

UConn
UNIVERSITY OF CONNECTICUT



Graduate Catalog
2017-2018

University of Connecticut Graduate Catalog 2017-2018

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The University of Connecticut reserves the right to revise, amend, or change items set forth in the *Graduate Catalog*. Accordingly, readers of the *Graduate Catalog* should inquire as to whether any revisions, amendments, or changes have been made since the date of publication. The University of Connecticut reserves the right to alter or cancel course offerings. Students must satisfy all requirements of their department, school or college, and the University of Connecticut whether or not they are listed in the *Graduate Catalog*.

University Accreditation

The University of Connecticut is accredited by the New England Association of Schools and Colleges.

Non-Discrimination Policy

The University of Connecticut complies with all applicable federal and state laws regarding non-discrimination, equal opportunity and affirmative action, including the provision of reasonable accommodations for persons with disabilities. The University of Connecticut does not discriminate on the basis of race, color, ethnicity, religious creed, age, sex, marital status, national origin, ancestry, sexual orientation, genetic information, physical or mental disability, veteran status, prior conviction of a crime, workplace hazards to reproductive systems, gender identity or expression, or political beliefs in its programs and activities. Employees, students, visitors, and applicants with disabilities may request reasonable accommodations to address limitations resulting from a disability.

For questions or more information, please contact the Associate Vice President, Office of Institutional Equity, 241 Glenbrook Road, Unit 4175, Storrs, CT 06269-4175; Phone: (860) 486-2943; Email: equity@uconn.edu; Website: equity.uconn.edu.

Academic Calendar

Summer Sessions 2017

The summer calendar and detailed information concerning the summer session may be obtained from the Office of Summer and Winter Programs. For course offering, registration procedures, fees, and deadlines, please consult summersession.uconn.edu.

The last day to announce an oral defense of a doctoral dissertation for conferral of a Summer 2017 degree is Thursday, July 27, 2017. The last day to defend a master's thesis or doctoral dissertation for conferral of a Summer 2017 degree is Thursday, August 10, 2017. The last day for degree candidates to submit thesis and dissertation final copies to Digital Commons and related paperwork to the Graduate School is Thursday, August 24, 2017 for conferral of a Summer 2017 degree. The conferral date for Summer 2017 degrees is Thursday, August 24, 2017.

Fall Semester 2017

| | |
|----------------|---|
| Mon., Aug. 28 | Fall Semester begins |
| Mon., Sept. 4 | Labor Day – No Classes |
| Mon., Sept. 11 | Add/Drop via Student Administration System closes. Courses added or dropped after this date require additional signatures. Dropped courses will have a “W” for withdrawal recorded on the academic record |
| Mon., Oct. 23 | Registration for the Spring 2018 semester via Student Administration System begins |
| Mon., Oct. 30 | Last day to drop a course without advisor's written recommendation and dean's approval |
| Fri., Nov. 17 | Last day to announce an oral defense of a doctoral dissertation for conferral of a Fall 2017 degree |
| Sun., Nov. 19 | Thanksgiving recess begins |
| Sun., Nov. 25 | Thanksgiving recess ends |
| Fri., Dec. 1 | Last day to defend a master's thesis or doctoral dissertation for conferral of a Fall 2017 degree |
| Fri., Dec. 8 | Last day of Fall semester classes |
| Mon., Dec. 11 | Final examinations begin |
| Fri., Dec. 15 | Last day to submit thesis and dissertation final copies to Digital Commons and related paperwork to Degree Audit in the Office of the Registrar for conferral of a Fall 2017 degree |
| Fri., Dec. 15 | Final examinations end Conferral date for Fall 2017 degrees |

Spring Semester 2018

| | |
|----------------|---|
| Tues., Jan. 16 | Spring Semester begins |
| Mon., Jan. 29 | Add/Drop via Student Administration System closes. Courses added or dropped after this date require additional signatures. Dropped courses will have a “W” for withdrawal recorded on the academic record |
| Thurs., Mar. 1 | Last day to apply for graduation via Student Administration System to guarantee name of degree candidate will be printed in the Commencement Ceremony program |
| Sun., Mar. 11 | Spring Recess begins |
| Sat., Mar. 17 | Spring Recess ends |
| Mon., Mar. 19 | Registration for the Fall 2018 semester via Student Administration System begins |
| Mon., Mar. 26 | Last day to drop a course without advisor's written recommendation and dean's approval |
| Fri., Apr. 6 | Last day to announce an oral defense of a doctoral dissertation for conferral of a Spring 2018 degree |
| Fri., Apr. 20 | Last day to defend a master's thesis or doctoral dissertation for conferral of a Spring 2018 degree |
| Fri., Apr. 27 | Last day of Spring Semester classes |
| Mon., Apr. 30 | Final examinations begin |
| Fri., May 4 | Last day to submit thesis and dissertation final copies to Digital Commons and related paperwork to Degree Audit in the Office of the Registrar for conferral of a Spring 2018 degree |
| Sat., May 5 | Final examinations end Conferral date for Spring 2018 degrees Graduate School Masters Commencement Ceremony |
| Mon., May 7 | Graduate School Doctoral Commencement Ceremony |

Graduate Degree Programs

Fields of Study and Concentrations

| | | | |
|---|---------------|--|--------------|
| Accounting..... | M.S. | Computer Science and Engineering..... | M.S., Ph.D. |
| Adult Learning..... | M.A. | Curriculum and Instruction..... | M.A., Ph.D. |
| Agricultural and Resource Economics..... | Ph.D. | Agricultural Education (M.A.) | |
| Animal Science..... | M.S., Ph.D. | Bilingual and Bicultural Education (M.A., Ph.D.) | |
| Animal Genetics and Regenerative Biology (Ph.D.) | | Elementary Education (M.A., Ph.D.) | |
| Animal Nutrition (Ph.D.) | | English Education (M.A., Ph.D.) | |
| Food Microbiology and Safety (Ph.D.) | | Foreign Language Education (M.A., Ph.D.) | |
| Growth and Reproductive Physiology (Ph.D.) | | History and Social Science Education (M.A., Ph.D.) | |
| Physiology (M.S., Ph.D.) | | Mathematics Education (M.A., Ph.D.) | |
| Anthropology..... | M.A., Ph.D. | Music Education (M.A.) | |
| Social Science and Health Care (Ph.D.) | | Reading and Language Arts Consultant (M.A.) | |
| Applied and Resource Economics..... | M.S. | Reading Education (M.A., Ph.D.) | |
| Applied Biochemistry and Cell Biology..... | M.S. | Remedial Reading and Language Teacher (M.A.) | |
| Applied Microbial Systems Analysis..... | M.S. | Science Education (M.A., Ph.D.) | |
| Applied Financial Mathematics..... | M.S. | Secondary Education (M.A., Ph.D.) | |
| Actuarial Science (M.S.) | | Dental Science..... | M.Dent.Sc. |
| Applied Genomics..... | M.S. | Digital Media and Design..... | M.A., M.F.A. |
| Art..... | M.F.A. | Dramatic Arts..... | M.A., M.F.A. |
| Arts Administration..... | M.F.A. | Acting (M.A., M.F.A.) | |
| Athletic Training..... | M.S. | Design (M.F.A.) | |
| Biodiversity and Conservation Biology..... | M.S. | Design/Puppetry (M.F.A.) | |
| Biomedical Engineering..... | M.S., Ph.D. | Directing (M.F.A.) | |
| Biomedical Science..... | M.S., Ph.D. | Performance/Production (M.A.) | |
| Cell Analysis and Modeling (M.S., Ph.D.) | | Puppetry (M.A., M.F.A.) | |
| Cell Biology (M.S., Ph.D.) | | Technical Direction (M.F.A.) | |
| Genetics and Developmental Biology (M.S., Ph.D.) | | Theatre History and Criticism (M.A.) | |
| Immunology (M.S., Ph.D.) | | Ecology and Evolutionary Biology..... | M.S., Ph.D. |
| Molecular Biology and Biochemistry (M.S., Ph.D.) | | Ecology and Biological Control (M.S., Ph.D.) | |
| Neuroscience (M.S., Ph.D.) | | Plant Ecology (M.S., Ph.D.) | |
| Skeletal Biology and Regeneration (M.S., Ph.D.) | | Economics..... | Ph.D. |
| Biostatistics..... | M.S. | Educational Administration..... | M.A. |
| Business Administration..... | M.B.A., Ph.D. | Educational Leadership..... | Ed.D. |
| Accounting (M.B.A., Ph.D.) | | Educational Psychology..... | M.A., Ph.D. |
| Business Analytics (M.B.A.) | | Cognition, Instruction, and Learning Technology (M.A., Ph.D.) | |
| Digital Marketing Strategy (M.B.A.) | | Cognition and Instruction (Ph.D.) | |
| Executive M.B.A. | | Counselor Education (Ph.D.) | |
| Finance (M.B.A., Ph.D.) | | Education Technology (M.A.) | |
| Financial Analysis and Investment (M.B.A.) | | Giftedness, Creativity and Talent Development (M.A., Ph.D.) | |
| General Business (M.B.A.) | | Measurement, Evaluation, and Assessment (M.A., Ph.D.) | |
| General Management (M.B.A.) | | School Counseling (M.A.) | |
| Health Care Management (M.B.A.) | | School Psychology (M.A., Ph.D.) | |
| Information Technology (M.B.A.) | | Special Education (M.A., Ph.D.) | |
| International Business (M.B.A.) | | Educational Studies..... | Ph.D. |
| Management (M.B.A., Ph.D.) | | History and Philosophy of Education | |
| Management of Technology (M.B.A.) | | Social Foundations of Education | |
| Marketing (M.B.A., Ph.D.) | | Electrical Engineering..... | M.S., Ph.D. |
| Marketing Intelligence (M.B.A.) | | Electronics and Photonics (Ph.D.) | |
| Operations and Information Management (M.B.A., Ph.D.) | | Electronics, Photonics, and Biophotonics (M.S.) | |
| Real Estate (M.B.A.) | | Information, Communication, Decision, and Biosystems (M.S., Ph.D.) | |
| Venture Consulting (M.B.A.) | | Energy and Environmental Management..... | M.S. |
| Business Analytics and Project Management..... | M.S. | Engineering..... | M.Eng. |
| Chemical Engineering..... | M.S., Ph.D. | Advanced Systems Engineering | |
| Chemistry..... | M.S., Ph.D. | Chemical Engineering | |
| Civil Engineering..... | M.S., Ph.D. | Civil and Environmental Engineering | |
| Applied Mechanics (Ph.D.) | | Computer Science and Engineering | |
| Environmental Engineering (M.S.) | | Electrical and Systems Engineering | |
| Fluid Dynamics (Ph.D.) | | General Engineering | |
| Geotechnical Engineering (M.S., Ph.D.) | | Materials Science and Engineering | |
| Structural Engineering (M.S., Ph.D.) | | Mechanical Engineering | |
| Transportation and Urban Engineering (M.S., Ph.D.) | | English..... | M.A., Ph.D. |
| Clinical and Translational Research..... | M.S. | American Studies (M.A.) | |
| Communication..... | M.A., Ph.D. | Environmental Engineering..... | M.S., Ph.D. |
| Communication Process and Marketing Communication (Ph.D.) | | Financial Risk Management..... | M.S. |
| Communication (M.A.) | | Quantitative Risk Management | |
| | | Genetics and Genomics Counseling..... | M.S. |
| | | Geography..... | M.A., Ph.D. |
| | | Geological Sciences..... | M.S., Ph.D. |
| | | Geology (M.S., Ph.D.) | |

