical management, including pharmacologic, of various diseases and conditions. Pathophysiologic processes relevant to each organ system will also be presented. Emphasis is on hematologic, EENT, and infectious disease.

PA 546. Rural Medicine for PA. 1 Hour.
PR: Good standing in physician assistant studies program. PA role in prevention of disease and maintenance of health with focus on the rural primary care setting. Includes an introduction to the integrated behavioral health model.

PA 547. Neurobiology. 4 Hours.
Lecture and laboratory based course provides fundamentals of neuroanatomy and mechanisms of Central Nervous System function.

PA 549. Prevention and Community Health for PA. 3 Hours.
PA role in the prevention of disease and maintenance of community health. Survey of cultural impact and health disparity. Includes inter-professional experience in community based health programs.

PA 553. PA Practice in Pediatrics & Geriatrics. 2 Hours.
PA practice in pediatric and geriatric populations, with emphasis on clinical conditions that uniquely affect children and older adults.

PA 593. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

PA 610. Family Medicine PA Practice. 4-6 Hours.
Clinical practice experience in primary care/family medicine. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 620. Internal Medicine PA Practice. 8 Hours.
Clinical practice experience in internal medicine. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 625. Cardiology PA Practice. 4 Hours.
Clinical practice experience in cardiology. Under supervision, students perform clinical assessments, procedures, and clinical decision making involved in patient care in the cardiology practice.

PA 630. Pediatric PA Practice. 4-6 Hours.
Clinical practice experience in primary care/pediatrics. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 640. Women's Health PA Practice. 4-5 Hours.
Clinical practice experience in obstetrics and gynecology. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 650. Surgery PA Practice. 4-6 Hours.
Clinical practice experience in general surgery. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 660. Behavioral Medicine PA Practice. 4 Hours.
Clinical practice experience in behavioral medicine and psychiatry. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 670. Emergency Medicine PA Practice. 4 Hours.
Clinical practice experience in emergency medicine. Under supervision, students perform clinical assessments, procedures and clinical decision making involved in patient care.

PA 680. Elective PA Practice. 4 Hours.
Elective experience in a clinical practice setting selected by the physician assistant student. The experience may be an extension of one of the core required rotations OR may reflect a special interest of the student within the practice of medicine.

PA 681. Elective PA Practice 2. 3 Hours.
PR: Good standing in physician assistant program. An additional elective experience in a clinical practice setting selected by the physician assistant student. The experience may be an extension of one of the core required rotations OR may reflect a special interest of the student within the practice of medicine.

PA 682. Rural PA Practice 2. 4 Hours.
An elective clinical practice experience in a primary care setting designated as rural. Students may elect this rotation in place of PA 680 Elective PA Practice. The experience may be in family medicine, internal medicine, or pediatrics.

PA 685. Rural PA Practice. 4 Hours.
Mandatory clinical practice experience in a setting designated as rural. The experience may be in either family medicine, internal medicine or pediatrics.

PA 686. PA Summative Evaluation. 1 Hour.
Summative evaluation and preparation for the national certification (PANCE) exam.

PA 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.).

PALM 503. AT Human Anatomy. 4 Hours.
PR: Acceptance into the Master of Science in Athletic Training degree program. This course is an advanced human anatomy course designed for students with previous gross anatomy experience accepted to the Master of Science in Athletic Training degree program. We will utilize a regional anatomical approach to provide students with a comprehensive understanding of human structure and function, with particular emphasis on musculoskeletal and peripheral nervous systems.

PALM 510. Molecular Diagnostics. 2 Hours.
PR or CONC: PALM 412. Principles and procedures of molecular biology that aid in the diagnosis and prognosis of disorders and disease states.

PALM 520. Immunohematology. 3 Hours.
PR or CONC: PALM 422. Primary principles and practices of blood banking which includes blood group systems, antibody detection and identification, compatibility testing, quality control requirements, instrumentation, blood transfusion, donor selection, and component preparation.

PALM 525. Immunohematology Practicum. 4 Hours.
PR: PALM 422 and PALM 520. Supervised practicum in which students will integrate practice and theory of immunohematology in a health care setting and will be exposed to the scope of work, variety of tests, and automation found within the immunohematology department.

PALM 530. Clinical Chemistry. 3 Hours.
PR or CONC: PALM 432. Theory of routine and specialized clinical chemistry laboratory testing, which will include quality assurance, laboratory test principles and methodologies, and correlation between test results and disease states.

PALM 535. Clinical Chemistry Practicum. 4 Hours.
PR: PALM 432 and PALM 530. Supervised practicum in which students will integrate practice and theory of clinical chemistry in a health care setting and will be exposed to the scope of work, variety of tests, and automation found within the clinical chemistry department.

PALM 540. Clinical Hematology. 3 Hours.
PR or CONC: PALM 442. Study of formed elements of blood including test principles and methodologies, associated disorders and diseases, and the correlation between test results and disease states.

PALM 544. Hemostasis. 1 Hour.
PR or CONC: PALM 446. Study of blood hemostasis including the coagulation cascade, principles of testing, hemostatic disorders and diseases, and the correlation between test results and disease states.

PALM 545. Clinical Hematology Practicum. 4 Hours.
PR: PALM 442 and PALM 540. Supervised practicum in which students will integrate practice and theory of clinical hematology in a health care setting and will be exposed to the scope of work, variety of tests, and automation found within the hematology department.

PALM 550. Clinical Microbiology. 3 Hours.
PR or CONC: PALM 452. Study of medically significant microbiology, including normal flora and pathogens, microbial physiology, interactions between host and pathogenic microorganisms, and the clinical and epidemiological consequences of these interactions.

PALM 554. Clinical Mycology & Parasitology. 2 Hours.
Study of clinically significant fungi and parasites that will include the morphological characteristics, pathogenicity, epidemiological characteristics, and laboratory testing.

PALM 555. Clinical Microbiology Practicum. 4 Hours.
PR: PALM 452 and PALM 550. Supervised practicum in which students will integrate practice and theory of clinical microbiology in a health care setting and will be exposed to the scope of work, variety of tests, and automation found within the clinical microbiology department.

PALM 560. Urinalysis and Body Fluids. 1 Hour.
PR or CONC: PALM 462. Comprehensive study of the renal system and bodily fluids including principles and methods of testing and associated disorders or diseases.

PALM 580. Medical Immunology. 3 Hours.
Comprehensive study of the immune system including principles of immunological and serological procedures, immunological disorders and diseases, and correlation between test results and disease states.

PALM 600. Pathologists' Assistant Microanatomy. 2 Hours.
This course is designed specifically for the pathologists' assistant student to build a foundation in normal microscopic anatomy.

PALM 602. Leadership Theory. 1 Hour.
Introduction to leadership theory and practice for medical laboratory science students.

PALM 603. Pathology and Anatomy. 6 Hours.
This course will cover gross and microscopic human anatomy including embryology, histology and microanatomy lab.

PALM 604. Educational Theory. 1 Hour.
Educational methodologies for medical laboratory science students.

PALM 605. Advanced Microanatomy. 2 Hours.
Microanatomy of disease states including clinical correlations for students in the pathologists assistant program.

PALM 606. Graduate Seminar. 1 Hour.
Introduction to research design and methods for medical laboratory science students.

PALM 610. Pathology Assistant Education Methods. 1 Hour.
Techniques in educational methodology for pathologist's assistants.

PALM 620. Clinical Pathology Seminar. 2 Hours.
This course presents a review of clinical pathology, including pertinent forensic molecular, toxicologic and radiologic diagnostics.

PALM 625. Anatomical Pathology Techniques. 4 Hours.
This course will cover standard techniques in surgical and autopsy dissection, preparation of reports, basic forensic, investigation techniques, and basic histological and immunological staining techniques.

PALM 627. Pathology Assistant Practicum 1. 9 Hours.
Rotations in surgical and autopsy pathology to include forensics and pediatrics.

PALM 628. Pathology Assistant Practicum 2. 9 Hours.
Rotations in surgical and autopsy pathology to include forensics and pediatrics.

PALM 629. Pathologists' Assistant Practicum 3. 7 Hours.
PR: PALM 628. This course is a continuation of PALM 628 and advanced procedures and application of advanced techniques in surgical and autopsy pathology.

PALM 630. Pathology Review 1. 2 Hours.
This course includes an intense review of clinical and anatomical pathology theory and techniques, and presentation of scientific journal articles and clinical cases.

PALM 631. Pathology Review 2. 2 Hours.
PR: PALM 630. This course is a continuation of PALM 630 and includes an intense review of clinical and anatomical pathology theory and techniques, and presentation of journal articles and clinical cases.

PALM 648. Surgical and Autopsy Pathology Procedures. 3 Hours.
This course is specifically designed for Pathologists' Assistant students as a comprehensive review course covering both surgical and autopsy pathology techniques to correlate with clinical rotations.

PALM 650. Introduction to Disease Mechanisms. 4 Hours.
This course is specifically designed for the pathologists' assistant students to study the general pathology concepts associated with disease mechanisms.

PALM 652. Histology for Pathologists' Assistants. 3 Hours.
This course presents students with histology content requisite to their field of study. It includes both lecture and web-based instruction.

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

PALM 701. Advanced Gross Anatomy. 2-6 Hours.
PR: PALM 704 or PALM 724 and consent. Morphological and functional analysis of a selected region, with dissection.

PALM 704. Human Structure. 1-17 Hours.
PR: Admission to medical school or medical basic science graduate program or consent. Integrated approach combining human gross anatomy, microanatomy and embryology. Includes human cadaver dissection, microscopic anatomy of cells, tissues and organs with application to human health and disease.

PALM 705. Microanatomy. 5 Hours.
PR: Admission to medical basic science graduate program or consent. Study of cells, tissues, and organs.

PALM 712. Special Topics in Anatomy. 2-4 Hours.
PR: Consent. Different topics of current interest in anatomy that are not included in the regular graduate courses.

PALM 714. Applied Anatomy. 2-6 Hours.
PR: Consent. Detailed study of anatomy, adapted to the needs of the individual student.

PALM 716. Craniofacial Growth and Maturation. 1 Hour.
PR: Consent. The current concepts of craniofacial growth and maturation are presented and integrated for application to clinical problems.

PALM 718. Dental Histology. 6 Hours.
PR: Dental student standing or consent of instructor or chairperson. Cells, tissues, organs. Structure, function, and development of oral tissues.

PALM 719. Advanced Head and Neck Anatomy. 1 Hour.
PR: Admission to medical, dental or basic science graduate programs, or consent. Head and neck craniofacial anatomy as it applies to specialties in dental or medical practice.

PALM 724. Human Gross Anatomy. 7 Hours.
PR: Admission to dental school or medical basic science graduate program or consent. Human anatomy including cadaver dissection for dental students. (4 hr. lec., 3 hr. lab.).

PALM 750. Systemic Pathology for Pathologists' Assistant Students. 6 Hours.
Pathologists' Assistant students study the different disease processes and neoplasms they will encounter while in surgical pathology and autopsy. This course provides the background necessary to properly gross surgical pathology specimens or select tissue at autopsy in order to assist the pathologist in diagnosing patients.

PALM 751. Advanced Microanatomy and Organology. 2-4 Hours.
PR: PALM 705 or PALM 709 and Consent. An extension of the major topics included in PALM 705 or 709. Special emphasis on recent contributions.

PALM 753. Oral Pathology 2. 2 Hours.
PR: PATH 738 or consent. Continuation of PATH 738.

PALM 782. Advanced Oral Histopathology. 1,2 Hour.
PR: PALM 738 and PALM 753 or consent. An elective seminar stressing the significant microscopic features and diagnosis of various oral lesions.

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

PALM 801. Human Structure. 7 Hours.
Human Structure is an integrated course combining human gross anatomy, microanatomy and embryology. Students will conduct human cadaver dissection and learn the microscopic anatomy of cells, tissues and organs with application to human health and disease.

PALM 802. Mechanisms of Human Disease. 11 Hours.
Integrated study of disease using structure-function relationships. This course includes the structural, biochemical, and functional changes in cells, tissues, and organs that underlie disease.

PALM 812. Mechanisms of Human Disease (PATH) 1. 3 Hours.
Pathology is the study (logos) of disease (pathos). It includes the structural, biochemical, and functional changes in cells, tissues, and organs that underlie disease. The purpose of this course is to introduce students to the morphologic, molecular, microbiologic, and immunologic techniques to identify the signs and symptoms manifested by patients.

PALM 820. Mechanisms of Human Disease (PATH) 2. 7 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. Pathology is the study (logos) of disease (pathos). It includes the structural, biochemical, and functional changes in cells, tissues, and organs that underlie disease. Pathologists use morphologic, molecular, microbiologic, and immunologic techniques to explain the whys of the signs and symptoms manifested by patients.

PATH 601. Special Studies in Oral Pathology. 1-3 Hours.
PR: PATH 738 and PATH 753. Advanced study of local or systemic disease processes affecting oral structures through seminars, assignment of specific topics, or research activities.

PATH 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of behavior medicine and psychiatry. 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.).

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

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

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

PATH 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.

PATH 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.).

PCOL 516. Pharmacology for PA. 3 Hours.
Principles of pharmacology for physician assistant students. Students will be introduced to basic pharmacological concepts and drugs commonly used in medicine.

PCOL 549. Pharmacology Fundamentals for Future Healthcare Professionals. 4 Hours.
PR: For exercise physiology and other graduate students or selected undergraduate seniors with consent. Pharmacology Fundamentals teaches future healthcare professionals the basics of how drugs interact with the body, including drug action, effects, and safe use in patient care.

PCOL 593. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

PCOL 701. Bioinformatics Tools. 2 Hours.
Introduction to biomedical databases and ontologies, sequence comparison and alignment, gene finding and protein function prediction, analysis of gene expression and high throughout proteomics, and pathways analysis.

PCOL 743. Pharmacology 1. 3 Hours.
PR: Second year professional standing or Consent. Cellular and biochemical effects that explain the therapeutic or adverse effects of drugs. These will be integrated into considerations of drug effects, toxicities and interactions between drugs.

PCOL 745. Advanced Pharmacology 1. 1-3 Hours.
This course contains three modules and addresses general pharmacological principles and contemporary topics in integrative, cellular, and molecular aspects of cardiovascular, inflammatory, endocrine, and pulmonary pharmacology, and toxicology.

PCOL 746. Advanced Pharmacology 2. 1-3 Hours.
This course contains three modules and addresses contemporary topics in integrative, cellular, and molecular aspects of neuropharmacology (first two modules) and cancer pharmacology (third module).

PCOL 760. Pharmacology & Therapeutics. 3 Hours.
PR: Second year dental students or graduate students with consent. Lecture course provides students with an understanding of how drugs commonly used in dentistry enter the body, produce effects, interact with other drugs, and are eliminated from the body. Drugs commonly prescribed by other practitioners will also be discussed.

PCOL 762. Literature Survey. 1 Hour.
per semester. PR: Graduate status in pharmacology and toxicology or Consent. Current literature pertinent to pharmacology and toxicology including journals of allied biological sciences.

PCOL 763. Applied Dental Pharmacology. 2 Hours.
Applied pharmacology course for third year dental students. Clinical application of pharmacology relevant to dental patients will be emphasized in small group activities. A prior knowledge of basic or introductory pharmacology is expected.

PCOL 764. Advanced Pharmacology. 1-6 Hours.
PR: PCOL 761 or Consent. Advanced lectures and discussion of general principles of pharmacology and toxicology and advanced lectures in biochemical, endocrine, pulmonary, and cardiovascular pharmacology. (1-6 hr. lec.) (Alternate years.).

PCOL 765. Advanced Biomedical Sciences: Applied Pharmacology. 1 Hour.
Web-based course for students of various masters level dental programs to promote application of pharmacology to clinical practice.

PCOL 770. Summer Medical Pharmacology. 7 Hours.
Online course covering basic principles of drug action, mechanisms of therapeutic effects, and undesirable effects. Emphasis on the classes of drugs currently used in medical practice.

PCOL 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of pharmacology. 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.

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

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

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

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

PCOL 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.

PCOL 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.

PCOL 801. Medical Pharmacology. 9 Hours.
Basic principles of drug action, mechanisms of therapeutic effects and undesirable effects. Emphasis on the classes of drugs currently used in medical practice.

PCOL 812. Medical Pharmacology 1. 3 Hours.
This course provides the foundational knowledge of pharmacology and therapeutics, then continues with systems-based drug information for the immune system and the nervous system. This course integrates the basic knowledge of drug action with the practical use of and problems associated with pharmacotherapy in clinical practice.

PCOL 820. Medical Pharmacology 2. 5 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. This course integrates the basic knowledge of drug action with the practical use of and problems associated with pharmacotherapy in clinical practice. Pharmacology integrates knowledge of anatomy, biochemistry, physiology, microbiology, immunology, and pathology into an understanding of the actions of drugs. Content coverage is by organ system, including renal/cardiovascular, respiratory, blood, endocrine, reproductive, musculoskeletal, and gastrointestinal.

PEDI 731. Clinical Clerkship in Pediatrics. 8 Hours.
CR. Required of third-year medical students. See description of clinical clerkship under MED 731. Clerkship in pediatrics occupies six weeks.

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

PEDI 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.).

PEDI 830. Clinical Clerkship in Pediatrics. 8 Hours.
PR: Required of third-year medical students. See description of clinical clerkship under MED 830. Clerkship in pediatrics occupies six weeks. (Third year.).

PERI 640. Core Classic Literature Review. 2 Hours.
PR: Enrollment in the MS program in Periodontics. This course will allow incoming residents in periodontology to gain knowledge of classic periodontal literature as it relates to etiology, pathogenesis, and clinical practice. This will include both clinical and basic sciences topics related to periodontics.

PERI 642. Classic Peri Lit Rev. 2 Hours.
PR: Enrollment in the MS program in Periodontics. This course allows residents to develop an in-depth knowledge of the periodontal literature as it relates to research and clinical practice. Both clinical and basic science content on etiology and treatment are included. The content is divided into two major sections (fall and spring semesters) over three academic years.

PERI 644. Clinical Management of Medically Compromised Patients. 1 Hour.
PR: Enrollment in the MS program in Periodontics. This course will provide an in-depth knowledge of various medically compromising conditions and their management during dental treatment.

PERI 650. Clinical Periodontics. 1-6 Hours.
PR: Enrollment in the MS program in Periodontics. Hands-on, one-on-one training with periodontal faculty on surgical techniques and procedures related to periodontics and implant dentistry are provided. This course prepares the dental resident with the skills necessary to become a specialist in periodontics through practical training on patients in a clinical setting.

PERI 662. Implant Dentistry. 1 Hour.
PR: Enrollment in the MS program in Periodontics. This course is intended to provide students with an in-depth knowledge of the use of dental implants for oral rehabilitation. Treatment planning options, surgical techniques, use of different implant systems and prosthetic solutions will be discussed and critically analyzed. A multidisciplinary approach involving other dental specialties such as endodontics, prosthodontics, orthodontics, oral surgery and oral radiology is emphasized.

PERI 664. Introduction to Advanced Periodontal/Implant Surgery. 2 Hours.
PR: Enrollment in the MS program in Periodontics. The course is designed to introduce the residents to the most common surgical techniques used in periodontal and implant therapy.

PET 515. Research Methodology in Physical Education. 3 Hours.
Application of historical, descriptive, and experimental research strategies and designs to physical education.

PET 565. Models-based Physical Education. 3 Hours.
This course aims to explore the foundations and application of models-based curricula in physical education. Students will delve into the core principles of models-based practice, serving as the groundwork for the in-depth exploration of diverse curriculum models. These models are designed to improve student learning and performance, enhance instructional effectiveness, foster professional community building, and promote professional development and advocacy.

PET 573. Instructional Technology in Physical Education. 3 Hours.
This course aims to explore cutting-edge instructional technologies and develop strategies for their seamless integration into physical education instruction. Students will engage with a range of instructional technologies designed to elevate student learning and performance, improve instructional effectiveness, foster professional community building, and promote professional development and advocacy within the field.

PET 574. Models-based Physical Education-Advanced Laboratory. 1-3 Hours.
This course delves into the intricacies of models-based practice within physical education curriculum development. Students will explore the art of applying curriculum planning, design, and evaluation principles to create effective physical education curricula. The course focuses on elucidating the advantages of Models-Based Practice within the physical education context.

PET 575. Principles of Effective Teaching in Physical Education-Advanced Laboratory. 1-3 Hours.
This course offers students hands-on teaching experiences in children and youth physical activity programs. Students apply research-based teaching principles, including effective instructional system elements and diverse instructional methods. The focus is on analyzing teaching practices, reflecting on experiences, and assessing progress toward expertise in physical education instruction.

PET 576. Adapted Physical Education-Advanced Laboratory. 1-3 Hours.
This course immerses students in teaching physical activity to children, focusing on inclusive practices for learners with disabilities. Students practice assessing progress, adapting lesson plans, managing diverse classes, and improving teaching.

PET 577. School Physical Activity Programs-Advanced Laboratory. 1-3 Hours.
This course guides students through developing, implementing, and evaluating comprehensive school physical activity programs (CSPAP) using a participatory approach. Students engage in all recommended steps of the CSPAP planning process using an actual K-12 setting. A range of facilitators and barriers to effective physical education promotion in school-based settings are also be addressed.

PET 580. School Physical Activity Programs. 3 Hours.
This course focuses on the literature on children's physical activity, health-related fitness, and school-based interventions through a multi-level approach. It offers an in-depth study of comprehensive school physical activity programs, focusing on key components such as quality physical education, before and after-school activities, during school initiatives, family and community engagement, as well as staff involvement.

PET 581. Adapted Physical Education. 3 Hours.
This course is designed to explore the motor developmental patterns of diverse special population groups, with a particular focus on the interactive role of physical education in the developmental process. Emphasizing current research in developmental areas, students will gain a comprehensive understanding of how physical education contributes to the development of individuals with unique needs.

PET 583. Principles of Effective Teaching. 3 Hours.
Research based principles of effective teaching as they relate to physical education. Students will examine and evaluate their own teaching practices through a series of reflective assignments.

PET 585. Physical Education Supervision and Advocacy-Advanced Laboratory. 1-3 Hours.
This course focuses on effective programmatic supervision and advocacy practices for leaders in school physical activity and physical education. Topics of discussion include the relevant literature covering leadership, program evaluation, capacity building, and advocacy. Students will apply these concepts to develop professional leadership and advocacy plans for their specific physical education programs.

PET 587. Student Teaching: K-5 Physical Education. 5 Hours.
PR or CONC: PET 588 and PET 589. A final, school-based practice teaching experience in elementary schools.

PET 588. Student Teaching: 6-12 Physical Education. 5 Hours.
PR or CONC: PET 587 and PET 589. A final, school-based practice teaching experience in secondary schools.

PET 589. Student Teaching Seminar. 2 Hours.
PR or CONC: PET 587 and PET 588. Discussions to enhance communication concerning the program's student teaching and stimulate critical thinking about the student teaching experience. (Seminar.).

PET 600. Workshop in Physical Education. 1-15 Hours.
Professional development experience for the physical education teacher.

PET 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of physical education teaching. 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.).

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

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

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

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

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

PET 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.

PET 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.).

PET 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.

PET 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 P/F; colloquium credit may not be counted against 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.

PET 735. Critical Thinking in Sport & Physical Education Research. 3 Hours.
PR: Admission to a School of Sport Science Doctoral Degree (Ed/D/PhD), program and/or course instructor approval. The objective for this course is to use a critical thinking framework to examine the research literature that underlies the knowledge base in physical education teaching and teacher education and coaching and coaching education for students in a doctoral level program in physical education and sport coaching studies.

PET 741. Action Research in Kinesiology. 3 Hours.
In this graduate seminar, students learn about action research design and its use to inform program development and professional practice in kinesiology-related settings. Action research is a systematic process by which the researcher employs a range of investigative, evaluative, and analytical methods to address problems of professional practice using an iterative or cyclical approach.

PET 745. Higher Education Curriculum in Kinesiology. 3 Hours.
Examination of higher education curricula in physical education teacher education, coaching education, and related fields with an emphasis on current curricular issues.

PET 753. Policy and Advocacy in Kinesiology. 3 Hours.
Current landscape of policy and advocacy in kinesiology and the theoretical and conceptual frameworks underlying it. Students critically analyze existing policies and utilize research evidence to support advocacy efforts.

PET 755. Physical Activity in Schools. 3 Hours.
This course provides student in-depth knowledge of the key guidelines, intervention strategies, and program evaluation methods associated with children's physical activity in schools.

PET 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of physical education. 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.).

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

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

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

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

PET 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.

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

PET 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). The tuition-waived continuing education courses are graded on a pass/fail grading scale and do not apply as graduate credit toward a degree program.

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

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

PHAR 694. Seminar. 1-6 Hours.
Seminars arranged for advanced graduate students. Grading may be S/U.

PHAR 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.

PHAR 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.).

PHAR 703. Pharmacy Practice Experience 1. 1 Hour.
PR: First professional year standing or consent. Introduces student to the practice of pharmacy with a focus on career exploration. Pharmacy Practice Experience (PPE) 1 is the first course in a sequence that introduces students to the roles of pharmacists in a variety of practice settings. Interprofessional education (IPE) is introduced and emphasized throughout the course.

PHAR 705. Advanced Cardiology Pharmacotherapy. 2 Hours.
PR: PHAR 824. For students with an interest in cardiology pharmacotherapy and will be highly useful for prospective pharmacy residents. This course serves as a bridge between the cardiology system-based teaching course PHAR 824 and advanced pharmacy practice experiences rotations. This class will contain didactic lectures, small group discussions, pros and cons clinical controversy debate, and patient case-based applied therapeutics.

PHAR 706. Biopharmaceutics. 2 Hours.
Introduces the fundamental principles of biopharmaceutics. This area of knowledge deals with the drug performance at the delivery system – human body interface, and addresses how physico-chemical drug properties, delivery system characteristics, and physiological processes influence drug distribution and affect the body, as well as drug bioavailability.

PHAR 707. Drug-Induced Diseases. 2 Hours.
Focused study of adverse effects of prescription and non-prescription medications designed for practical application across multiple disease states.

PHAR 710. Pharmacy Practice Experience 2. 1 Hour.
PR: PHAR 703 or consent. Introduces student to the practice of pharmacy with a focus on career exploration. Pharmacy Practice Experience (PPE) 2 is the second course in a sequence that introduces students to the roles of pharmacists in a variety of practice settings. Interprofessional education (IPE) is introduced and emphasized throughout the course.

PHAR 713. Oncology Pharmacotherapy. 2 Hours.
PR or CONC: PHAR 853. Provides practical aspects to oncology pharmacy practice including clinical decision making and more in-depth review of specialty areas of practice within hematology/oncology.

PHAR 714. Entrepreneurship/Intrapreneurship in Pharmacy. 2 Hours.
PR: Second professional year standing or consent. Focuses on entrepreneurship, intrapreneurship and entrepreneurial leadership in pharmacy.

PHAR 718. Pediatric Pharmacotherapy. 2 Hours.
PR: Second professional year standing or consent. Overview of common pathophysiology and pharmacotherapy principles in the pediatric population and selection of drug therapy to treat the pediatric patient.

PHAR 720. AI and Health Data Science Research. 2 Hours.
PR: Second professional year standing or consent. Provides pharmacy students the opportunity for hands-on learning about basic Artificial Intelligence (AI) and Data Science methods by analyzing health-related data.

PHAR 721. Advocacy and Leadership. 2 Hours.
PR: Second and third professional year standing or consent. The course will focus on developing the student's leadership skills as an advocate for the profession of pharmacy.

PHAR 729. Introduction to SAS. 2 Hours.
Provides didactic instruction on and practical exposure to SAS programming for health outcomes research through the simulation of the analysis of published research adapted for active learning, take-home assignments, and full-length projects.