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| Geophysics (M.S., Ph.D.) | |
| Health Care Genetics..... | M.S. |
| Health Promotion..... | M.S. |
| Health Promotion Sciences..... | Ph.D. |
| Higher Education Student Affairs..... | M.A. |
| History..... | M.A., Ph.D. |
| American Studies (M.A.) | |
| Latin American History (Ph.D.) | |
| Medieval European History (Ph.D.) | |
| Modern European (Ph.D.) | |
| United States (Ph.D.) | |
| Human Development and Family Studies..... | M.A., Ph.D. |
| Human Resource Management..... | M.S. |
| International Studies..... | M.A. |
| European Studies | |
| Italian Studies and Culture | |
| Latino and Latin American Studies | |
| Judaic Studies..... | M.A. |
| Kinesiology..... | M.A., M.S., Ph.D. |
| Exercise Science (M.A., M.S., Ph.D.) | |
| Sport Management (M.A., Ph.D.) | |
| Learning, Leadership, and Education Policy..... | Ph.D. |
| Adult Learning | |
| Leadership and Policy | |
| Sport Management | |
| Linguistics..... | M.A., Ph.D. |
| Literatures, Cultures, and Languages..... | M.A., Ph.D. |
| Classics, Ancient and Mediterranean Studies (M.A.) | |
| Comparative Literary and Cultural Studies (M.A., Ph.D.) | |
| French and Francophone Studies (M.A., Ph.D.) | |
| German Studies (M.A., Ph.D.) | |
| Italian Literary and Cultural Studies (M.A., Ph.D.) | |
| Spanish Studies (M.A., Ph.D.) | |
| Materials Science..... | M.S., Ph.D. |
| Alloy Science (M.S., Ph.D.) | |
| Biomaterials (M.S., Ph.D.) | |
| Corrosion Science (M.S., Ph.D.) | |
| Crystal Science (M.S., Ph.D.) | |
| Dental Materials (M.S., Ph.D.) | |
| Metallurgy (M.S., Ph.D.) | |
| Polymer Science (M.S., Ph.D.) | |
| Materials Science and Engineering..... | M.S., Ph.D. |
| Mathematics..... | M.S., Ph.D. |
| Actuarial Science | |
| Mechanical Engineering..... | M.S., Ph.D. |
| Applied Mechanics (Ph.D.) | |
| Design (M.S., Ph.D.) | |
| Dynamics and Control (M.S., Ph.D.) | |
| Energy and Thermal Sciences (M.S., Ph.D.) | |
| Fluid Dynamics (Ph.D.) | |
| Manufacturing (M.S., Ph.D.) | |
| Medieval Studies..... | M.A., Ph.D. |
| Molecular and Cell Biology..... | M.S., Ph.D. |
| Cell and Developmental Biology (M.S., Ph.D.) | |
| Genetics and Genomics (M.S., Ph.D.) | |
| Microbiology (M.S., Ph.D.) | |
| Structural Biology, Biochemistry and Biophysics (M.S., Ph.D.) | |
| Music..... | DMA, M.A., M.Mus., Ph.D. |
| Conducting (DMA, M.Mus.) | |
| Historical Musicology (M.A.) | |
| Music Education (M.Mus., Ph.D.) | |
| Music Theory and History (Ph.D.) | |
| Performance (DMA, M.Mus.) | |
| Theory (M.A.) | |
| Natural Resources..... | M.S., Ph.D. |
| Nursing..... | D.N.P., M.S., Ph.D. |
| Adult Gerontology Acute Care Nurse Practice (D.N.P., M.S.) | |
| Adult Gerontology Prim Care Nurse Practice (D.N.P., M.S.) | |
| Clinical Nurse Leader (D.N.P., M.S.) | |
| Family Nurse Practitioner (D.N.P., M.S.) | |
| Neonatal Nurse Practice (D.N.P., M.S.) | |
| Nutritional Science..... | M.S., Ph.D. |
| Oceanography..... | M.S., Ph.D. |
| Pathobiology..... | M.S., Ph.D. |
| Bacteriology (M.S., Ph.D.) | |
| Pathology (M.S., Ph.D.) | |
| Veterinary Anatomic Pathology (M.S.) | |
| Virology (M.S., Ph.D.) | |
| Pharmaceutical Sciences..... | M.S., Ph.D. |
| Managed Care Pharmacy (M.S.) | |
| Medicinal Chemistry (M.S., Ph.D.) | |
| Neurosciences (M.S., Ph.D.) | |
| Pharmaceutics (M.S., Ph.D.) | |
| Pharmacology and Toxicology (M.S., Ph.D.) | |
| Pharmacy Administration (M.S.) | |
| Philosophy..... | M.A., Ph.D. |
| Physical Therapy..... | D.P.T. |
| Physics..... | M.S., Ph.D. |
| Physiology and Neurobiology..... | M.S., Ph.D. |
| Comparative Physiology (M.S., Ph.D.) | |
| Endocrinology (M.S., Ph.D.) | |
| Neurobiology (M.S., Ph.D.) | |
| Neuroscience (M.S., Ph.D.) | |
| Plant Physiology (Ph.D.) | |
| Plant Science..... | M.S., Ph.D. |
| Agronomy (M.S., Ph.D.) | |
| Horticulture (M.S., Ph.D.) | |
| Landscape Architecture (M.S.) | |
| Plant Breeding (M.S., Ph.D.) | |
| Plant Environment (M.S., Ph.D.) | |
| Soil Science (M.S., Ph.D.) | |
| Political Science..... | M.A., Ph.D. |
| American Studies (M.A.) | |
| Survey Research (M.A.) | |
| Polymer Science..... | M.S., Ph.D. |
| Psychological Sciences..... | M.S., Ph.D. |
| Behavioral Neuroscience (M.S., Ph.D.) | |
| Clinical Psychology (M.S., Ph.D.) | |
| Developmental Psychology (M.S., Ph.D.) | |
| Ecological Psychology (M.S., Ph.D.) | |
| General Experimental (M.A., Ph.D.) | |
| Industrial/Organizational Psychology (M.S., Ph.D.) | |
| Language and Cognition (M.S., Ph.D.) | |
| Neurosciences (M.S., Ph.D.) | |
| Personality (Ph.D.) | |
| Social Psychology (M.S., Ph.D.) | |
| Public Administration..... | M.P.A. |
| Public Health..... | M.P.H., Ph.D. |
| Occupational and Environmental Health Science (Ph.D.) | |
| Social and Behavioral Health Science (Ph.D.) | |
| Public Policy..... | M.P.P. |
| Quantitative Economics..... | M.S. |
| Social Work..... | M.S.W., Ph.D. |
| Administration (M.S.W.) | |
| Casework (M.S.W.) | |
| Community Organization (M.S.W.) | |
| Group Work (M.S.W.) | |
| Individuals, Groups, and Families (M.S.W.) | |
| Policy Practice (M.S.W.) | |
| Sociology..... | M.A., Ph.D. |
| Social Science and Health Care (Ph.D.) | |
| Survey Research (M.A.) | |
| Speech, Language, and Hearing Sciences..... | M.A., Ph.D., Au.D. |
| Sport Management..... | M.S. |
| Statistics..... | M.S., Ph.D. |
| Industrial Statistics (M.S.) | |

Survey ResearchM.A.
 Systems Genomics Ph.D.

Sixth-Year Diploma in Professional Education

Adult Learning
 Bilingual and Bicultural Education
 Cognition and Instruction
 Cognition, Instruction and Learning Technology
 Counseling Psychology
 Educational Administration
 Educational Technology
 Elementary Education
 English Education
 Evaluation and Measurement
 Exercise Science
 Foreign Language Education
 Giftedness, Creativity and Talent Development
 History and Social Science Education
 Mathematics Education
 Professional Higher Education Administration
 Reading and Language Arts Consultant
 Reading Education
 Remedial Reading and Language Teacher
 School Psychology
 Science Education
 Secondary Education
 Social Science of Sport
 Special Education

Graduate Certificates

Advanced Business Certificate in Digital Marketing Strategy
 Advanced Business Certificate in Business Analytics
 Advanced Business Certificate in Health Care Analytics
 Advanced Business Certificate in Health Care Finance and Insurance
 Advanced Business Certificate in Human Resource Management
 Advanced Business Certificate in Information Technology Audit
 Advanced Business Certificate in Project Management
 Addiction Science
 Adult Learning
 American Studies
 Arts Administration
 Biomedical Science Research Experience
 Bridge Program in Accounting
 Clinical and Translational Research
 Cognitive Science
 College Instruction
 Corporate and Regulatory Compliance
 Culture, Health and Human Development
 Cytogenetics
 Digital Media and Design
 Digital Humanities and Media Studies
 Disability Studies in Public Health
 Exercise Prescription
 Feminist Studies
 Foundations of Public Health
 Geographic Information Systems
 Gifted Education and Talent Development
 Global Risk Management
 Health Professions Education
 Health Promotion and Health Education
 Health Psychology
 Holistic Nursing

Human Rights
 International Studies
 Latin American Studies
 Intraoperative Neuromonitoring
 Leadership and Diversity in Sport Management
 Leadership and Public Management
 Literacy Supports
 Long Term Health Care
 Medical Laboratory Sciences
 Molecular Diagnostic Genetics
 Music Performance
 Neurobiology of Language
 Nonprofit Management
 Nursing Practice
 Adult Gerontology Acute Care
 Adult Gerontology Primary Care
 Community Health Nursing
 Neonatal Nurse Practitioner
 Patient Care Service
 Psychiatric Health Nursing
 Occupational Health Psychology
 Occupational Safety and Health
 Pain Management
 Positive Behavior Support
 Postsecondary Disability Services
 Power Engineering
 Pre-Medical / Pre-Dental
 Program Evaluation
 Public Financial Management
 Puppet Arts
 Quantitative Research Methods
 Race, Ethnicity, and Politics
 School Law
 Social Determinants of Health and Disparities
 Special Education Transition to Adulthood
 Survey Research Certificate
 Sustainable Environmental Plan and Management
 Systems Engineering
 Controlled Systems
 Embedded Systems
 System Design

Admission

To study for a graduate degree, a student must be matriculated by the Dean of the Graduate School before the first day of classes in their admitted term. To ensure academic success, newly admitted students must accept admission one month before the first day of classes for the term when their studies will begin. Students must arrive on campus on or before the first day of classes in their admitted term. Failure to meet these conditions may cause:

- A delay in stipend payments and a loss or reduction of tuition waiver benefits for students holding a graduate assistantship and
- A delay of enrollment in a degree program until the following semester.

No coursework taken before the date of admission to the Graduate School may be included on a plan of study for a graduate degree unless specific approval has been granted by the Dean of the Graduate School.

Admission will be cancelled if a student does not register for coursework in the semester or summer term to which they have been admitted. If this occurs, the student must apply for readmission with no certainty of being accepted. Students can request a deferral of admission for up to one year after their initial application term from the program to which they were admitted. These requests will be reviewed by the Graduate School.

Students may earn a graduate degree only in a program to which they have been admitted. Ordinarily, a student is granted admission to pursue graduate study in one field at a time. A student may be permitted to enroll concurrently in two different degree programs with approval of their advisors in both programs.

There are several approved dual degree programs providing the opportunity for the student to pursue work toward two degrees simultaneously. These programs often involve the sharing of a limited and specified number of course credits between the two degrees. The list of dual degree programs offered by the Graduate School and the other participating schools and colleges within the University (e.g., the Schools of Law, Medicine, and Dental Medicine) can be found under "Dual Degree Programs." In all cases separate applications must be filed for each of the two degree programs.

To be admitted to regular status and to begin studies, an applicant must hold a baccalaureate from a regionally accredited college or university or present evidence of the equivalent. The applicant must submit official transcripts covering all previous work, undergraduate and graduate, which must be of at least the following quality: a cumulative grade point average of 3.0 for the entire undergraduate record, or 3.0 for the last two years of full-time coursework, or 3.5 GPA or higher in the entire final year to the Graduate School. The grade point average is computed on the basis of the following scale: "A" = 4.0, "B" = 3.0, "C" = 2.0, "D" = 1.0, "F" = 0. Applicants from international colleges and universities must meet equivalent standards of eligibility and are expected to submit official transcripts showing all work completed. All advanced post-baccalaureate coursework is considered, as well. Failure to send transcripts from all educational institutions, regardless of whether or not a degree was received, may be grounds for cancellation of admission.

Applicants to most programs are encouraged to submit test scores from the General Test of the Graduate Record Examinations (GRE) directly to the Graduate School. Letters of recommendation, usually three, preferably from members of the academic profession, are required by most departments. Meeting the minimum requirements does not guarantee admission. Applicants must show promise of superior achievement and must have specific preparation for the course of study they wish to undertake. If their records indicate deficiencies, applicants may be refused admission or required either to take background courses without graduate credit or to demonstrate by examination that they have acquired the requisite knowledge or skills for graduate study. In addition, since each graduate program has a limited number of places, the successful applicant must have a record competitive with those of other applicants in the same field.

Regular and Provisional Status

Application procedures and required credentials for admission to regular status are specified above. Occasionally students who hold the baccalaureate but do not qualify fully for admission to regular status may give evidence of ability in their chosen field sufficiently convincing to warrant their provisional admission to a master's degree program only. Students who require F-1 or J-1 visa sponsorship are not eligible for provisional admission. Students admitted provisionally must have a cumulative, bachelor's grade point average of 2.60 or higher. (Applicants are not admitted provisionally to

a doctoral program.) If a provisional student's initial 12-credits of completed coursework (excluding 1000's-level courses) meet the minimum scholastic requirement of the Graduate School, the student is accorded regular status. Otherwise, the student is subject to dismissal. In situations where special consideration is warranted, and only upon the specific request of the major advisor, the Dean of the Graduate School may approve changing a student to regular status if at least nine credits of advanced coursework have been completed with grades of "A+," "A," or "A-." Regular, not provisional, status is required for degree conferral.

Language-Conditional Status

International graduate applicants whose English language proficiency does not meet the minimum standard to qualify for regular admission (an internet based score of 79 or greater, or a written test score of at least 550, on the TOEFL (Test of English as a Foreign Language), an overall band score of 6.5 or greater on the IELTS (International English Language Testing System), or an overall score of 53 or greater on the PTE (Pearson Test of English) Academic test may be admitted as Language-Conditional Students. The applicant will have 12 months to meet the language requirement by receiving a Certificate of English Proficiency from UCAELI (University of Connecticut English Language Institute) and/or receiving a passing English proficiency score.

Admission to D.P.T. Program

The Department of Kinesiology offers a program of study leading to the degree of Doctor of Physical Therapy. In addition to the standard requirements of the Graduate School, applicants must have completed the following prerequisite courses: biology with a lab, anatomy and physiology (eight credits), general chemistry (eight credits), psychology (two courses: e.g., introductory psychology, developmental psychology, abnormal psychology, or physiological psychology), pre-calculus or calculus, statistics, and general physics (eight credits).

Dual Degree Programs

Below is listed the currently offered dual degree programs as of the 2016-2017 academic year.

- D.M.D./Ph.D.
- M.B.A./J.D.
- M.B.A./M.A. (International Studies)
- M.B.A./M.Eng.
- M.B.A./MIM (ESC Lyon, France)
- M.B.A./M.S. (Nursing)
- M.B.A./M.S.W.
- M.B.A./Pharm.D.
- M.B.A./Ph.D. (Biomedical Science)
- M.D./Ph.D.
- M.P.H./D.M.D.
- M.P.H./J.D.
- M.P.H./M.D.
- M.P.H./M.S. (Nursing)
- M.P.H./M.S.W.
- M.S.W./J.D.

Admission to the D.M.A. Program

Applicants are expected to demonstrate outstanding musical ability and to have a superior record of previous performance and scholarship. A completed master's degree is required for admission. Holding a master's degree from this or from any other institution, however, does not render the applicant automatically admissible to the D.M.A. program. Areas of concentration offered are Conducting and Performance. A personal audition is required as part of the application process. Inquiries should be addressed to: Director of Graduate Studies, Department of Music, 1295 Storrs Road, Unit 1012, Storrs, CT 06269-1012, or to music@uconn.edu.

Admission to Ph.D. Programs

Applicants to Ph.D. programs are expected to demonstrate outstanding ability and to show on the record of previous scholarship and experience that they are likely to do superior creative work in their respective fields. Holding a master's degree from this or any other institution does not render the applicant automatically admissible to a doctoral program. Certain master's programs, on the other hand, are open only to applicants likely to qualify for doctoral

study. In general, doctoral applicants must meet all admission requirements for the master's degree as regular graduate students and must present evidence that they are capable of doing independent work of distinction.

Post-Baccalaureate and Certificate Programs

University of Connecticut certificate programs are designed to deliver valuable, real-world expertise to students in specialized academic niche areas. Our certificate programs are conceived and developed by outstanding full-time faculty, and we offer two types of certificate programs: graduate certificates and post-baccalaureate certificates. Graduate certificate programs consist entirely of graduate courses (those numbered 5000 or above). Post-baccalaureate certificate programs consist either entirely of undergraduate courses (those numbered 1000-4999) or of a mixture of undergraduate and graduate courses. To receive a certificate, students must first apply for admission to a certificate program through the Graduate School and must then satisfy the requirements of the certificate program to which they have been admitted.