PHAR 743. Teach to Learn: Learn to Teach. 2 Hours.
Provides pharmacy students the opportunity to learn how to teach in higher education/pharmacy and develop their teaching skills by participating in select teaching and learning activities.

PHAR 744. Education Journal Club. 1 Hour.
PR: PHAR 743 or Consent. Evaluate educational research articles from pharmacy education and other healthcare disciplines. Students will present and critically analyze educational literature and develop presentation skills.

PHAR 745. Critical Care Pharmacotherapy. 2 Hours.
PR: Third professional year standing or consent. Gain knowledge in multiple facets of critical care pharmacotherapy, particularly for students interested in pharmacy residency training in a clinical setting.

PHAR 747. History of Pharmacy. 2 Hours.
Gives the student a deeper appreciation of the background of pharmacy and its development from ancient times to present.

PHAR 748. Acute Care Case Studies. 2 Hours.
PR: Third professional year standing or consent. Gain experience developing pharmaceutical care plans in an acute care setting. Further prepares students interested in pursuing pharmacy residency training.

PHAR 749. Pharmaceutical Investigation. 1-3 Hours.
Provides the student with real-time insight into translational research and the rigors of academia. The student will be provided with the opportunity to participate in diverse types of studies based on the selected mentor (in vitro, in vivo and human, socio-economical studies), perform data analysis and develop critical thinking and scientific writing skills.

PHAR 749A. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749B. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.).

PHAR 749C. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.).

PHAR 749D. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.).

PHAR 749E. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems, and policy, or clinical pharmacy. (Grading may be S/U.).

PHAR 749F. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749G. Pharmaceutical Investigation. 2-3 Hours.
PHAR 749G. Pharmaceutical Investigation. 2-3 Hr, PR: Consent. Original Investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749H. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749I. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749J. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749K. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749L. Pharmaceutical Pharmacy. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749M. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749N. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749O. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749P. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749Q. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749R. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749S. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749T. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749U. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749V. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749W. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749X. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749Y. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749Z. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 751. Geriatrics. 2 Hours.
PR: Second or third year pharmacy students. A review of common pharmacotherapeutic and social issues of importance to older adult patients.

PHAR 752. History of Drug Discovery. 2 Hours.
This course is concerned with the way in which advances in chemistry and biochemistry have influenced advances in drug discovery and therapeutics beginning with the late 18th century through today.

PHAR 753. Social and Behavioral Theory and Health Outcomes Research. 3 Hours.
Basic social and behavioral theories related to the health behavior change and health outcomes. Open to graduate students in pharmacy, public health, or other health care fields.

PHAR 754. Decision Analysis in Healthcare. 3 Hours.
Core skills in clinical decision analysis which builds on concepts derived from epidemiology, biostatistics, computing, economics and operations research and applies them to medical and pharmacological decisions.

PHAR 755. Pharmacoeconomics. 3 Hours.
This graduate-level course is intended to train graduate students in evaluating and conducting pharmacoeconomic research.

PHAR 756. Health Survey Research Methods. 3 Hours.
This course seeks to increase students' understanding of survey research methods and to develop basic skills in survey development and administration.

PHAR 757. Patient Reported Outcomes. 3 Hours.
Provides a foundation in health outcomes research with an emphasis on patient reported outcomes in health service research.

PHAR 758. Ethical and Regulatory Aspects of Clinical Research. 2 Hours.
Provides overview of ethical and regulatory aspects of clinical research.

PHAR 759. Clinical and Population Practicum. 1 Hour.
Expose students to a population of interest in preparation for a research project. This course will help students to understand the lived experience of the population of interest and expose students to aspects of the healthcare system. Students will either work with a clinical population or community-based population to address one or more disease states. Grading will be Pass/Fail.

PHAR 760. APPE 1. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 761. APPE 2. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 762. APPE 3. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 763. APPE 4. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 764. APPE 5. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 765. APPE 6. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 766. APPE 7. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 767. Scientific Writing: Health Services and Outcomes Research. 3 Hours.
Students will be trained in effective written communication skills by developing scientific journal articles in health services and outcomes research.

PHAR 768. HEOR/HSOR Internship. 1-6 Hours.
Strengthen practical knowledge and hands-on experience in the areas of Health Services and Outcomes Research/Health Economics and Outcomes Research by working with pharmaceutical companies, clinical research organizations, federal, state, and local governments, policy think tanks, or health care systems.

PHAR 769. Advanced Health Service Research Methods. 3 Hours.
Provides a working knowledge of health services research methods and how to apply these methods to answer typical research questions in health services research. The course will examine concepts but will have an applied focus with hands-on research using publicly available datasets or those that students have access for their dissertations/manuscripts.

PHAR 770. Community Rotation. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in the delivery of pharmaceutical care in a community pharmacy setting.

PHAR 771. Introduction to Specialty Pharmacy. 2 Hours.
PR: Second professional year standing or consent. A focus on specialty pharmacy. Exploration of the day to day operation of specialty pharmacy, including business components, dispensing, and disease state management with a focus on appropriate patient care for specialty disease states.

PHAR 772. APPE 8. 5 Hours.
PR: Fourth year professional standing or consent. Advanced Pharmacy Practice Experiences (APPEs) are clinical rotations that collectively provide experience in delivering comprehensive patient care across various healthcare settings and provides exposure to different sectors of pharmacy practice.

PHAR 773. Recent Research Advancement in Cardiology Journal Club. 1 Hour.
To impart a fundamental understanding of the recent research advancements in cardiology. The course provides a basis for understanding recent advances in basic, clinical and translational cardiology (cardiovascular research).

PHAR 774. Managed Care Principles and Policies. 1 Hour.
PR: Second professional year standing or consent. Introduces students to managed care pharmacy practice. Students will cover topics in formulary management, drug utilization review, medication therapy management, specialty pharmacy, pharmacoeconomics, outcomes research, pharmaceutical contracting, pharmacy benefit design, and current issues in managed care.

PHAR 775. Substances of Abuse. 2 Hours.
Focuses on substances of abuse including both legal prescription, over-the- counter, supplement, and general substances in addition to substance abuse, substance use disorder (addiction), and drug diversion.

PHAR 776. Preparing Residency Applicants. 2 Hours.
Increase knowledge and skills needed to pursue postgraduate residency training in pharmacy, and implement measures to increase pharmacy residency competitiveness.

PHAR 777. Health Outcomes Research Designs. 2 Hours.
Focuses on the skills required to design, conduct, and analyze research topics in health outcomes research. Includes a study of statistics, analysis of research design and methodology, use of library resources, and evaluation of current literature.

PHAR 778. Travel Medicine and Global Pharmacy Practice. 2 Hours.
Identifies and explores major issues in global health with a specific focus on global pharmacy practice and medication therapy. Students will also learn fundamentals in travel medicine so they can assist international travelers in preventing and treating travel-related maladies.

PHAR 779. Drug Discovery. 3 Hours.
PR: Graduate Standing or permission of instructor. Instruction in the process of drug discovery to the development of new forms for therapeutic use. Topics covered included drug design/discovery, target identification and development, lead optimization, and pre-clinical and clinical development.

PHAR 780. Introduction to Molecular Modeling. 4 Hours.
PR: Graduate standing or permission of instructor. Introduction to molecular modeling describes computational methods for chemical and biological problems and is designed to enable the student to use molecular modeling methods as a research tool in their current or future research activities.

PHAR 781. Drug Metabolism. 3 Hours.
PR: Graduate standing or permission of instructor. This course presents a comprehensive review of the field of drug metabolism with an emphasis on the chemistry and enzymology of drug biotransformation, and current methods in drug metabolism research.

PHAR 782. Tumors of the Central Nervous System Journal Club. 1 Hour.
(May be repeated for a maximum of 15 credit hours.) Fundamental and advanced topics focused on drug distribution into normal brain, brain pathology and brain cancers. Other areas of focus include, advanced drug delivery methods, pharmacokinetics, experimental design and statistical analysis. Students will present and critically analyze scientific literature and develop presentation skills.

PHAR 783. Pharmacy Cell Biology Seminar. 1 Hour.
A literature review course in which each student will present and critically analyze primary literature in cell and molecular biology as pertinent to pharmaceutical and biomedical sciences.

PHAR 784. Pharmacology Journal Club. 1 Hour.
A primary literature based course that critically evaluates the latest findings and methods used in pharmacological research.

PHAR 785. Pharmacoepidemiology. 3 Hours.
This course covers basic principles and research study designs used in pharmacoepidemiology, as well as a review of the primary literature that details case examples of drugs withdrawn from the US drug market.

PHAR 786. Health Services Research and Secondary Database. 3 Hours.
PR: PHAR 785. This course presents various topics related to large databases including common study designs, advantages and limitations, and basic steps to extracting and analyzing large databases.

PHAR 787. Drug Discovery and Development. 1 Hour.
This seminar will teach students in the Pharmaceutical Sciences and related disciplines the current state-of-the- art of drug discovery, design, and development, develop student presentation skills, and convey the importance of staying current with key developments.

PHAR 788. Graduate Seminar in Health Outcomes Research. 1 Hour.
(May be repeated for credit toward graduation.) Forum for graduate students to present research, discuss research issues and contemporary topics of interest, develop an understanding of research methods through discussion, while focusing on scientific presentation skills. Topics vary from semester to semester.

PHAR 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of pharmacy. 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.).

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

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

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

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

PHAR 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.

PHAR 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.).

PHAR 800. Introduction to Pharmacy. 4 Hours.
PR: First professional year standing or consent. Introduces students to the profession and practice of pharmacy. Students will gain an understanding of the history of pharmacy, the role of pharmacists in the US healthcare system, and the foundations of pharmacy law. Students develop hands-on skills in patient communication and drug information retrieval.

PHAR 801. Drug Delivery. 5 Hours.
An introduction to the concepts and techniques involved in the design and evaluation of pharmaceutical dosage forms, principles of physical pharmacy and drug delivery, and their applications in patient care.

PHAR 802. Preparation of Pharmaceutical Products. 1 Hour.
Preparation of sterile and non-sterile dosage forms. Students will apply the principles of pharmaceutics to the preparation of pharmaceutical products.

PHAR 803. Physical Pharmacy. 2 Hours.
Provides an overview of the principles of physical pharmacy and their application in drug formulation and administration. Topics include: drug dissolution, acid-base chemistry, drug solubility, diffusion, distribution, and drug stability.

PHAR 804. Drug Delivery Systems. 3 Hours.
Introduces the students to the principles and technologies involved in the preparation and evaluation of pharmaceutical dosage forms and drug delivery systems. Students will develop skills in dosage form design and evaluation, as well as their applications in patient care. The course integrates and applies basic physicochemical and biological principles to solve problems in drug delivery in pharmacy practice.

PHAR 805. Drug Chemistry. 2 Hours.
Introduces principles of chemical stability and chemical properties as they relate to drugs and to the basic metabolic processes observed for drug molecules. Topics include functional group analysis, solubility, oil/water partitioning, organic acids/bases, drug decomposition, basic metabolic processes including oxidation, reduction, hydrolysis, and conjugation.

PHAR 806. Pharmaceutical Biotechnology. 1 Hour.
Basic principles of biotechnology with an emphasis on pharmaceutical applications is addressed. Knowledge from cell and molecular biology will be applied to solve biomedical problems and to make useful products for diagnostic and therapeutic purposes. Key processes used in the making, analysis, and application of biopharmaceuticals, such as proteins and nucleic acids as well as their stability, delivery, and handling.

PHAR 807. Pharmacy Calculations. 1 Hour.
Gain experience in pharmaceutical calculations that reflect activities in a variety of practice settings.

PHAR 808. Pharmacogenomics. 2 Hours.
Introduces the fundamental principles of pharmacogenomics and individualized medicine. It provides a basis for understanding how an individual's genetic background affects their response to a specific drug or class of drugs. Pharmacogenomic principles include pharmacogenetic characteristics of drug metabolizing enzymes, drug transporter activity, and receptor sensitivity. Other basic concepts of genetic counseling, personalized medicine, ethics and costs will be discussed.

PHAR 809. Principles of Drug Action. 2 Hours.
Provides a basis for understanding the biochemical and molecular mechanisms by which drugs and the body interact. This course will use drug classes to introduce foundational concepts of drug action and the application of pharmacological tools to better understand how drugs work in the body.

PHAR 810. Community Pharmacy Practice. 2 Hours.
PR: First professional year standing or consent. Focuses on the various roles of a pharmacist including the prescription dispensing and medication management processes in the community pharmacy setting. Legal aspects of community pharmacy practice are also discussed.

PHAR 811. Foundational Pharmacy Skills. 1 Hour.
PR: First professional year standing or consent. Provide students with foundational skills necessary for the provision of patient care including physical assessment, point of care testing, and oral and written communication. Many skills learned during this course will be further strengthened throughout pharmacy school.

PHAR 812. Drug Chemistry. 2 Hours.
PR: First professional year standing or consent. Introduces principles of chemical stability and chemical properties as they relate to drugs and to the basic metabolic processes observed for drug molecules.

PHAR 813. Biopharmaceutics and Pharmacogenomics. 4 Hours.
PR: First professional year standing or consent. Develops an understanding of fundamental principles of biopharmaceutics and pharmacogenomics.

PHAR 814. Biochemical Pharmacology. 4 Hours.
PR: First professional year standing or consent. Provides a basis for understanding the biochemical and molecular mechanisms by which drugs and the body interact. This course will use drug classes to introduce foundational concepts of drug action and the application of pharmacological tools to better understand how drugs work in the body.

PHAR 815. Self-Care. 3 Hours.
PR: First professional year standing or consent. Provides an introduction to nonprescription medications and the application to patient care. Learners will assess the patient, make appropriate recommendations, and educate the patient on self-care treatment options for commonly encountered disease states and patient complaints.

PHAR 816. Pharmacokinetics. 2 Hours.
Introduces fundamental principles of the pharmacokinetic and biological processes that the drug undergoes once it enters the body. The students will be exposed to various pharmacokinetics techniques and problem-solving methods, which should prepare them to design and refine drug therapeutic regimens.

PHAR 817. Principles of Immunology and Microbiology. 2 Hours.
PR: First professional year standing or consent. Introduces scientific principles of immunology as well as introduces students to the pharmacist's role as vaccination advocate, and provides the knowledge and skills required to safely administer vaccines. Lastly, it provides an introduction to microbiology and mechanisms of action of antibiotics.

PHAR 818. Intro Community Rotation. 4 Hours.
PR: PHAR 800 and PR or CONC: PHAR 810. Introductory pharmacy practice experience in a community pharmacy setting.

PHAR 820. Population Health and Policy. 3 Hours.
PR: Second professional year standing or consent. Introduces the role of the pharmacist in population-based care and promoting preventative health services. Includes epidemiology and public policy in the healthcare system, and integrates content with interprofessional service outreach projects.

PHAR 821. Pain. 1 Hour.
PR: Second professional year standing or consent. A course in the systems-based therapy series with a focus on pain management and treatment of associated disorders, including addiction therapy. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with pain-associated disorders.

PHAR 823. Pulmonology. 2 Hours.
PR: Second professional year standing or consent. First course in the systems-based therapy series with a focus on pulmonology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with pulmonary diseases.

PHAR 824. Cardiology. 5 Hours.
PR: Second professional year standing or consent. Second course in the systems-based therapy series with a focus on cardiology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with cardiovascular diseases.

PHAR 825. Nephrology. 2 Hours.
PR: Second professional year standing or consent. Third course in the systems-based therapy series with a focus on nephrology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with kidney diseases.

PHAR 826. Evidence-Based Practice. 3 Hours.
PR: Second professional year standing or consent. The components of evidence-based practice are reviewed. Emphasis is placed on the appropriate use of information resources in practice and the critical analysis and evaluation of primary literature and other types of information.

PHAR 830. Health Systems Pharmacy Practice. 2 Hours.
PR: Second professional year standing or consent. Introduces and reinforces the distributive, clinical, and administrative roles of pharmacists with a focus on health-systems pharmacy practice and management.

PHAR 833. Endocrinology. 3 Hours.
Fourth course in the systems-based therapy series with a focus on endocrinology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with endocrine diseases.

PHAR 835. Autoimmune Diseases. 2 Hours.
A course in the systems-based therapy series with a focus on management of autoimmune diseases. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with these diseases.

PHAR 836. Research in Pharmacy. 1 Hour.
PR: Second professional year standing or consent. An overview of the process of conducting pharmacy-related research focusing on concepts, principles and methodology involved with the research process. Students gain experience in design, conduct and dissemination of pharmacy-based research. Student learning is facilitated by didactic lectures, active learning and independent small group sessions.

PHAR 837. Quality and Outcomes in Pharmacy Practice. 2 Hours.
PR: Second professional year standing or consent. Emphasizes the implementation of quality improvement in pharmacy practice, monitoring outcomes of drug therapy to ensure optimal patient care, and implementation of systems to prevent and minimize patient risk. Application of pharmacoeconomic principles to daily pharmacy practice are discussed.

PHAR 838. Intro Institutional Rotation. 2 Hours.
PR or CONC: PHAR 830. Gain experience in an institutional pharmacy setting.

PHAR 840. Pharmacy Practice Management. 3 Hours.
PR: Third professional year standing or consent. Focuses on pharmacy management related to financial and operational management of pharmacies, marketing of pharmacy services, and human resources management.

PHAR 843. Gastroenterology and Nutrition. 2 Hours.
PR: Third professional year standing or consent. A course in the systems-based therapy series with a focus on gastroenterology and nutrition. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with gastrointestinal diseases and nutrition support.

PHAR 844. Infectious Diseases. 3 Hours.
Eighth course in the systems-based therapy series with a focus on infectious diseases. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with infectious diseases.

PHAR 845. Neurology and Psychiatry. 4 Hours.
Ninth course in the systems-based therapy sequence with a focus on neurology and psychiatry. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with neurologic and psychiatric diseases.

PHAR 848. Acute Care Practice Experience. 2 Hours.
Gain knowledge as well as hands-on experience in the acute care setting. Students will learn the key components of acute care practice, perform activities that would be expected to be completed in acute care experiential rotations (such as medication reconciliation and formulary monographs), and simulate rounding experiences in an interprofessional environment. Interprofessional education is a component of this course.

PHAR 849. Ambulatory Care Practice Experience. 2 Hours.
Gain knowledge as well as hands-on experience in the ambulatory care setting. Activities will include ambulatory patient assessment, medication regimen evaluation, patient presentations, direct patient education, and targeted group education. Interprofessional education is a component of this course.

PHAR 853. Hematology/Oncology. 3 Hours.
PR: Third professional year standing or consent. A course in the systems-based therapy series with a focus on hematology-oncology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with hematological diseases and cancer.

PHAR 854. Special Populations. 3 Hours.
The final course in the systems-based therapy series that addresses special populations such as geriatrics, pediatrics and women's health (pregnancy, lactation, menopause) as well as disease processes that involve multiple body systems. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems.

PHAR 857. Pharmacy Ethics. 1 Hour.
The ethical basis of pharmacy practice. Students learn and apply the Code of Ethics for Pharmacists and core bioethical principles to ethics related situations that can arise during pharmacy practice.

PHAR 858. Comprehensive Assessment of Practice. 3 Hours.
Assess students' readiness for successful completion of the upcoming advanced pharmacy practice experiences curriculum. Provides focused reinforcement of essential material relative to ensuring a student is practice ready, as well as reviewing difficult material from throughout the curriculum. Students complete a final objective structured clinical examination, which requires the demonstration of specific skills, including communication.

PHAR 859. Pharmacy Law. 2 Hours.
PR: Third professional year standing or consent. The legal basis of pharmacy practice. Students learn about federal and state statutes, rules, and regulations that affect pharmacy practice.

PHAR 860. Current Topics in Pharmacy. 1 Hour.
PR: Fourth professional year standing or consent. Discussion of current topics in pharmacy practice. Core components of giving a seminar and journal club will be practiced.

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.

PHSC 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of physical science. 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.).

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

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

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

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

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

PHSC 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.

PHSC 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.).

PHSC 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.

PHSC 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.

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

PHYS 611. Introduction to Mathematical Physics. 3 Hours.
PR: Calculus, differential equations, PHYS 111 and PHYS 112 or equivalent. Complex variables: series, contour integration and conformal mapping; ordinary differential equations; Fourier series, Laplace transforms; Fourier transforms; special functions; Bessel functions and Legendre, Hermite differential equations; Poisson's equation, wave equation, and Laguerre polynomials; introduction to partial differential equations.

PHYS 631. Advanced Classical Mechanics 1. 3 Hours.
PR:PHYS 331 and PHYS 332 and differential equations. Lagrange and Hamilton form of equations of motion, rigid bodies, small and nonlinear oscillations. Transformation theory, relativistic dynamics, and systems with an infinite number of degrees of freedom.

PHYS 633. Electromagnetism 1. 3 Hours.
PR:PHYS 333 and PHYS 334 and differential equations. Boundary value problems in electrostatics and magnetostatics. Greens functions. Multipole expansions. Dispersion and absorption of electromagnetic waves propagating in matter.

PHYS 634. Electromagnetism 2. 3 Hours.
PR:PHYS 333 and PHYS 334 and differential equations. Propagation of guided waves. Radiation from antennas, small sources, and relativistic particles. Fraunhoffer and Fresnel diffraction. Special relativity and the covariant formulation of electromagnetism.

PHYS 651. Quantum Mechanics 1. 3 Hours.
PR:PHYS 451. The Schroedinger equations. One-dimensional problems. Operators and Hilbert space. Three-dimensional problems. Orbital and spin angular momentum. One-electron atoms.

PHYS 652. Quantum Mechanics 2. 3 Hours.
PR: PHYS 651. Time-independent perturbation theory. Angular momentum coupling and Clebsch-Gordan coefficients. Time-dependent perturbation theory. Emission and absorption of radiation by atoms. Scattering theory.

PHYS 671. Introduction to Solid State Physics. 3 Hours.
PR or CONC: PHYS 651. Emergence of solid crystalline structure; emergent quasiparticles and band structures; interaction of solids with electromagnetic fields; phases, such as metals, semiconductors, magnets and superconductors; applications.

PHYS 681. Principles of Plasma Physics. 3 Hours.
Plasmas occur naturally in electrical discharges and in space and are produced artificially in laboratory devices. This course is a survey of plasma phenomena using fluid and kinetic models.

PHYS 685. Solar and Space Physics. 3 Hours.
Heliophysics (solar and space physics) is the study of the sun and its magnetic environment (the heliosphere). Discussion of solar interior, solar corona, solar wind. Also includes bow shock, terrestrial magnetosphere and solar wind-magnetospheric coupling, radiation belts, aurora, ionosphere, observational and numerical techniques for space physics.

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

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

PHYS 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.).

PHYS 710. Nonlinear Dynamics. 3 Hours.
PR: PHYS 631. Flows, fixed-point analysis, and bifurcations in 1D, 2D, and 3D using analytical, numerical, and geometrical approaches. Limit cycles, chaos, fractals, strange attractors, iterated maps, and Hamiltonian systems.

PHYS 725. Advanced Atomic and Molecular Physics 1. 3 Hours.
PR:PHYS 651. Review of one-electron atoms leading to approximation schemes for many-electron atoms. Thomas-Fermi theory, Hartree-Fock theory, and central field approximation. LS, JJ, and intermediate coupling of angular momentum. Relativistic effects.

PHYS 761. Statistical Mechanics. 3 Hours.
PR:PHYS 461 and PHYS 651. Ensemble theory, applications to noninteracting systems, as well as perturbative and approximate treatment of interactions. Typical applications include equilibrium constants, polymers, white dwarfs, metals, superfluids, magnetic transitions.

PHYS 771. Advanced Solid State Physics. 3 Hours.
PR: PHYS 671. Universal paradigms revealed in solids state physics; hierarchy of effective theories to determine mechanical, electronic, magnetic and optical properties; non-interacting classical and quantum approaches; interacting quantum many-body approaches.

PHYS 772. Semiconductor Physics. 3 Hours.
PR:PHYS 771. Semiconductor band structure. Intrinsic and extrinsic semiconductors. Hall effect and magneto-transport effects. Fundamentals of nanostructures and quantum structures. Semiconductor device physics.

PHYS 773. Collective Phenomena in Solids. 3 Hours.
PR: PHYS 771. Paramagnetism. Magnetic phenomena in thin films and multilayers. Phase transitions: mean field theories and fluctuations. Superconductivity and BCS theory.

PHYS 774. Optical Properties of Solids. 3 Hours.
PR: PHYS 771. Absorption and dispersion in light propagation. Quantum wells and quantum dots. Solid state laser materials. Nonlinear optics and parametric amplification.

PHYS 782. Computer Simulation of Plasma. 3 Hours.
PR: (PHYS 481 or PHYS 781) and PHYS 633; programming proficiency in C, FORTRAN, or BASIC. Projects teach mathematical and physical foundations of computer simulation algorithms and develop and refine physical understanding and intuition of phenomena encountered in plasma research.

PHYS 783. Advanced Kinetic Theory of Plasmas. 3 Hours.
PR:PHYS 481 and PHYS 631 and PHYS 634. The Vlasov equation, quasilinear theory, nonlinear phenomena. Plasma waves and instabilities. Landau damping and finite-Larmor-radius effects.

PHYS 784. Advanced Magnetohydrodynamic Theory of Plasmas. 3 Hours.
PR:PHYS 481 and PHYS 631 and PHYS 634. The fluid approximation. Magnetohydrodynamic description of plasma equilibrium and stability. Confinement schemes and plasma waves. Emphasis on analytic theory.

PHYS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of physics. 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.).

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

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

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

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

PHYS 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.

PHYS 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.).

PHYS 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.

PHYS 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.

PLSC 547. Applied Wetlands Ecology and Management. 3 Hours.
The management and ecology of wetland vegetation, soils, hydrology, and wildlife. (Cross listed as WMAN 547 and CE 547.).

PLSC 550. Grants and Grantsmanship. 2 Hours.
A course covering all steps of grant preparation, application, submission and review process.

PLSC 553. Organic Crop Production. 3 Hours.
PR: PLSC 206 and AGRN 202 and AGRN 203 or consent. Principles, practices, history, philosophy and economics of organic farming and gardening. Crop/livestock systems, national and international research on organic production. (Students may not receive credit for both PLSC 453 and PLSC 553).

PLSC 560. Plant Biochemistry. 3 Hours.
PR: (CHEM 231 or (CHEM 233 and CHEM 234)) and BIOL 219 or consent. Study of the biochemical processes and biosynthetic pathways leading to the formation of desirable plant products such as those used in food, feed, fiber, fuel and medicinal applications. (Credit cannot be received for both PLSC 460 and PLSC 560).

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

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

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

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

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

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

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

PLSC 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of plant science. 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.).

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

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

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

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

PLSC 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.

PLSC 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.).

PNGE 501. Petroleum Engineering Problems. 3 Hours.
PR: Senior standing. Investigation of a special problem in petroleum engineering.

PNGE 532. Introduction to Reservoir Simulation. 3 Hours.
PR or CONC: PNGE 434 or Consent. Partial differential equations for fluid flow in porous media and the use of finite difference equations in solving reservoir flow problems for various boundary conditions. Study of individual well pressures and fundamentals of history matching.

PNGE 533. Secondary Recovery of Oil by Water Flooding. 3 Hours.
PR: PNGE 333. Theory of immiscible fluid displacement mechanism, evaluation and economics of water flood projects, and oil field flooding techniques.

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

PNGE 593. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

PNGE 601. Fluid Flow in Porous Media. 3 Hours.
PR: MATH 261 and PNGE 434 or consent. Theoretical and practical aspects of the physical principles of hydrodynamics in porous media.