To be admitted to either type of certificate program and to begin studies, an applicant must hold an earned baccalaureate degree from a regionally accredited college or university or present evidence of the equivalent. Some certificate programs may require applicants to hold an advanced degree prior to admission. The applicant must submit official transcripts covering all previous work, undergraduate, and graduate, which must be of at least the following quality: a cumulative grade point average (GPA) of 3.0 for the entire undergraduate record, or 3.0 GPA for the last two years of full-time coursework, or 3.5 GPA or higher in the entire final year to the Graduate School. Non-degree students may take up to six credits before being formally admitted to a University of Connecticut certificate program. Students may not use courses completed at other institutions to satisfy requirements of a University of Connecticut certificate program. Currently matriculated University of Connecticut students must apply for admission to a certificate program in a term before all of the required courses are complete. If a student earns a certificate and is subsequently admitted to a related graduate degree program, all credits from the certificate may be counted toward the graduate degree, subject to the approval of graduate program faculty in that area of concentration. The terminal date associated with the degree will be determined using the date of the first certificate class as the initial date of enrollment for the degree.

Occasionally students who hold a baccalaureate degree but do not qualify for admission to a certificate program may be granted provisional admission, based on a recommendation from the program. Students admitted provisionally must have a cumulative bachelor's grade point average (GPA) of 2.60 or higher. If such a student does not meet the minimum academic standards of the Graduate School after completing 3-credits, the student is subject to dismissal and will be allowed to enroll only upon recommendation from the program.

Non-Degree Study

Individuals with appropriate preparation who have not been admitted to any of the admissions categories described above may take courses as non-degree students. All non-degree students are presumed to be taking courses for reasons other than earning a certificate, Sixth-Year diploma in professional education, or a graduate degree at the University. Should they later be admitted to a graduate degree, certificate, or Sixth-Year diploma in a professional education program at the University, limited credits will be acceptable toward the degree. Credits accepted toward graduate degree must be of "B" (not "B-") quality or higher. For further information regarding registration, contact the Office of the Registrar at: registrar.uconn.edu or 860-486-3331.

Admission of University Faculty and Staff

University of Connecticut faculty members who hold tenure or a rank higher than instructor leading to tenure ordinarily may not earn a graduate degree at this institution. Exceptions to this policy may be made by the Dean of the Graduate School, with the advice of the Executive Committee of the Graduate Faculty Council.

New England Regional Student Program

The University of Connecticut participates in a regional program administered by the New England Board of Higher Education. This program, known as the New England Regional Student Program, permits qualified residents of the New England states to study with reduced out-of-state tuition privileges. The purpose of the program is to expand opportunities in higher education for New England residents by making available on a substantially equal basis

to all students those programs not commonly offered at every institution. This practice tends to reduce duplication of courses and thus to utilize most efficiently the higher educational facilities in each state.

Detailed information about this program can be obtained from the Graduate School website or from the New England Board of Higher Education, 45 Temple Place, Boston, MA 02111 or at nebhe.org.

Application Processing Fee

A non-refundable fee of \$75 for electronic submission must accompany the application. It may not be applied toward other charges. This fee must accompany every application submitted except for a doctoral degree program to follow immediately a master's degree program in the same field at this University or for current University graduate students applying to a certificate program. (Fees are subject to change without notice.)

Application Deadlines

Applicants are advised to check with appropriate academic departments concerning deadlines, and they are advised to submit their applications for admission as early as possible. At a minimum, applicants should file the application for admission several months in advance of the first semester of coursework. Students must be admitted and accept admission one month prior to the first day of classes for that term. All credentials, including official transcripts covering all undergraduate and graduate work taken up to the time of application, as well as the non-refundable processing fee, must be received by the Graduate School to be matriculated by deadline dates.

International Applicants

To ensure academic success, it is highly recommended that students studying on a visa sponsored by the University of Connecticut be present in the United States and attending classes by the first business day of their admitted term.

Students whose native language is not English, regardless of visa status, must show evidence of proficiency in the English language by having earned either an Internet-based (IBT) TOEFL (Test of English as a Foreign Language) score of at least 79 or a Paper-based (PBT) TOEFL score of at least 550, an overall band score of 6.5 or greater on the IELTS Academic Module (International English Language Testing System), or an overall score of 53 or greater on the PTE (Pearson Test of English) Academic test. Some departments require the Test of Spoken English (TSE) or the Test of Written English (TWE).

If you are not a native speaker of English and you expect to hold a teaching assistantship, you must satisfy the University's English Proficiency Policy at: ita.uconn.edu before being allowed direct instructional contact. This policy applies to all prospective teaching assistants, regardless of citizenship or visa status.

Supplementary and Departmental Transcripts

If a student is admitted before completing a baccalaureate or graduate degree or additional non-degree coursework which is in progress at the time of application, the student will not be permitted to register in future semesters until the completion of the degree or coursework and the submission of the official transcripts to the Graduate School. Students must submit official transcripts by the end of the first semester of study. Until all transcripts have been received, the plan of study will not be approved. All transcripts submitted, including test scores, become the property of the Graduate School and are not returnable.

Program Inquiries

Inquiries regarding the Master of Business Administration (M.B.A.) program should be addressed to the director of that program at mba.uconn.edu. Inquiries regarding graduate degree programs located at the University of Connecticut Health Center in Farmington, CT should be addressed to the Graduate Student Affairs Office at studentaffairs.uhc.edu. Inquiries regarding the Master of Social Work (M.S.W.) should be directed to the School of Social Work in Hartford, CT at ssw.uconn.edu. Inquiries regarding study in Law in Hartford, CT should be directed to the School of Law at law.uconn.edu.

Fees and Expenses

The schedule of fees contained on the Bursar’s Office website is expected to prevail during any given academic year, but the Board of Trustees and the Board of Governors for Higher Education reserve the right, at any time, to authorize changes in fees and to establish new fees applicable to all currently enrolled students.

Fee bills, covering the semester’s charges, are computed by and are payable to the Bursar’s Office no later than the Friday before the start of the semester.

Financial Responsibility

Graduate students are permitted to register, to modify their course registrations without penalty, or obtain deferments through the first day of the semester. Graduate students become liable for payment of tuition and other required course-related fees beginning with the Friday before the semester starts whether or not they have attended any classes or have paid their fee bills as of that date.

Failure to receive a bill does not relieve a student of responsibility for payment of fees by the specified due date. A student who fails to make timely payment of an outstanding balance may be barred from all privileges normally accorded to a student in good standing. Additionally, any pending University employment authorization may not receive approval or may be subject to cancellation. If there is a question concerning a bill, it is the student’s responsibility to contact the Bursar’s Office directly at bursar.uconn.edu for clarification and resolution.

If a graduate student does not fulfill their financial obligations to the University by the Friday before the semester starts or by the expiration date of an approved deferment, an enrollment and service restricting hold is placed on the student’s record.

Application Processing Fee

A non-refundable fee of \$75 for electronic submission must accompany an application to the Graduate School. It may not be applied toward other charges. This fee must accompany every application submitted except for a doctoral degree program to follow immediately on a completed master’s degree program in the same field at this University, or for a University Scholar, or for a current graduate degree seeking student applying for a graduate certificate program. If applicable, a fee waiver may be available. Please review the Graduate School’s Fee Waiver Policy at: grad.uconn.edu/admissions/fee-waiver-policy or email the Graduate Admissions Office at gradadmissions@uconn.edu.

Post-Baccalaureate and Graduate Certificate Program Costs

Please see individual program descriptions for fees and credit costs, which can vary across different types of certificate courses.

In-State and Out-of-State Status

Each student must file an affidavit of residence with the application for admission to the Graduate School. A form for this purpose is provided as part of the application. On the basis of this information, each entering student is classified as either a Connecticut student or an out-of-state student. Failure to file the form will result in classification as out-of-state.

Questions concerning the classification of graduate students as resident (in-state) or non-resident (out-of-state) are resolved by the Graduate School. In the event that students believe they have been incorrectly classified, requests for review, along with supporting documentary evidence, should be directed to the Graduate School.

Residents of other New England states enrolled in certain graduate degree programs may be eligible for special tuition rates through the New England Board of Higher Education Regional Student Program.

Office of the Bursar Website

Graduate students should refer to the Bursar’s Office website at: bursar.uconn.edu for current tuition and fee information, procedures, and policies pertaining to graduate students and graduate programs.

Reinstatement Fee

The Graduate School regulations require registration in each semester by all graduate degree, certificate, and post-baccalaureate program students, with the exception of those students on an approved leave of absence. All graduate students who fail to complete initial course registration by the end of the tenth

day of classes of any semester will be dropped from active status and will be required to pay a penalty fee of \$65. The reinstatement fee is added to a student’s bill along with any registration fee that has accrued. Students who do not register for longer than a year will be required to reapply for admission. A letter from the major advisor justifying the use of previous coursework to satisfy current degree requirements is required to count previous coursework towards the new enrollment.

Refunds and Cancellations of Charges

In order to be eligible for a refund or cancellation of charges, a student must officially drop all courses currently being taken for credit.

The University grants a full refund of fees to any student dismissed for academic deficiency or other cause, provided that the dismissal takes place prior to the start of classes. In certain other instances, including illness, full refunds or cancellations of charges may be made at the discretion of the Dean of the Graduate School.

A student inducted into military service will receive a prorated refund or cancellation of charges based on their date of separation. The student in this situation must furnish the Bursar’s Office with a copy of the orders to active duty, showing this to be the reason for leaving the University.

Refunds or cancellations of charges are available on the following schedule for students whose programs are interrupted or terminated prior to or during a regular academic semester. The refund schedule applies to students taking an approved leave of absence. When notice is received prior to the first day of classes of a semester, full refund (less nonrefundable fees) will be made if the fees have been paid in full. Thereafter, refunds or cancellations of refundable charges will be made according to the following schedule:

| | |
|--|-----|
| Day 1, 1 st calendar week..... | 90% |
| 2 nd week | 60% |
| 3 rd and 4 th week..... | 50% |
| 5 th week through 8 th week..... | 25% |

Assistantships, Fellowships, and Other Aid

The University of Connecticut supports the Council of Graduate Schools Resolution Regarding Graduate Scholars, Fellows, Trainees, and Assistants. Acceptance of an offer of financial support (such as a graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by a prospective or enrolled graduate student completes an agreement that both student and the Graduate School expect to honor. In that context, the conditions affecting such offers and their acceptance must be defined carefully and understood by all parties.

Students are under no obligation to respond to offers of financial support prior to April 15; earlier deadlines for acceptance of such offers violate the intent of this resolution. In those instances in which a student accepts an offer before April 15, and subsequently desires to withdraw that acceptance, the student may submit in writing a resignation of the appointment at any time through April 15. However, an acceptance given or left in force after April 15 commits the student not to accept another offer without first obtaining a written release from the institution to which a commitment has been made. Similarly, an offer by an institution after April 15 is conditional on presentation by the student of the written release from any previously accepted offer. It is further agreed by the institutions and organizations subscribing to the above resolution that a copy of this resolution should accompany every scholarship, fellowship, traineeship, and assistantship offer. Source: cgsnet.org/april-15-resolution

Support for graduate students engaged in degree study at the University of Connecticut comes from many sources. Two general types of financial aid support are available: (1) aid based on academic merit; and (2) aid based on demonstrated financial need.

1. Awards based on academic merit include: Graduate Assistantships (for teaching or research), University Predoctoral Fellowships, and Dissertation Fellowships. Application for merit aid such as graduate assistantships should be made directly to the academic department. Students interested in scholarships and fellowships offered through the Graduate School should monitor the website for appropriate application procedures and deadlines.
2. Need-based financial aid includes: Federal Direct Stafford Loans (FDSL), Federal Work-Study (FWS), and University of Connecticut Tuition Remission Grants. Citizens or permanent residents of the United States apply for need-based financial aid by completing the Free Application for Federal Student Aid (FAFSA) on the web at fafsa.ed.gov each year.

The University of Connecticut's one-time deadline each year is March 1 (May 1, for entering graduate students).

Note: International students are not eligible to receive need-based financial aid.

All need-based financial aid recipients and merit-based award recipients must meet Satisfactory Academic Progress (SAP) requirements, which are based on federal regulations. These requirements include maintenance of an appropriate grade point average (3.00) and satisfactory completion of a percentage (75%) of the number of credit hours attempted in each award year, as well as not exceeding published credit maximums for the student's program plan. A warning is sent to students once they have reached their degree minimums. A complete text of this policy is available at financialaid.uconn.edu/sap.

Assistantships, fellowships, and other awards from University sources are used in combination with need-based aid to calculate final need-based financial aid amounts offered either for a semester or an academic year.

Additional information regarding need-based financial aid for graduate students is available from the Office of Student Financial Aid Services at financialaid.uconn.edu/graduate. For example, information is provided concerning benefits under the various educational assistance programs provided by the Veterans Affairs and Military Programs.

Graduate Assistantships, Fellowships, and Internships

Many graduate students engaged in full-time degree study at the University of Connecticut hold graduate assistantships for teaching or research, whereas others hold fellowships, traineeships, or internships. Support from any of

these sources is subject to terms of the funding source and to approval by the Graduate School. A brief definition of each is as follows:

An assistantship (teaching assistantship or research assistantship) is awarded to a graduate student who provides teaching or research support to the University that is a part of the student's academic program. In recognition of this support, the tuition of the student is provided by the grant/contract funding agency (for research assistants) or the University (for teaching assistants).

Note that all assistantships must be administered through an academic department.

A fellowship is awarded to a graduate student to pursue their academic program, but does not require the student to provide any teaching or research support to the institution. The tuition of a student receiving a fellowship must be paid by the student, the granting organization, the department and/or school/college, or by the University with prior approval. An example of this can be found in the Policy on Competitive Federal Graduate Awards at policy.uconn.edu.

An internship is an experiential job placement designed to enhance the knowledge, skills, and abilities of a student, enhance their employability, and requires a student to perform specific work at the host's site. The tuition payment is the responsibility of the student, the host, or the external funding specifically designated for this purpose.

Note: Holders of an assistantship, fellowship, or internship are responsible for associated fees. The following information provides more details regarding assistantships, fellowships, and other forms of aid available through the University. Other sources may be available upon further inquiry, and graduate students are encouraged to seek opportunities for external sources of support, such as prestigious national fellowships. For more information, please refer to the Office of National Scholarships and Fellowships (ONS&F) website at onsf.uconn.edu.