PNGE 632. Reservoir Simulation and Modeling. 3 Hours.
PR: PNGE 532 or consent. Application of finite-difference equations to multi-phase fluid flow in porous media in two or three dimensions with gravity and capillary pressure effects. Simulation of waterflood performance and enhanced recovery techniques.

PNGE 633. Advanced Secondary Recovery. 3 Hours.
PR: PNGE 533. Secondary recovery of oil by gas flooding, miscible fluid injection, in-situ combustion, and heat injection.

PNGE 634. Pressure Transient Analysis. 3 Hours.
PR: PNGE 434 or consent. Methods of analysis of pressure transient data obtained from well testing for the purpose of determining in-situ reservoir conditions including porosity, lateral extent, average reservoir pressure, and formation permeability.

PNGE 647. Carbon Capture Utilization and Storage. 3 Hours.
This course studies the environmental and economical impact of carbon capture utilization and storage (CCUS) technologies, introduces different carbon capturing utilization and storage technologies, and shows how this technology can provide a long-term solution for excess carbon dioxide. This course evaluates different carbon storage sites and teaches the concept of CO2 sequestration modeling.

PNGE 661. Petroleum Data Analytics Modeling. 3 Hours.
This course concentrates on solving petroleum engineering related problems using Artificial Intelligence and Machine Learning. It provides the ability to import, manage, perform quality control, and generate visualization of the petroleum engineering related data. The students gain the ability to use multiple existing Python libraries for engineering application of Artificial Intelligence and Machine Learning to solve Petroleum engineering related problems.

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

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

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

PNGE 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.).

PNGE 701. Environmental Issues in Petroleum Engineering. 3 Hours.
PR: Graduate standing. Environmental impacts of petroleum exploration and production, methods to minimize or eliminate potential environmental impacts, treatment and disposal of the drilling and production wastes, and remediation methods for petroleum contaminated sites.

PNGE 710. Advanced Drilling Engineering. 3 Hours.
PR: PNGE 310. Drilling optimization, methods for estimating formation pore and fracture pressures, air drilling, application of directional drilling and deviation control, horizontal drilling, and coiled tubing applications.

PNGE 711. Advanced Productions Engineering. 3 Hours.
PR: PNGE 420. Advanced well completion methods, problem well analysis, well remediation and workover planning, multi-phase flow in pipes, system approach for oil and gas wells, application of NODAL analysis, and surface and subsurface production equipment.

PNGE 734. Advanced Reservoir Engineering. 3 Hours.
PR:PNGE 434. Modeling and simulation of heterogeneous reservoirs, predicting the performance of the heterogeneous reservoirs during primary, secondary, and enhanced recovery production.

PNGE 735. Advanced Formation Evaluation. 3 Hours.
PR: PNGE 450. Advanced methods for interpreting well logs, shaly sand analysis, and production logging methods.

PNGE 770. Advanced Natural Gas Engineering. 3 Hours.
PR: PNGE 470 and PNGE 470L. Application of reservoir modeling, history matching, and type curves techniques to analyze and predict the performance of conventional and unconventional gas reservoirs.

PNGE 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of petroleum and natural gas engineering. 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.).

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

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

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

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

PNGE 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.

PNGE 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.).

POLS 500. Introduction to Political Research. 3 Hours.
Introduction to the research methods and techniques used in political and policy analysis. Topics include logic of inquiry, research design, measurement, and survey and unobtrusive research.

POLS 501. Quantitative Political Analysis. 3 Hours.
Application of a range of statistical techniques in political and public policy research. Includes use of selected computer software commonly used in political science and policy analysis.

POLS 502. Advanced Quantitative Methods. 3 Hours.
PR: POLS 501. Methods surveyed include multiple linear regression, time-series analysis, causal modeling, and linear programming.

POLS 522. Racial & Ethnic Politics. 3 Hours.
This course examines contemporary research on the influence of race and ethnicity on U.S. politics. The focus is on African American politics, and, to a lesser extent, Latino or Hispanic politics; the politics of other racial and ethnic groups are also discussed.

POLS 530. Policy Analysis. 3 Hours.
Overview of the field of political science and the sub-field of public policy studies. Focuses on the issues and problems involved in studying policymaking, and an assessment of policy analysis as a mode of thinking and inquiry. (3 hr. seminar.).

POLS 536. Politics of Agenda Setting. 3 Hours.
Examines the social, economic, institutional and political influences on the development of public problems and their placement on the policy agenda. (3 hr. seminar.).

POLS 550. Comparative Politics. 3 Hours.
Survey of the subfield of Comparative Politics within Political Science. Course includes an introduction to the major methods and theoretical perspectives employed in the field including an overview of rational, structural and cultural perspectives.

POLS 551. Comparative Political Institutions. 3 Hours.
This course covers core debates in the study of comparative political institutions. Students discuss constitutional engineering, parliamentary versus presidential systems, electoral rules, party systems, representation, legislative rules of procedure, federalism, veto points, and other topics.

POLS 555. Comparative Public Policy. 3 Hours.
Comparison of public policy stages in several advanced industrial democracies with emphasis on various explanations of public policy in these countries in different policy areas. (3 hr. seminar.).

POLS 559. Contentious Politics. 3 Hours.
This is a course sub- field of political science, encompassing International Relations, Comparative and American Politics. This course presents a survey of the main concepts, theoretical debates, and methodological approaches in the field.

POLS 560. International Theory and Policy. 3 Hours.
Survey of theoretical approaches in the study of international relations, covering major works in the realist, neo-liberal, and foreign policy literature. Emphasis on the place of foreign policy explanations within the wider, systemic international relations literature. (3 hr. seminar.).

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

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

POLS 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 choice.

POLS 603. Advanced Quantitative Analysis. 3 Hours.
POLS 603. Advanced Quantitative Analysis. 3 hr. A survey of advanced statistical applications in political science, covering time series analysis, maximum likelihood estimation, and structural equation modeling.

POLS 630. Seminar: American Politics and Policy. 3 Hours.
A survey of classic and contemporary literature on U.S. politics and policy. Emphasis on how various institutions and linkage mechanisms affect the policy process. (3 hr. seminar.).

POLS 638. Seminar: Policy Implementation. 3 Hours.
Research seminar focusing on how the intentions of policy- makers are transformed into programs and policies which have both intended and unintended consequences. Topics include traditional implementation studies, rational choice approaches, neo-institutionalism, and principal-agent theory. (3 hr. seminar.).

POLS 660. International Political Economy. 3 Hours.
Advanced theoretical courses in IPE. Topics include capital financial and trade liberalization, economic development, regionalism, and the intricacies between domestic governments and international economic relations.

POLS 665. Comparative Foreign Policy. 3 Hours.
Application of the comparative method of theoretically assessing the mainly domestic sources of conflict and change in foreign policy beyond the U.S. case and in cross- national and historical perspective.

POLS 666. National Security Policy. 3 Hours.
Overview of security policy issues as both foreign and domestic policy. Traces the development of defense and security, arms transfers, spending tradeoffs, deterrence, game theoretic decision models, intelligence analysis, and terrorism.

POLS 667. Foreign Policy Decision Making. 3 Hours.
This course examines the roots of foreign policy decision making. It examines how ideational, cultural, institutional and political variables constrain decision makers, and how the core psychological characteristics of decision makers shape their behavior.

POLS 670. Professional Seminar in Political Theory. 3 Hours.

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

POLS 703. Internship. 6-9 Hours.
per semester; students may enroll more than once. PR: Consent.

POLS 710. Judicial Politics, Policy and Law. 3 Hours.
Judicial influence on American public policy with emphasis on the political theory of American law, the agenda of disputes, the formulation of public policy by courts, and the effects of judicial policy on politics. (3 hr. seminar.).

POLS 712. American Construction and Political Development. 3 Hours.
The development of American political institutions, with emphasis on theoretical underpinnings of American politics and the role of courts and the Constitution in defining the scope of political change in America.

POLS 715. The American Presidency. 3 Hours.
This course examines how the president interfaces with other power centers in the political system, and assesses the extent to which this institution is capable of meeting what we have come to expect of it.

POLS 728. Congress. 3 Hours.
Students engage research literature on the U.S. Congress, examining theories of member behavior, the role of political parties, the endogenous creation and reform of congressional institutions, and other areas of research on Congress.

POLS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of political science 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.).

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

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

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

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

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

POLS 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.

POLS 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.).

PPTH 501. Diseases of Economic Plants. 3 Hours.
; 2 Hr. in summer. PR: PPT 401 or 503 or consent. Recognition, cause, and control of diseases of economic plants. (Sem. 1--Diseases of vegetable crops and of tree and small fruits; Sem. 2--Diseases of ornamental plants and field and forage crops; S--Diseases of forest trees. Students may register for 1-3 Hrs. in fall and spring and 2 Hr. in summer until 8 hours of credit are accumulated).

PPTH 503. Mycology. 4 Hours.
PR: Corequisite of PPTH 503L. Lectures and field and laboratory studies of parasitic and saprophytic fungi.

PPTH 503L. Mycology Laboratory. 0 Hours.
PR: Corequisite of PPTH 503. Mycology - PPTH 503 Laboratory.

PPTH 509. Nematology. 3 Hours.
PR: Corequisite of PPTH 509L. (Primarily for graduate students majoring in the agricultural sciences or biology.) Nematode taxonomy, binomics, and control, with particular emphasis on plant parasitic forms.

PPTH 509L. Nematology Laboratory. 0 Hours.
Coreq: PPTH 509. Nematology - PPTH 509 Laboratory.

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

PPTH 593. Special Topics. 1-6 Hours.

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

PPTH 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.).

PPTH 730. Physiology of the Fungi. 4 Hours.
PR: Organic chemistry, mycology, and bacteriology, or Concent. Physiological aspects of growth, reproduction, and parasitism of fungi, with emphasis on nutrition, environmental, and other biotic factors.

PPTH 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in the college teaching of plant pathology. 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.).

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

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

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

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

PPTH 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.

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

PR 512. Fund Raising and Foundation Management. 3 Hours.
PR: Journalism graduate student or senior standing. Seminar. Studies in fund raising, alumni relations, and foundation management.

PR 522. Public Relations Case Studies. 3 Hours.
Graduate seminar based on in-depth studies of public relations programs developed and applied in support of our institutions. Primary emphasis on successful campaigns, but unsuccessful efforts also will be examined for causes of failure.

PR 524S. Crisis Communication. 3 Hours.
Crises can violate organization-public relationships, tarnish brands' reputations, and cause widespread human and material damages that are difficult for organizations, individuals, and communities to overcome. Ethical, evidence-based crisis communication play key roles. This course exposes students to the science and art of strategic crisis, emergency, and risk communication in a variety of contexts.

PR 526S. Advocacy Communication. 3 Hours.
The purpose of this course is to explore the literature and theories associated with advocacy communication, and to develop theoretical and practical implications by designing a study. In this course we will cover myriad advocacy communication topics including ethics, social movements, activism, digital advocacy, historical and international perspectives and policy advocacy.

PR 528S. Public Interest Communication. 3 Hours.
Public interest communication merges theory and practice to apply the art and science of strategic communication seeking widespread, sustained prosocial behavior change. Students explore science-grounded approaches toward communication in a variety of areas meaningful to society, such as public health, education, and various social movements. This course challenges and empowers students to use communication and media as responsible change agents.

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

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

PR 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.).

PR 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 students reports (698), or dissertations (798). Grading is normal.

PR 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.

PROS 675. Introduction to Advanced Prosthodontics. 2 Hours.
This course is a composite of several phases of instruction designed to quickly raise the level of knowledge of the First Year Resident in laboratory techniques and clinical instrumentation.

PROS 676. Introduction to Advanced Complete Dentures Prosthodontics. 2 Hours.
PR: PROS 675. The Advanced Complete Denture course covers all phases of complete denture treatment and is designed to accelerate first year Prosthodontic Residents beyond the basic knowledge expected of the general dentist. Laboratory exercises and demonstrations are scheduled throughout the course to practice the various techniques discussed.

PROS 677. Introduction to Removable Prosthodontics. 1 Hour.
PR: PROS 676. This course will provide the resident with the foundational principles of RPD treatment planning, framework design, preprosthetic surgery, material selection, and adjunctive procedures (i.e., Survey Crowns, Implant Retention).

PROS 678. Introduction to Fixed Prosthodontic Theory. 2 Hours.
PR: PROS 676. This course will provided the resident with the foundational principles of fixed restoration treatment planning, smile design and esthetics, crown preparation, material selection, and cementation selection and procedures.

PROS 680. Prosthodontic Classic Literature Review. 1 Hour.
Provides seminar discussions on the topics of: basic prosthodontic techniques, advanced prosthodontic techniques, prosthodontic literature review, case presentation, advanced prosthodontic theory, topical analysis: fixed, removable, implant, maxillofacial, temporomandibular disorders, dental materials, digital dentistry and legal aspects of clinical practice.

PROS 681. Prosthodontic Current Literature Review. 1 Hour.
Provides seminar discussions on the topics of: Current Prosthodontics techniques, current prosthodontics literature review, and legal aspects of clinical practice.

PROS 688. Advanced Clinical Prosthodontics. 1-6 Hours.
Advanced prosthodontics practice in the areas of fixed and removable partial dentures, complete dentures, temporomandibular dysfunction, maxillofacial prosthetics and implant prosthodontics.

PROS 689. Advanced Prosthodontics Seminar. 1 Hour.
Seminar discussions in the topics of: Ethics, Behavioral Sciences, Dental Disease Affecting Prosthodontic Treatment, Practice Management, and other topics of prosthodontic disciplines. Format will be a combination of lecture, literature review, and case presentation.

PROS 693. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

PSIO 516. Medical Physiology for PA. 4 Hours.
This course examines the functions of the human body required for the study of clinical medicine. Topics include the physiology of nervous, muscle, cardiovascular, renal, pulmonary, gastrointestinal, and endocrine systems.

PSIO 541. Integrative Physiology. 4 Hours.
PR: First professional year standing in the School of Pharmacy. A systematic examination of the homeostatic functions of the human body with emphasis on the physicochemical mechanisms involved. Pathophysiology and clinical correlations related to pharmacy are introduced in relation to normal physiology.

PSIO 580. Systems Physiology. 4 Hours.
PR: PSIO 241 or PSIO 441 with a minimum grade of C-. This course is designed to provide students with a systematic examination of homeostatic functions with emphasis on integrative, systems physiology. The course focuses on how complex relationships between organ systems allows the body to adapt to stressors to maintain homeostasis. Students will apply problem solving and critical thinking in evaluating physiological changes to stressors such as disease, injury and aging.

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

PSIO 742. Physiological Methods 2. 1-4 Hours.
PR: Consent. Research techniques and strategies for physiology.

PSIO 743. Fundamentals of Physiology. 5 Hours.
PR: College physics, algebra, chemistry, and consent. (For dental students and a limited number of full-time graduate students.) Analysis of basic facts and concepts relating to cellular processes, organ systems, and their control.

PSIO 744. Graduate Seminar. 1 Hour.
PR: Graduate standing and consent. (Grading may be S/U.).

PSIO 745. Physiology Journal Club. 1 Hour.
This course provides graduate students in Physiology and Pharmacology with experience in presenting and evaluating current or historic research articles. A major focus will be to develop critical thinking, presentation skills, active reflection, and personal confidence as well as experience as a scientific colleague. The course will also emphasize connections between the history of physiology and current research directions.

PSIO 750. Graduate Physiology and Pharmacology 1. 3 Hours.
This is a flipped classroom format course that integrates the basic knowledge (molecular, sub-cellular, cellular, and tissue components) of cardiovascular, respiratory and kidney system function. It also includes the application of basic pharmacology to the fundamental understanding of human health and disease as it relates to these systems.

PSIO 751. Graduate Physiology and Pharmacology 2. 3 Hours.
This course is designed to integrate basic knowledge (molecular, sub-cellular and tissue components) of gastrointestinal, endocrine and neural system function. It also includes the application of basic pharmacology to the fundamental understanding of human health and disease as it relates to these systems. This is a flipped classroom format course.

PSIO 760. Human Physiology. 6 Hours.
A blended online medical physiology course with weekly face-to-face class meetings for first-year medical students who took a leave of absence and will repeat their first year.

PSIO 775. History of Physiology. 1 Hour.
This course will examine historical and seminal papers that have shaped the course of physiology research and that provide the foundation for our current understanding of various physiological systems.

PSIO 777. Systems Toxicology: Paracelsus Society. 1 Hour.
PR: Currently enrolled in a PhD program and in good standing. This course is a monthly meeting to discuss current concepts in toxicology. Examples include, journal club presentations, current events and technological research tools.

PSIO 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of physiology. 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.).

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

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

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

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

PSIO 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.

PSIO 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.).

PSIO 801. Summer Medical Physiology. 7 Hours.
An online course designed for medical students who need to remediate the physiology portion of WVU SOM: CCMD 730 (or equivalent), prior to entering their second year. Course will be taught on a Pass/Fail basis.

PSIO 820. Principles of Medical Physiology. 5 Hours.
PR: Medical students must satisfactorily pass all first-year MD Degree courses to enroll in this course. Principles of Medical Physiology examines the functions of the human body required for the study of clinical medicine with an emphasis of the connections of physiology to pathology and pharmacology. Topics include the physiology of muscle, cardiovascular, renal, pulmonary, gastrointestinal and endocrine systems. The course also includes integration of physiological principles to special situations (pregnancy, aging, exercise, stress).

PSYC 511. Research Design and Data Analysis 1. 3 Hours.
Principles of experimental research and data analysis, with the goal of building both applied skills (e.g., data analysis and interpretation; excel and SPSS) and conceptual knowledge (e.g., probability, normal distributions, null hypothesis testing, analysis of variance).

PSYC 512. Research Design and Data Analysis 2. 3 Hours.
PR: PSYC 511. Inferential statistics and quasi-experimental design strategies, including correlation and regression, and identification of moderation and indirect effects.

PSYC 531. Experimental Analysis of Behavior. 3 Hours.
Research and theory in the psychology of learning. Assessment of traditional and behavior-analytic approaches to the study of positive reinforcement, aversive control, and stimulus control. Includes laboratory work with animals.

PSYC 532. Human Behavior. 3 Hours.
PR: PSYC 531. Review of the role of basic human operant research in testing the generality of animal-based behavior principles, analyzing phenomena that are specific to humans, and extending behavior analysis to traditional psychological problems.

PSYC 533. Applied Behavior Analysis. 3 Hours.
PR: PSYC 531. Methodological, empirical, and conceptual issues in the application of basic research in behavior analysis to problems of social significance.

PSYC 541. Infant Development. 3 Hours.
Examination of psychological literature on prenatal and infant development. Topics include physical, cognitive, perceptual, language, and socioemotional development.

PSYC 542. Child Development. 3 Hours.
Examination of psychological literature on child development. Topics include perception, learning, language, problem solving, social cognition, peer and family relationships, gender, moral development, friendship, aggression, and altruism.

PSYC 543. Adolescent and Young Adult Development. 3 Hours.
Examination of the psychological literature in adolescence and young adulthood. Topics include learning, problem solving, social cognition, peer and family relationships, gender, moral development, friendship, aggression, and altruism.

PSYC 544. Adult Development and Aging. 3 Hours.
Examination of psychological literature on adulthood and aging. Topics include health, cognition, family relationships, personality, psychopathology, work, and retirement.

PSYC 545. Conceptual Issues in Developmental Psychology. 3 Hours.
History, philosophies, and theories of psychological development in the major age periods and the life span; conceptual issues such as nature-nurture, sex differences, cultural differences, life events, rigidity-plasticity, continuity-discontinuity, and competence-performance.

PSYC 546. Methodological Issues in Developmental Psychology. 3 Hours.
Methodological issues in psychological research on the major age periods and the life span. Topics include: validity; reliability; age, cohort, and time of measurement; cross-sectional, longitudinal, and mixed designs; data analytic methods; ethical issues.

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

PSYC 601. Professional Issues in Behavior Analysis. 1 Hour.
(May be repeated for credit.) Survey of professional issues in behavior analysis.

PSYC 602. Professional Issues in Developmental Psychology. 1 Hour.
(May be repeated for credit.) Survey of professional issues in developmental psychology. (Grading may be S/U.).

PSYC 603. Professional Issues in Clinical Psychology. 1 Hour.
(May be repeated for credit.) Survey of professional issues in clinical psychology. (Grading may be S/U.).

PSYC 606. Seminar on Teaching Psychology. 1 Hour.
(May be repeated for credit.) Review and discussion of methods and issues in college teaching of psychology.

PSYC 607. Ethical and Legal Issues in Psychology. 3 Hours.
Surveys the ethical guidelines and major legal issues confronted by psychologists.

PSYC 608. Professional Issues - Behavioral Neuroscience. 1 Hour.
Survey of professional issues in behavioral neuroscience.

PSYC 609. Ethics in Behavior Analysis. 3 Hours.
PSYC 609. Ethics in Behavior Analysis. 3-Hr. Surveys the ethical guidelines and standards for behavior analysts.

PSYC 611. Single-Subject Research Methods. 3 Hours.
PR:PSYC 511 and PSYC 531. Critical evaluation of single-subject designs in basic and applied research. Major topics include single- subject methodology's historical and conceptual bases, its relation to group-statistical methods, and its role in behavioral psychology.

PSYC 612. Multivariate Analysis. 3 Hours.
PR: PSYC 511. Data analysis techniques in psychology with application to typical research problems. Includes simple matrix algebra, discriminant analysis, multivariate analysis of variance, and an introduction to factor analysis.

PSYC 614. Program Evaluation and Intervention. 3 Hours.
Examines the nature, method, and process of evaluative research, especially as it applies to social and behavioral treatment and service delivery programs.

PSYC 615. Software Design in Psychology. 3 Hours.
PR: Consent. Practical introduction to software development for behavioral research applications including real-time experimental control and data collection, graphical user interfaces, and data analysis; general algorithmic methods; event-driven models. No programming background required.

PSYC 630. Behavior Analysis Practicum. 3 Hours.
PR: PSYC 533 and consent. Supervised applied behavior analysis experience integrated with a seminar emphasizing group solutions to problems that individuals encounter in students' applied projects. Progress and final project reports are presented and evaluated. (1 hr. sem., 2 hr. practicum.).

PSYC 650. Behavioral Neuroscience Methods. 3 Hours.
An overview of the most common research methods and techniques used in the behavioral neuroscience field.

PSYC 651. Behavior Pathology. 3 Hours.
Advanced study of diagnostic classification, functional analysis, and experimental research in psychopathology of child, adult, and geriatric adjustment problems.

PSYC 652. Clinical Interviewing. 3 Hours.
Clinical interviewing assessment, and interviewing skills acquisition.

PSYC 653. Behavioral and Psychological Assessment 1. 3 Hours.
Conceptual and methodological bases for behavioral assessment; comparison of trait-oriented versus behavioral assessment; design and evaluation of measurement systems, particularly self-report, ratings by others, and direct observation, within the basic framework of generalizability theory.

PSYC 654. Behavioral and Psychological Assessment 2. 4 Hours.
PR: PSYC 653. Evaluation of clinically relevant behavior and environments by means of testing and other methods. Includes test selection, administration, and report writing.

PSYC 655. Research Methods in Clinical Psychology. 3 Hours.
Fundamental knowledge of research methodology in the science of clinical psychology. Acquisition of skills in research design, evidence-based practice of psychology, scholarly review, and scientific writing.

PSYC 656. Grant Writing in Psychology. 3 Hours.
Essential writing skills for securing extramural funding for research programs in the behavioral sciences.

PSYC 660. Clinical Psychology Practicum. 1-15 Hours.
(May be repeated for credit.) PR: Consent. Supervised practice of psychological techniques in clinics or institutional settings; experience in psychological testing, interviewing, report writing, case presentation, interpretation of tests and supportive counseling.

PSYC 661. Behavior Therapy. 3 Hours.
Reviews the roots and development of behavioral interventions. Applied clinical intervention is stressed in concert with evaluation and research application.

PSYC 670. Clinical Child Psychology Practicum. 1-15 Hours.
(May be repeated for credit.) PR: Consent. Supervised field experience in various aspects of delivering psychological services directly or indirectly to children. Experience in assessment, treatment, program design, administration, and evaluation.

PSYC 671. Child Behavior Therapy. 3 Hours.
Assessment, intervention, and evaluation strategies appropriate for childhood disorders and based on behavior principles.

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

PSYC 694. Seminar. 6 Hours.
Special seminars arranged for advanced graduate students.

PSYC 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.

PSYC 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.

PSYC 701. Advanced Professional Issues in Psychology. 1 Hour.
(May be repeated for credit.) Discussion of professional issues in psychology relevant to advanced doctoral students. (Grading May be S/U.).

PSYC 711. Seminar in Methodology. 1 Hour.
(May be repeated for credit with consent.) Current problems and techniques in research design, data analysis, and research methods.

PSYC 712. Advanced Longitudinal Methods and Statistics. 3 Hours.
PR: PSYC 612. Analysis of longitudinal methods, with the goal of building both applied skills (e.g., data analysis and interpretation; Mplus) and conceptual knowledge (e.g., studying change/development, end-point versus mean-level change, person-centered).

PSYC 715. Archival Data Analysis. 3 Hours.
PR: PSYC 612. Using existing data sources to answer specific questions with a focus on finding high-quality-data, manipulation and management of data, and writing an empirical paper.

PSYC 721. History and Systems. 3 Hours.
Study of the history of psychology from its roots in physics, biology, and philosophy. The development of American psychology is emphasized.

PSYC 722. Biological Aspects of Behavior. 3 Hours.
PR: Consent. Overviews of the areas of psychological investigation that pertain to the relation between biology and psychology, including neuroscience, psychobiological theories of personality and development, neurological and neuropsychological assessment, psychophysiology, and biologically-based treatment strategies, including basic psychopharmacology.

PSYC 724. Advanced Neuroscience. 4 Hours.
PR: PSYC 722 with a minimum grade of B-. In-depth exploration of nervous system anatomy and physiological processes, including the biological mechanisms underlying emotion, motivation, memory, and disease.

PSYC 725. Social Psychology. 3 Hours.
Survey of current concepts, research, and findings in social psychology. Includes such topics as self and identity, attribution theory, interpersonal perception, social cognition, attitude change, social influence, interpersonal processes, prosocial behavior, aggression, and prejudice.

PSYC 726. Social Cognition. 3 Hours.
Advanced integrative course that uses both cognitive and social psychological theories and methodologies to understand human behavior. Reviews the major theories of social cognition and how these theories can be used to explain human behavior across many domains. Contemporary and classic research supportive of these theories is reviewed.

PSYC 728. Hormones and Behavior. 3 Hours.
PR: Graduate standing. Explores the complex interactions between the endocrine system, brain, and behavior in a broad range of animals, including people. Special emphasis is placed on reproductive hormones, as well as systems of homeostasis, aggression, and biological rhythms.

PSYC 729. Performance Management. 3 Hours.
PR: PSYC 533 with a minimum grade of B-. Best-practice techniques for performance management, including behavioral approaches to performance management in the context of clinical supervision, personnel management, and consultation.

PSYC 730. Advanced Behavior Analysis Practicum. 1-6 Hours.
PR: PSYC 533 or consent. Supervised applied behavior analysis experience in an approved setting.

PSYC 731. Research Issues in Behavior Analysis. 3 Hours.
(May be repeated for credit with consent.) PR: Consent. Examination of research issues in general psychology from a behavior analytic perspective. Topics vary from year to year.

PSYC 732. Behavior Theory and Philosophy. 3 Hours.
PR: PSYC 531 or equivalent. Critical consideration of contemporary concepts, theories, and methods of psychology.

PSYC 733. Stimulus Control and Memory. 3 Hours.
PR: PSYC 531 or consent. Critical review of basic research and theory in discrimination learning, stimulus generalization, and memory.

PSYC 734. Reinforcement and Punishment. 3 Hours.
PR: PSYC 531. Examination of theories of response acquisition, maintenance, and suppression in the context of recent experimental work with animals and humans.

PSYC 735. Assessment and Intervention for Severe Behavior. 3 Hours.
PR: PSYC 533. Research and clinical practice in functional behavior assessment, including indirect, descriptive assessment, and functional analysis, and behavior-analytic interventions for severe challenging behavior.

PSYC 736. Advanced Experimental Analysis of Behavior. 3 Hours.
(May be repeated for credit with consent.) PR: PSYC 531. Selected topics and research issues in the experimental analysis of behavior.

PSYC 737. Advanced Applied Behavior Analysis. 3 Hours.
(May be repeated for credit with consent.) PR: PSYC 533. Application of research and theory of behavior analysis to social problems; other selected topics.

PSYC 738. Behavior Analysis in Education. 3 Hours.
PR: PSYC 533 with a minimum grade of B-. Behavior-analytic strategies in educational contexts, including problems facing the educational system, curriculum-based measurement, individualized educational assessment, and instructional design.

PSYC 739. Verbal Behavior. 3 Hours.
PR: PSYC 531 or consent. Examination of current empirical and theoretical issues related to the functional analysis of verbal behavior.

PSYC 740. Practicum in Developmental Psychology. 1-6 Hours.
PR: Consent. Provides experience in a wide range of applied settings. Sites are chosen to accommodate exposure to the entire life-span from infancy through old age. Supervising responsibilities are determined by the instructor-in-charge in the agency.

PSYC 745. Seminar in Life-Span Development. 3 Hours.
(May be repeated for credit with consent.) Current issues in life-span development or selected periods of the life span.

PSYC 750. Clinical Internship. 1-15 Hours.
Intensive training in clinical assessment, diagnosis, consultation, and/or treatment skills that occur during an internship placement, typically at an off-campus training site.

PSYC 752. Family and Marital Therapy. 3 Hours.
Examines both theoretical and practical aspects of the assessment and treatment of family and marital difficulties.

PSYC 754. Clinical Psychopharmacology. 3 Hours.
Survey of the ways in which psychotropic drugs are used to treat behavioral and psychological disorders.

PSYC 755. Seminar in Clinical Supervision. 1 Hour.
(May be repeated for credit with consent.) Theoretical foundations and empirical research pertaining to clinical supervision, coupled with experiential training in conducting clinical supervision in applied settings.

PSYC 762. Seminar in Clinical Psychology. 3 Hours.
(May be repeated for credit with consent.) Research and problems in clinical psychology.

PSYC 762B. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent.) Research and problems in clinical psychology.

PSYC 762D. Seminar in Clinical Psychology. 1 Hour.
(May be repeated for credit with consent.) Research and problems in clinical psychology.

PSYC 762G. Seminar in Clinical Psychology. 3 Hours.
(May be repeated for credit with consent.) Research and problems in clinical psychology.

PSYC 762I. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762J. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762K. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762L. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762M. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762N. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762O. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762P. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762Q. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762R. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762S. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762T. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762U. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762V. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762W. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762X. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762Y. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 762Z. Seminar in Clinical Psychology. 1-3 Hours.
(May be repeated for credit with consent) Research and problems in clinical psychology.

PSYC 763. Cultural Competency in Clinical Psychology. 3 Hours.
PR: PhD student in Clinical Psychology or instructor permission. Advanced course on theory and research in multicultural psychology. Addresses historical, sociopolitical, and economic factors that contribute to human behavior. Topics include psychological processes and impact of bias, discrimination, racism, and privilege, and building cultural competencies related to awareness, sensitivity, and tolerance in working with diverse individuals. Contemporary and classic research supportive of these theories and processes are reviewed.

PSYC 772. Seminar in Clinical Child Psychology. 1 Hour.
(May be repeated for credit with consent.) Current issues and research related to a particular area of clinical psychology involving children.

PSYC 780. Advanced Integrative Seminar. 3 Hours.
Examination of the integration of two of the following areas of knowledge in scientific psychology: affective, biological, cognitive, developmental, or social aspects of behavior. (May be repeated for credit with consent.).

PSYC 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of psychology. 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.).

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

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

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

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

PT 514. . 4 Hours.
An introduction to basic sciences fundamental to physical therapist diagnosis and treatment. Areas of study include genetics, embryology, histology, pathology, and immunology.

PT 515. Evidence Based Physical Therapy 1. 3 Hours.
Introduces students to information needed to practice evidence-based physical therapy by understanding research studies and applying research findings to patients/clients. The course emphasizes the role of scientific evidence in physical therapy practice; foundational content in research design, methods, analyses, and statistical software; and the critical appraisal of intervention studies.

PT 518. Movement Diagnosis 2. 3 Hours.
This foundational course sets the stage for more advanced examination procedures of the movement system. The course covers many of the essential components of a physical therapy examination including: history taking, vital signs, gross evaluation, basic neurological examination, functional evaluation, goniometry, manual muscle testing, balance assessment, postural assessment, and medical screening.

PT 701. Professional Development 1. 3 Hours.
Introduction to the roles and professional behaviors of physical therapists. Includes units on professionalism, health care ethics, and clinical documentation.

PT 706. Advanced Clinical Anatomy. 5 Hours.
This course presents advanced study of clinical applications of gross anatomy to physical therapy practice through lecture and lab. Laboratory includes dissection, computer-based instruction and clinical palpation.

PT 708. Movement Diagnosis 1. 2 Hours.
An introduction to the concept of human movement as the basis of physical therapy expertise. Includes overview of how anatomic structures and physiologic functions interact to move the body or its component parts. Laboratory activities include exposure to methods to assess the systems that contribute to human movement.

PT 713. Lifespan Functional Movement. 2 Hours.
An overview of motor learning including acquisition of developmental patterns, motor control, and motor skill acquisition. This course also provides an overview of the effects of normative processes of aging on neuromotor patterns in occupational performance.

PT 714. Foundational Science 1. 4 Hours.
An introduction to basic sciences fundamental to physical therapist diagnosis and treatment. Areas of study include genetics, embryology, histology, pathology, and immunology.

PT 715. Evidence Based Physical Therapy 1. 3 Hours.
Introduces students to information needed to practice evidence-based physical therapy by understanding research studies and applying research findings to patients/clients. The course emphasizes the role of scientific evidence in physical therapy practice; foundational content in research design, methods, analyses, and statistical software; and the critical appraisal of intervention studies.

PT 716. Kinesiologic Foundations. 4 Hours.
PR: Admission to professional program in PT. Functional anatomical correlations and human movement. Statics, biomechanics, dynamics and functional movement analysis. (2 Hr. lec; 4 hr. lab.).

PT 718. Movement Diagnosis 2. 3 Hours.
This foundational course sets the stage for more advanced examination procedures of the movement system. The course covers many of the essential components of a physical therapy examination including: history taking, vital signs, gross evaluation, basic neurological examination, functional evaluation, goniometry, manual muscle testing, balance assessment, postural assessment, and medical screening.

PT 720. Clinical Education 1. 2 Hours.
Experiential learning through an integration of classroom and patient/client opportunities. This first course in a series of two integrated clinical education courses will focus on documentation, communication, development of basic examination and treatment techniques, the roles of the physical therapist, and introduction to the members of the interprofessional team.

PT 723. Developmental Life Tasks. 3 Hours.
Life-span human development across cognitive, psychosocial and neuromotor domains with particular emphasis on applications to physical or occupational therapy interventions. Cultural influences in health and illness.

PT 724. Cardiopulmonary Physical Therapy 1. 3 Hours.
Principles of aerobic and resistance training for both healthy and rehabilitation populations. Includes exercise testing and development of exercise programs for persons with either primary or secondary cardiopulmonary issues.

PT 725. Evidence-Based Physical Therapy 2. 3 Hours.
PR: PT 715. This is the second course in the Evidence-Based Physical Therapy sequence that emphasizes various types of research methodologies and designs as well as the critical appraisal of each required for evidence-based clinical practice. Includes systematic reviews, meta-analyses, clinical practice guidelines, diagnostic studies, prognostic studies, population health/epidemiology, survey methods, qualitative methodologies, mixed methodologies, case reports/series, and single case designs.

PT 727. Neurobiologic Foundations. 4 Hours.
PR: Enrolled in professional sequence. Basic and clinical applications of neurophysiological basis of physical and occupational therapy practice.

PT 729. Physical Therapy Interventions 1. 3 Hours.
Introduction and application of the clinical interventions foundational to physical therapy practice. Includes body mechanics, positioning and draping, transfer and gait training, seated mobility, and wound management.

PT 731. Professional Development 2. 1 Hour.
The role of the physical therapist in wellness and health promotion for patients/clients and communities. Includes content related to nutrition, physical activity, sleep, stress management and avoiding addictive substances to prepare future physical therapists to provide health behavior change advice within their scope of practice.

PT 734. Cardiopulmonary Physical Therapy 2. 3 Hours.
Correlation of anatomy, physiology and pathology for the physical therapy management of cardiovascular and pulmonary conditions. Laboratory includes cardiopulmonary assessments and interventions for persons with cardiovascular and/or pulmonary conditions in a variety of settings.

PT 736. Orthopedic Physical Therapy 1. 4 Hours.
Clinical-decision making principles that govern diagnosis of soft tissue lesions and joint impairments associated with movement dysfunction. Includes application of therapeutic exercise techniques and skills used in physical therapist intervention.

PT 738. Movement Diagnosis 3. 1 Hour.
An introduction to imaging studies with an emphasis on plain film imaging of the musculoskeletal system. This course, the first in a 2-part series, focuses on normal anatomy and common pathologies as viewed on radiographs of major areas of the upper extremity. Clinical correlations of information gleaned from imaging studies affecting physical therapy diagnosis and interventions is emphasized.

PT 739. PT Interventions 2. 3 Hours.
Introduces the use of thermal, mechanical and electromagnetic biophysical agents as physical therapists. The course includes a strong emphasis of the effects on human anatomy and physiology as well as clinical decision-making principles involved in usage to ensure safe and effective application.

PT 740. Clinical Education 2. 1 Hour.
Experiential learning through an integration of classroom and patient/client opportunities. This second course in a series of two integrated clinical education courses will focus on advancement of documentation, communication, examination/screening, and interventional techniques as well as the role of the physical therapist as part of the interprofessional team.

PT 741. Professional Development 3. 3 Hours.
The roles of the physical therapist as an educator and a provider of primary, secondary and tertiary prevention services in the community. Includes information on educational theories and methods, evidence-based development of community health programs, providing culturally competent care, and post-professional development.

PT 743. Geriatric Physical Therapy. 2 Hours.
Students are provided information about medical and psychosocial factors associated with aging. Study of the role of physical therapy in geriatrics, including laboratory practice of common evaluation and treatment procedures. (1hr. lec, 2 hr. lab.).

PT 744. Foundational Science 2. 2 Hours.
Introduction to pharmacology for the physical therapy student. Includes study of pharmacotherapeutics, and an overview of selected medications. The emphasis is on clinical application and the therapist's role as a health care team member.

PT 745. Evidence Based Physical Therapy 3. 1 Hour.
Small group presentation, critical review and discussion of current literature related to physical therapy and applications to patient care.

PT 746. Orthopedic Physical Therapy 2. 4 Hours.
Physical examination and interventional techniques for the cervical and thoracic spine and upper extremity. Includes mechanisms of injury, diagnostic signs and symptoms, and therapeutic management of musculoskeletal injury and disease.

PT 747. Neurorehabilitation 1. 3 Hours.
The first course in a two course series to prepare physical therapy students to work in neurologic rehabilitation. The course is based on an International Classification of Function (ICF) paradigm. Theories of motor control, motor learning and motor rehabilitation which support the ICF are presented in the context of adult neurorehabilitation.

PT 749. Survey of PT Practice. 1 Hour.
Content related to practice areas of women's health/pelvic floor PT, occupational PT and chronic pain/psychological health and PT.

PT 754. Foundational Science 3. 3 Hours.
Introduction to selected topics in clinical medicine that are foundational to physical therapy practice. Utilizes the movement system model to describe screening, examination, evaluation and intervention as it relates to medical conditions seen in physical therapy practice such as metabolic and endocrine disorders, somatic disorders, oncology, and rheumatology.

PT 756. Orthopedic Physical Therapy 3. 4 Hours.
Physical examination and interventional techniques for the lumbosacral spine, pelvis, and lower extremity. Includes mechanisms of injury, diagnostic signs and symptoms, and therapeutic management of musculoskeletal injury and disease.

PT 757. Neurorehabilitation 2. 3 Hours.
The second in the course sequence preparing the physical therapy student to work with patients in neurologic rehabilitation. Builds on the International Classification of Function model of analysis and outcomes. Clinical populations include brain injury, spinal cord injury, and cerebral palsy.

PT 758. Movement Diagnosis 4. 1 Hour.
The second in a 2-part series, focuses on normal anatomy and common pathologies as viewed on radiographs of areas of the spine and the lower extremity. Clinical correlations of information gleaned from imaging studies affecting physical therapy diagnosis and intervention is emphasized.

PT 759. Prosthetics and Orthotics. 3 Hours.
Presents the principles of biomechanics as they apply to prosthetic and orthotic prescription and fabrication. Students learn how to plan and implement rehabilitation programs for patients who use orthotic or prosthetic devices.

PT 760. Clinical Education 3. 5 Hours.
The first of three full-time clinical education experiences. Students practice for 10 weeks under the direction of licensed physical therapists.

PT 761. Professional Development 4. 2 Hours.
Introduction to health policy related to physical therapist practice, including payment policies in various clinical settings and licensure laws. Includes a unit on advocacy for people with disabilities.

PT 770. Clinical Education 4. 5 Hours.
The second of three full-time clinical education experiences. Students practice for 10 weeks under the direction of licensed physical therapists.

PT 771. Professional Development 5. 3 Hours.
Principles of business and management as they apply to contemporary physical therapy practice. Fiscal management, risk management, marketing, and program improvement are addressed.

PT 773. Pediatric Physical Therapy. 3 Hours.
An overview of pediatric physical therapy practice, including legislation, common practice settings, as well as unique aspects of assessment and documentation. Pediatric conditions commonly treated by physical therapists are introduced.

PT 775. Evidence Based Physical Therapy 4. 1 Hour.
Emphasis is on review and integration of physical therapy principles in preparation for successful completion of the national board examination. The course includes a curriculum based comprehensive examination.

PT 780. Clinical Education 5. 8 Hours.
Students practice full-time for sixteen weeks under the direction and supervision of licensed physical therapists.

PT 781. Professional Development 6. 1 Hour.
Students who are preparing for graduation present a culminating professional development plan based on clinical experience and professional interest. The course also includes student experiences within the professional organization and ongoing plan for professional activity.

PT 785. Advanced Clinical Decision Making. 2 Hours.
Students who are preparing for graduation present a culminating case study based on their clinical experience and applying principles of evidence based practice. The presentation could be on an individual case, a community needs assessment, or a quality improvement project.

PT 786. Medical Issues of Prematurity. 1 Hour.
Introduction to medical issues of prematurity for the physical therapy neonatal fellow. Includes common medical sequelae of prematurity as well as medical management of these conditions as they affect neonatal physical therapy practice.

PT 787. Premature Infant Growth and Development. 1 Hour.
Introduction to growth and development of the premature infant for the physical therapy neonatal fellow. Includes normal and abnormal development of the GI system, nutritional needs, feeding methods and developmental impact.

PT 788. Neurobehavioral Management of Premature Infants. 1 Hour.
This course prepares the learner for specialty physical therapy practice in the Neonatal Intensive Care Unit (NICU), utilizing principles of family centered care and synactive theory. Topics include neurobehavioral development, developmental assessment, intervention planning and outcomes assessment.

PT 789. Evidence Based PT in NICU Practice. 1 Hour.
The learner to prepared to critically read the literature relevant to neonatal physical therapy practice, as well as to develop skills in Scientific Inquiry in order to be able to design, carry out and disseminate a clinical study and participate in ongoing NICU research by other professionals.

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

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

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

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

PT 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.).

PT 800. Professional Roles in Neonatal Physical Therapy. 1 Hour.
The learner is prepared to participate in the roles of a leader in neonatal physical therapy, including education, administration, and evidence based practice.

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

PUBA 600. Democratic Context of Public Administration. 3 Hours.
Orientation to the field of public administration and its role in democratic governance in the United States. Review of the historical, philosophical, Constitutional, and intellectual foundations of administrative theory and public service values, with application to current trends and issues.

PUBA 610. Public and Nonprofit Management. 3 Hours.
Introduction to public and nonprofit management, including assessing organizational contexts, structures, and systems. Explores diverse strategies for managing programs, projects, people, and resources in public service organizations.

PUBA 620. Public and Nonprofit Financial Management. 3 Hours.
Graduate level introduction to the principles, practices, participants, and policies involved in public and nonprofit financial management, including fiscal resource management, financial reporting, and performance analysis.

PUBA 630. Public Service Research. 3 Hours.
Foundations and processes of applied research to inform public and nonprofit organizations, with an emphasis on research design, data collection and analysis, and presentation of findings and recommendations.

PUBA 645. Public Policy and Administration. 3 Hours.
Examines the administrative role throughout the democratic public policy process, focusing on ethical implications and associated technical skills.

PUBA 646. Public Policy Advocacy. 3 Hours.
This course examines the roles that advocacy plays in shaping public policy. Readings, class discussions, and applied project with stakeholders will connect the theoretical underpinnings of public policy advocacy to the public and private practices that can be used to mobilize policy change and legislative action.

PUBA 650. Local Governance. 3 Hours.
Introduction to the institutions and processes of local governance. Institutions include: government structures (county, municipal, special districts), volunteer boards and commissions, and various types of community-based organizations.

PUBA 651. Social Equity in Public Service. 3 Hours.
Explores the meaning, contributing factors, and challenges associated with social equity in public service organizations, processes, and outcomes. Examines application to different socioeconomic contexts.

PUBA 655. Public Engagement. 3 Hours.
Explores theories of community engagement. Develops skills in techniques for engaging citizens and other stakeholders in collaborative local governance and community building efforts.

PUBA 670. Health Systems. 3 Hours.
Graduate-level introduction to the development, structure, and current issues in the healthcare in the United States including health promotion, disease prevention, epidemiology, delivery and utilization of health services, financing, policy, regulation, and ethical concerns.

PUBA 671. Healthcare Organization and Operation. 3 Hours.
PR: PUBA 670 or PR or CONC:CHPR 635. Examines the organization and management of health-care settings including system influences, leadership, communication, organization behavior, team development, organization design, evaluation, productivity, performance improvement.

PUBA 672. Healthcare Finance. 3 Hours.
PR or CONC: PUBA 670 or CHPR 635. Examines financing of health-care, financial management concepts, insurance mechanisms, reimbursement, cost accounting, budgeting, and staffing for healthcare organizations, including integrated networks and managed care. The course focuses on concepts needed by first line and mid-level managers.

PUBA 691. Advanced Topics. 1-6 Hours.
Investigation of advanced topics not covered in regularly scheduled courses.

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

PUBA 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.).

PUBA 700. Capstone Seminar. 3 Hours.
PR: All PUBA 600 level and PUBA 751 or concurrent. Links MPA academic preparation to professional career through analysis of practice settings, professional literature, and internship/professional experience of student; integrates coursework, practice themes, competencies, and ethics.

PUBA 710. Public Service Leadership. 3 Hours.
Prepares students to exercise leadership in public and nonprofit organizations in response to changing social, economic, and environmental challenges. Examines various approaches to leadership and innovation, including strategic, communicative, and reflective practice.

PUBA 712. Administrative Ethics. 3 Hours.
Exploration of the foundations of ethical principles and practices in the public and nonprofit sectors. Application of principles through analysis of ethical dilemmas in serving the public.

PUBA 715. Organizational Development and Change Management. 3 Hours.
Examines organization development and change management applied to public agencies. Explores basic organization development skills, and techniques for effective change management.

PUBA 720. Public and Nonprofit Budgeting. 3 Hours.
PR: PUBA 620. Graduate level study of public budgeting principles and political processes in government and nonprofit organizations. Emphasis is placed on understanding revenue sources and tax structures, while developing the skills to craft, analyze, and revise budgets and performance measures.

PUBA 730. Advanced Public Service Research. 3 Hours.
PR: Consent. Methodological foundations, methods, and research design for public policy analysis and evaluation or program assessment and evaluation.

PUBA 741. Human Resources Systems. 3 Hours.
PR: Consent. Examines competing values, systems, processes, and methods for managing human resources in government and non-profit organizations; including merit, patronage, professional, collective bargaining, and entrepreneurial models.

PUBA 750. Public Planning. 3 Hours.
Examine the substantive range of public planning arenas. Principles and practices of organizational, program, project, or physical planning with consideration of the political and economic context.

PUBA 751. Public Service Internship. 1-6 Hours.
PR: Consent. A working internship in a government or public service related agency, designed to provide students with an opportunity to gain field experience, and to relate knowledge gained through course work situation. (Grading will be S/U.).

PUBA 755. Sustainable Community Development. 3 Hours.
PR: PUBA 750. Explores the theory, principles, and ethics of economic, environmental, and social sustainability as applied to community and economic development activities, with a focus on project and program implementation.

PUBA 780. Healthcare Administration Practicum. 3 Hours.
Students will develop and execute a field experience or scholarly research project that applies and integrates knowledge gained during healthcare administration course work into a functional capstone experience.

PUBA 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of public administration. 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 student not on assistantships to gain teaching experience.

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

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

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

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

PUBA 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.

PUBA 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.).

PUBH 501. Advanced Professional Writing. 3 Hours.
A review of English syntax and usage in professional writing; constructing and developing ideas; research and writing based on careful reading of author's instructions, using the APA style manual, using library resources, and academic honesty.

PUBH 510. Contemporary Foundations of Public Health Practice. 2 Hours.
Examines the goals and mission of public health, from its historical roots in sanitation to current efforts to improve population health. The disciplines of public health and their relationships to each other are introduced. The interdisciplinary nature of the field is emphasized.

PUBH 511. Epidemiology for Public Health Practice. 3 Hours.
Examines the application of epidemiologic methods; explains ecological, environmental, biologic, genetic, behavioral, and psychological factors affecting population health; and describes national and global mortality and morbidity trends.

PUBH 512. Research Translation and Evaluation in Public Health Practice. 3 Hours.
Introduces quantitative and qualitative methods as applied to public health practice as well as methods for evaluating public health programs and policies. Emphasis is placed on translating research into practice.

PUBH 520. Building and Sustaining Public Health Capacity. 2 Hours.
Provides a theoretical and practical understanding of key factors associated with building and sustaining the institutional and organizational capacity required to achieve the mission and goals of public health. Includes discussion of key social, political, and economic determinants of health and the role of public health in eliminating health disparities rooted in structural biases, social inequalities, and racism.

PUBH 521. Public Health Prevention and Intervention. 3 Hours.
Provides students with the conceptual and practical tools used in planning, designing, implementing, and evaluating prevention and intervention programs from the perspective of multiple public health disciplines. Through reading, cooperative learning, and discussing, students gain experience in these four areas. Students also apply information learned in foundation courses.

PUBH 536. Worksite Wellness. 3 Hours.
Overviews the field of health promotion in a worksite setting, offering a comprehensive introduction. Persons with interest in exploring the possibility of employment in health promotion in a worksite setting will find this course helpful.

PUBH 540. Leading and Managing Health Organizations. 3 Hours.
This course addresses the foundational principles of leadership and management in healthcare and public health settings. Topics addressed include strategy, governance, human resources, fiscal leadership, communication skills, leading teams, and developing and leading organizational culture. Core leadership and management theories are reviewed and applied. The course helps prepare students to effectively lead and manage internal operations and external partnerships.

PUBH 541. Systems Thinking in Public Health Practice. 2 Hours.
Application of systems thinking tools to a range of public health issues. Using team-based and inter-professional approaches, theory and data are employed to identify how public health problems emerge, map phenomenon, and recommend appropriate public health intervention at multiple levels. Includes addressing the identification of and effective communication with potential partners throughout diverse communities and systems.

PUBH 580. Prevention through Resilience. 3 Hours.
The principles of resilience, resiliency theories and current research, resilience and stress and the mind-body implications, recognizing and eliciting resilience and resilient outlooks and behaviors in ourselves and clients, professional and public health implication.

PUBH 581. Rural Gerontology. 3 Hours.
This course is designed to provide students with a broad understanding of current research information regarding health and social aspects of rural elderly in the United States. The course consists of lecture and class discussions.

PUBH 593. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

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

PUBH 596. Graduate Seminar. 1-3 Hours.
PR: Consent. It is anticipated that each graduate student will present at least one seminar to the assembled faculty and graduate student body of his/her program.

PUBH 601. Introduction to Community/Public Health. 3 Hours.
An introduction to the field of community/public health with an emphasis on the relationship and role of public health to other disciplines in resolving public health problems.

PUBH 604. Health Care Cultural Competence. 3 Hours.
This course prepares students to tackle population health challenges in the dynamic US healthcare system. It emphasizes cultural competencies, health disparities, and related topics, covering diverse facets such as race, ethnicity, gender, and various Isms (ageism, linguicism, nameism, etc.). It offers strategies for creating inclusive service environments and examines diversity's impact on both population and healthcare workplaces.

PUBH 605. Introduction to Global Public Health. 3 Hours.
This introductory course provides a broad overview of global health problems, non-communicable and communicable diseases, the burden and impact of disease, and the main determinants, controversies and challenges ahead for disease control in the current international context. It includes fundamental concepts in demography, epidemiology, occupational and environmental health relevant to global health.

PUBH 613. Public Health Program Evaluation. 3 Hours.
Examines and builds competence in the evaluation of public health programs, policies, and environment/systems change efforts to advise programmatic and funding decisions. Includes emphasis on practical application of processes and practices from the Centers for Disease Control and Prevention (CDC), the Joint Committee on Standards for Educational Evaluation (JCSEE), and the American Evaluation Association (AEA).

PUBH 617. Ethical/Legal Issues in Public Health. 3 Hours.
This course provides an opportunity for sustained reflection on the many ethical and legal issues involved in public health. Ethical and legal frameworks will be identified and applied to the analysis of critical issues.

PUBH 618. Health Services/Outcomes Research Methods. 3 Hours.
This course covers the key issues facing the health care system today and teaches the basic skills needed to evaluate health care programs addressing these issues.

PUBH 628. Aging Women & Culture 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.

PUBH 629. MPH Capstone. 1 Hour.
PR or CONC: PUBH 630. The MPH Capstone course is the culminating experience for MPH students. This course provides students the opportunity to demonstrate their command of the Master of Public Health’s core competencies via a culminating project by synthesizing and integrating knowledge and skills from across the curriculum. (Grading will be Pass/Fail.).

PUBH 630. MPH Field Practicum. 1-6 Hours.
PR: Consent. (May be repeated for a maximum of 6 credit hours.) The MPH field practicum provides students with the opportunity to develop their practical skills and enhance professional competencies by applying the knowledge and techniques gained from their MPH coursework to public health practice.

PUBH 645. Fundamentals of Gerontology. 3 Hours.
This course introduces students to a broad spectrum of topics and issues related to aging by drawing upon several core disciplines and their contributions to the corpus of gerontological knowledge and research.

PUBH 646. Public Policy of Aging. 3 Hours.
Analysis of major policy and public programs for older adults, including Medicaid, Medicare, Social Security and the Older Americans Act. A major emphasis is placed on programs in West Virginia.

PUBH 658. Public Mental Health. 3 Hours.
Students apply principles and methods of general epidemiology to the study of mental disorders. Provides updated scientific information regarding the epidemiology and risk factors of major psychiatric disorders such as anxiety, mood, psychotic, personality, drug and alcohol use disorders and the increased prevalence of mental disorders, cost of mental health care, and its burden on society. (co-list with 458).