Graduate Assistantships

Graduate students, who meet the criteria listed below, are eligible. Appointments are ordinarily made for the nine-month period, August 23 through May 22. Recipients serve the University as teaching assistants, readers, or laboratory and research assistants. Graduate assistants ordinarily take fewer than the usual number of courses per year because of this added workload. To be appointed, to retain an appointment, or to be reappointed, a student must have been accorded regular (not provisional) status, must have been maintaining a cumulative grade point average of at least "B" (3.00) in any coursework taken, must be eligible to register (i.e., must not have more than three viable grades of Incomplete on their academic record), must be enrolled in a graduate degree program scheduled to extend through the entire period of the appointment or reappointment, and must be a full-time student, counting coursework and/or its equivalent together with assistantship duties (See "Course Loads"), throughout the period.

The holder of a full assistantship devotes one-half of available time to studies and one-half (approximately twenty hours per week) to assistantship duties, whereas the holder of a half assistantship devotes three-quarters of available time to studies and one-quarter (approximately ten hours per week) to assistantship duties. Assistantships are not available for less than ten hours per week.

Graduate assistants divide their full-time efforts between study and assistantship responsibilities. As a result, they may not hold concurrent employment outside the University without the written consent of their major advisor.

All graduate assistants in programs based at UConn Health are awarded the same stipend. Nine month rates for Storrs and the regional campuses can be found at payroll.uconn.edu. Twelve month rates for UConn Health can be found at health.uconn.edu/student-services. Stipend rates for graduate assistants are graduated in terms of progress toward the advanced degree and experience.

- **Level 1:** For graduate assistants with at least the baccalaureate
- **Level 2:** For experienced graduate assistants in a doctoral program with at least the master's degree or its equivalent in the field of graduate study. Equivalency consists of 30-credits of appropriate coursework beyond the baccalaureate completed at the University of Connecticut, together with admission to a doctoral program.
- **Level 3:** For students with experience as graduate assistants who have at least the master's degree or its equivalent and who have passed the

doctoral general examination.

Tuition (but not the General University Fee, the Graduate Matriculation Fee, or other fees) is waived for graduate assistants. If an assistantship begins or terminates during the course of a semester, tuition will be prorated on a weekly schedule – charged for that portion of the semester when the assistantship is not in force, waived when it is in force. This often results in an adjustment of the tuition charges, including partial assessment (if the student is registered throughout the semester for coursework for which tuition is charged) or a partial refund (if tuition has been paid).

A graduate assistant is eligible for health insurance. Graduate assistants should be aware that it is necessary to complete the proper forms to enroll in health insurance. Health insurance does not take effect automatically. The University requires that all students have health insurance. If you have other health insurance and do not want the GA Student Health Insurance plan, you may waive the coverage by using the “GA Online Enrollment/Waiver Application” located at: hr.uconn.edu/ct-partnership-health-benefits.

When graduate assistants at Storrs or a regional campus become eligible for a Level 2 or Level 3 stipend, their department may request an increase by filing a new employment authorization effective at any time after the student attains eligibility.

Additional Sources of Financial Support

Many additional sources of funding for graduate education exist through both internal and external opportunities. Opportunities to seek external funding can be found through the office of National Scholarships and Fellowships at onsf.uconn.edu. A searchable database of opportunities can be accessed through the website, in addition to resources helpful to graduate students seeking to prepare competitive applications. Additional internal awards are available in many programs, and students are encouraged to seek information about awards on program websites. Although not exhaustive, the Graduate School website maintains a list of internal funding opportunities.

Graduate Student Resources

A wide variety and continuum of support services are offered at the University of Connecticut that can be accessed by graduate students. Although not considered to be exhaustive, the following offers an alphabetical listing of University contacts for graduate students who may be seeking supports to facilitate successful graduate study. Graduate students are also encouraged to visit the Division of Student Affairs website at: studentaffairs.uconn.edu for additional information about University services for students.

Bailey Agencies, Inc. The agency manages insurance coverage plans for all graduate assistants and fellows of UCONN/UHC. Graduate students are encouraged to contact this agency with any questions regarding coverage, provider availability, enrollment, ID cards, and policy. **Website:** baileyagencies.us. **Address:** 15 Thames Street, Suite 100, Groton, CT 06340. **Phone:** 860-446-8255, ext. 102. **Email:** katiek@baileyagencies.com.

Center for Career Development. The center is dedicated to excellence through offering the highest levels of service to students, across all schools, colleges, campuses, and disciplines. Office staff supports the intellectual growth of students by providing programs and experiences that promote self-awareness and engagement as they identify a course of study and pursue opportunities to become contributing members of the state, national, and world communities. Through partnership with employers, alumni, faculty, and staff, students are connected to quality career development resources, internships, experiential learning, and post-graduate opportunities. **Website:** career.uconn.edu. Location: Wilbur Cross Building, Room 201. **Phone:** 860-486-3013. **Email:** career@uconn.edu.

Center for Excellence in Teaching and Learning. CETL is dedicated to the support and advancement of best practices in teaching and learning at the University of Connecticut. The staff work with individual faculty, teaching assistants, students, departments and the academic administration to create a culture which values teaching and learning, supports and rewards faculty for innovation in teaching, encourages respect for differences in learners and provides an environment where faculty, staff, and students work together to accomplish the learning objectives. **Website:** cetl.uconn.edu. **Address:** 368 Fairfield Way, Unit 4001, Storrs, CT 06269-4001. **Phone:** 860-486-0457. **Email:** itl@uconn.edu.

Center for Students with Disabilities. The CSD offers a variety of accommodations and services to students with documented permanent and temporary injuries and conditions. Additional programs are offered to prepare students to enter college as well as for life beyond college. **Website:** csd.uconn.edu. Location: Wilbur Cross Building, Room 204. **Phone:** 860-486-2020. **Email:** csd@uconn.edu.

Dean of Students. The primary function of the DOS Office is to help students and their families get answers and solutions to those tough college-life questions or problems that students may have. Questions and problems may include life decisions (personal or academic), navigating the bureaucracy of a large institution and/or learning self-advocacy. In addition, the website maintains a page with helpful UConn web links. **Website:** dos.uconn.edu. Location: Wilbur Cross Building, Room 203. **Phone:** 860-486-3426. **Email:** dos@uconn.edu.

Division of Environmental Health and Safety. The division’s goal is to promote and maintain a safe and healthful environment by ensuring the highest level of environmental health and safety services for faculty, staff, students, and visitors at the University. Graduate students can find information about relevant policies and procedures governing safety in their workplace, including checklists to guide thinking through various issues. In addition, personal consultation related to assessment of the safety of the student’s work environment can be provided by staff. **Website:** ehs.uconn.edu. **Address:** 3102 Horsebarn Hill Road, U-4097, Storrs, CT 06269-4097. **Phone:** 860-486-3613. **Email:** ehs@uconn.edu.

Office of Global Affairs. The office includes the following units:

Study Abroad: The University offers over 300 study abroad programs in 65 countries on six continents. Begin your journey by exploring their website at: studyabroad.uconn.edu.

Global Partnerships: The University enters into a limited number of partnerships with institutions of higher education abroad. Most of these partnerships revolve around particular projects, but some are general, laying the foundation for more focused activities in the future. Search the University

of Connecticut Global Database or consult the Interactive Map to learn more about our global presence.

International Students and Scholar Services (ISSS): ISSS supports the greater internationalization of the University through the development and delivery of services and programs that help our international students, scholars, faculty and staff accomplish their academic and professional goals at the University of Connecticut. Services provided include: (1) ensuring compliance with U.S. immigration regulations governing visa; (2) sponsoring international students, scholars, faculty, and staff; (3) providing quality service and assistance with immigration and intercultural matters to University of Connecticut sponsored visa holders and their families through advising, programs, workshops and events; (4) serving as the resource for academic and administrative units; (5) hiring and sponsorship of international students, scholars, faculty, and staff; (6) providing on-going orientation and support services designed to foster cultural adjustment to the U.S., and; (7) building links within the University of Connecticut community.

The University American English Language Institute (UCAELI): UCAELI supports the greater internationalization of the University through the development and delivery of services and programs that help our international students, scholars, faculty and staff accomplish their academic and professional goals at UConn. For more information visit us at: ucaeli.uconn.edu. **Website:** global.uconn.edu.

Office of Institutional Equity. The OIE ensures the University's commitment and responsibility to foster diverse and inclusive working and learning environments. Their work focuses on ensuring compliance with the University's Non-Discrimination policies (please see website at: policy.uconn.edu) and also state and federal laws and regulations related to equal opportunity and affirmative action. OIE's major areas of focus include Americans with Disabilities Act (Title I) Compliance, Affirmative Action, Discrimination, Education and Training, Search Process Compliance, and Title IX Compliance, including sexual violence awareness. Although oversight is provided by OIE, specific resources regarding sexual violence are maintained at: titleix.uconn.edu. **Website:** equity.uconn.edu. **Location:** Wood Hall, First Floor. **Phone:** 860-486-2943. **Email:** equity@uconn.edu.

Office of National Scholarships and Fellowships. The office serves to advise and mentor high-achieving students who are competing for prestigious national and international scholarships and fellowships. It is part of the University of Connecticut's Enrichment Programs and is open to all graduate and undergraduate students, including students at the regional campuses. **Website:** onsf.uconn.edu. **Location:** Rowe Center for Undergraduate Education, Room 405. **Phone:** 860-486-3631. **Email:** onsf@uconn.edu.

Office of Financial Aid Services. Provides information regarding the costs of attendance, student employment, and financial literacy. **Website:** financialaid.uconn.edu. **Location:** Wilbur Cross Building, First Floor. **Phone:** 860-486-2819. **Email:** financialaid@uconn.edu.

Bursar's Office. The Bursar's Office is committed to ensuring financial integrity in the receipt, collection, and deposit of all revenues, including tuition, fees, fellowships, scholarships and stipends, while providing the highest level of professional, efficient, and responsive customer service. **Website:** bursar.uconn.edu. **Location:** Wilbur Cross Building, First Floor. **Phone:** 860-486-4830. **Email:** bursar@uconn.edu.

Office for Diversity and Inclusion. In order to develop an inclusive community for instruction, research and outreach, the University of Connecticut embraces diversity and cultivates leadership, integrity, and engaged citizenship among our students, faculty and staff. This collegial and vibrant environment promotes and nurtures perspectives that are enabled through differences in culture, experience and values. To achieve this goal, the university emphasizes diversity in the recruitment, retention and advancement of students, faculty and staff. **Website:** diversity.uconn.edu. **Location:** Budds Building, Third Floor. **Phone:** 860-486-2422.

Ombuds Office. This office serves as a neutral resource and provides confidential and informal assistance to members of the campus community. This office is not a designated reporting office for the University, but is available to discuss a variety of workplace concerns confidentially to the extent permitted by law. The Ombuds Office supplements but does not substitute for any of the other resources included on this list. Persons can contact the office at any point during an issue when a confidential conversation or source of information may be needed. **Website:** ombuds.uconn.edu. **Location:** Homer

D. Babbidge Library, 2nd Floor, Room 2189. **Phone:** 860-486-5143. **Secure Fax:** 860-486-5875. **Email:** Jim.Wohl@uconn.edu.

Payroll Department. Processes biweekly payments to employees of the University. Other special services provided include, but are not limited to, worker's compensation administration, wage verifications and social security earnings reports, moving expense reimbursements, and non-resident alien tax consultation. The Payroll Department may also be contacted with questions regarding salary and deductions or to complete the various forms available from our office. Such forms include: Federal and State W-4 forms, I-9 form, Direct Deposit Authorization Agreement form, Salary Amendment Agreement form (for tax deferred products), and the Personal Information Change form. **Website:** payroll.uconn.edu. **Location:** Budds Building. **Phone:** 860-486-2423.

Research Compliance Services. The University of Connecticut is committed to the highest standards of integrity in fulfilling its mission to expand human knowledge and benefit society through research. All research activities undertaken by faculty, staff, and students at UConn will be conducted in accordance with strict ethical principles and in compliance with federal, state, and institutional regulations and policies. The Office of Research Compliance Services (RCS) reports to the Vice President for Research. RCS is responsible for providing support and training to faculty, students and staff in order to meet these requirements and maintain a robust research compliance program at the University of Connecticut. **Website:** research.uconn.edu/rcs. **Location:** Nathan L. Whetten Graduate Center.

Residential Life. The primary role of the Department of Residential Life is to provide assistance with housing. Housing options vary widely for graduate students at the University. The primary decision which will guide your housing need is whether you want or need to be located close to campus or find something in a more urban area. **Website:** reslife.uconn.edu. **Location:** Rome Commons, Ground Floor. **Phone:** 860-486-2926.

Student Health Services. Provides primary level health care for both medical and mental health. Student Health Services is a fully accredited ambulatory health care facility. Students are offered both in- and out-patient services, as well as health care treatment for non-emergency conditions. Services include the following:

- Primary Medical Care
- Women's Clinic
- Men's Health
- Nutrition Services
- Counseling & Mental Health
- Clinical Research
- Health Education
- Sports Medicine
- Orthopedics
- Physical Therapy
- Club Sports Athletic Training

Website: shs.uconn.edu. **Address:** Hilda May Williams Student Health Services Building, 234 Glenbrook Road, U-4011, Storrs, CT 06269-4011. **Phone:** 860-486-4700. **Email:** shs@uconn.edu.

Veterans Affairs and Military Programs. Provides support for returning armed forces personnel as they adjust to the academic and social terrain at the University. The office assists student veterans in accessing services on-campus and in the surrounding community. The University is an institution that enhances its support towards and celebration of its student veteran population. **Website:** veterans.uconn.edu. **Location:** Arjona Building, Room 340. **Phone:** 860-486-2442. **Email:** veterans@uconn.edu.

Academic Regulations

Registration

By accepting admission, the student assumes responsibility for knowing and complying with the regulations and procedures set forth by the University.

Applicants admitted on the basis of an expected baccalaureate or graduate degree must have completed all requirements for that degree prior to the start of classes. University of Connecticut seniors must have completed the baccalaureate prior to the start of classes. Otherwise, they must continue to register as undergraduates, even though admitted to the Graduate School and registering for graduate courses.

Occasionally, a University of Connecticut senior planning to enter the Graduate School has less than a full course load remaining to complete for graduation. Such a student may take advanced courses along with the remaining undergraduate courses and may count those advanced courses toward the graduate degree. Inclusion of up to six credits of such coursework is permissible under the following conditions: (1) the work is completed with grades of “B” or above; (2) the student is later admitted to Regular status in the Graduate School; (3) the work is approved as part of the graduate plan of study; and (4) the work was not counted toward the baccalaureate degree.