PUBH 659. Public Health Foundations. 3 Hours.
Examines the history of public health, from its roots in sanitation to current efforts to broadly improve population health. Each of the five core disciplines, epidemiology, biostatistics, environmental health, social and behavioral sciences, and health policy and management receives attention. Quantitative and qualitative research designs are covered as well as infectious diseases, tuberculosis, and risk management.

PUBH 662. Clinical Research Methods and Practices. 3 Hours.
Students learn research techniques for application to a wide variety of cardiovascular, neurological, trauma and social services emergency care, conduct real-time clinical research, and interact with patients/potential study subjects in the Emergency Department. (Also listed as CHPR 440; students may not count both PUBH 662 and CHPR 440 toward degree requirements.).

PUBH 663. Dismantling Structural Racism in Public Health. 3 Hours.
A basic tenet of this course is that race and racism are responsible for the excess burden of morbidity and mortality for Black and Brown people in the US and are rooted in what students have historically been taught are social determinants of health. The course will cover historical events and contemporary movements.

PUBH 680. Health-Based Leadership. 3 Hours.
PR:CHPR 635 or equivalent. Gain personal understanding, knowledge, and growth in the human dimensions of leadership: developing rapport, trust, teamwork, and mentoring; managing tone and facilitating "problem" situations; evaluating systems and leading system change; articulating vision, mission and strategy.

PUBH 684. Population Health Capstone. 1-2 Hours.
PR: Academic advisor approval required, also must be taken during final term in the program. This course provides students the opportunity to demonstrate their command of the Master of Science in Population Health core competencies through a culminating project. Under the direction of the instructor, students will focus on a real-world project or population health issue. Additionally, this course requires students to independently synthesize and apply methods, concepts, skills and knowledge gained throughout the program.

PUBH 685. Internship-Public Health Practicum. 1-5 Hours.
The internship provides the students with the opportunity to develop their practical skills and enhance professional competencies by applying the knowledge and techniques gained from their MPH coursework to public health practice.

PUBH 686. Occupational Medicine Practicum. 5 Hours.
This course provides occupation medicine residents with the opportunity to develop practical skills and professional competencies by applying the knowledge and techniques gained from their MPH and occupational medicine coursework to public health practice.

PUBH 687. Practicum Proposal. 2 Hours.
PR: PUBH 611 and PUBH 630 and PUBH 650 and PUBH 660 and (PUBH 691E or CHPR 634). A structured, faculty-supported process for developing a proposal for the 300-hour practice and theory- based practicum.

PUBH 688. MPH Practicum Report. 3 Hours.
PR: PUBH 611 and PUBH 630 and PUBH 650 and PUBH 660 and PUBH 687 and PUBH 689 and (PUBH 691E or CHPR 634). Provides students with the opportunity to report the results of their practicum projects to others via a professional paper and presentation.

PUBH 689. Practicum. 3 Hours.
PR: PUBH 611 and PUBH 630 and PUBH 650 and PUBH 660 and PUBH 687 and CHPR 612 and (PUBH 691E or CHPR 634). Implementation of the practicum proposal; a planned, supervised, and evaluated public health-oriented experience encompassing 300 hours of activity reflecting public health practice and theory. Students are required to take 3 credit hours of the practicum but may spread credits among semesters.

PUBH 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of public health. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given collges teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

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

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

PUBH 696. Graduate Seminar. 1-3 Hours.
PR: Consent. It is anticipated that each graduate student will present at least one seminar to the assembled faculty and graduate student body of his/her program.

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

PUBH 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that believe that this level of control and supervision is needed during the writing of students' reports, theses, or dissertations.

PUBH 701. Public Health Grant Writing. 3 Hours.
This course addresses various components of the grant writing process, including collaboration, funding sources, proposal preparation, and grants management for health professionals. Students will benefit from having a research methods course.

PUBH 703. Social and Behavioral Measurement. 3 Hours.
Theory and development of effective tools for measuring social and behavioral public health phenomena. Students will learn how to find, construct and analyze effective social and behavioral measurement instruments.

PUBH 705. Injury Control Research Methods. 3 Hours.
PR: PUBH 660 or equivalent and PUBH 611 or equivalent. Evidence-based approach to increasing the knowledge and methodological skills necessary for basic injury (unintentional and intentional) control research.

PUBH 706. Current Research Issues. 2 Hours.
The purpose of this course is to utilize research-based discussions to stimulate a unique information gathering environment of current research and investigation.

PUBH 707. Applied Multivariable Statistics. 3 Hours.
Basic theory and application of survival analysis, multivariate analysis of variance (MANOVA) and exploratory factor analysis.

PUBH 766. Medical Toxicology. 2 Hours.
This course introduces healthcare providers to the clinical aspects of toxicology, including the evaluation and treatment of individuals and populations with potential toxic exposures.

PUBH 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of public health. 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.).

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

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

PUBH 795. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.

PUBH 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.

PUBH 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.).

RDNG 640. Instructing Students Who Have Reading Difficulties. 3 Hours.
PR: RDNG 621 and (RDNG 624 or RDNG 622). A methods course that emphasizes ways to intervene when students face reading difficulties. Course focuses on methods that can be used by classroom teachers, reading specialists, and other special teachers of reading and language arts.

RDNG 689. Intervention for Struggling Readers. 3 Hours.
PR: RDNG 640. This practical experience is designed to give literacy education candidates opportunities to apply the theoretical concepts from previous coursework to practical teaching contexts. The practicum is defined as fieldwork experience that combines whole group class meetings, individual intervention sessions with a K-12 student, peer-coaching sessions, and individual supervision sessions.

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

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

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

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

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

RDNG 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.).

RDNG 725. Survey of Reading Research. 3 Hours.
A research course in which each student will complete an individual problem in an area of special interest.

RDNG 726. Literacy Leadership. 3 Hours.
PR: 18 hours of M.A. requirements. Roles, responsibilities, and practices of reading specialists, administrators, and classroom teachers in organizing literacy programs from early childhood through college.

RDNG 780. Seminar. 1-6 Hours.
PR: Consent. The interrelationships among the language arts: mental, physical, and psychological deterrents to language arts; and similar topics.

RDNG 785. Practicum. 1-12 Hours.
PR: Consent. Practical application of reading theory to organizing and conducting developmental and remedial reading programs.

RDNG 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of reading. 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.).

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

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

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

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

RDNG 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.

RDNG 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.).

RDNG 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.

RDNG 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.

REHB 600. Introduction to Rehabilitation Services. 3 Hours.
PR: Consent. Introduction to comprehensive rehabilitation, its history and development as a philosophy process, and professional area. Professional and ethical issues in rehabilitation counseling. Other services involved in various rehabilitation settings.

REHB 612. Disability Across the Lifespan. 3 Hours.
A study of the psychological adjustment of disability across the lifespan, using a model of understanding stages of human development including cultural, interpersonal, and interpersonal factors. Includes information on appropriate interventions.

REHB 620. Career Development and Job Placement. 3 Hours.
PR: Consent and graduate standing in social sciences or education. Principles and methods involved in the vocational counseling and placement of disabled persons. The use of occupational and educational information. Theories of career development, occupational analysis, and job placement in rehabilitation.

REHB 621. Vocational Evaluation Systems and Techniques. 3 Hours.
PR: REHB 600. An introduction to vocational evaluation. Formal and informal vocational evaluation systems and procedures will be explored with the goal of preliminary development of individualized evaluation plans.

REHB 622. Advanced Vocational Evaluation Techniques. 3 Hours.
PR: REHB 621. Advanced vocational evaluation systems including empirically based and informal systems will be studied. Emphasis will be on administration, scoring and interpretation, particularly as it relates to handicapped populations with specific evaluation problems.

REHB 623. Seminar in Vocational Evaluation Services. 3 Hours.
PR: REHB 621 and consent. Supervisory and professional issues in vocational evaluation services with an emphasis on standards, methods, procedures and resources for developing and maintaining vocational evaluation services.

REHB 672. Counseling Practicum. 1-4 Hours.
PR: Graduate standing, liability insurance, and consent. Supervised experience in the application of counseling techniques in the rehabilitation process. Demonstration of high professional standards, counseling skills, and personal characteristics appropriate to the counseling relationship are essential.

REHB 675. Clinical Practice. 1-15 Hours.
PR: Consent. Clinical practice (internship) in selected agencies, rehabilitation centers, clinics, or hospitals conducting an organized program of services for the physically, mentally, emotionally, or socially handicapped. Practice will be under direct supervision of faculty and agency personnel.

REHB 680. Seminar. 1-6 Hours.
Seminars arranged for advanced graduate students.

REHB 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of human resources and education. 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.).

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

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

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

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

REHB 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.

REHB 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.).

REHB 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.

REHB 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking course work 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 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.

RELG 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of religion. 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.).

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

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

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

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

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

RELG 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.).

RELG 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.

RELG 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but 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.

RESM 505L. Drones in Resource Management. 3 Hours.
PR: An interest in aeronautical principals, spatial data collection and analysis, and natural resource applications is preferred. Provides training in the use of drones to collect and analyze spatial data in natural resource applications.

RESM 540. Geospatial Modeling. 3 Hours.
There are two goals for this course: to present the fundamental methods for analyzing spatial data statistically, and to demonstrate spatial model building implementation and analysis. A prior statistics or econometric course is recommended.

RESM 545. Spatial Hydrology and Watershed Analysis. 3 Hours.
PR: RESM 440 or consent. Introduction to applied spatial hydrology using GIS; integrates statistical modeling and terrain analysis; provides insights into water quality and quantity analysis for local and regional watershed scales. (Credit cannot be received for both RESM 445 and RESM 545.).

RESM 560. Advanced Energy Project and Program Management. 3 Hours.
This course builds around the concepts and best practices required to manage, coordinate and provide effective leadership for multi-dimensional programs and projects in the energy and environmental resource industries.

RESM 575. Spatial Analysis for Resource Management. 3 Hours.
This interdisciplinary course develops and applies advanced Geography Information System (GIS) and spatial analysis skills for natural resource and environmental management. (Previous GIS experience helpful.).

RESM 585. GIS and Spatial Analysis Project. 3 Hours.
PR: RESM 440 or GEOG 350 or consent. Provides an opportunity for students to pursue a research interest in the spatial sciences with development of an applied spatial project and paper. Guidance and direction will be provided to assure relevant integration of the geospatial techniques to address the problem addressed.

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

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

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

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

RESM 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in the college teaching of resource management. 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.).

RESM 691. Advanced Topics. 1-6 Hours.
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RESM 692. Directed Study. 1-6 Hours.
Directed study, reading and/or research.

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

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

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

RESM 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.

RESM 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.).

RESM 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.

RESM 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.

RESM 790. Teaching Practicum. 1-3 Hours.
Supervised practice in college teaching of agriculture. 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.).

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

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

RESM 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.

RESM 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.

ROBE 514. Robot Motion Planning. 3 Hours.
This course presents contemporary topics selected from recent developments in the field of robot motion planning, with emphasis on optimal trajectory generation in high-dimensional spaces. The course complements the training of the students who wish to specialize in the area of robotics, providing them with important tools for solving complex motion planning problems.

RPTR 536. Sustainable Trails: Engagement. 3 Hours.
Develop management plans, incorporate interpretive signage, and activate greenspace and public trails with civic engagement while planning for post-construction maintenance. Online, 3 credit hour graduate course, cross listed with RPTR 436 (for undergraduate students).

RPTR 570. Meanings of Place. 3 Hours.
Study of place as a psychological and social phenomenon with implications for community development, historic preservation, interpretation design, management, natural and cultural sustainability, and human well-being. (Equivalent to LARC 570.).

RPTR 608. Recreation and Park Management Practicum. 2-4 Hours.
PR: Consent. Field experience and conference in the study, analysis, and solution of management problems in private, commercial and governmental recreation and park organizations.

RPTR 680. Non-Personal Interpretation. 3 Hours.
This course focuses on the theoretical underpinnings and application of non-personal communication methods. This is a project-based course about interpreting historical, cultural, and natural resources.

RPTR 685. Personal Interpretation. 3 Hours.
This course focuses on the theoretical underpinnings and applications of personal communication methods. This is a project-based course about interpreting historical, cultural, and natural resources.

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

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

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

RPTR 714. Outdoor Recreation Behavior. 3 Hours.
This course explores the biophysical, psychological, social psychological, and sociological constructs that contribute to a contemporary, interdisciplinary understanding of outdoor recreation behavior. These concepts will be related to recreation resource management.

RPTR 715. Leisure and Recreation. 3 Hours.
PR: Consent. Study of leisure as a social phenomenon and its implications for recreation.

RPTR 718. Participatory Approaches Natural Resource Management. 3 Hours.
This seminar style class focuses on the adoption of more participatory approaches to managing natural resources. Specific topics will include the use of advisory committees, mediating conflicts, facilitation skills, management partnerships and public participation plans.

RPTR 738. Tourism Planning. 3 Hours.
Use of natural settings; integration of tourism development with respect to environmental protection concerns. (Field trip required; some transportation and food costs.).

RPTR 752. Tourism and Natural Resources Marketing. 3 Hours.
Apply the principles of marketing to tourism and natural resources emphasizing the convergence of increasing tourism demand and destination/resource competitiveness and sustainability.

RPTR 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of recreation, parks, and tourism resources. 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.).

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

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

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

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

RPTR 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.

RPTR 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.).

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

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

RUSS 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.).

SAFM 501. Safety Management Integration. 3 Hours.
Consideration of integrated arrangements, staff roles, management theory, staff liaison, project improvement, effectiveness, audits, and collaboration needed to assure success of the safety function.

SAFM 502. Controlling Environmental and Personnel Hazards. 3 Hours.
Investigation of hazard control principles relating to environmental facilities and equipment including control procedures recommended by authorities from the fields of engineering, medicine, and public health as well as from the field of safety.

SAFM 505. Safety Legislation and Compliance. 3 Hours.
Comprehensive study and analysis of federal and state legislation which mandates compliance with certain safety conditions and practices related to work performed in occupational and comparable settings.

SAFM 511. General Industry Safety. 3 Hours.
PR: Graduate standing. Focuses on management and planning aspects of general industry safety, including walking working surfaces, confined space, machine guarding, electricity, fire protection, emergency planning, and other compliance aspects of 29 CFR 1910.

SAFM 528. Economic Aspects of Safety. 3 Hours.
PR: Graduate standing. An overview of economic factors that must be considered when justifying the development and implementation of safety initiatives, including examining published research, cost estimating, ROI, risk assessment, benefit-cost analysis, and project planning.

SAFM 533. Disaster Preparedness. 3 Hours.
Major elements involved in disasters and emergencies, preparedness planning, systems utilization, and attention to essential human services, with emphasis on community action.

SAFM 534. Fire Safety Management. 3 Hours.
Analysis of fire services usually provided under safety manager jurisdiction, with special attention to legal bases, organizational structure, services rendered, training needs, and management techniques.

SAFM 539. Security Management. 3 Hours.
Safety manager responsibilities for security of persons and property including organizational patterns, personnel competencies expected, surveillance and monitoring methods, and occupational problems among security personnel.

SAFM 550. Loss Control and Recovery. 3 Hours.
A required course with a detailed analysis of Loss Control Management Opportunities to Protect the Major Organizational Elements from damage and loss, with special attention to organizational structure, worker development, investigation of incidents, training needs, and management techniques to identify loss exposures through Job Safety Analysis.

SAFM 552. Safety and Health Training. 3 Hours.
Analysis of safety and health performance discrepancies, developing and conducting training programs to eliminate those discrepancies and the evaluation of program effectiveness in terms of cost effectiveness and organizational impact.

SAFM 578. Substance Abuse in the Workplace. 3 Hours.
The problem, nature, and effects of alcohol and drug use in the workplace; approaches for treatment and avoidance such as EAP's, community programs, and testing; development of management approaches and programs.

SAFM 580. Fundamentals of Environmental Management. 3 Hours.
An introductory but comprehensive overview of topics related to environmental technology as it applies to safety management. Focuses on regulation and technology relative to environmental management. Includes field trip.

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

SAFM 601. Research Method. 3 Hours.
This course introduces students to the research process, research design, and quantitative and qualitative research methods. Students will learn to conduct literature reviews, develop research questions, design studies, collect and analyze data, and write research reports. The course will also cover ethical considerations in research and the interpretation of research findings.

SAFM 602. Systems Thinking. 3 Hours.
This course offers a transformative approach to understanding and addressing complex problems across various domains such as environmental, technological, societal, and economic systems. Students will learn to identify and analyze connections and patterns that influence system behavior through a structured exploration of systems theory, principles, and methodologies. The curriculum emphasizes the development of critical thinking and modeling-based simulation.

SAFM 603. Applied Statistics for Occupational Safety and Health. 3 Hours.
This course is designed to provide students with minimal statistics experience the statistics knowledge they will need to perform competently in the field of safety management and perform research in the area of occupational safety and health.

SAFM 640. Instrumentation for Safety Managers. 3 Hours.
Anticipation, recognition, and evaluation of industrial hygiene topics encountered by safety managers. Fundamental instrumentation techniques are presented in lectures. Management-oriented control and remediation programs are developed.

SAFM 641. Leadership Development for Safety Management. 3 Hours.
This course presents concepts in ethics, leadership in crisis and non-crisis modes, experiential training, and creating a values-congruent workplace even under conditions of non-support by upper management.

SAFM 689. Professional Field Experience. 3 Hours.
PR: Must have completed 12 hours in SAFM and consent. Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

SAFM 691. Advanced Topics. 1-6 Hours.
Investigation of advanced topics not covered in regularly scheduled courses.

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

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

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

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

SAFM 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 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.

SAFM 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of safety and environmental management. Note: This course is intended to ensure 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.).

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

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

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

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

SAFM 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.

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

SBHS 521. Grant Writing for Public Health Practice. 1 Hour.
This course covers the skills and techniques necessary for writing successful grant proposals tailored to foundations.

SBHS 601. Social and Behavioral Theory. 3 Hours.
The focus of this course is on the role of individual behavior in attaining health. Integration of the concepts of health education and behavioral science to facilitate changes in health behavior is addressed.

SBHS 610. Public Health Research Methods. 3 Hours.
Provide students with the practical skills necessary to read, understand, critique, and contribute to the public health literature. Emphasis is placed on common research methods used in public health research.

SBHS 611. Community Assessment. 3 Hours.
Provides students with the knowledge and skills needed to conduct meaningful community needs assessments to improve a community's health. The course will cover various community health topics including the nature of health and its varied social determinants, the use of quantitative and qualitative methods of data collection methods, and data analysis.

SBHS 617. Community Engagement and Advocacy in Public Health. 2 Hours.
Addresses the roles of community engagement and advocacy as essential tools to mobilize organizational and social change. Through lecture, discussion, case studies, self-assessment, and experiential exercises, students develop the knowledge and skills necessary to engage and empower communities through participation and advocacy.

SBHS 619. Intervention Planning & Design. 3 Hours.
This course focuses on the utility of social and behavioral science theories as tools to confront public health problems, understand the behavior change process, and how to develop and implement interventions to address these problems at the intrapersonal, interpersonal, organizational, and community levels. Students create an intervention program plan informed by theory as a skills application experience.

SBHS 620. Implementing and Managing Public Health Programs. 3 Hours.
PR: SBHS 619 or consent. This course provides students with conceptual and practical tools used for implementing and managing health promotion programs. Critical elements include learning to implement theoretically sound intervention programs with high levels of program fidelity; effectively engaging and managing human, financial, and community resources; and identifying and responding to commonly occurring opportunities and challenges. Course methods emphasize cooperative and experiential learning.

SBHS 629. Capstone Course. 2 Hours.
This is the culminating experience for social and behavioral sciences majors in the MPH program and requires students to demonstrate their capacity to synthesize and integrate the core and SBHS departmental competencies via a paper and poster.

SBHS 665. Grant Writing for Public Health Practice. 3 Hours.
PR: SBHS 601 and (SBHS 613 or SBHS 612). This course addresses skills and techniques necessary for writing successful grant proposals for professionals in public health agencies. This is a writing intensive course focused on grant writing and evaluation of social and behavioral based health promotion and disease prevention programs and interventions and is specifically tailored for the public health practice workforce.

SBHS 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of social and behavioral sciences. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given collges teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience.

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

SBHS 693. . 1-6 Hours.

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

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

SBHS 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.

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

SBHS 698. Thesis or Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that believe that this level of control and supervision is needed during the writing of the students' reports, theses, or dissertations.

SBHS 711. Research Translation for Health. 3 Hours.
PR: SBHS 610. Principles, theories, and evidence-based methods of knowledge and research translation for health are discussed to facilitate student competence for translating research discoveries into policies and practices that promote health and prevent disease.

SBHS 715. Intervention Design. 3 Hours.
This course will provide students with the conceptual and practical tools used in planning, designing, implementing, and evaluating health promotion programs. Through reading, cooperative learning, and discussing, students will gain experience in these four areas. Students will also apply information learned in foundation courses.

SBHS 760. Survey Research Methods. 3 Hours.
This course presents scientific knowledge and practical skills used in survey research. Focus is on question construction and development, questionnaire design, sampling and survey modes, interviewing techniques, and survey data analysis. (Also listed as SBHS 660. Students may not count both SBHS 760 and SBHS 660 toward degree requirements.).

SBHS 761. Qualitative Research Methods. 3 Hours.
This course will introduce students to qualitative research methods, including the various types of study design. The course will include critiques of qualitative studies in the relevant research literature as well as student-driven studies using various types of study designs. Students will also learn about analyzing and reporting the results of qualitative studies.

SBHS 763. Advanced Evaluation Public Health. 3 Hours.
PR: PUBH 612 and (SBHS 601 or SBHS 619). Application of scientific public health program evaluation methods. Students will learn about theory and methods of program evaluation, identification of stakeholders, data collection, preparation, analysis, reporting and conclusion.

SBHS 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of SBHS. 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.

SBHS 793. Special Topics. 1-6 Hours.
Study of advanced topics that are not covered in regularly scheduled courses.

SBHS 795. Independent Study. 1-9 Hours.
PR: Consent. Faculty-supervised study of topics not available through regular course offerings.

SBHS 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.

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

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

SCFD 600. Sociology of Education. 3 Hours.
Education as a social institution; cultural and class influences on education; social roles and career patterns in the school system; the school and problems of the community. (Also listed as SOCA 332.).

SCFD 605. Educational Research Literacy. 3 Hours.
This course provides a foundation for graduate students to introduce them to an array of research questions about and research approaches in education, to induct them into ways of framing and pursuing educational research questions, and to orient them to analytically reading and synthesizing published educational research for a variety of methods and theoretical traditions.

SCFD 615. Qualitative Research Methods. 3 Hours.
An introduction to the nature of qualitative research and to techniques of interviewing, observation, and the analysis of documents and other cultural artifacts. Includes guided experience in designing and implementing a qualitative research study.

SCFD 620. Philosophy of Education. 3 Hours.
Examines different systems of educational philosophies focusing on aims, values, and criteria of education. Stresses the application of philosophic thinking to educational language, issues, methods, and subject matter.

SCFD 640. History of American Education. 3 Hours.
Major forces affecting U.S. educational developments at all school levels are examined in political, social, economic, and cultural context. Major historical periods include colonial, early national, pre/post civil war, and late nineteenth to mid-twentieth century.

SCFD 650. Comparative Education. 3 Hours.
PR:Graduate standing. Compares educational systems in selected foreign countries with the United States. Examines formal and informal educational influences in historical and contemporary contexts and in socioeconomic, political, and philosophical perspectives.

SCFD 685. Practicum. 1-12 Hours.
PR: Consent.

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

SCFD 694. Seminar. 1-6 Hours.
Selected topics in historical, sociological, and philosophical foundations of education. (Titles to be announced each semester.).

SCFD 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.).

SCFD 700. John Dewey Studies. 3 Hours.
This seminar focuses on the work of John Dewey. Students examine secondary and primary works. The course traces the influence of Dewey's life and thought from 1859 to present.

SCFD 715. Advanced Qualitative Research. 3 Hours.
PR: SCFD 615. Advanced exploration of methodological issues related to qualitative research, including basic interpretive, case study, grounded theory, phenomenological, and mixed-methods dissertations and research projects. The course also provides a service course for doctoral students in other colleges.

SCFD 781. Nature of Inquiry 1. 1 Hour.
PR: HR&E Interdisciplinary PhD students or consent. First course in a sequence focusing on epistemological, ontological, cultural, and political contexts of educational inquiry. (Grading S/U.).

SCFD 782. Nature of Inquiry 2. 1 Hour.
PR: SCFD 781 or consent. Second course in a sequence focusing on epistemological, ontological, cultural, and political contexts of educational inquiry. (Grading S/U.).

SCFD 783. Nature of Inquiry 3. 1 Hour.
PR: SCFD 782 or consent. Third course in a sequence focusing on epistemological, ontological, cultural, and political contexts of educational inquiry. (Grading S/U.).

SCFD 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of SCFD. 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.).

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

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

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

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

SCFD 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.

SCFD 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.).

SENG 505. Programming Applications with Java. 3 Hours.
PR: Consent. This course serves as an introduction to developing application software. It covers solving problems using the Java programming language. Topics include problem-solving, fundamentals of programming, basic algorithms and data structures, data organization, defensive programming, relational databases and creating database applications.

SENG 510. Software Project Management. 3 Hours.
Techniques and tools for managing the software development process for large development projects.

SENG 520. Software Analysis and Design. 3 Hours.
Defining software requirements and an introduction to the principles and concepts relevant to the design of large programs and software systems.

SENG 530. Software Verification and Validation. 3 Hours.
Tools and techniques for applied verification and validation of computer software including requirements, design, and code relevant to several development lifecycle models.

SENG 540. Software Evolution. 3 Hours.
Software process and the Capability Maturity Model (CMM), software maintenance and evolution, program understanding, reengineering, software configuration management, and software tools related to these issues.

SENG 550. Object Oriented Design. 3 Hours.
Highlights contemporary design and analysis techniques with a strong emphasis on the Unified Modeling Language(UML). The class focuses on problem space analysis utilizing object oriented techniques to produce real world design solutions in UML.

SENG 560. Software Reuse. 3 Hours.
PR: SENG 550 or consent. A detailed study of the business, organizational, and technical implications of large-scale software reuse in modern environments. Architecture, design for reuse, domain engineering, model-driven development, frameworks, library design, reuse tools, and design patterns.

SENG 561. Agile Software Development. 3 Hours.
PR: SENG 550 or consent. Techniques and methodologies of agile software engineering; development team roles, product backlog, sprint planning, sprint execution, test-driven development, sprint retrospective, development tools and environments. Emphasis on successfully managing agile projects in geographically dispersed work environments.

SENG 564. Software Engineering of Mobile Applications. 3 Hours.
PR: SENG 550 or consent. Software engineering of mobile applications and real-world development of mobile technology. Architecture of a simple mobile application. Industry leaders of mobile software engineering. Mobile economics. Mobile software engineering security practices. Mobile enterprise architectures.

SENG 565. Database Design and Implementation. 3 Hours.
PR: SENG 520 and SENG 550. Database Design and Implementation is an introduction to designing and implementing databases, using the relational model, for computer applications. Course projects are designed to develop problem solving, engineering skills, and development skills. Project work will be provided to demonstrate database concepts.

SENG 581. Quality Software Process Management. 3 Hours.
PR: SENG 510 or consent. Evaluate quality theories and practices; research quality history, principles and techniques; and apply software engineering quality management methods and standards to develop software quality model artifacts in an enterprise environment.

SENG 582. Enterprise Architecture Framework. 3 Hours.
PR: SENG 520 or Consent. Study of architecture frameworks used in government and business to design holistic advanced computer systems. Application of frameworks to the enterprise processes, technologies, and people to achieve the enterprise mission and objectives.

SENG 585. Software Engineering Economics. 3 Hours.
PR: SENG 510 or instructor consent. The software engineering economics fundamentals to real-world software economic problems addressed to include software life cycle economics and concepts of risk and uncertainty to software development projects. Application of best practices economic analysis methods for software life-cycle economics, including portfolio and product line management, investment decisions, and earned value management.

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

SENG 610. Strategies for Managing Software Projects. 3 Hours.
PR: SENG 510. Presents best practices for managing software development projects. Addresses leadership, teamwork, issues in modern system development, complexity and its influence on projects, estimating project effort and duration, development of software-intensive systems and systems-of-systems.

SENG 630. Requirements Engineering. 3 Hours.
PR: SENG 520 or consent. Study of the requirements engineering phase of the software development process. Techniques for building strong requirements, including management, analysis, risk mitigation, validation, customer signoff, and change control.

SENG 650. Cloud Computing for the Internet of Things. 3 Hours.
PR: SENG 550 or consent. Investigation of cloud computing techniques and architectures for the Internet of Things (IoT). Basic concepts and current practices of cloud computing and IoT. Topics include cloud computing models, technologies, security, and privacy. Exploration of example applications and patterns of IoT.

SENG 660. Engineering Secure Software. 3 Hours.
PR: CS 230 or SENG 510. This course teaches the application of fundamental cybersecurity principles to all aspects of the software development process. You will learn to manage the development of software in a way that minimizes vulnerabilities, reduces the impact of the potential exploitation of undiscovered vulnerabilities, and addresses root causes to prevent the recurrence of vulnerabilities.

SENG 670. Data Analytics with Applications in Software Engineering. 3 Hours.
PR: SENG 520 and STAT 215 or consent. Foundation of data science, with focus on applications in software engineering. Different empirical methods such as surveys, case studies, and experiments. Threats to validity. Methods for data preparation. Statistics for data understanding and assessment. Commonly used supervised and unsupervised machine learning algorithms.

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

SENG 693. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

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

SENG 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.).

SEP 615. Research Methodology in Physical Education. 3 Hours.
PR: Graduate standing or consent. Application of historical, descriptive, and experimental research strategies and designs to physical education. (Also listed as PET 615.).

SEP 620. Individual Interaction in Sport and Physical Activity. 3 Hours.
PR: SEP 615. Designed to acquaint the student with the reciprocal relationships between sport and physical activity and the societies and culture from which sport emerges.

SEP 640. Sport and Performance Psychology. 3 Hours.
Sport psychological theory, research, and practice related to specific populations in sport and other performance settings. Emphasis on examining and critiquing selected areas of research in sport psychology and applying this knowledge in a given discipline.

SEP 647. Supervision Sport Psychology. 1-6 Hours.
Supervision of graduate-level applied sport psychology consultation.

SEP 686. Internship in Sport and Exercise Psychology. 1-6 Hours.
PR: Graduate student status in SEP PhD Program. Sport behavior supervised experiencing various aspects of sport psychology teaching, research, and/or practice at on-campus or off-campus sites.

SEP 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sport studies. 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.).

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

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

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

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

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

SEP 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.

SEP 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.).

SEP 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.

SEP 699. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students nor 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 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.

SEP 719. Social and Psychological Foundations of Performance. 3 Hours.
PR: SEP 640. An examination of how and why behavior and performance are affected by psychological factors and interactions with others in performance settings. An emphasis is placed upon individual and group performance within sport and other evaluative settings.

SEP 720. Psychological Sport Performance Enhancement. 3 Hours.
An in-depth examination of commonly used interventions designed to maximize the performance of individual athletes and teams.

SEP 721. Counseling College Student-Athletes. 3 Hours.
An exploration of psycho-social aspects of college student- athletes' life experiences and common counseling concerns to include individual and systems intervention used to assist this at-risk group.

SEP 722. Exercise and Health Psychology. 3 Hours.
Major theories and techniques of health behavior change and health behavior assessment especially with respect to exercise.

SEP 723. Psychological Aspects of Sport Injury. 3 Hours.
Explores the psychosocial antecedents to athletic injury and factors related to the psychological experience and treatment of the injured athlete.

SEP 726. Advanced Measurement and Research in Physical Education. 3 Hours.
PR: SS 615. Extension and application of basic concepts of measurement and statistical evaluation to physical education.

SEP 727. Ethical/Legal Issues in sport Psychology. 3 Hours.
Graduate-level seminar on ethical and legal aspects of research, teaching and practice in sport and exercise psychology.

SEP 765. Dissertation and Thesis Seminar. 3 Hours.
Critical development and analysis of the graduate student's dissertation or research proposal.

SEP 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sport 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 not on assistantships to gain teaching experience. (Grading will be S/U.).

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

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

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

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

SEP 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.

SEP 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.).

SHED 600. Foundations of Public Health for School Health Educators. 3 Hours.
This course provides an overview of the five core public health disciplines with an emphasis on school health promotion and child and adolescent health. Course materials will help students develop the theoretical background, philosophical approach, and professional skills required to effectively serve as a public health promotion professional in the school setting.

SHED 601. Emerging Research in Elementary School Health. 3 Hours.
This course provides a critique of contemporary research in children's health and evaluates its influence on current and emerging elementary school health promotion practice. Additionally, it emphasizes building the skills required to properly evaluate the quality of health and educational research articles and reports, as well as those required to properly apply research findings in elementary school settings.

SHED 602. Emerging Research in Secondary School Health. 3 Hours.
This course provides a critique of contemporary research in adolescent health and evaluates its influence on current and emerging secondary school health promotion practice. Additionally, it emphasizes building the skills required to properly evaluate the quality of health and educational research articles and reports, as well as those required to properly apply research findings in secondary school settings.

SHED 603. Community and Context in School Health. 3 Hours.
This course addresses public health in the U.S. with a special emphasis on schools as an important community in which health promotion takes place. Additionally, we discuss the major structural and social forces that influence school and student health outcomes and consider the unique needs of diverse communities of children, adolescents, and families represented within the broader school organization.

SHED 604. Advanced School Health. 3 Hours.
PR: Admission to the school health master's program. Course addresses the teacher's role in organizing and implementing comprehensive school health programs at the elementary and secondary levels. Additional attention is paid to providing instruction specific to the health educator skills and standards.

SHED 640. School Health Program Design. 3 Hours.
PR: Admission to school health master's program. Course provides a practical application experience for students to design a health education course curriculum, demonstrate classroom teaching, and self-evaluate their own teaching.

SHED 645. Evaluating School Health Programs. 3 Hours.
Provides students with the theoretical background and practical skills required to conduct meaningful school-based, health-focused, student assessments and program evaluations. Specifically, students will develop the skills necessary to evaluate and improve elementary and secondary health promotion initiatives, including health education lessons, health promotion programs, and effective implementation of the Coordinated School Health model, including school climate and community collaboration.

SHED 675. Leadership and Advocacy in School Health. 3 Hours.
This course focuses on building the leadership and advocacy skills required to promote health in the school setting. These skills include being able to describe the value of the school health program, enlist the assistance of school and community partners, understand and respond to community concerns, build consensus regarding controversial issues, and anticipate and meet future needs in school health.

SHED 680. School Health Concepts. 3 Hours.
Addresses content areas for health education, the national health education standards, the CDC adolescent risk factors, and healthy people 2010 objectives as applicable to: emotional health, injury prevention, disease and nutrition, and physical activity.

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

SHED 782. Supervised Applied Health Education Project. 1 Hour.
PR: Advanced graduate standing or consent. Doctoral students only. Plan and conduct a health education intervention in other than a classroom setting, i.e., a defined community.

SHED 783. Supervised Health Education Research Report. 1 Hour.
PR: Advanced graduate standing and consent. Doctoral students only. A written report of empirical research of either a survey or an experiment.

SM 502. Revenue Generation and Financial Sustainability in Sport. 3 Hours.
This course covers the various sources of revenue for sport organizations, including ticket sales, donations, sponsorships, media rights, and licensing. The course includes contemporary topics such as name, image and likeness and athlete branding. This course also integrates practical skillsets related to development, including interpersonal skills such as: professionalism, active listening, networking and alumni relations.

SM 503. Data-Based Decision-Making in Sport Organizations. 3 Hours.
Provides a comprehensive overview of the value of data in sport organizations. This class demonstrates how data can be used in sport organizations to inform operational decision-making. Students will learn the value of data planning, collection, analysis, visual and/or graphic representation, and business presentation skills including compelling story telling with data.

SM 504. Human Resource Development and Managing Change in Sport Organizations. 3 Hours.
This class focuses on the application of innovation, management, and organizational change. Students will develop skill sets to build innovative management proficiencies that provide a sustainable competitive advantage in sport organizations.

SM 505. Critical Thinking and Ethics in Sport. 3 Hours.
This course incorporates case studies in which students will wrestle with compliance, governance, and ethics at a deeper, applied level. Practical skill sets learned will include critical thinking, collaboration, persuasion, and diplomacy. This course is meant to prepare future leaders in the sport industry to think and behave critically and ethically.

SM 516. Applied Research in Sport Management. 3 Hours.
PR: Graduate standing or consent. This course is for students enrolled in the master's degree in Sport Management with an area of emphasis of "Comprehensive Sport Industry Management." Students introduced to the fundamentals of research methods and design with an emphasis in the managerial aspects of sport. This course focuses on the importance of research as a tool to inform decision-making in sport.

SM 527. Navigating Legal Issues in Sport Management. 3 Hours.
The NCAA, its rules, and its regulations: In-depth study of professional sport leagues, their constitution, by-laws, regulations, collective bargaining agreements, standard player contracts; legal issues involving sport agents.

SM 535. Management of Human Resources in Sport Organizations. 3 Hours.
PR: Consent. This course takes a broad look at the way sport organizations are managed. Most of the course content is drawn from the literature and resources on both organizational theory and organizational behavior as this course aims to provide students with a solid theoretical background on how sport organizations work.

SM 540. Sport Policy and Governance. 3 Hours.
This course examines the issues and the stakeholders in the governance of sport and sport organizations at the local, national, and international levels. This course provides an in-depth study of the history, development, and organizational structures of the organizations that govern amateur and professional sports.

SM 545. Current Issues & Applications in Sport Management. 3 Hours.
The course specifically focuses on current issues in sport management where an emphasis will be put on applied management skills, decision making, communication, and career development. Students will also apply knowledge of the fundamentals of research methods and design as they read and analyze case studies in sport management.

SM 546. Sport Consumer Behavior and Marketing. 3 Hours.
This course aims to facilitate an understanding of marketing by bringing theories and concepts to bear upon issues in sport marketing. Students will be asked to analyze how sport is marketed from a systems perspective. This class will teach students how to incorporate the perspectives and models relevant to marketing sport organizations and how external companies market through sport entities.

SM 570. Financial Decision-Making in Sport. 3 Hours.
PR: Graduate standing or consent. Examines the financial tools used by sports managers. It explores traditional and innovative methods of revenue acquisition and financial management, the financial business structure of sports organizations, and the financial planning and forecasting processes that make organizations effective. Other aspects of finance are discussed as they relate to sports organizations with a special focus on strategy.

SM 571. Interscholastic Sport Organization and Administration. 3 Hours.
This class is designed to provide current or future interscholastic athletic administrators with fundamental theoretical and practical knowledge to be successful in interscholastic athletics. Topics of administrative principles, managerial responsibilities, and current and potential issues in interscholastic athletics will be covered.

SM 575. Sport Development and Fundraising. 3 Hours.
Blend of fundraising theory and practice. Covers the administrative aspects of conceptualizing, developing, and implementing athletic program fundraising through the actual operation of an assortment of straightforward and complex fundraisers. Numerous practical applications provided to stimulate student learning through the delineation of ‘real world’ athletic program fundraising activities.

SM 578. Leadership in Interscholastic Athletic Administration. 3 Hours.
This course examines contemporary and productive leadership and management principles and concepts used throughout the sport industry, but specifically focused on their use within Interscholastic Athletic Administration. This course also fulfills a requirement to enable students to gain certification as an Interscholastic Athletic Administrator and covers LTCs 504 and 506, which are required for the certification.

SM 580. Social and Ethical Responsibility in Sport. 3 Hours.
This course is designed to foster critical thinking, writing, and discussion about the sociological, cultural and ethical dimensions of sport and their impact upon modern society. Social theories and ethical concepts covered and its application to key social issues that affects the development of sport. Students examine specific cases from a sociological and ethical angle.

SM 586. Sport Facility Operations. 3 Hours.
In-depth study of sport facilities, including planning, design, liability and facility management concepts and evaluation. To fulfill course and module learning outcomes, you will actively participate in learning modules. Each module will contain readings, commentary, and media - each of which will contribute to advancing your knowledge.

SM 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sport management. Note: This course in 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.

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

SM 621. Sport Publicity/Public Relations. 3 Hours.
The course provides an in-depth understanding of effective public relations and publicity in the sport organizational context. In particular, the course focuses on the communication modalities for sport information through public mediums.

SM 630. Sport Sponsorship and Sales Management. 3 Hours.
The project-based course develops an in-depth understanding of sport sponsorship and sales management processes including strategic communication, direct and indirect selling protocols, and brand development.

SM 660. NCAA Compliance and Current Issues. 3 Hours.
PR: Graduate standing. An in-depth analysis of compliance issues impacting collegiate administrators and the NCAA.

SM 685. Internship in Sport Management. 1-6 Hours.
Supervised professional fieldwork providing students with the opportunity for practical application of classroom theory in a professional work environment. Acquire experience in the Sport Management Industry or a related field including areas such as program planning, leadership, supervision, resource/facility management, public relations, entertainment, sales, fund-raising, development, marketing, and evaluation.

SM 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sport studies. 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.).

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

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

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

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

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

SM 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.

SM 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.).

SM 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.

SM 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 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.

SM 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sport 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 not on assistantships to gain teaching experience. (Grading will be P/F.).

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

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

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

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

SM 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.

SM 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.).

SOC 522. Contemporary Sociological Theory. 3 Hours.
Review of recent trends and orientations in sociology. Theory construction, topologies, models, and the relationship between theory and research. Review of current literature.

SOC 600. Becoming a Sociologist. 1 Hour.
The purpose of this seminar is to socialize students into the discipline and profession of sociology. Training to become a professional sociologist includes learning information on (a) policies and procedures, (b) the importance and means of presentation of self, and (c) information on research, teaching and service. Students are required to take this course during their first semester.

SOC 615. Sociological Data Analysis and Interpretation 1. 3 Hours.
Univariate, bivariate, and multivariate analyses of social science data. Topics include descriptive statistics, elementary statistical inference, and linear regression. The use of statistical software to conduct data analysis is also explored.

SOC 616. Sociological Data Analysis and Interpretation 2. 3 Hours.
PR: SOC 615. Advanced regression-based analysis of social science data. Topics include nonlinear regression, mediation and path analysis, methods for analyzing panel data, and techniques for examining categorical dependent variables. The use of statistical software is also explored.

SOC 620. Sociological Research Methods. 3 Hours.
Focuses on the logic of framing and designing social research: Philosophical foundations, connections between theory and methods, narrowing research questions, and making design and data collection decisions. Emphasis on reading and critiquing published studies.

SOC 632. Introduction to Qualitative Data Analysis Software. 3 Hours.
This courses examines the basic functions of computer assisted qualitative data analysis software and shows how it can be used to analyze a variety of types of qualitative data. Topics covered include how to open, import, and manage qualitative data, how to code/recode the data, summarize and report it, and perform a wide variety of procedures.

SOC 640. Quantitative Analysis Using Stata. 3 Hours.
Interpretation and application of social scientific quantitative data analysis concepts and techniques using Stata. Examination of the basic functions of Stata and shows how it can be used to analyze quantitative datasets. Topics covered include descriptive and inferential statistics, how to manage datasets in Stata, and how to perform a wide variety of statistical procedures using Stata.

SOC 689. Field Work. 1-6 Hours.
PR: Departmental consent. Supervised field work.

SOC 693. Special Topics. 1-6 Hours.
PR: Consent. Study of advanced topics that are not covered in regularly scheduled courses.

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

SOC 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

SOC 698. Thesis. 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.

SOC 700. Navigating the Job Market. 1 Hour.
This course is designed to help students successfully navigate the job market. There are four main topic areas covered in this course. These include 1) getting started, 2) the interview process, 3) getting the job, and 4) surviving the first year as a faculty member. Students will take this class in the same semester they defend their dissertation proposal.

SOC 710. Teaching Sociology. 3 Hours.
Students will engage in the literature on teaching and learning, exploring the major issues involved in teaching sociology at the university level. Each student will work with an instructor in the activities that constitute the teaching enterprise in an “apprenticeship” role for the semester. Students are expected to develop a course plan by the end of the semester.

SOC 711. Writing in Quantitative Methods. 3 Hours.
PR: SOC 615 and SOC 616. This course provides students with the resources to write a polished quantitative paper that is suitable for submission to a peer-reviewed journal. The students will revise the paper they have completed as part of the requirements for SOCA 615/616, a research paper from a substantive course, or a paper that is part of a research or grant project.

SOC 715. Advanced Statistical Methods for Sociology. 3 Hours.
PR: SOC 615 and SOC 616. Course covers statistical methods beyond basic descriptive and inferential analysis. Topics may include categorical analysis, structural equation modeling and/or hierarchical linear models. The use of statistical software is also discussed.

SOC 720. Sociological Survey Methods. 3 Hours.
Provides students with tools to evaluate and design survey research projects critically in sociology. Key topics include relationships among sampling, questionnaire construction, and mode choice. Course designed around types of error in surveys and ways to minimize.

SOC 721. Qualitative Methods. 3 Hours.
Provides students with tools to evaluate and design qualitative research projects critically. Focuses on philosophical foundations and researcher/subject roles, considerations associated with data collection, and data analysis methods.

SOC 722. Mixed Methodology for the Social Sciences. 3 Hours.
Focus is on designing and conducting a mixed methods research study including how to identify appropriate research questions and answering them by combining quantitative and qualitative methods approaches.

SOC 724. Structural Equation Modeling for the Social Sciences. 3 Hours.
PR: SOC 640. Focus on how to specify, estimate, and test structural equation models. Topics include path analysis, confirmatory factor analysis and linear models with latent variables. Emphasizes applications to substantive problems in the social sciences.

SOC 725. Introduction to Evaluation Research Methods. 3 Hours.
PR: SOC 620. This course serves as an introduction to evaluation methodology and to the evaluation tools commonly used to assess effectiveness of a wide variety of programs and policies.

SOC 726. Ethnographic Investigation. 3 Hours.
Training in theories and practical application of ethnographic methods. Focus is on understanding the types of questions best answered by ethnographic investigations, why such methods are appropriate, and hands-on training in various styles of ethnography. Students will perform original ethnographic research using the concepts and tools gained.

SOC 727. Demographic Research Methods. 3 Hours.
PR: SOC 620. This course will comprise an overview of demographic data and methods commonly used by professionals in public health practice and research. The course is a graduate level seminar.

SOC 728. Content Analysis. 3 Hours.
Advanced introduction to the analysis of textual content for social insight; surveys classic approaches and recent advances in quantitative and qualitative content analysis; students design and execute projects that analyze textual data for social inference.

SOC 729. Experimental Design and Analysis for Sociology. 3 Hours.
PR: SOC 615 and SOC 616. How to design, carry out, and analyze experiments. Various designs are discussed and their respective differences, advantages, and disadvantages are noted. The use of statistical software to conduct analysis is also explored.

SOC 730. Sociological Explanation. 3 Hours.
Addresses the development and application of sociological theory to empirical research questions. Includes the logic of theory, strategies and steps in constructing theories, and strengths and limitations of theories.

SOC 740. Theories of Crime and Deviance. 3 Hours.
PR: SOC 610. Graduate-level foundation of theory and new empirical research in sociological criminology. Focus is definitive statements from important theoretical traditions and critical empirical tests of these theories. Critiques of the theories or the research generated by them and attempts to translate theories into policy and action.

SOC 750. Systemic Inequalities. 3 Hours.
Examines inequalities that are built into societies' legal, social, and economic structures, with an emphasis on intersecting processes and experiences of inequality. Focuses on analysis of classical and contemporary theories and research and applications to contemporary debates about inequality. These center on a variety of social spheres such as education, housing, labor markets, and the criminal justice system.

SOC 760. Space, Place, and Community. 3 Hours.
PR: SOC 610. Sociological based ideas about space, place and community, discussing the theoretical contributions in these areas, assessing the methodological contributions to the discipline and linking them all to sub-areas within community, including urban, rural, medical and environmental sociology.

SOC 770. Sociology of Religion. 3 Hours.
This course examines factors that lead to conversion, apostasy, and religious commitment and explores what makes certain religious traditions more effective at gaining and retaining members. Focuses on analysis of classical and contemporary sociological theories of religion that provide a framework for understanding past, present, and future religious phenomena, including the role of religion in society.

SOC 780. Individual and Society. 3 Hours.
PR: SOC 610. Examines micro and macro-linkages and uncovers relationships between society and the perceptions, beliefs, and behaviors of individuals.

SOC 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sociology.

SOC 793. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

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

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

SOC 798. 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.

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

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

SOCA 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sociology and anthropology. 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.).

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

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

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

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

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

SOCA 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.

SOCA 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.).

SOCA 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.

SOCA 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 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.

SOCA 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of sociology. 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.).

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

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

SOCA 798. 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.

SOWK 513. Research Methods. 3 Hours.
PR: Graduate standing in SOWK. Introduction to social work research methods, with the unifying theme of the importance of evidence-based practice. Content prepares students to develop, use, and communicate empirically based knowledge effectively. Research knowledge is used to provide high-quality services; initiate change to improve practice, policy and social service delivery; and evaluate practice at all levels.

SOWK 520. Human Behavior in the Social Environment. 3 Hours.
PR: Graduate standing in SOWK. Theories underlying human behavior within the social environment, including human development as well as behavior within families, groups, organizations, and communities. Special attention is given to issues of human diversity and the challenges and opportunities offered by rural environments.

SOWK 530. Professional Identity and Social Justice. 3 Hours.
PR: Graduate standing in SOWK. Provides the basic framework for generalist social work practice, theory, and professional values. Examines social work practice from an empowerment, human rights and social justice perspective. Addresses contemporary issues in social work reflecting the unique needs of diverse populations, settings and social conditions.

SOWK 531. Social Welfare Policy and Programs. 3 Hours.
PR: Graduate standing in SOWK. Development of foundational understanding and appraisal of social welfare policies and programs in the United States, and of the historical and contemporary forces that shaped their development. Introduces conceptual approaches to policy analysis and assesses selected social policies, programs regarding income maintenance, health care and social services with emphasis on impact in rural areas.

SOWK 540. Generalist Practice 1: Individuals, Families, and Groups. 3 Hours.
PR: Graduate standing in SOWK. Development of a generalist framework for social work practice at the micro and mezzo levels. Reinforcement of engagement, assessment, and intervention skills with attention to strengths-based perspective and multi-culturally competent social work practice. Focus on developing theoretical knowledge as well as practicing and applying specific techniques necessary for generalist social work practice.

SOWK 541. Generalist Practice 2: Rural Community Macro Practice. 3 Hours.
PR: Graduate standing in SOWK. Students learn to identify and understand social problems in rural communities. Development of knowledge and skills in community and organizational practice to assist rural communities effectively, to enhance their empowerment through acquisition and mobilization of resources.

SOWK 581. Generalist Field Experience. 3-6 Hours.
PR or CONC: SOWK 530 and SOWK 540 and graduate standing in Social Work. Community-based generalist field placement and an integrative seminar. Students learn to apply generalist engagement, assessment, intervention, and evaluation skills. Students also acquire an understanding of responding to social and human problems within the context of social work values and ethics, social justice, and affirmation of the human rights of diverse groups of people.

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

SOWK 616. Evaluation Research in Social Work. 3 Hours.
PR or CONC: SOWK 682 and graduate standing in Social Work. Prepares students to evaluate social work practice and health and human services programs. Students learn to design an evaluation study, collecting qualitative and quantitative data, and to report and interpret results while adhering to ethical research standards.

SOWK 626. Child Mental Health: Promotion, Prevention, and Treatment. 3 Hours.
PR: Graduate standing in SOWK. Examines the structure of the United States' public mental health system for children and related policy issues. Analysis of mental-health construct across a prevention-treatment continuum. Students learn to distinguish universal, selected, and indicated prevention from treatment. Risk and protective factors, evidence-based prevention and treatment interventions are evaluated throughout the course.

SOWK 627. Clinical Practice in Integrated Healthcare. 3 Hours.
PR: Graduate standing in SOWK. Prepares students to address challenges of integrating services for persons with health, mental health and substance use problems. Addresses language and culture of health, theories and models for integrated health care. Examines role of behavioral health providers in primary care settings. Examines multidisciplinary team practice and best practices for assessment and intervention.

SOWK 633. Social Policy Analysis, Advocacy, and Deliberation. 3 Hours.
PR: Graduate standing in SOWK and students must have completed SOWK 531 or have Advanced Standing status. Focus is on contribution of social work and social welfare to the human condition and communities. Analyzes ideologies and values, and their impact on policy and social work practice. Students analyze social problems and issues, and reach conclusions about strategies to empower clients.

SOWK 643. Assessment and Diagnosis. 3 Hours.
PR: Graduate standing in SOWK and students must have completed all 500-level courses in the MSW degree plan or have Advanced Standing status. Analyzes mental illness assessment and diagnosis from a social work perspective. Examines the impact of major mental illnesses on diverse client populations across the life cycle and multi-level systems. Assessment, diagnostic, and intervention strategies are provided for advancing social work methods of assessment and diagnosis within integrated practice settings.

SOWK 649. Practice with Individuals. 3 Hours.
PR: Graduate standing in SOWK and students must have completed all 500-level courses in the MSW degree plan or have Advanced Standing status. Focus on social work theories and methods consistent with integrated practice with individuals. Emphasis on evidence-based theories and methods relevant to integrated practice in contemporary settings. Advanced integrated practice addressed within a context of professional social work values and ethics, social justice, and affirmation of the human rights of diverse groups of people.

SOWK 650. Practice with Families and Groups. 3 Hours.
PR: Graduate standing in SOWK and students must have completed all 500-level courses in the MSW degree plan or have Advanced Standing status. Exploration of advanced integrated social work practice with families and groups. Emphasis on group work and family intervention relevant to integrated practice in contemporary settings, the context of professional social work values and ethics, social justice, and affirmation of the human rights of diverse groups of people.

SOWK 654. Organizational Administration and Leadership. 3 Hours.
PR: Graduate standing in SOWK. Examination of concepts, principles, and skills of social agency and program administration from an integrated practice perspective. Includes programming, budgeting, staffing, organization, and management of social agencies and programs. Addresses relationships with constituents and other human service organizations and systems within a context of professional social work values and ethics, social justice, and human rights.

SOWK 656. Financial Management and Grant Writing. 3 Hours.
PR: Graduate standing in SOWK. Focus is on grant development and financial management in nonprofit settings from an integrated practice perspective. Topics include grant seeking, proposal development, budgeting, and nonprofit management within the context of professional social work values and ethics, social justice, and affirmation of the human rights of diverse groups of people.

SOWK 675. Addiction and Social Work Practice. 3 Hours.
PR: Graduate standing in SOWK. Examination of theoretical and neuro-biological perspectives on addiction from an integrated practice perspective. Study of evidence-based intervention strategies used for engagement, assessment, and treatment of individuals who have substance use disorders. Discussion of impact of substance-use disorders and addiction on families and society. Review of substance use-related social policies.

SOWK 680. Child Welfare Continuum. 3 Hours.
PR: Graduate standing in SOWK. Theories and methods of integrated practice related to child welfare, including child welfare policy and services, family preservation/home-based services, adoption, foster, and residential care. Also includes community-based practices and intervention in the context of professional social work values and ethics, social justice and affirmation of human rights.