Advance registration and fee payments are accepted on the assumption that students will remain eligible to continue, having met the scholastic standards of the Graduate School and by having complied with its regulations. The following instructions apply to students registering for most courses conducted on the Storrs campus. All degree-seeking students must register for courses using the Student Administration System and pay all fees either through the Bursar’s Office at: bursar.uconn.edu or online using the Student Administration System. All course charges (applicable tuition and fees) are due and payable by the close of business on the Friday before the semester starts. Late fees are assessed after that time. Part-time students who are not degree-seeking students must register through the Office of the Registrar at: nondegree.uconn.edu/registration.

Both new and continuing students should make appointments with their major advisors to determine the courses in which they plan to enroll. Dates for registration are contained in the Academic Calendar. Depending upon course selections, most students should be able to register using the Student Administration System. Problems encountered during registration (including enrollment in restricted courses) may be taken to the Registrar’s office. Graduate students are permitted to register, to modify their course registrations without penalty, and to pay their fee bills or obtain deferments through the first day of the semester. Graduate students become liable for payment of tuition and other required course-related fees, however, beginning with the Friday before the semester starts whether or not they have attended any classes or have paid their fee bills as of that date.

Continuous Registration

Master’s, doctoral, Sixth-Year in Education, graduate certificate, and post baccalaureate students must begin their programs with coursework and must maintain registration continuously each semester thereafter (except summer sessions) until all requirements for the degree have been completed. Registration may be maintained either by taking coursework for credit or by registering for one of the five non-credit Continuing Registration courses. These include Special Readings at the certificate (GRAD 5997), master’s (GRAD 5998), or doctoral (GRAD 6998) level, Master’s Thesis Preparation (GRAD 5999), and Doctoral Dissertation Preparation (GRAD 6999). Other zero-credit courses may be substituted, if appropriate. Non-credit registration requires payment of University fees.

International students should consult with the office of International Student and Scholar Services prior to registering for zero-credit courses. Per U.S. immigration regulations, students with F-1 and J-1 status are permitted to register for zero-credits only in their final semester of degree study. Continuous Registration is granted with the consent of the student’s major advisor and the student’s international advisor.

Failure to maintain Continuous Registration during the spring and fall semester results in the student’s inactivation. Reinstatement is possible within a year of last registration and payment of all fees. (See “Reinstatement Fee” in the Fees and Expenses section of the catalog). The consequences associated with matriculation via Continuing Registration rather than credit courses are addressed in the “Course Loads” section below.

Neither enrollment for Continuing Registration nor payment for it is required for any semester, during the first ten class days of which the student completes all requirements for a degree, if it is the only degree the student is pursuing.

Any currently matriculated student taking coursework at another institution, either for transfer to a University of Connecticut graduate degree program or for any other reason, must register for Continuing Registration as specified above in any affected semester.

Enrollment in Continuing Registration is not required during the summer. To receive most forms of summer financial aid for study or research, a student must register for either five credits of coursework or one of the full-time research courses, GRAD 5960 (Full-Time Master’s Research) or GRAD 6960 (Full-Time Doctoral Research).

Registration Deadlines

All graduate students registering with the University must register themselves and have their initial registration in place no later than the close of business of the first day of classes each semester. Additions to and deletions from a student’s class schedule may occur freely throughout the first ten business days of the term. Students who do not complete an initial registration by the close of business of the first day of classes are subject to a late registration fee.

Course Loads

The number of credits and choice of courses for which a student registers is a matter to be discussed by the student and the major advisor. Graduate students may enroll in up to 20 credits per semester. If a student has extenuating circumstances which require them to take more than 20 credits, the major advisor must send a written request to the Graduate School for approval. A student may be classified as a full-time student in one of three ways: (1) enroll in nine or more credits of coursework; (2) enroll in six or more credits of coursework while holding a graduate assistantship (50 percent or greater); or (3) enroll in one of the four special purpose three credit courses. These courses include GRAD 5960 (Full-Time Master’s Research), GRAD 6960 (Full-Time Doctoral Research), GRAD 5930 (Master’s Level Directed Studies), and GRAD 6930 (Doctoral Level Directed Studies). The former two courses may be taken by students who have completed all requirements for the respective degree except the research component and who have no other obligations at the University (i.e., no other coursework and no graduate assistantship). The latter two courses denote a full-time, off-campus directed project, such as an internship, field work, or other special activity. Students in GRAD 5930 or 6930 may hold graduate assistantships if those assistantships are in direct support of their studies. Such an assistantship may not be a standard teaching assistantship.

To be classified as three-quarter time, the student’s course credit load must be greater than six and less than nine credits per semester. To be classified as half time, the student’s course credit load must be between 4.5 and 5.99 credits per semester. A credit load of fewer than 4.5 credits per semester is considered less than half time. These criteria apply to all registered students at the University. The currently defined Continuing Registration courses (GRAD 5997, 5998, 5999, 6998, and 6999) are zero-credit “place-holder” courses denoting part-time study and do not count toward the credit load requirement for half-time, three quarter-time, or full-time enrollment status. Degree and certificate seeking students who do not need to be certified by the University as holding at least half-time enrollment status may use these courses to maintain registration on a part-time basis. For various reasons, the University may need to provide the institutional consideration of a “part-time” course credit load. A part-time course credit load is between one and 8.99 credits. Students holding graduate assistantships must register for six or more credits per semester. Such students are considered to be full-time students.

In addition to courses offered by each department, a student’s credit load may include GRAD 5950 (Thesis Research), GRAD 6950 (Dissertation Research), and other equivalent research courses defined by the Graduate School, including seminar and other “colloquium” courses that are not part of the plan of study. These variable credit courses carry “S” or “U” (Satisfactory or Unsatisfactory) grading, with the student’s major advisor as the instructor of record.

Auditing Courses

Students who do not wish to register for credit may be permitted to register as auditors under the following conditions: (1) they pay the appropriate tuition and fees for courses; (2) they obtain the consent of the instructor; (3) they audit

only courses for which there are adequate classroom or laboratory facilities; and (4) in the case of students in degree programs, they obtain consent from their major advisors. All permissions and registrations for auditing courses must be filed in the Registrar's office. Courses audited are entered on the student's permanent record, but such courses cannot be used toward fulfilling requirements for a graduate degree at the University.

The privileges of an auditor in a course are limited specifically to attending and listening. Auditors must attend class regularly. The auditor assumes no obligation to do any of the work required of the course and is not expected to take any of the instructor's time. In addition, the auditor does not submit any work, and is neither eligible to take any tests or examinations nor able to receive grades on all or any part of the course.

Students should not "sit-in" on classes for which they do not register as auditors. No audit enrollment request will be approved after the ninth week of the semester.

Repeating Courses

Any student who is regularly registered for courses and who satisfies the requirements shall receive credit except that no student shall receive credit for the same course twice, unless repeating the course is specifically authorized in the Graduate Catalog, as in a variable content course. Courses with the same number that cover the same course content cannot be counted more than once for credit. The parenthetical phrases ("Formerly offered as...") and ("Also offered as...") that follow a course description as a cross reference indicate that a student may not take both the course and the cross-referenced course. A student is regularly registered for a course only if that student has conformed to all university or college regulations or requirements when applying to register.

A student may repeat a course previously taken two times without seeking permission in order to earn a higher grade. When a student repeats a course, credit shall be allowed only once. Furthermore, in the computation of the grade point average, the registered credit and grade points for the highest grade shall be included in the GPA calculation and the registered credit and grade for the lower grade shall remain on the transcript, but shall be removed from the GPA calculation.

The student should note that repeating a course that was previously passed can have negative consequences. For example, repeating a previously passed course may have an effect on financial aid. Students considering repeating previously passed courses should consult their advisors and Student Financial Aid Services staff. When a student repeats a course after receiving a degree, the student's transcript will indicate a grade, but no registered credit, for the repeated course. The grade and registered credit recorded for the course prior to receipt of the degree shall continue to be included in the GPA and credit calculations.

A student must have major advisor permission to repeat a course that is listed as a prerequisite or corequisite for any course that the student has passed. For example, a student who received a "C" in ACCT 5121 and subsequently passed ACCT 5122 may not retake ACCT 5121 without permission.

Graduate Schedule Revision Regulations

Section changes require the same authorization as other add/drop transactions.

Adding Courses

| Semester Period | Add |
|-----------------------------------|--|
| First and second weeks of classes | Registration |
| Third and fourth weeks of classes | Advisor, Instructor, and Department Head offering the course |
| After the fourth week | All of the above and the Dean |

After the beginning of a semester or summer session, a student may not add a course if the instructor feels that elapsed time might preclude its successful completion. For degree and certificate seeking students, courses added after the tenth day of a semester or after the fifth day of a summer session term must be submitted to the Registrar's office on a Schedule Revision Request form available at registrar.uconn.edu/forms.

Students may add courses during the first 10 days of classes without special permissions. In exceptional cases only, a student may add courses after the tenth day of classes with the consent of the student's advisor, the course instructor, and the head of the department or program offering the course. After the fourth week, the permission of the student's dean or dean's designee is also required for adding classes.

Dropping Courses

| Semester Period | Single Drop |
|--------------------------------------|--|
| First and second weeks of classes | Registration with NO "W" grade |
| Third through ninth weeks of classes | Advisor with "W" grade |
| After the ninth week | Dean; exceptions made only for extenuating circumstances |

Discontinuance of attendance or notice to an instructor or to an advisor does not constitute cancellation of course registration, and may result in a failing grade on the student's permanent record. Before terminating class attendance, the student should ensure that the course has been dropped officially. Until this has been done, the student is obligated to complete all work. No grade is recorded for courses officially dropped, but a mark of "W" is recorded to signify withdrawal from a course after the tenth day of the semester or after the first week of a summer session course. Cancellation of course registration does not automatically drop a course from a plan of study, nor does approved deletion of a course from a plan of study cause cancellation of course registration. The procedures are separate and unrelated.

During the first nine weeks of a semester or prior to the midpoint of a summer session course, a course may be dropped by the following procedure. Students registered directly by the Registrar's office at Storrs must file a properly completed and signed Schedule Revision Request form with the Registrar's office. This form is available on the Registrar's office website at: registrar.uconn.edu/forms. Non-degree students register and drop courses through the Office of the Registrar at: nondegree.uconn.edu.

After the first nine weeks of a semester or the midpoint of a summer session course, students ordinarily are not allowed to drop a course. If, however, a student must drop a course because of illness or other compelling reason beyond the student's control, the student must request special permission as early as possible and well before the last day of classes. Permission to drop a course or to change from participant to auditor is granted only for good cause. All students must obtain permission from the Graduate School. Permission is granted only on the major advisor's written recommendation, which must be convincing and sufficiently specific regarding reasons beyond the control of the student. The recommendation should be accompanied by a properly completed and signed Schedule Revision Request form for the course(s) to be dropped. Students in the M.B.A. programs must obtain permission from the director of the program. Under no circumstances is a student at any location or in any program permitted to drop a course after the course has officially ended.

Dropping All Courses

The general policies and procedures regarding dropping a course (above) apply to dropping all courses, whether the student wishes to remain active in the graduate degree program or to withdraw permanently from it. Permission from the Graduate School is required for the student either to remain active in the program or to leave in good standing. No refund is possible unless all coursework for credit is dropped.

Course Grades

Instructors are required to file grades with the University Registrar for all credit-bearing courses taken by a student. Although instructors are free to set the standard of performance expected in their courses, the following uniform scale is published to encourage general agreement on the meaning of grades: Students are required to maintain in their course program at least a "B" (3.00) average, for which a grade point average will be computed using the following chart.

Grades and Grade Point Formulas

Instructors grade graduate courses based on the following letter and point system.

| Explanation | Final Grades | Grade Points |
|-----------------------------|--------------|--------------|
| Distinction | A+ | 4.3 |
| | A | 4.0 |
| | A- | 3.7 |
| Good Quality | B+ | 3.3 |
| | B | 3.0 |
| | B- | 2.7 |
| Below Expected Standard | C+ | 2.3 |
| | C | 2.0 |
| | C- | 1.7 |
| Unsatisfactory Quality | D+ | 1.3 |
| | D | 1.0 |
| | D- | 0.7 |
| Failure | F | 0 |
| Satisfactory (Good Quality) | S | N/A |
| Unsatisfactory/(Failure) | U | N/A |
| Withdrawal | W | N/A |
| Continuing Registration | R | N/A |

Grades Below Expected Standard

- All “C” Grades – Course used in a supporting area may be of benefit to students who should not be discouraged from including work in their programs. Such work shall be identified on the plan of study. Plus and minus values may be assigned to all but failing grades, are entered on the permanent record, and are computed into the student’s grade point average.
- All “D” Grades - Course may not remain on the plan of study and the student’s eligibility to continue in the degree program is reviewed by the student’s advisory committee.
- Letters “F” and “U” - Necessitates a recommendation by the advisory committee to the Graduate School as to whether or not the student shall be permitted to continue graduate study.
- Final grades of “S” (Satisfactory) or “U” (Unsatisfactory) are associated only with certain courses designated as such by the Executive Committee of the Graduate Faculty Council. Certain foreign language courses designed under method (2) for fulfillment of a doctoral language requirement also may carry the “S” or “U” grading option, if chosen by the student. (See “Foreign Language; Related or Supporting Area of Study”). An “S” is not computed into the student’s grade point average whereas a “U” is viewed as an “F.”

Graduate students are not permitted to take any course, undergraduate or graduate, on a Pass/Fail basis.

Temporary Grades

Temporary grades signify that credit has not been earned in that course, and may subject the student to scholastic probation or dismissal. Temporary grades shall not prevent the calculation of either the semester or the cumulative grade point average.

Temporary Grades Related to Incomplete Work

An instructor may assign a temporary grade for a course when student work is not completed within the semester.

| Grade | Conditions for Assigning Temporary Grade |
|-------------------------------|--|
| N No basis for grade | A student has completed few or no assessments and no make-up schedule has been agreed upon with the instructor; the instructor has no basis for a grade. |
| I Incomplete Grade | A student has not completed all of the assessments but work completed is of passing quality and a make-up schedule has been agreed upon with the instructor. |
| X Final assessment absence | A student did not submit a final assessment and might by means of a satisfactory performance on the assessment complete the course with a passing grade. If in the opinion of the instructor such a student would fail the course regardless of the result of the assessment, the student shall be given a grade of “F.” |

If all work required to change a mark of “I” or “X” is not submitted to the University Registrar within 12 months following the end of the semester or session for which the mark was recorded, or within a shorter period of time specifically designated by the instructor, no credit is allowed for the course. For grades of “I,” it is the student’s responsibility to reach and to maintain an understanding with the instructor concerning the timely completion of the work. For grades of “X,” it is the student’s responsibility to seek the required permission to take the final examination from the Graduate School as soon as possible after it has been missed.