SOWK 682. Advanced Field Experience. 3-5 Hours.
PR: Graduate standing in SOWK and students must have successfully completed SOWK 582 or have Advanced Standing status and students are expected to take all sections of SOWK 682 in sequence as denoted on their degree plans. Community-based advanced field placement and integrative seminar. Students learn to apply advanced integrated practice skills. They engage with interdisciplinary teams to address social and human problems within a context of social work values and ethics, social justice, and affirmation of the human rights of diverse groups of people.

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

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

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

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

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

SOWK 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.

SOWK 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.).

SOWK 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.

SOWK 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.

SOWK 731. Philosophy and Theories of Social Sciences. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course provides an overview of the history and evolution of social science philosophy and theories. This overview serves as a contextual base to examine the history and development of the social work profession and underlying foundation of contemporary social work practice.

SOWK 732. Advanced Social Work Practice Theories. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course expands on content covered in Philosophy and Theories of Social Sciences by focusing on classic and contemporary social work practice theories. Students will examine key theories in their area of research interest and begin the development of a theoretical foundation for their own work.

SOWK 735. Advanced Social Work Research Methods. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course provides essential skills for independent research. Students learn advanced skills related to hypothesis formulation, operationalization of variables and measurement, issues of validity and reliability, data collection methods, sampling, and quantitative research designs. Students apply research concepts to their own substantive interest area. Examination of research methods is grounded in the context of social work values and ethics.

SOWK 736. Community Focused Research. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course expands on topics taught in Advanced Social Work Research Methods and examines qualitative, mixed methods, and program evaluation research designs commonly utilized in community focused research. The challenges and strategies of data collection and analysis across designs are addressed, with particular focus on ethics and community engagement strategies.

SOWK 741. Statistics & Data Analysis 1. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course begins a two-semester sequence in statistics. This first course provides an introduction to the fundamentals of quantitative reasoning, probabilistic analysis, and statistical inference as applied in social science research. Students will develop a conceptual framework for approaching quantitative problems and build a strong foundation for understanding increasingly complex methods and applications in the second semester.

SOWK 742. Statistics & Data Analysis 2. 3 Hours.
PR: PhD student in Social Work or instructor permission and preceded by Statistics & Data Analysis 1 or instructor permission. This course is the second in the statistics and data analysis sequence. The course focuses on regression topics and other methods based on the linear model. There will be a special emphasis on issues that arise in data analysis, model building, and interpretation of empirical results. Advanced techniques on specific topical areas will be discussed.

SOWK 750. Advanced Social Policy and Programs. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course assists students in developing an advanced understanding of social policy and programs and provides opportunity to analyze policies at all levels as related to their research area of focus. Special emphasis is placed on issues related to organizational leadership and implementation science in health and human service organizations.

SOWK 761. Research Practicum 1. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course prepares students for the initial stages of independent research with a focus on problem definition, hypothesis formulation, literature review, and application of theoretical perspectives appropriate to the research question. Content related to external funding and grant pathways related to students' areas of research are also addressed.

SOWK 762. Research Practicum 2. 3 Hours.
PR: PhD student in Social Work or instructor permission and preceded by Research Practicum 1 or instructor permission. This course prepares students for independent research with a focus on design and measurement. Students develop an advanced conceptual understanding of skills used in research design and measurement, with emphasis on community focused research. The Institutional Review Board (IRB) review process as it applies to students' substantive areas is also addressed.

SOWK 770. Issues in Social Work Education. 3 Hours.
PR: PhD student in Social Work or instructor permission. This course examines the history and current philosophy of social work education within the context of higher education. Topics include higher education as a setting for social work education programs, career advancement in the academy, significant developments in the evolution of social work education, accreditation and curricula design, and current issues in social work education.

SOWK 780. Integrative Research Seminar. 3 Hours.
PR: PhD student in Social Work or instructor permission and preceded by all other PhD coursework in Social Work or instructor permission. This seminar provides students with faculty and peer feedback in the development of their comprehensive exam in the form of a dissertation proposal. Emphasis is placed on conceptual and methodological congruency of the proposed research. A plan for manuscript writing based on the 3-article dissertation format is developed. Professional development as an academic researcher and/or organizational leader is also addressed.

SOWK 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper, scholarly project, or a dissertation. Grading is S/U.

SPAN 521. Dialectology and Sociolinguistics. 3 Hours.
This course covers the variation of the Spanish language from geographical and social perspectives. Students will learn about variation at multiple levels of the grammar including its phonology, morphology, lexicon and syntax. The first part of the course will concentrate on the diatopic variation while the second part will look at the role of external forces and socially induced changes.

SPAN 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of Spanish. 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.).

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

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

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

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

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

SPAN 610. Methods of Research. 3 Hours.
Fundamentals of literary and cultural research, writing and publishing, both in form and content. Topics include: selection and definition of a corpus of study; formulation and articulation of a research hypothesis; research and evaluation of secondary sources; formats for literary/cultural research projects; online research engines; alternative secondary sources; professional conference presentations; and academic article submissions.

SPAN 611. Literary Criticism. 3 Hours.
Introduction to the main tendencies of contemporary literary theory as applied to Spanish literature; literary theory and practice. Review and evaluation of the main critical approaches from a practical standpoint.

SPAN 630. Latin American Culture. 3 Hours.
A study of history, culture, politics, economics, and development of the Latin American continent.

SPAN 631. Latin American Short Story. 3 Hours.

SPAN 633. Latin American Novel Since 1960. 3 Hours.

SPAN 637. Early Spanish-American Literature. 3 Hours.
In depth readings in Spanish-American literature of the colonial period in their historical context.

SPAN 638. Mexican Literature. 3 Hours.
In-depth readings of literary works from Mexico.

SPAN 639. Gaucho Culture and Literature. 3 Hours.
In-depth study of the culture and literature of the Gaucho in the historical and political context of Argentina and Uruguay. Taught in Spanish.

SPAN 640. 19th Century Latin American Literature. 3 Hours.
In-depth study of the main literary works and movements in Latin America from Neoclassicism to Modernism. Taught in Spanish.

SPAN 641. 20th- and 21st-Century Latin American Literature. 3 Hours.
In-depth study of the main literary works and movements in Latin America from early 20th century to the present. Taught in Spanish.

SPAN 643. Contemporary Spanish Literature. 3 Hours.
Introduction to the major tendencies, authors, and works of Spanish Peninsular Literature from the late 19th Century to nowadays; presentation and analysis of the main literary movements of the period.

SPAN 651. Medieval and Golden Age. 3 Hours.
In-depth reading in Spanish literature of the Middle Ages Renaissance, and Baroque periods, in narrative, drama, and poetry, within its historical context. Non-canonical works will also be included and studied.

SPAN 652. Cervantes. 3 Hours.
PR: 24 hours of Spanish or consent.

SPAN 653. Eighteenth and Nineteenth Century Literature. 3 Hours.
Introduction to the major tendencies, authors, and works of the 18th and 19th Centuries Spanish Peninsular Literature; presentation and analysis of the main literary movements of the period, from the Enlightenment to Naturalism.

SPAN 654. Spanish Literature 1898-1936. 3 Hours.
Survey of the major trends and representative authors and works of the Modernist period in Spain.

SPAN 655. Spanish Literature 1936-1975. 3 Hours.
In-depth study of Spanish literature published between 1936, the outbreak of the Spanish Civil War, and 1975, the end of the Franco dictatorship. Focus on all genres and their historical context.

SPAN 656. Spanish Literature after 1975. 3 Hours.
Survey of the major trends and representative authors and works of Spanish literature since the end of the Franco dictatorship.

SPAN 672. Spanish Women Writers. 3 Hours.

SPAN 673. Hispanic Literature and Film. 3 Hours.

SPAN 674. Afrohispanic Literature. 3 Hours.
The reading, discussion, and analysis of literature written by Hispanic authors of African descent.

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

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

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

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

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

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

SPAN 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.

SPAN 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.).

SPAN 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.

SPAN 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.

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

SPAN 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.

SPED 500. Legal/Educational Foundations: Special Education. 3 Hours.
Comprehensive overview of legal requirements and educational practices related to exceptionalities which require special education.

SPED 501. Academic Interventions for Special Needs. 3 Hours.
Curriculum development and instructional programming across academic content areas for students with mild/moderate disabilities.

SPED 513. Internship: Multicategorical Special Education K-6. 3 Hours.
PR: Consent. Internship or advanced student teaching for certification or additional endorsement to work with students with mild/moderate disabilities in grades K-6.

SPED 514. Internship: Multicategorical Special Education 5-Adult. 3 Hours.
PR: Consent. Internship or advanced student teaching for certification or additional endorsement to work with students with mild/moderate disabilities in grades 5-12.

SPED 561. Individualizing Academic Instruction for Special Needs. 3 Hours.
Planning, implementing and evaluating modifications to core academic curriculum in reading/literacy, mathematics, science and social studies; developing unit plans and lesson plans using Differentiated Instruction and Universal Design for Learning; designing individualized learning activities and instructional materials to teach academic content.

SPED 562. Designing Supportive Learning Environments for Special Needs. 3 Hours.
Designing and arranging learning environments that support diverse learners and promote inclusion of students with disabilities; using classroom settings, schedules, activities, and expectations to create a positive classroom climate and promote engagement in learning by students with and without special needs; using positive behavior supports to manage individual and group behaviors in the classroom.

SPED 563. Co-Planning/Co-Teaching for Inclusion for Special Needs. 3 Hours.
Developing successful working relationships with teacher colleagues, implementing models of professional collaboration and consultation in school settings; implementing models of co-teaching in classroom environments; coordinating planning and teaching activities for co-taught lessons; applying conflict management and problem resolution strategies to facilitate collaboration in inclusive schools.

SPED 564. Initial Professional Practice for Special Needs. 1 Hour.
Mentored initial classroom practice in applying evidence-based practices for students with disabilities related to individualized instruction, classroom and behavior management, and collaboration and consultation; guided self-assessment of and reflection on entry-level performance related to state teaching standards to inform professional development.

SPED 565. Promoting Academic Learning and Achievement for Special Needs. 3 Hours.
Designing, planning and implementing evidence-based practices and specialized instructional strategies for students with disabilities; conducting curriculum-based assessments to monitor student progress and evaluate achievement of learning outcomes in the core academic curriculum in reading/literacy, mathematics, science and social studies.

SPED 566. Individualizing Behavior Interventions for Special Needs. 3 Hours.
Developing and conducting functional behavior assessments to target inappropriate behaviors exhibited by students with disabilities; designing and implementing individualized Behavior Intervention Plans to promote student engagement and manage inappropriate behaviors in the classroom; collecting and interpreting data to assess effectiveness of Behavior Intervention Plans.

SPED 567. Collaborating for Effective Educational Programs for Special Needs. 3 Hours.
Legal and education foundations of special education services, including eligibility, placement, individual education programs, and collaborative programs; strategies for developing partnerships with families and collaborating with professionals from education and related services disciplines; team-based strategies for developing individualized education programs planning for transition into adulthood.

SPED 568. Advanced Professional Practice for Special Needs. 2 Hours.
Mentored advanced classroom practice in applying evidence-based practices for students with disabilities related to individualized instruction, classroom and behavior management, and collaboration and consultation; formal professional assessment of end-of-year performance related to state teaching standards to inform planning for future professional development.

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

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

SPED 600. Instructional/Assistive Technology. 3 Hours.
Characteristics and functions of instructional and assistive technologies; selection,design and implementation of devices for mobility, manipulation, environmental control communication, and learning; and legal mandates, ethical issues and policy initiatives in technology adoption and utilization.

SPED 602. School-Based Assessment for Special Needs. 3 Hours.
Development of expertise in various forms of cognitive and effective assessment techniques, understanding psychoeducational needs of exceptional learners, and designing appropriate educational prescriptions from assessment protocols.

SPED 603. Classroom/Behavior Management for Special Needs. 3 Hours.
Theory and classroom application of procedures to implement behavior changes in children with mild/moderate disabilities and/or problems; effective group and individual behavior management.

SPED 604. Characteristics/Educational Adaptations: Developmental Disabilities. 3 Hours.
Characteristics and educational implications of physical, neurological, and sensory impairments; management strategies, adaptive equipment and assistive technology; and functional skills training programs for infants, toddlers and preschoolers with special needs and persons with severe disabilities.

SPED 605. Family/Professional Collaboration: Developmental Disabilities. 3 Hours.
Strategies and interpersonal skills for needs assessment, conferencing and training; parental involvement; interdisciplinary teaming interagency collaboration in educational programs for infants, toddlers, and preschoolers with special needs and persons with severe disabilities.

SPED 606. Communication and Literacy Intervention: Developmental Disabilities. 3 Hours.
Design and implementation of assessment, instruction and augmentative communication devices to promote learning of communication, oral language and early literacy skills by infants, toddlers and preschoolers with special needs and persons with severe disabilities.

SPED 607. Formal and Informal Assessment: Developmental Disabilities. 3 Hours.
Principles and practices of assessment, legal and ethical issues in assessment, and using assessment results to plan individualized educational programs for infants, toddlers, and preschoolers with special needs and persons with severe disabilities.

SPED 609. Technology Applications for Special Needs. 3 Hours.
Implementing computer-assisted and online instruction in the special education programs; technology tools for student learning and collaboration as well as teacher design and management of instruction.

SPED 610. Typical/Atypical Development: Early Intervention. 3 Hours.
Characteristics of atypically developing children from birth through age six; causes and correlates of developmental delays and disabilities and at risk conditions during the prenatal, perinatal and postnatal periods; and strategies for promoting child development in early intervention programs.

SPED 611. Early Learning Curriculum: Early Intervention. 3 Hours.
Design and evaluation of developmental and pre-academic curricula based on early learning standards and individualized family service or education plans for infants, toddlers, and preschoolers with special needs.

SPED 612. Responsive Intervention: Early Intervention. 3 Hours.
Design, delivery and evaluation of individualized instruction for infants, toddlers, and preschoolers with special needs using relationships and routines-based interventions to promote early development, parent-child interactions, and acquisition of pre-academic skills.

SPED 613. Inclusive Practices in Early Childhood Education Settings. 3 Hours.
Inclusive practices in early childhood education programs for children with developmental disabilities, delays and at risk conditions from three to eight years of age; pre-academic and social skills development with attention to designing curricula, individualized education programs, and evidence-based practices to foster pre-academic and social skills of individual learners with special needs in inclusive settings.

SPED 616. Behavior Guidance/Support: Early Intervention. 3 Hours.
Development guidance and positive behavior support for infants, toddlers and preschoolers with special needs in home-and center-based programs to foster emotion development social skills and appropriate behavior.

SPED 617. Birth to Three Services for Children and Families. 3 Hours.
Overview of services for infants and toddlers with disabilities or at risk and families, including assessment; natural environment; role and importance of family; routines-based intervention model; importance of quality interactions among caregivers and children; collaboration among family members, caregivers, and early intervention providers; and transition process.

SPED 619. Culminating Practicum: Early Childhood Special Education. 6 Hours.
PR: Consent. Internship or advanced student teaching in this area of specialization. Early intervention/early childhood special education.

SPED 620. Standards-Based Curriculum: Severe Disabilities. 3 Hours.
Design and evaluation of academic and functional curricula based on state content standards and individualized education and habilitation plans for children and adults with severe disabilities.

SPED 622. Instructional Programming: Severe Disabilities. 3 Hours.
Design, delivery and evaluation of individualized instruction for children and adults with severe disabilities to promote access to the general education curriculum and develop academic, social and functional skills in inclusive school and community environments.

SPED 625. Secondary/Adult Programs: Severe Disabilities. 3 Hours.
Education and habilitation in secondary and post-secondary programs for children and adults with severe disabilities in functional academics, vocational training, independent living, productive employment, community participation, recreation/leisure skills, and sexuality and aging.

SPED 626. Positive Behavior Support:Severe Disabilities. 3 Hours.
Strategies for functional analysis, prevention, intervention, and crisis management of self-injury, stereotypes, self-stimulation, noncompliance, and aggression; legal and ethical issues in management of problem behavior.

SPED 629. Culminating Practicum: Severe/Multiple Disabilities. 6 Hours.
PR: Consent. Internship or advanced student teaching in this area of specialization. Severe/Multiple Disabilities.

SPED 630. Intro Low Vision/Blindness. 3 Hours.
Vision impairments and their impact on development and learning; psychosocial aspects of vision loss for individual and family; functional vision assessment; legal and educational foundations of programs for individuals with low vision/blindness.

SPED 631. Introduction to Braille. 3 Hours.
Fundamentals of Braille code, employing Braille code for reading and writing, implements for production of Braille code, and uses of Braille code by individuals with low vision/blindness.

SPED 632. Braille Reading and Literacy Development. 3 Hours.
PR: SPED 631. Assessment of literacy skills; teaching of reading and writing, using print enhancements, assistive technologies and Braille; teaching Braille readiness and Braille reading and writing skills; development of literacy in individuals with low vision/blindness.

SPED 633. Nemeth Code and Mathematics Development. 3 Hours.
PR: SPED 631. Assessment of mathematics skills; teaching of computation and problem solving using print enhancements, assistive technologies and Nemeth code; teaching Nemeth code for mathematics and other areas; development of numeracy in individuals with low vision/blindness.

SPED 635. Teaching Students With Low Vision/Blindness. 3 Hours.
Classroom and itinerant teaching models; design and delivery of instruction in academic and functional skills and selection of methods, materials and environments to promote learning by individuals with low vision/blindness.

SPED 636. Teaching Students With Vision/Multiple Impairments. 3 Hours.
Service delivery models; design and delivery of instruction in academic and functional skills and selection of methods, materials and environments to promote learning by individuals with multiple impairments (vision impairments plus other impairments).

SPED 637. Basic Orientation and Mobility Skills. 3 Hours.
Environmental cues, environmental arrangement, travel skills and mobility aids as well as strategies for teaching individuals with low vision/blindness orientation and mobility skills for safety and independence.

SPED 639. Culminating Practicum: Low Vision/Blindness. 6 Hours.
PR: Consent. Internship or advanced student teaching in this area of specialization: low vision/blindness.

SPED 650. Learning Characteristics:Autism. 3 Hours.
Characteristics and educational implications of autism spectrum disorders, assessment of individual learning and behavior, and panning, implementing and collaborating in the design of programs and services for children and adults.

SPED 652. Educational Interventions: Autism. 3 Hours.
Design, delivery and evaluation of instruction for individuals with autism spectrum disorders, use of assistive technology and augmentative communication and implementation of functional behavior assessment and positive behavior support for children and adults.

SPED 653. Professional Ethics for Behavior Analysts. 3 Hours.
This course will provide for prospective behavior analysts a range of ethical principles and practices appropriate to governing self-guided professional activities, as well as those conducted for and with external agencies, service recipients, and their caregivers and families.

SPED 654. Foundations and Philosophies of Applied Behavior Analysis. 3 Hours.
The purpose of this course is to provide a philosophical and procedural foundation in the science and technology of behavior analysis. Course concepts will connect basic findings from behavioral research to fundamental treatment concepts and applications for professionals.

SPED 655. Naturalistic and Functional Analyses of Behavior. 3 Hours.
The purpose of this course will be instruction in the use of functional behavior assessment and functional analysis procedures, as well as the proper use of these procedures within the steps of creating and implementing effective, evidence-based programs of behavior change. Emphasis will be placed on connecting assessment results to the interventions most likely to produce desired, sustainable change.

SPED 656. Methods in Behavioral Intervention and Treatment. 3 Hours.
The purpose of this course will be to instruct students in the use of specific techniques for (a) applying the principles of operant conditioning, (b) adapting techniques for individual needs and preferences, (c) modifying behavior in applied settings, and (d) evaluating and adjusting intervention components for maximal effectiveness.

SPED 657. Systems for Behavior Change/Team Building/Case Management. 3 Hours.
This course will integrate the thoughtful use of behavior change systems (e.g., those that plan for sustainability and generalization) with procedures for training agency staff, families, and education professionals in the implementation of behavior support plans. Special emphasis will be placed on effectively and efficiently assessing procedural integrity, social validity, and the level of intrusiveness of behavioral treatments.

SPED 659. Culminating Practicum: Autism Spectrum Disorders. 6 Hours.
PR: Consent. Internship or advanced student teaching in this area of specialization: Autism spectrum disorders.

SPED 661. Transition Planning and Programs for Students with Disabilities. 3 Hours.
Laws, policies, and evidence-based practices related to transition for students with disabilities, including assessment, transition planning, and instructional methods to facilitate successful postsecondary enrollment, employment, daily living, social relationships, and community involvement.

SPED 662. Differentiating Instruction for English Language Learners with Disabilities. 3 Hours.
Overview of second language learning; characteristics and needs of individuals with disabilities when English is a second language; and evidence-based strategies for using universal design and differentiated instruction to plan, implement and evaluate instruction for K-12 students who have disabilities and are English Language Learners.

SPED 663. Collaborative-Consultative Inclusion Strategies. 3 Hours.
Strategies for building and maintaining effective collaborative teams for the inclusive environment. Communication, decision making, group dynamics, and conflict resolution will be discussed.

SPED 665. Mathematics for Special Needs. 3 Hours.
Comprehensive approach to mathematics instruction for students with mild/moderate disabilities, curriculum design and modifications, curriculum-based assessment of individual needs and learning outcomes, and research-based strategies to address special needs in mathematics.

SPED 666. Reading for Special Needs. 3 Hours.
Comprehensive approach to reading instruction for students with mild/moderate disabilities, curriculum design and modifications, curriculum-based assessment of individual needs and learning outcomes, and research-based strategies to address special needs in reading.

SPED 667. Elementary Content Methods. 3 Hours.
Elementary programs for students with mild/moderate disabilities, planning and delivering research-based intervention in reading, mathematics and written expression to address content standards and learning needs, and academic study survival skills.

SPED 668. Secondary Content Methods. 3 Hours.
Secondary and post-secondary programs for students with mild/moderate disabilities, planning and delivering research-based intervention in core content areas to address content standards and learning needs and development and implementation of transition plans.

SPED 669. Culminating Practicum: Multicategorical Special Education. 6 Hours.
PR: Consent. Internship or advanced student teaching in this area of specialization: multicategorical special education.

SPED 670. Gifted Learners: Identification and Development. 3 Hours.
Introductory course concerning characteristics of gifted and talented children and implications these factors have for education. Definition, characteristics, history and philosophy of special programs, identification procedures, and development of program prototypes across grade levels.

SPED 671. Gifted and High Ability Learners in Inclusive Classrooms. 3 Hours.
Characteristics of gifted and high academic ability students that create opportunities and challenges for learning in general education classrooms; differentiated instructional strategies to tailor academic curriculum content to individual needs; design of project-based learning for individual and group instruction; collaboration strategies to coordinate work of gifted education specialists and general education teachers at the elementary and secondary levels.

SPED 672. Teaching Strategies: Gifted Education. 3 Hours.
Development of qualitatively different educational experiences for gifted students. Models of differentiation in contents, process, and product in academic areas.

SPED 674. Support for Special Populations in Gifted Education. 3 Hours.
Emotional and social needs of students who are gifted and talented, strategies for designing instructional programs to foster emotional maturity and social relationships, and considerations for working with special populations of gifted and talented individuals.

SPED 675. Research to Practice. 3 Hours.
Identification of special education issues and action research strategies for investigating issues in educational practice.

SPED 676. Critical Thinking/Creativity in Gifted Education. 3 Hours.
Definition and rationale for promoting critical thinking and creativity skills in students who are gifted and talented; design of instructional activities to teach reasoning, problem solving, decision making, brainstorming, and creative problem solving.

SPED 679. Culminating Practicum: Gifted Education. 6 Hours.
PR: Consent. Internship or advanced student teaching in this area of specialization: gifted education.

SPED 680. Culminating Project. 6 Hours.
PR: Consent and completion of all required courses. Planning for and completion of an individualized project in applied research or curriculum development or program design to document integration of knowledge and skills across courses as the final requirement for completion of the Master's degree in special education. (6 hr. lec.).

SPED 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in the college teaching of special education. 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.).

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

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

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

SPED 697. Research. 1-15 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.).

SPED 713. Designing Single Case Research. 3 Hours.
Measurement and design tactics for research with one or a small number of participants allowing the researcher to identify effective practices for individual students or clients.

SPED 767. Professional Product Preparation. 1 Hour.
Supervised experiences in planning and developing responses, preparing documentation, and responding to faculty feedback in the preparation of professional products for committee review.

SPED 768. Prospectus Development. 1-6 Hours.
Supervised experiences in planning the dissertation research project, developing the chapters for the prospectus, and preparing the proposal document for review by committee members.

SPED 769. Faculty Career Development. 1 Hour.
Supervised experiences in searching for available positions, preparing and submitting application materials, participating in campus interviews, and planning a successful future career.

SPED 770. Policy Analysis and Development. 3 Hours.
Advanced foundations of special education and disability services; historical trends and philosophical perspectives; policy review, analysis, research, and formulation; and advocacy roles and activities related to policy development.

SPED 771. Personnel Preparation Strategies. 3 Hours.
Design, delivery and evaluation of preparation programs in special education and disability services; observation, supervision and evaluation of student teaching and practicum experiences; issues and trends in special education personnel preparation.

SPED 772. Professional Writing and Grant Writing. 3 Hours.
Writing for professional publication in special education and disability services; review and editing of the written works of others; grant writing and review for private foundations or state and federal agencies.

SPED 773. Professional Development Models. 3 Hours.
Design, implement, and evaluate professional development for practitioners in special education and disability services, including induction and mentoring programs, peer and consultant coaching, in-service training for individuals and groups, and communities practice.

SPED 774. Analysis and Design of Research. 3 Hours.
Research literature in special education and disability services; integrative reviews and research critiques; formulation of research questions; translation of questions into appropriate research designs for participants with exceptionalities; preparation of research proposals.

SPED 775. Program Administration and Supervision. 3 Hours.
Planning/implementing service delivery for eligibility, placement, program planning, and assessment; developing/ managing budgets with multiple funding sources; staffing practices for hiring and monitoring personnel; communication and interaction skills for collaborative activities.

SPED 776. Leadership for System Change. 3 Hours.
Theories of leadership; current and evolving legislative mandates and service paradigms in special education and disability services; planning, implementing and evaluating systems change; collaborative, team building and conflict resolution during innovation.

SPED 779. Contemporary Issues and Trends. 3 Hours.
Analysis, discussion and research review of contemporary issues and trends in special education and disability services; selecting and defending a position on a variety of legal, ethical, social and programmatic issues.

SPED 781. Orientation to Doctoral Study. 1 Hour.
Introduction to doctoral study in special education; University, college, department and program option requirements; leadership roles/responsibilities for teacher education faculty or special education administrators/ supervisors; planning for committee selection and program of study preparation.

SPED 782. Professional Practice in Systems Advocacy. 1 Hour.
Supervised experience in advocating for change in current emerging areas of state and federal policy as it applies to special education or disability services.

SPED 783. Professional Practice in College Instruction. 1 Hour.
(May be repeated for a maximum of 3 hours.) Supervised experience in design, delivery, and evaluation of a college or university course in special education or disability services.

SPED 784. Professional Practice in Clinical Supervision. 1 Hour.
Supervised experiences in observing, supervising and evaluating student or practicing educator performance in a practicum setting in special education or disability services.

SPED 785. Professional Practice in Empirical Research. 1 Hour.
(May be repeated for a maximum of 3 hours.) Supervised experience in designing, conducting and reporting research using quantitative and/or qualitative methods in special education or disability services.

SPED 786. Professional Practice in Service Activities. 1 Hour.
Supervised experiences in planning, implementing and evaluating service activities at local, state and/or national levels in special education or disability services.

SPED 787. Professional Practice in Program Administration. 1 Hour.
Supervised experiences in operation and management of programs and services related to special education in school systems and/or disability services in community agencies.

SPED 788. Professional Practice in Personnel Support. 1 Hour.
Supervised experiences in instructional supervision and personnel evaluation in programs related to special education in school systems and/or disability services in community agencies.

SPED 789. Professional Practice in Evaluation Practices. 1 Hour.
Supervised experiences in needs assessment and program evaluations related to special education in school systems and/or disability services in community agencies.

SPED 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of special education. 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.).

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

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

SPED 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

SPED 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

SPED 796. Graduate Seminar. 1-3 Hours.
PR: Consent. Designed to permit graduate students an opportunity to present research to the assembled faculty and graduate student body. (Graded as S/U.).

SPED 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or the equivalent scholarly project, or a dissertation (Grading may be S/U.).

SPED 799. 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 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.

SPED 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.

SPED 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.

SRVL 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

STAT 511. Statistical Methods 1. 3 Hours.
Descriptive numerical and graphical univariate and bivariate statistics; probability and random variables including normal, t, F, and chi-square distributions; one- and two-sample tests of hypotheses and confidence intervals; simple linear regression and correlation; one-way analysis of variance with multiple comparisons protection; and contingency table chi-square tests. (Equivalent to EDP 613 and PSYC 511.).

STAT 512. Statistical Methods 2. 3 Hours.
PR: STAT 511. Methods for analyzing data primarily with a continuous response variable collected from a completely random, randomized complete block, or factorial experimental design with or without subsampling. Unplanned and planned multiple and orthogonal comparisons for qualitative and quantitative treatments and factorial arrangements. Experimental data versus observational studies. Simple and multiple linear regression analysis. (Equivalent to EDP 614 and PSYC 512.).

STAT 513. Design of Experiments. 3 Hours.
PR: STAT 512. Fixed, random, and mixed linear models for analyzing data from designed experiments including the complete and fractional factorial experiment, and the completely random, randomized complete block, balanced incomplete block, Latin square, central composite, nested, and split-plot experimental designs. Expected mean squares and power of tests. Use of blocking and confounding to increase design testing power and efficiency.

STAT 516. Forensic Statistics. 3 Hours.
PR: STAT 215 or equivalent. Probabilistic and statistical evaluation of evidence in forensic science: concepts of uncertainty variation, discriminating power, coincidence/significance probabilities, historical overview, transfer evidence, DNA profiling, fingerprint identification, biometric identification, and case studies.

STAT 521. Statistical Analysis System Programming. 3 Hours.
PR: STAT 511 or equivalent. Topics in Statistical Analysis System (SAS). Students perform statistical data analyses, data modifications and manipulations, file operations, and statistical report writing. Prepares students for the SAS Base Programming certification exam.

STAT 522. Advanced Statistical Analysis System Programming. 3 Hours.
PR: STAT 521 or consent. Advanced topics in Statistical Analysis System (SAS); SAS SQL to generate reports, join tables, construct queries; SAS Macrolanguage basics; write/implement SAS macro programs. Prepares students for SAS Advanced Programmer Certification Exam.

STAT 523. Statistical Computing. 3 Hours.
PR: STAT 512. Monte Carlo methods; randomization, partitioning, and the bootstrap; identifying data structures, estimating functions, including density functions; statistical models of dependencies. R programming.

STAT 531. Sampling Theory and Methods. 3 Hours.
PR: STAT 511 or consent. Survey components, methods of sampling for finite and infinite populations, single and multi-stage procedures, confidence limits for estimating population parameters, sample size determination, area sampling sources of survey error, and basic inference derived from survey design.

STAT 541. Applied Multivariate Analysis. 3 Hours.
PR: STAT 511 or equivalent. Introduction to Euclidean geometry and matrix algebra; multiple and multivariate regression including multiple and canonical correlation; the k-sample problem including discriminant and canonical analysis; and structuring data by factor analysis, cluster analysis, and multi-dimensional scaling.

STAT 543. Bioinformatics Data Analysis. 3 Hours.
PR: STAT 512 or equivalent. Statistical analyses of high-throughput experiments using data visualization, clustering, multiple testing, classification and other unsupervised and supervised learning methods. Data processing, including background adjustment and normalization. Case studies.

STAT 545. Applied Regression Analysis. 3 Hours.
PR: STAT 512. Matrix approach to linear and multiple regression, selecting the best regression equation, model building, and the linear model approach to analysis of variance. Use of diagnostic measures to assess and improve model adequacy leading to practical model-based inferences or predictions.

STAT 547. Survival Analysis. 3 Hours.
PR: STAT 512. Survival model methodology, including model selection for incomplete data with censored, truncated, and interval censored observations. Applications to many real life problems using R.

STAT 551. Nonparametric Statistics. 3 Hours.
PR: STAT 511 or equivalent. Distribution-free procedures of statistical inference. Location and scale tests for homogeneity with two or more samples (related or independent); tests against general alternatives.

STAT 555. Categorical Data Analysis. 3 Hours.
PR: STAT 512 or equivalent. Bivariate association for ordinal and nominal variables, models for categorical or continuous responses as a special case of generalized linear models, methods for repeated measurement data, exact small-sample procedures.

STAT 561. Theory of Probability and Statistics 1. 3 Hours.
Probability and random variables, univariate and multivariate distributions, expectations, generating functions, marginal and conditional distributions, independence, correlation, functions of random variables, including order statistics, limiting distributions, and stochastic convergence.

STAT 562. Theory of Probability and Statistics 2. 3 Hours.
PR: STAT 561. Bayesian and frequentist techniques of point and interval estimation. Properties of estimators including bias, consistency, efficiency, and sufficiency. Hypothesis testing including the Neyman-Pearson Lemma and likelihood ratio tests. Regression, correlation, and nonparametric statistical procedures.

STAT 582. Statistical Consulting. 1 Hour.
PR: STAT 513 or Consent. Statistical consulting principles and procedures. The entire consulting experience, including design, models, communication skills, ethics, tracking, and documentation, is presented in a series of case studies, including student presentations and reports on assigned cases.

STAT 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of statistics. Note: This courses 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.).

STAT 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced topics not covered in regularly scheduled courses.

STAT 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

STAT 595. Independent Study. 1-9 Hours.
STAT 595. Independent Study. 1-6 HR. Faculty supervised study of topics not available through regular course offerings.

STAT 623. Data Technologies. 3 Hours.
PR: STAT 512 or consent. R data manipulation and processing. Topics include: R operators, functions, data structures, and objects; R data input and output, package development, and text processing; R interfaces to XML and SQL databases.

STAT 624. High Performance Analytics. 3 Hours.
PR: STAT 623. High performance and data-stream computing using R. Topics include: parallel R packages; Hadoop clusters; MapReduce R scripting; shared R network spaces; beyond-memory data analysis; data-stream modeling and visualization.

STAT 645. Linear Models. 3 Hours.
PR: STAT 545 and (STAT 462 or STAT 562) or consent. Multivariate normal distribution, distribution of quadratic forms, linear models, general linear hypotheses, experimental design models, components of variance for random effects models.

STAT 682. Statistics Practicum. 1 Hour.
PR: STAT 582. Statistical consulting on university-related research projects under the direction of a statistics faculty member.

STAT 689. Professional Field Experience. 1-6 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours). Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

STAT 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of statistics. 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.).

STAT 691. Advanced Topics. 6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

STAT 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

STAT 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

STAT 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

STAT 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

STAT 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.

STAT 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.).

STAT 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.

STAT 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 in the semester in which graduation occurs.

STAT 745. Data Mining. 3 Hours.
PR: STAT 545 or equivalent. Development of predictive models for large datasets, including logistic and linear models, regression and classification trees, and neural networks. Data preparation, including imputation and filtering.

STAT 761. Theoretical Statistics 1. 3 Hours.
PR: STAT 562 or consent. Advanced statistical theory including: consistent estimators; limiting distributions; asymptotic properties; goodness-of-fit tests; maximum likelihood estimation, moment generating functions; properties of statistical tests and procedures for finite-dimensional and infinite-dimensional spaces.

STAT 762. Theoretical Statistics 2. 3 Hours.
PR: STAT 761. Continuation of STAT 761 including: asymptotic optimality, contiguity of probability measures, local asymptotic normality of likelihood ratio test, Bayesian estimation, general linear models estimation and testing, and kernel smoothing methods in density and regression estimation.

STAT 763. Stochastic Processes. 3 Hours.
PR: STAT 561. Modeling of random phenomenon occurring over time, space, or time and space simultaneously. Modern techniques, such as the martingale decomposition, are applied to different statistical models.

STAT 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

STAT 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading will be S/U).

SURG 741. Clinical Clerkship in Surgery. 8 Hours.
SURG 741. Clinical Clerkship in Surgery. (Third year.) PR: Required of third-year medical students. Clinical clerks are assigned responsibility for hospitalized surgical patients under supervision of house staff and attending surgeons. Students are an integral part of the team providing diagnostic and treatment services and are expected to take histories, perform physical examinations, and participate in ward and laboratory procedures. A course of surgical lectures, designed to outline surgical core curriculum, is given concurrently. The student is expected to attend the daily rounds and conferences arranged by the department.

SURG 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

SURG 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.).

SURG 830. Clinical Clerkship in Surgery. 8 Hours.
PR: Required of third-year medical students. Clinical clerks are assigned responsibility for hospitalized surgical patients under supervision of house staff and attending surgeons. Students are an integral part of the team providing diagnostic and treatment services and are expected to take histories, perform physical examinations, and participate in ward and laboratory procedures. A course of surgical lectures, designed to outline surgical core curriculum, is given concurrently. The student is expected to attend the daily rounds and conferences arranged by the department. (Third year.).

THET 510S. Programming for Lighting. 3 Hours.
PR: Consent. Intermediate to advanced programming methods and procedures for industry standard lighting consoles, including typical lighting console hierarchy and operation and its field application and implementation. Application and development of skills in general lighting electrics, lighting management and lighting networking set up and troubleshooting.

THET 520S. Principles of Stage Lighting. 2 Hours.
An exploration of lighting as a creative tool with emphasis on design development and equipment.

THET 523S. Costume Crafts Studio. 3 Hours.
This course will allow the graduate student to pursue research and intensive projects in the area of costume crafts through course work and lecture.

THET 524. Production Planning. 3 Hours.
Through the use of examples from the industry and an examination of current shows in the School's production program, this course will offer a detailed study of the principles and successful strategies of production planning. An emphasis will be placed on time and labor management and budgeting for theatrical productions.

THET 535. Grad Theatre Health and Safety. 3 Hours.
An overview of safety-related issues in the theatre and entertainment technology industries. Through formal lectures and practical projects, students will be introduced to applicable safety policies and codes. Students will also complete American Red Cross CPR and First Aid certification.

THET 540S. Graduate Vocal Techniques. 2 Hours.
In-depth vocal work, with special care taken to address each actor's individual qualities, beginning with breath, alignment, and release of habitual tension. Open resonance and free articulation to support the actor's voice.

THET 541S. Graduate Voice Techniques. 2 Hours.
PR: THET 540 or THET 540S. Continue the work introduced in THET 540S with text exploration. Introduce the International Phonetic Alphabet (IPA) and structure.

THET 542S. Graduate Stage Movement 1. 2 Hours.
Study of human movement in performance, including basic body awareness and anatomy, as well as Viewpoints and Suzuki training.

THET 543S. Graduate Stage Movement 2. 2 Hours.
PR: THET 542 or THET 542S. An intensive study of compositional techniques through the development of original performance materials using movement as a basis. Will include a study of the history of theatrical performance art works and artists.

THET 544S. Graduate Acting Studio 1. 3 Hours.
Foundation of the craft of acting including sensory elements ensemble building, environment, personalization, imagination, communication, conflict, and audition skills. Concentration is on modern and contemporary theatre.

THET 545S. Graduate Acting 2. 3 Hours.
PR: THET 544 or THET 544S. Exploration of acting techniques applicable to the late 19th century, early 20th century European playwrights.

THET 546S. Graduate Scene Study 1. 1 Hour.
The presentation of scenes before a panel of acting, voice and movement faculty for critique. (May be repeated four times for credit.).

THET 547S. Graduate Scene Study 2. 1 Hour.
PR: THET 546 or THET 546S. The presentation of scenes chosen from Shakespeare and other plays of heightened text, before a panel of acting, voice, and movement faculty for critique.

THET 590. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of theatre. 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.).

THET 591. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

THET 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

THET 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

THET 594. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

THET 595. Independent Study. 1-9 Hours.
Faculty-supervised study of topics not available through regular course offerings.

THET 600. Graduate Production Practicum. 1 Hour.
PR: Consent. (May be repeated for a maximum of 6 credit hours.) Participation in assigned performance or production projects.

THET 610. Research Methods. 3 Hours.
Methods of production research for graduate students in acting and design, with particular emphasis on writing, library use, and manuscript preparation.

THET 613S. Stage Management. 3 Hours.
An exploration of stage managers' techniques, skills, and responsibilities through exercises, research into the profession, and experience stage managing an actual production.

THET 615S. Graduate Portfolio Development. 3 Hours.
Lab course on the techniques of portfolio development, focusing on both digital and traditional portfolio formats and related general techniques of graphic and image preparation.

THET 621S. Graduate Theatre Make-up. 2 Hours.
PR: Consent. Lecture/laboratory course exploring practical and physical applications of a stage character with makeup. In-depth study of facial anatomy and potential alterations through two- and three-dimensional appliances.

THET 622S. Graduate Scene Design. 3 Hours.
Graduate-level study of scenic design including conceptualization, mechanical perspective, drafting, model building, and color rendering. Emphasis placed on translating the script into a visual design.

THET 623S. Advanced Graduate Scene Design. 3 Hours.
PR: THET 622 or THET 622S. Continued study of conceptualization and techniques of presentation used in the creation of scenic environments. Emphasis on alternative forms including opera, ballet, display, and industrial venues. (May be repeated for a maximum of 9 credit hours.).

THET 624S. Graduate Costume Design 1. 3 Hours.
Intensive study of basic design elements as applied to costume design. Script analysis leading to conceptualization and communication through visual language. Experience in practical organization skills, paperwork, and budgeting. Studio/rendering work.

THET 625S. Graduate Lighting Design. 3 Hours.
PR: THET 427 or consent. Lecture/studio; intensive practical experience of lighting design for the theatre. Emphasis is placed on conceptualization, drafting, and rendering techniques related to the development and presentation of lighting design. (May be repeated for a maximum of 9 credit hours.).

THET 626S. Graduate Costume Design 2. 3 Hours.
PR: THET 624 or THET 624S. Intensive studio/practical study of costume design. Exploring conceptual process of design for text, movement, dance, opera, and puppetry. Emphasis on rendering, composition, and fabric applications.

THET 627S. Graduate Costume and Decoration 1. 3 Hours.
A historical survey of clothing, artistic style, and decoration from ancient Egypt to 1750. Emphasis on how stage designers employ period style in the design of costumes, scenery, and properties. (Field trip required.).

THET 628S. Graduate Costume and Decoration 2. 3 Hours.
A historical survey of clothing, artistic style, and decoration from 1750 to the present. Emphasis on how stage designers employ style in the design of costumes, scenery, and properties. (Field trip required.).

THET 629. Graduate Computer Assisted Design Seminar. 3 Hours.
PR: THET 631 and THET 622 or consent. Advanced study of the computer- assisted graphic design for the stage.

THET 630S. Graduate Rendering Techniques. 3 Hours.
This course allows the graduate student to explore and develop rendering techniques for scenic, costume and lighting designs. Students will work in watercolor, acrylic, marker, and other media.

THET 631S. Graduate Drafting for the Stage. 3 Hours.
Advanced techniques in drafting in accordance with current graphic standards for stage design and technology. Refinement of technique and graphic style through projects and exercises.

THET 633. Graduate Stage Properties. 3 Hours.
An advanced studio course on the creation and organization of properties for the stage covering materials and construction techniques as well as research methods and keeping accurate paperwork.

THET 633S. Graduate Stage Properties. 3 Hours.
An advanced studio course on the creation and organization of properties for the stage covering materials and construction techniques as well as research methods and keeping accurate paperwork.

THET 635S. Graduate Scene Painting. 3 Hours.
Course will provide scene painting skills needed in the execution of any kind of scene design and art skills that crossover into rendering and design. Scene painting skill enhances the artistic range and marketability of scene designers and technicians.

THET 636. Advanced Stagecraft. 3 Hours.
Study and research into advanced technical procedures including welding, materials, wood joinery, and practical construction problem solving. Emphasis on the practices and development of skills through projects.

THET 640S. Advanced Graduate Vocal Techniques. 2 Hours.
PR: (THET 541 or THET 541S) or consent. Intensive vocal exploration with Shakespearean text, character choices, and dialect work.

THET 641S. Advanced Graduate Vocal Techniques 2. 2 Hours.
PR: (THET 640 or THET 640S) or consent. Continuation of THET 640S with emphasis on period style texts, vocalization during emotionally intense scenes and fights. Includes technical analysis of text with attention to screaming, crying, and other moments of emotional intensity.

THET 642S. Advanced Graduate Stage Movement. 2 Hours.
PR: (THET 543 or THET 543S) or consent. Advanced study of movement techniques for character work, including rhythms of basic language/movement connections and period styles of movement.

THET 643S. Advanced Graduate Stage Movement 2. 2 Hours.
PR: (THET 642 or THET 642S) or consent. Continuation of THET 642S through work on directed projects; special topics in issues related to physicality in performance.

THET 644S. Advanced Graduate Acting Studio 1. 3 Hours.
PR: THET 545 or THET 545S. Continued exploration of the acting process focusing on heightened text and issues of period and style using the works of William Shakespeare.

THET 645S. Advanced Acting Studio. 3 Hours.
PR: THET 644 or THET 644S. Exploration of acting techniques specific to comedy, comedy of manners, physical comedy and sketch comedy.

THET 650S. Graduate Study in Musical Theatre. 2 Hours.
PR: THET 645 or THET 645S. Advanced musical theatre performance study with solos and scenes focusing on Stanislavski principles of objective and action along with interpretation choices within music composition.

THET 651S. Graduate Acting for the Camera. 2 Hours.
PR: THET 645 or THET 645S. Exploration of the principles of acting for the camera using multiple on-camera acting exercises. The course includes performance as well as audition skills.

THET 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of theatre. 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.).

THET 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

THET 692. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

THET 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

THET 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

THET 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

THET 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.

THET 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.).

THET 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.

THET 699. Graduate Colloquium. 1-6 Hours.
THET 699. Graduate Colloquium. 1-6 hr. 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 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.

THET 710. Structural Design for the Stage. 3 Hours.
Structural Design for the Stage focuses on the safe design of scenic structures. Mathematical equations are defined to provide a foundation of how to approach structural challenges in theatre making sure scenic elements are safe and load bearing for production needs.

THET 712. Entertainment Rigging. 3 Hours.
Examines the tools, equipment, hardware, and safety practices in the entertainment industry. Rigging exploration ranges from traditional theatrical houses to concert settings.

THET 720. Seminar in Production Research. 3 Hours.
PR: THET 610 and THET 622 or THET 626 or THET 625. Seminar approach to individual design projects with oral and written presentations of research materials. Intensive critique within class by faculty and peers.

THET 721. Professional Aspects of Design. 3 Hours.
PR: THET 622 and THET 624 and THET 625. An in-depth work in the packaging and presentation of the design portfolio, resume writing, and job opportunities. Emphasis is placed on methods of making a successful transition from an academic environment into the performance industry.

THET 725S. Portfolio Development. 1 Hour.
Independent studio work supervised by faculty mentor to prepare the designer portfolio for professional presentations and interviews.

THET 726. Graduate Automation. 3 Hours.
PR: THET 629. Graduate Automation is the exploration of motorized equipment used in the arts and how it can be utilized for production purposes. Topics from electricity to mechanical design will be discussed.

THET 740S. Advanced Graduate Vocal Techniques 3. 2 Hours.
PR: THET 640 or THET 640S. The student will focus on more advanced dialect and vocal techniques to refine and ready the student's skills for the professional world. Microphone techniques will be introduced as well as development of voiceover techniques and copy.

THET 742S. Advanced Graduate Stage Movement 3. 2 Hours.
PR: THET 643 or THET 643S. The final course in the Graduate Acting movement sequence. An introduction to stage violence, specifically unarmed combat and basic rapier.

THET 750S. Graduate Showcase 1. 1 Hour.
PR: THET 645 or THET 645S. Preliminary preparation for Graduate Actor's Showcase. The showcase gives the graduating MFA actor the opportunity to demonstrate his/her skills for an audience of professional agents, casting directors, producers, and directors.

THET 751S. Showcase Development. 2 Hours.
PR: THET 624 or THET 624S. Using skills learned in monologue and scene work, students will develop a performance of selected works, develop a mailing list of professional agents, and perform two showcases.

THET 771. Contemporary Theatre Organizations. 3 Hours.
PR: THET 610. This course studies the philosophical and organizational structure of modern and contemporary theatres (1898-present). The class will function as a graduate seminar.

THET 780. Thesis Research & Writing. 3 Hours.
This course provides formal supervision during the writing of a graduate thesis document. Thesis is a requirement to achieve an MFA in the areas of Acting and Design/Technology in the School of Theatre and Dance.

THET 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of theatre. 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.).

THET 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation in advanced topics not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

THET 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

THET 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

THET 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

THET 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.

THET 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.).

THET 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.

UTCH 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

VETS 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

VETS 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

VETS 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.).

WDSC 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in the college teaching of wood science. 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.).

WDSC 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

WDSC 692. Directed Study. 1-6 Hours.
Directed study, reading and/or research.

WDSC 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

WDSC 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

WDSC 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

WDSC 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.

WDSC 697. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading will be S/U.).

WDSC 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.

WDSC 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.

WDSC 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.

WDSC 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.).

WDSC 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.

WGST 530. Feminist Theory. 3 Hours.
Explores feminist theory through works of diverse scholars, focusing on questions of essentialism, difference, sexuality, bodies, language, power, economic and ecological justice; intersections of race, class, and gender, as well as global social justice struggles.

WGST 592. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

WGST 593. Special Topics. 1-6 Hours.
PR: Consent. A study of contemporary topics selected from recent developments in the field.

WGST 595. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

WGST 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

WGST 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.

WGST 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of women's 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 not on assistantships to gain teaching experience. (Grading will be S/U.).

WGST 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

WGST 792. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

WGST 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

WGST 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

WGST 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.

WGST 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.).

WMAN 512. Advanced Wildlife Population Ecology. 3 Hours.
PR: WMAN 313 or equivalent, or consent. Case history approach to wildlife population ecology with emphasis on ungulates, gallinaceous birds, large predators; forest invertebrates and their vertebrate predators; endangered species; genetics and conservation of wildlife populations. Emphasis on current and historical literature. (3 hr. lec.).

WMAN 534. Ecology and Management of Upland Wildlife. 4 Hours.
PR: Consent. Ecology and management of upland game birds and mammals with emphasis on recent literature. (Offered in fall of even years.).

WMAN 536. Ecology and Management of Wetland Wildlife. 4 Hours.
PR: Consent. Ecology and management of waterfowl and wetland fur bears with emphasis on recent research and management literature.

WMAN 547. Applied Wetlands Ecology and Management. 3 Hours.
The management and ecology of wetland vegetation, soils, hydrology, and wildlife. (Cross listed as CE 547 and PLSC 547.).

WMAN 550. Fish Ecology. 3 Hours.
PR: WMAN 445. Study of the interrelations between fish and the biotic and abiotic environment and the influence of these interactions upon fisheries. Includes trophic dynamics, reproductive ecology, predatory-prey interactions, and anthropogenic factors.

WMAN 593. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

WMAN 630. Conservation Genetics. 3 Hours.
Study of population genetic concepts relevant to small fish and wildlife populations, with a focus on interpretation of the management implications of genetic data and current application of conservation genetics.

WMAN 633. Quantitative Ecology. 3 Hours.
PR: STAT 511 or equivalent, and WMAN 313 or equivalent. A survey of techniques and strategies for the quantitative analysis of complex ecological data sets.

WMAN 639. Conservation Biology. 3 Hours.
Discussion of current topics in conservation biology, the applied science of maintaining earth's biological diversity. Emphasis is on current literature with some guest lectures by topic experts.

WMAN 640. Fish Physiology. 3 Hours.
This course will cover all of the physiological systems in fish. Included are sensory, digestive, circulatory, nervous and endocrine, feeding, osmoregulation, movement, reproduction, and development systems.

WMAN 641. Aquatic Toxicology. 3 Hours.
Class will cover toxicity testing, the environmental fate of contaminants and toxicological assessment. The class will emphasize fish toxicity.

WMAN 642. Advanced Fish Management. 3 Hours.
Class covers important topics in fisheries assessment and management. Primary areas discussed include fish sampling, indices, and exploitation and harvest regulations.

WMAN 643. Advanced Ichthyology. 3 Hours.
An in-depth study of fishes, with emphasis on ecology, morphology, systematics, and zoogeography. Identification of fishes within the Appalachian region is emphasized through lab and field study.

WMAN 644. Wildlife Data Analysis 1. 3 Hours.
This course will cover data interpretations, statistical power, data techniques, use of correct data methods and alternatives, and interpretation of results.

WMAN 645. Wildlife Data Analysis 2. 3 Hours.
PR: WMAN 644. This course will cover statistical power and sample size, selection of proper methods, identify assumptions of methods and use of proper alternatives, and identify results.

WMAN 684. Foundations and Philosophy of Research. 3 Hours.
This course will guide students through fundamental readings in Wildlife, Fisheries, and Ecology. Students will explore philosophy of science, learn induction, deduction, retroduction, and the hypothetico-deductive method. Students will also begin formulating hypotheses and construct their own research proposals.

WMAN 691. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

WMAN 692. Directed Study. 6 Hours.
Directed study, reading, and/or research.

WMAN 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

WMAN 694. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

WMAN 694A. Seminar. 1-6 Hours.
Seminars arranged for advanced graduate students.

WMAN 695. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

WMAN 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.

WMAN 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.).

WMAN 770. Wildlife Seminar. 1 Hour.
Per semester; PR: Consent. May be repeated for a maximum of 4 credit hours.) Discussion of current developments in wildlife management.

WMAN 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in the college teaching of wildlife and fisheries management. 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.).

WMAN 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

WMAN 792. Directed Study. 1-6 Hours.
Directed study, reading and/or research.

WMAN 793. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

WMAN 797. Research. 1-9 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading will be S/U.).

WMAN 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.

WRIT 502. Publishing. 3 Hours.
Provides graduate students in technical and professional writing and editing with a foundation in contemporary publishing issues and practices. Students gain hands-on practice in the craft of academic, non-profit, and/or commercial (e.g., professional) publishing. Includes opportunities for research, practice, and team leadership.

WRIT 503. Grant Proposal Writing for Community & Industry. 3 Hours.
Provides graduate students in technical and professional writing and editing with a foundation in grant seeking and persuasive writing. Covers grant and proposal writing in the academy, in business, and for nonprofits. Includes opportunities for research, practice, and team leadership.

WRIT 507. The Writing of Health and Medicine. 3 Hours.
PR: Departmental approval. Explores genres important to health and medicine. Students read, analyze, and write texts in these genres-considering their audiences, purposes, and conventions as well as the role specific texts play in shaping the practices and experiences of health and medicine. Students may not earn credit for both WRIT 407 and WRIT 507.

WRIT 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.

WVUE 595. Independent Study. 1-9 Hours.
WVUE 595. Independent Study. 1-9 hr. Faculty-supervised study, reading, or research.

WVUE 690. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of WVUE. 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).

WVUE 695. Independent Study. 1-9 Hours.
Faculty-supervised study, reading, or research.