Upon the recommendation of the instructor to the Graduate School, a limited extension of an incomplete may be granted. The Graduate School is not obligated to approve an extension if the instructor of the course no longer is a faculty member at the University of Connecticut. If more than three courses have been left incomplete, the student may be required to complete those still viable before being allowed to register for additional coursework. Too many permanent incompletes on the record may be grounds for the student’s termination or dismissal. An employment authorization for a graduate assistantship appointment may not be approved for a student who has four or more viable incomplete courses on their academic record.

For further information, the reader is referred to the document “*Key to the Transcript*,” available from the Office of the Registrar.

Significant Letters

| Letter | Explanation |
|--------|---|
| R | Administrative symbol signifying that a student is registered. Any zero-credit course (e.g., GRAD 5997, 5998, 5999, 6998, or 6999) for which a student registers appears on the permanent academic record with the letter “R” as the grade. |
| T | Course credit has been accepted in transfer from another institution. |
| W | Withdrawal from a course after either the 10th day of a semester course or the first week of a summer session course. Except in extraordinary cases where academic factors or extreme or unusual circumstances warrant it, this mark is not deleted from the permanent academic record. |

Changes of Course Grades

Grades are part of the student’s permanent record; they should never be changed for reasons unrelated to course requirements or quality of work. Once the grade in the course has been submitted, an instructor may neither accept additional work nor give additional examinations.

Instructors should change grades for the following reasons: a computational error, clerical error, and the discovery of overlooked components in a student’s body of work. In cases when the instructor concludes that a course grade ought to be changed, the instructor determines a corrected grade and initiates the grade change process. The head of the department or program offering the course and the dean of the school or college in which the course is taught will be notified of a grade change to ensure consistency.

Appeals of Assigned Course Grades

If a student believes that an error in grading has occurred, the student may request (within six months of the final grade being posted) that the instructor review the grade. If the student cannot contact the instructor, then the student should contact the department head. When the course is in a non-departmentalized school or college, the student should contact that dean or the dean's designee.

If the instructor agrees that a grade change is justified, the instructor will initiate the grade change using procedures described by the Registrar.

If the instructor believes that the original grade is correct, the student has 30 days to appeal the decision to the head of the department in which the course is taught. The department head will seek input from the instructor and the student to determine his/her opinion related to the merits of the grade appeal.

If after this review the instructor and the department head agree that a grade change is justified, the instructor will initiate the grade change according to the procedures described by the Registrar.

If the instructor and the department head agree that a grade change is not justified, the department head shall notify the student in writing with a copy to the instructor. If the student is dissatisfied with the appeal decision, the student has 10 working days to request, through the dean of the school or college in which the course is taught, a review by a Faculty Grade Change Review Panel.

If the department head thinks that a grade change is justified but the instructor does not agree, the department head shall request, through the dean of the school or college in which the course is taught, a review by a Faculty Grade Change Review Panel. The department head's request shall be made within 10 working days of completion of the grade appeal review.

The Faculty Review Panel is composed of three full-time faculty members appointed by the dean of the school or college in which the course is taught. The panel will convene a hearing within 10 working days of notification of a case. Both the appealing student and the course instructor should be present at the hearing. The student will be given an opportunity to state the grounds on which he or she is appealing the grade.

The instructor will be given the opportunity to document the basis on which the grade was awarded. Both parties may present supporting evidence and/or request testimony of others. The Faculty Review Panel may request input from the department head.

If the Faculty Review Panel recommends a grade change, it is authorized to execute the change by sending to the Registrar a change of grade request signed by all the members of the panel. The panel will send a written report of the decision to the instructor, the student, the department head, and the dean of the school or college offering the course within 10 working days of the decision. This decision is considered final.

Standards and Degree Requirements

Maintenance of good academic standing in the Graduate School requires a cumulative grade point average of 3.00 or higher at all times while enrolled in a graduate program. An official transcript of an individual's graduate academic career, however, includes grade point average calculations based on all coursework completed during the student's graduate career (including any 1000-level courses). Credits completed elsewhere and accepted in transfer by the Graduate School do not affect the student's University of Connecticut grade point average in any way.

Whenever a student's cumulative average falls below 3.00, the program is to be reviewed by the student's advisory committee to determine whether or not the student shall be permitted to continue graduate study.

The general academic standards and degree requirements of the Graduate School apply to all graduate students enrolled in certificate and degree programs. Some programs have additional requirements that are more detailed or tailored to the needs of the specific program. Students should acquaint themselves with all of the standards and degree requirements for their degree program, as specified in both the Graduate Catalog and official graduate program handbooks. Undergraduate and non-degree students taking a graduate course should consult the appropriate catalog for regulations that apply to them.

Post-Baccalaureate and Certificate Programs

A certificate from the University of Connecticut provides post-baccalaureate students with critical knowledge in a specific field or niche. UConn's certificate programs may be offered face-to-face, entirely online, or in a blended/hybrid format. Those that involve a substantial online component are predominantly administered through UConn eCampus. Post-baccalaureate and graduate

certificates can often be completed in a single year, allowing working professionals to update their skill sets or expand into an emerging area quickly.

Both post-baccalaureate and graduate certificate programs are offered through the Graduate School. Students are awarded certificates based upon completion of a well-defined program of coursework. A certificate is not a degree. Rather, it is a focused series of courses that, when completed, demonstrates competence in a coherent academic specialty. Detailed information concerning criteria and procedures may be obtained from certificate program coordinators.

To be awarded a certificate, a student must satisfactorily complete (grades of "B" [not "B-"] or higher) a set of courses consisting of 12 to 15 credits specified in the certificate program requirements. In a small number of cases where detailed justification has been provided, a certificate program may require as few as nine credits. In certain cases where the appropriate programs have obtained specific prior approval, one three-credit course may be used simultaneously to satisfy course requirements in two different certificate programs. A student may enroll in a certificate program on either a part-time or a full-time basis, but the student must complete the requirements for the certificate within three years of initial enrollment.

Advanced coursework taken on a non-degree basis at the University of Connecticut may account for up to six of the course credits required toward a certificate's plan of study provided the following conditions are met: (1) courses are the appropriate level; (2) the grades earned in such coursework are "B" (not "B-") or higher; and (3) such coursework is within the time limit for completion of the certificate program requirements. Credits earned at other institutions may not be counted toward a certificate's plan of study. Non-degree coursework may be included on the plan of study only with the consent of the advisor.

Admission to a certificate program does not guarantee admission to a related degree program, but if a certificate student is admitted to a degree program, all credits from the certificate may be counted toward the graduate degree, subject to the approval of graduate program faculty in that field of study or area of concentration. The terminal date associated with the degree will be determined using the date of the first certificate class as the initial date of enrollment for the degree. Students should contact graduate program coordinators to determine whether credits earned as part of a certificate program satisfy degree requirements of any particular degree program.

Graduate Degree Programs

The student is expected to register for coursework with reasonable regularity and to complete all requirements for the degree within a moderate span of time to assure continuity and adequate familiarity with developments in the field of study (see "Continuous Registration").

Time Limits

The student is expected to register for coursework with reasonable regularity and to complete all requirements for the degree within a moderate span of time to assure continuity and adequate familiarity with developments in the field of study. All work for the master's degree must be completed within six years from the beginning of the student's matriculation in the degree program. Work for the doctor of musical arts and doctor of philosophy degrees must be completed within eight years of the beginning of the student's matriculation.

Failure to complete the work within the periods specified or failure to maintain Continuous Registration (see "Continuous Registration") will require re-evaluation of the entire program and may result in a notice of termination.

A one-time extension of the student's terminal date of no longer than two years is considered only when there is substantial evidence that the student has made regular and consistent progress toward completion of degree requirements. A detailed recommendation to extend the terminal date must be signed by the major advisor and submitted in a timely manner to the Dean of the Graduate School.

Plans of Study

To become a candidate for a graduate degree, the student must have an approved plan of study or advisement report approved by their advisory committee or major advisor as appropriate for the degree program. Successful completion of all work indicated on the approved plan of study is a fundamental prerequisite to the conferral of the degree. Courses elected shall be consistent with the student's objectives and related to the field in which the degree is to be taken. The plan of study shall consist largely of courses at the 5000 level or above. Course credit by examination is not allowed as a means of accumulating credits to meet the requirements for advanced degrees at this institution.

Plans of study for master's and doctoral degree programs must be prepared and signed by the student and the members of the advisory committee. The Doctor of Musical Arts degree must also be approved by the Director of Graduate Studies in Music. Plans of study for master's degree programs must be submitted to the Graduate School for approval no later than the beginning of the student's final semester. Doctoral plans of study must be submitted to the Graduate School no later than when 18 credits of coursework have been completed.

Before drawing up and approving the plan of study, the major advisor should have on file and should consult for guidance a set of transcripts of all undergraduate and graduate work the student has taken. Failure to present the plan on time may prolong the period of study for the degree. Master's students may not take the final examination and doctoral students may not take the general examination before the plan of study has been approved.

In addition to the content coursework and any required Related Area included in the plan of study, satisfactory completion of at least 15 credits of GRAD 6950 – Doctoral Dissertation Research or GRAD 6960 – Full-Time Doctoral Dissertation Research is required for doctoral degrees.

The plan of study for some programs also may designate a foreign language(s) in which the student is required to demonstrate reading knowledge and any courses comprising a Related Area. Course credit by examination is not allowed as a means of accumulating credits to meet the requirements for advanced degrees at this institution.

After approval of the plan, any request for change must be submitted to the Office of the Registrar on the *Request for Changes to Plan of Study form* bearing the signatures of the members of the advisory committee and the student.

Transfer Credit

A limited number of credits at the 3000 or 4000 level (not more than six) may be accepted for graduate degree plans of study.

Advanced coursework taken on a non-degree basis at the University may be included on the plan of study provided the following conditions are met: (1) the grades earned in such coursework are "B" (not "B-") or higher; (2) such coursework is within the time limit for completion of the degree requirements; and (3) such credits have not been applied toward any other degree, at the University of Connecticut or elsewhere (already completed or to be completed in the future). In any event, inclusion of non-degree coursework on the plan of study requires the consent of the advisory committee. Such non-degree course credits may account for up to 25 percent of the credits required for a master's degree, provided the courses are at the graduate level. Up to 12 credits of University of Connecticut non-degree courses may be included on doctoral plans of study.

Any credits transferred to a graduate degree program at the University of Connecticut must not have been or be used toward a degree elsewhere (already completed or to be completed in the future).

Master's Degree Programs

Master's degree programs are offered in a broad range of fields throughout the University. A master's degree program represents the equivalent of at least one year of full-time study beyond the baccalaureate (or its equivalent).

The Graduate School requires a minimum of 30 credits for a master's program, though some programs may require more. Ordinarily, the master's degree should be completed within three years.

The Master of Arts degree usually is awarded to qualified candidates in the humanities, the social sciences, education, and other non-scientific fields. The Master of Fine Arts is a terminal degree in the fields of Art, Digital Media and Design, and Dramatic Arts. The Master of Science degree is awarded to candidates in the natural, physical, mathematical, pharmaceutical, nutritional, and agricultural sciences, as well as Accounting, Nursing, and Engineering. Other master's degrees awarded include the Master of Business Administration, the Master of Dental Science, the Master of Engineering, the Master of Music, the Master of Professional Studies, the Master of Public Administration, the Master of Public Health, and the Master of Social Work.

Thesis and Non-Thesis Master's Degrees

Master's degrees may be earned under either of two plans, as determined by the advisory committee. The Thesis plan emphasizes research activities while the Non-Thesis plan requires comprehensive understanding of a more general character. Non-Thesis plans in the Masters of Fine Arts emphasize research that

culminates in a final Research Project. The Thesis plan requires no fewer than 21 credits of advanced coursework and no fewer than nine additional credits of Master's Thesis Research (GRAD 5950 or 5960), as well as the writing and oral defense of a thesis. The Non-Thesis plan requires no fewer than 30 credits of advanced coursework and a comprehensive final examination if the program requires it. In either case, advisory committees may require the student to take other courses with or without graduate credit, depending on the student's objectives and previous preparation.

The advisory committee may require that the student take an exploratory examination to guide the committee in formulating the plan of study. Certain master's degree programs submit advisement reports for individual students at the conclusion of master's study rather than a plan of study. Advisement reports require the approval of the major advisor or program director.

Transfer Credit

Up to 25 percent of the credits required for a University of Connecticut master's degree program may be accepted in transfer from other institutions provided these conditions are met: (1) the major advisor or the advisory committee indicates its approval of the transfer of credit(s) by signing the Plan of Study and the *Transfer Credit Request form* as appropriate for the degree program; (2) the courses must be at a level appropriate for a graduate degree and offered by an accredited institution; (3) such coursework is within the six year limit for completion of master's degree requirements; and (4) the grades earned in any courses to be transferred must be "B" (not "B-") or higher. Official transcripts of any coursework to be transferred must be on file in the Graduate School. Once the approved plan of study or program plan is submitted to the Graduate School and official transcripts indicating satisfactory completion of the coursework to be transferred are received, the transfer of credit is noted on the student's permanent University of Connecticut academic record.

Master's Degrees for Doctor of Philosophy Students

Students admitted to study for the degree of Doctor of Philosophy may earn a Master of Arts or Master of Science degree, if one is offered specifically in their field of study, under either the Thesis or the Non-Thesis Plan. Students also may apply for this degree if they have on file a fully approved Ph.D. plan of study including at least 30 completed credits of suitable content coursework taken at this University and have passed a master's final examination. They also may apply for this degree if they have completed at least 30 credits on an approved Ph.D. plan of study, have passed the doctoral General Examination, and have been recommended by their major advisor or by the Dean of the Graduate School for award of the master's degree. More than one master's degree may not be awarded at this institution to an individual student unless the degree titles are different or unless the degrees are earned in substantially different fields of study. The same course may not be offered for credit toward more than one degree, except in the case of officially approved dual degree programs.

The Master's Thesis

The advisory committee must approve the topic and scope of the thesis and, upon its completion, ascertain that it represents an independent investigation of a significant topic and is an important contribution to ongoing research in the candidate's field. The thesis must be acceptable in literary style and organization.

Specifications for preparation of the thesis can be obtained at the Graduate School or from the Graduate School's website at grad.uconn.edu. It is the student's ultimate responsibility to be certain that the thesis conforms to the specification.

The thesis must be dated as of the calendar year in which all requirements for the degree are completed. The Graduate School requires the electronic submission of the thesis through Digital Commons, a University repository for public access. The final copy must meet all specifications outlined on the Graduate School website. The *Thesis Submission Checklist* must be submitted to the Graduate School with an Approval Page and the Report on the Final Examination bearing original signatures of all members of the advisory committee. No restrictions that limit or delay the accessibility, use, or distribution of the results of a master's student's research are acceptable if such delays are inconsistent with an embargo period requested by the student or if they interfere with the timely completion of a student's academic program.

Final Examination

Fields of study may require that candidates complete a final examination as part of a master's degree. If a final examination is required, it must be completed no

later than one year after completion of coursework or the thesis. The contents of the final examination are under the jurisdiction of the advisory committee. The student may not take the final examination before Regular graduate status has been granted. The advisory committee has discretion to determine whether the examination shall be written, oral, or both. Invitation to participate in an oral examination is issued by the advisory committee, although members of the faculty may attend. The examination must be completed by the published deadlines for the appropriate conferral period for the degree to be granted with that conferral date.

The decision as to whether a student has passed or failed the examination rests solely with the advisory committee, which shall take into account the opinions of other participating faculty members. The vote of the advisory committee must be unanimous. Following the examination, the major advisor shall communicate the results to the student and send a report on the official form to the Graduate School. If the student has failed the examination or if the advisory committee considers the result of the examination inconclusive, the committee has the option of requiring the student to retake it. In such cases, the recommendation must reach the Graduate School promptly, and any re-examination must take place within 12 months from the date of the original examination.

Under the Thesis plan, the examination may center on the candidate's research and its relation to the field of study as a whole, but may have a wider scope. Under the Non-Thesis plan, the examination shall be comprehensive and designed to assess the candidate's mastery of the field and ability to integrate the knowledge acquired. The final examination for M.F.A. candidates may include a focus on the candidate's research project and its relationship to the field.

Doctor of Musical Arts Degree

The D.M.A. degree is the highest practice-oriented degree offered by the Graduate School in the field of Music. The program leading to its attainment is intended to give students of outstanding ability the opportunity to become creative contributors in musical performance and scholarship. Award of the degree testifies to broad mastery of the art of music, an ability to practice that art on an exceptionally high level, and acquisition of appropriate research skills.

The equivalent of at least two years of full-time study beyond the master's degree is required; the degree ordinarily requires at least 60 credits. The General Examination shall be passed within four years of the beginning of doctoral study. A five year time limit applies to the acceptance of foreign language courses (see "Foreign Language"). While certain minimum requirements are set by the Graduate School and the Music Department, it is important for students to realize that work toward this degree is not merely a matter of accumulating course credits or satisfying other requirements. The degree will be conferred only after the advisory committee and the Graduate Music Faculty are convinced that the student is able to demonstrate consummate artistry in a public forum, and has developed independence of judgment and mature scholarship.

The advisory committee may require that the student take an exploratory examination to guide the committee in formulating the plan of study. Once the plan of study is approved, the student and the advisory committee should reevaluate it regularly and modify it, following the established procedure, if appropriate.

Residence Requirement

A graduate student can fulfill the special demands of a doctoral program only by devoting a continuous period of time to concentrated study, practice, and research with a minimum of outside distraction or employment. The D.M.A. student must complete one year (two semesters) of full-time study in residence. This residence period must be completed through registration for and completion of appropriate course loads or research at the Storrs campus. Students ordinarily must register for full-time student status during the residence period (See "Course Loads").

The principal criterion for full-time study as required for fulfillment of the doctoral residence requirement is whether the student is in fact devoting essentially full-time effort to studies, without undue distraction caused by outside employment. It is left to the advisory committee to determine whether a student's outside employment is a distraction that prevents the student from devoting essentially full-time effort to the planned program. The advisory committee will record this determination on the plan of study, along with a

description of the nature, extent, and period(s) of outside employment during the residence period.

Foreign Language

Students in all areas of concentration shall be required to have a competent reading knowledge of at least one foreign language appropriate to the general area of study.

Students should plan to meet the language requirement early in their graduate career and well before they begin preparation for the General Examination. Methods for establishing evidence of reading competence are the same as those for the Ph.D. (See explanation of the Foreign Language requirement under "The Doctor of Philosophy Degree").

Transfer Credit

Transfer of credit for coursework completed at other institutions is approved only after the student has demonstrated the ability to do acceptable graduate work at the University of Connecticut. Such ability must be demonstrated by successful completion of graduate level University of Connecticut coursework. The maximum number of credits accepted from accredited institutions is 12, provided it is of at least "B" (not "B-") quality and contributes to the objectives of the proposed doctoral program. Such graduate work may be approved for transfer provided that the General Examination is to be passed and all degree requirements are to be completed within the prescribed period of seven years from the beginning date of the earliest course, wherever taken, listed on the approved doctoral plan of study. (See "Time Limits"). Transfer credit is not granted for individual courses used for a degree elsewhere (already completed or to be completed in the future). Instead, consideration is given to that degree program as an entity when the doctoral plan of study is being prepared.

Evaluation of Performance

The advisory committee shall evaluate continually the student's performance. Any graduate student whose scholastic performance does not meet the minimum requirements of the Graduate School may be subject to dismissal. The first recital for all D.M.A. students, except for those in conducting, is considered to be a qualifying recital, and must be presented during the first year of D.M.A. study. The hearing for this recital is evaluated by the full performance faculty. Any student who does not demonstrate an appropriate level of performance in this hearing and recital is subject to dismissal.

General Examination

The General Examination shall be taken near the end of the course program. Before arrangements for the examination are made, the foreign language requirement(s) should have been met and the plan of study must have been approved by the Executive Committee of the Graduate Faculty Council. The examination is comprehensive in nature and incorporates elements of music history and literature, music theory, performance practice, and practical application of these constituent components.

The examination is under the jurisdiction of the student's advisory committee and contains both written and oral components. Not fewer than five faculty members, including all members of the advisory committee, constitute the examining committee and participate in the examination. The final decision as to whether or not the student has passed the examination is determined solely by majority vote of the examining committee.

After the examination, the major advisor communicates the results to the candidate and sends the official report on the examination to the Graduate School.

D.M.A. Dissertation Proposal

The D.M.A. Dissertation proposal describing the intended research must be approved by the Graduate Studies Committee of the Music Department at least four months before the filing of the D.M.A. dissertation and it must be approved by the Executive Committee of the Graduate Faculty Council at least three months before the filing of the D.M.A. dissertation.

Candidacy, Recitals, and D.M.A. Dissertation Preparation

Upon passing the General Examination, the foreign language requirements, and (in the case of all students except conducting majors) the qualifying recital, the student becomes a candidate for the degree of Doctor of Musical Arts. Students are notified of their advancement to candidacy.

Students in every D.M.A. area of concentration except conducting must present three full-length recitals during the course of study for the degree. The first of these is considered a qualifying recital, which must be preceded by a pre-recital

hearing. This hearing must be presented on a designated date at least three weeks before the scheduled recital, and is adjudicated by the full performance faculty. Hearings for subsequent degree recitals may be held at the discretion of the major advisor or applied instructor. These recitals and concerts represent the culmination of the performance aspect of this degree, and will be judged according to the highest levels of musical artistry. Majors in conducting must appear in concert as conductors with an appropriate departmental ensemble. Appearances in multiple concerts are permitted provided that the amount of music prepared and performed is equal to a whole concert appearance.

A written dissertation representing research into some aspect of music performance, repertoire, or pedagogy is an important requirement of this degree. The D.M.A. dissertation is under the immediate supervision of a member of the music theory or music history faculty, and secondarily under the supervision of the advisory committee. It must be acceptable in literary style and organization. It is the student's responsibility to be certain that the dissertation conforms exactly to the specifications prescribed by the student's advisory committee. The D.M.A. dissertation receives no academic credit, although the 15 credits of GRAD 6950 are associated with its preparation. This document will uphold the highest standards of scholarship, identical to those required of Ph.D. dissertations.

The advisory committee will set a date for completion of the D.M.A. dissertation, allowing time for each advisor to make suggestions for revisions, and then will set a date for the final examination, allowing time for the student to make those revisions. In some cases, further revision of the dissertation may be required by the advisory committee as a result of the final examination. Final approval of the dissertation following the examination is indicated by the original signatures of all members of the advisory committee on the dissertation's final approval page. This must be submitted to the Graduate School following the examination. Final approval pages must be received at the Graduate School by the conferral period deadline in August, December, or May. The technical specifications for the preparation of the D.M.A. dissertation are identical to the specifications for the preparation of the Ph.D. dissertation (See "Candidacy and Dissertation Preparation").

No restrictions that limit or delay the accessibility, use, or distribution of the results of any student's research are acceptable, if such delays interfere with the timely completion of a student's academic program.

Final Examination

The final examination is oral and under the jurisdiction of the advisory committee. It deals mainly with the subject matter of the D.M.A. dissertation. It is held by the conferral period deadline in August, December, or May. Invitation to participate in the examination is issued by the advisory committee, although any member of the faculty may attend. Not fewer than five members of the faculty, including all members of the candidate's advisory committee, must participate in the final examination unless written approval for a lesser number has been secured in advance from the Dean of the Graduate School. The decision as to whether a candidate has passed or failed the examination rests solely with the advisory committee, which will take into account the opinions of any other participating faculty members. The vote of the advisory committee must be unanimous. Following the examination, the major advisor communicates the results to the student and verifies that the official report has been completed and signed for submission to the Graduate School.

Doctor of Philosophy Degree

The Ph.D. is the highest degree offered by the University. The program leading to its attainment is intended to give persons of outstanding ability the opportunity to become creative contributors in a scholarly field. Award of the degree testifies to broad mastery of an established subject area, acquisition of acceptable research skills, and a concentration of knowledge in a specific field.

The Graduate School requires a minimum of at least 30 credits of content coursework beyond the baccalaureate (or its equivalent) or at least 15 credits of content coursework beyond the master's degree or other advanced degree in the same or a closely-related field of study (exclusive of any required Related Area).

Although certain minimum requirements are set by the Graduate School, it is important for students to realize that work toward this degree is not merely a matter of accumulating course credits or of satisfying other requirements. The degree will be conferred only after the advisory committee and the Graduate Faculty are convinced that the student has developed independence of judgment and mature scholarship in the chosen field. An individual may not earn more than one Ph.D. degree in a single field of study at this institution.

Transfer Credit

Up to 30 credits of letter-graded, graduate-level academic work completed at accredited institutions may be accepted by the Graduate School in transfer provided the grade earned in any course to be transferred is "B" (not "B-") or higher and any course to be transferred was taken within the time limit prescribed for the student's degree program. Official transcripts must be on file with the Graduate School to document any and all coursework accepted in transfer. Transfer of credit toward the Ph.D. degree requires the approval of both the advisory committee and the Graduate School. Submission by the advisory committee of the completed *Transfer Credit Request* form together with the signed Ph.D. plan of study is required.

Related Area and/or Foreign Language Requirement

For all fields of study except those listed in the following paragraph, satisfactory completion of at least one related area or demonstrated reading proficiency of at least one appropriate language other than English is required.

Fields of study which require neither a related area nor demonstrated reading knowledge of a language other than English currently include: Biomedical Engineering, Biomedical Science, Cell Biology, Chemical Engineering, Chemistry, Civil Engineering, Computer Science and Engineering, Ecology and Evolutionary Biology, Economics, Educational Leadership, Educational Psychology, Environmental Engineering, Human Development and Family Studies, Learning, Leadership and Education Policy, Linguistics, Materials Science, Materials Science and Engineering, Molecular and Cell Biology, Pathobiology, Philosophy, Physics, Plant Science, Political Science, Psychological Sciences, Public Health, and Statistics.

If a related or supporting area is required, the courses chosen must comprise a coherent unit of advanced (i.e., 4000 level or above) work outside the major field of study (or area of concentration, if appropriate). Coursework toward the Related Area normally is taken outside the student's "home" department. The courses must be approved by the advisory committee as a part of the plan of study. With few exceptions, they must be taken at this institution. With the consent of the advisory committee, a three credit advanced course in mathematics or statistics passed satisfactorily at this institution may fulfill the otherwise six credit minimum requirement if the student's preparation contains a suitably advanced prerequisite course (i.e., equivalent to a 4000-level University of Connecticut course) passed satisfactorily at this or another institution (although no course credits will be accepted in transfer).

For a specific language to be considered appropriate there must exist a significant body of literature written in that language in the student's field. Students should plan to meet any language requirement early in their graduate careers and usually well before they begin preparation for the General Examination. One of five methods below may be used to establish evidence of reading competence in an approved language. The advisory committee may designate which method shall be used or may leave the choice of method up to the student. For methods (1) through (3), courses and examinations will not be accepted if passed more than five years prior to submission of the plan of study for approval.

1. The student may pass both semesters of an approved one year reading or intermediate course in the language with grades equivalent to "C" (not "C-") or higher. This requirement will be considered to be met if, in light of previous preparation, the student is permitted by the instructor to enter directly into the second semester of the one year sequence and earns a grade of "C" (not "C-") or higher. The courses may be taken by graduate students on a Satisfactory or Unsatisfactory basis, with a grade of Satisfactory denoting performance at the level of "C" (not "C-") or higher. Courses approved for this purpose include FREN 1163-1164, GERM 1145-1146, and SPAN 1003-1004. Alternatively, the student may pass a course in a foreign language or literature at or above the 3000 level, provided that the reading for the course is required to be done in the language. Language courses taken at other institutions are not accepted.
2. The student may pass an examination set by a member of the University faculty (or, if approved by the advisory committee and the Graduate School, a faculty member at another college or university) designated by the student's advisory committee and approved by the head of the department in which the major advisor holds an appointment. The examiner may be a member of the same department but may not be a member of the student's advisory committee. The examination will include, but need not be limited to, the translation of a passage

approximately 400 words in length. The use of a dictionary may be permitted at the option of the examiner. The translation is to be written in English unless permission is granted by the Executive Committee of the Graduate Faculty Council to write it in another language. Such permission is granted only if it is deemed in the best interest of the student and if an acceptable examiner is available. The examiner will choose the passage from among books or articles submitted by the major advisor. The passage may be the same for a group of students in the same field or may be selected individually for each student. The examination must be supervised and have a reasonable time limit. The result of the examination, whether passed or failed, must be reported to the Graduate School on the official form bearing the signature of the examiner.

3. A doctoral reading examination passed at another graduate school of approved standing may be accepted in transfer (subject to the above five-year limitation) provided the examination was taken prior to the student's enrollment in the Graduate School.
4. The student may establish evidence of competence in the language through an official transcript stating that the baccalaureate or a higher degree was earned with that language as the major.
5. The student may establish evidence of competence in the language through documentation that it is the student's native language, learned in childhood and used primarily through at least secondary school.

Evaluation of Performance

The advisory committee continually evaluates the student's performance. Any graduate student whose scholastic record does not meet the minimum requirements of either the program and/or the Graduate School may be subject to dismissal.

General Examination

The doctoral General Examination usually is undertaken when the student has completed at least 75 percent of the content coursework listed on the approved plan of study.

The General Examination is under the jurisdiction of the student's advisory committee unless the members of the Graduate Faculty in a student's field of study have voted to assign jurisdiction for all or part of the examination to a differently constituted examining committee. The examination may be written, oral, or both. All members of the advisory committee must participate in any oral examination. A student is examined in the several facets of their field of study, not merely in the particular area of concentration. Advisory or examining committees may give a series of cumulative examinations, to be taken at intervals over the student's period of study. For practical purposes, the final part of such a series shall be regarded as "the General Examination," and its scope may be limited as the advisory or examining committee may judge appropriate.

The examining committee includes at least one faculty member representing each of the major areas addressed in the examination. Not fewer than five faculty members, including all members of the student's advisory committee, must participate in the examination. All examiners are invited to submit questions and to evaluate answers, but the final decision as to whether or not the student has passed the examination shall rest solely with the advisory committee unless the members of the Graduate Faculty in a student's field of study have voted to assign this authority to a differently constituted examining committee.

After the examination, the Report on the General Examination, indicating the result of the entire examination and the names of all faculty members participating, must be signed by the members of the advisory committee and submitted to the Graduate School no later than the date of the submission of the Dissertation Proposal for final approval by the Graduate School (see below).

Dissertation Proposal

The Dissertation Proposal is to be prepared in consultation with the members of the advisory committee before the research is well underway. The Dissertation Proposal, bearing the signatures of the members of the student's advisory committee as well as the signature of the department or program head verifying satisfactory review by two experts (see the following paragraph) who are not members of the advisory committee, should be submitted to the Graduate School for final approval by the time the student has completed the ninth credit of GRAD 6950 or 6960. The Graduate School will not grant final approval of the Dissertation Proposal without proof of any required IRB,

IACUC, or human stem cell approval granted by SCRO. In any event, the approved Dissertation Proposal must be on file in the Graduate School before the public announcement of the oral defense of the dissertation.

When the Dissertation Proposal has been completed and signed by the student and also has been approved by the members of the advisory committee, the proposal then is submitted to the head of the department or program to which the student was admitted. The department or program head appoints reviewers from outside the advisory committee to conduct a critical evaluation of the Dissertation Proposal. The use of at least one reviewer from outside the University is encouraged. Reviewers may be appointed to evaluate an individual student's proposal, or they may be appointed to a committee responsible for reviewing all proposals in a particular field of study or group of related fields of study.

Dissertation Proposals are reviewed with the following questions in mind:

1. Is the proposal well written, well organized, and well argued?
2. Does the proposal describe a project of appropriate scope?
3. Does the student demonstrate knowledge of the subject and an understanding of the proposed method of investigation?
4. Does the student show awareness of the relevant research by others?
5. Does the student consider how the proposed investigation, if successful, will contribute to knowledge?

The department or program head's signature on the proposal when the review is completed confirms that the results of the review were favorable. The evaluation may take the form of a reading of the proposal or attendance at an oral presentation and discussion of the proposal. A copy of the signed approval form and Dissertation Proposal must be received by the Graduate School when the review process has been completed. Receipt by the Graduate School of the approved Dissertation Proposal and any required IRB, IACUC, or SCRO approval is a basic requirement for eligibility to schedule the oral defense of the dissertation and for conferral of the doctoral degree.

Candidacy, Dissertation Preparation, and Final Oral Defense

Upon approval of the plan of study, passing the General Examination, and approval of the Dissertation Proposal by the Executive Committee of the Graduate Faculty Council, the student becomes a candidate for the degree of Doctor of Philosophy.

A dissertation representing a significant contribution to ongoing research in the candidate's field is a primary requirement. The preparation of the dissertation is under the immediate and continuous supervision of the advisory committee, and it must meet all standards prescribed by the committee and by the Graduate School. It must be acceptable in literary style and organization. Specifications for its preparation may be obtained from the Graduate School website under the section entitled Current Students, Doctoral Degree Program. It is the student's ultimate responsibility to be certain that the dissertation conforms to the specifications.

The oral defense of the dissertation must be announced publically by means of the University's online Events Calendar at least two weeks prior to the date of the defense. At this time, electronic tentative approval of the dissertation and an electronic working copy of the entire dissertation must be filed with the Graduate School (or with the Health Center, if appropriate). Not fewer than five members of the faculty, including all members of the candidate's advisory committee, must participate in the final examination, unless written approval for a lesser number has been secured in advance from the Dean of the Graduate School.

The decision regarding whether a candidate has passed, conditionally passed, or failed the examination rests solely with the advisory committee, which will take into account the opinions of other participating faculty members and other experts. The vote of the advisory committee must be unanimous. Following the examination, the major advisor communicates the results to the student and verifies that the official report has been completed and signed for submission to the Graduate School (or to the Health Center, if appropriate).

The abstract and dissertation must be dated as of the calendar year in which all requirements for the degree are completed, including submission of the dissertation. The Graduate School requires the electronic submission of the dissertation through Digital Commons, a University repository for public access. The final copy must meet all specifications outlined on the Graduate School website. The *Dissertation Submission Checklist* must be submitted to the Graduate School with an approval page bearing original signatures of all members of the advisory committee. No restrictions that limit or delay the

accessibility, use, or distribution of the results of a doctoral student's research are acceptable if such delays are inconsistent with an embargo period requested by the student or if they interfere with the timely completion of a student's academic program.

Conferral of Degrees

Conferral

Degree conferral requires that the student be in good academic standing and that all requirements for the degree have been completed satisfactorily by the deadline specified in the Academic Calendar. Degrees are conferred three times each year in August, December, and May. However, the only graduate Commencement ceremony is held annually in May. Students who qualify for degree conferral receive their diplomas by mail, normally within three months following conferral.

Application for the Degree

Formal application for a degree to be conferred must be filed online by the degree candidate using the Student Administration System. Information and instructions can be found on the Graduate School website under the section titled Current Students. If filing is not timely, conferral is delayed to the next conferral period, even though all other degree requirements may have been completed on time.

Commencement

The graduate Commencement ceremony is held once each year at the end of the spring semester. Individuals who have had degrees conferred at the end of the previous summer or fall semester, and candidates for degrees who complete degree requirements by the end of the spring semester may participate in the annual Commencement ceremony. Academic regalia appropriate for the University of Connecticut degree being conferred is strictly required for all who participate in the ceremony. Information concerning the Commencement ceremony, including academic regalia and guest tickets, is made available by the mid-spring semester, and can be found on the Graduate School website.

Policy on Leave of Absence from Graduate Studies

A graduate student is defined as any individual who holds admission to the Graduate School to pursue a post-baccalaureate certificate, a graduate certificate, or graduate degree.

Under compelling personal or medical reasons, a graduate student may request a leave of absence from their graduate program for a period of up to twelve months or one calendar year. The request for a leave of absence must be made in writing using the Request for Leave of Absence from Graduate Studies form on the Graduate School website at grad.uconn.edu.

The completed application form must bear the signatures of the student's major advisor and the department or program head. The completed application form is to be submitted to the Graduate School for review and approval at least thirty days before the leave of absence is to commence, or the earliest date possible in extenuating circumstances.

Information provided in the application for a personal leave of absence must address the specific reason(s) prompting the request. Examples could include, but are not limited to, family leave and financial hardship. Applications for a medical leave of absence require documentation from an appropriate health care provider, which must be submitted along with the Request for Leave of Absence from Graduate Studies form. In certain cases, the Dean of the Graduate School may request that a student provide documentation from an appropriate health care provider which certifies that the student has medical clearance to resume study at the conclusion of an approved leave of absence. In addition, consultation with university offices may be appropriate. For example, consultation related to assessment of the safety of the student's work environment may be requested by contacting the Division of Environmental Health and Safety at ehs.uconn.edu and accommodations and services for students with disabilities may be discussed with the Center for Students with Disabilities at csd.uconn.edu.

When students are on approved leaves of absence for the full duration of a fall or spring semester, they are not required to register for any credit or non-credit course. Requests submitted during an academic session will be reviewed on a case-by-case basis to determine the most appropriate mechanism for recording the period of leave (e.g., requests made prior to the open enrollment closing date may be dated to cover the entire semester). An approved leave of absence indicates that the student status will be recorded as "inactive" for the duration of the requested period of leave, and as such, the student will not have access

to university services as a graduate student. In addition, the terminal date (the date determined by the Graduate School by which it is expected that all degree requirements will be completed) of any student granted a leave of absence will be extended by a period of time equivalent to the duration of the approved leave of absence. Thus, the period of the approved leave of absence will not be considered when calculating the time the student has spent working toward the completion of the degree. In contrast, a student who chooses to maintain Continuous Registration will maintain active status, which means the student will continue to pay associated fees, have access to university services as a graduate student, and the terminal date for degree requirements is not extended. Thus, the decision to choose a leave of absence versus Continuous Registration to maintain active status must be weighed accordingly. The refunds and cancellation of charges information found in the Fees and Expenses section of the catalog applies to students taking an approved leave of absence.

International students are strongly encouraged to thoroughly evaluate the implications of each decision on their student status. International students must obtain authorization from an international advisor at International Student and Scholar Services before any course is dropped. Failure to do so will be considered a status violation and it will result in termination of the student's SEVIS record. It is strongly recommended that students hold advisory meetings with international advisors if they are considering requesting leaves of absence.

The leave of absence can be extended up to a maximum of one additional 12-month period. The request must be resubmitted using the previously described procedures, and ultimately approved by the Graduate School. A leave of absence cannot exceed two full calendar years in duration. In such cases in which a student needs leave for more than a total of two calendar years, the student must reapply for admission to the Graduate School with no assurance of acceptance.

Approval of a leave of absence does not assure or guarantee that a graduate program, an academic department, the Graduate School, or the University would be in a position to provide financial support or a graduate assistantship to any graduate student upon their return to studies following an approved leave of absence. Students returning to studies after a leave of absence must work with appropriate faculty advisors and program personnel to resume their degree programs.

Reinstatement from an approved leave of absence will occur at the beginning of the appropriate academic term. To request reinstatement from an approved leave of absence, the student should complete the Request for Reinstatement from Leave of Absence from Graduate Studies form on the Graduate School website and submit it to the Graduate School.

Termination of Status and Academic Dismissal

During a student's degree program, certain circumstances may lead to termination of status or dismissal from the Graduate School.

Termination of Status

To remain in good standing, a student must at all times have a major advisor and be within the degree time limits for the degree the student is seeking. Once a student's plan of study has been approved by the Graduate School, the student at all times must have a duly constituted advisory committee, minimally including a major advisor. (Refer to the Advisory System section for additional information regarding the advisory committee).

A student's major advisor may resign from the advisory committee by written notice to the Graduate School and the student. If the student does not identify a new major advisor within thirty business days of the resignation, the student's graduate degree program status is terminated. When the resignation occurs during a summer session or winter session, then the thirty business days begin on the first day of classes of the next fall or spring semester.

A graduate student and the major advisor must always be cognizant of the time limits associated with the student's degree. The student, the major advisor, and the graduate program director and/or department head are notified of the date by which requirements must be completed when the Graduate School sends approved copies of the student's plan of study. Any request to extend the date by which requirements must be completed must be submitted in writing to the Graduate School, and must be accompanied by a written endorsement from the major advisor.

Extensions of the terminal date are granted by the Graduate School only on the basis of substantial evidence that the student is making consistent and satisfactory progress toward the completion of degree requirements, and with

certification by the major advisor that the student is likely to complete within the requested extension period. If an extension is granted, it establishes a new terminal degree date for the student. Whenever a student's graduate degree program status is terminated, the student receives notice from the Graduate School. The student may appeal the termination under the provisions outlined below under the "Academic Dismissal and Termination of Status Appeal Procedures" sections.

Academic Dismissal

A graduate student's progress in a degree program must be monitored regularly by the student's advisory committee. If at any time, a student's academic performance, progress in a graduate degree program, or professional development and/or suitability is judged by the advisory committee to be unsatisfactory to the degree that dismissal is warranted, the advisory committee must submit its written recommendation that the student be dismissed on such grounds. A student may be dismissed for:

1. Failure to maintain the minimum cumulative grade point average required by the Graduate School (3.0);
2. Receiving a grade of "D+," "D," "D-," "F," or "U" in any course;
3. If required, failure to satisfy a foreign language requirement for a degree;
4. Failure of the doctoral General Examination, if one is required;
5. Failure to produce an acceptable Doctoral Dissertation Proposal, if one is required;
6. Unsatisfactory performance in any aspect of the research or writing for a required master's thesis or doctoral dissertation;
7. Failure of a required final examination for the master's or doctoral degree; or
8. Failure to satisfy any other requirement of the student's graduate degree program.

The major advisor submits the written recommendation for academic dismissal to the Graduate School on behalf of the entire advisory committee, indicating the specific judgment on which the advisory committee's recommendation is based. For a student who does not have an established advisory committee, the major advisor alone submits the recommendation. Whenever a student is dismissed on academic grounds, the student receives notice from the Graduate School. The student may appeal the termination under the provisions outlined in Complaint, Appeal, and Hearing Procedures.

Advisory System

Degree programs are planned by the advisory committee after consultation with the student, unless a field of study has established a uniform curriculum. There is considerable flexibility in meeting special needs insofar as these are consistent with the regulations of the Graduate School. A degree program may entail coursework in more than one field of study, but each program must include a coherent emphasis within one existing field of study and area of concentration, if applicable.

A major advisor must be appointed at the appropriate level by the Dean of the Graduate School, by authorization of the President of the University, to advise in a particular field of study or area of concentration. In applying for admission, an applicant may indicate a preference for a particular major advisor. If at the time of admission an applicant expresses no preference, or if the preferred advisor is unable to accept, another advisor may be appointed. Since consistency of direction is important, a durable relationship between the student and advisor should be formed as early as possible. Occasionally, it may be desirable or appropriate for a student's degree program to be directed by co-major advisors (not more than two). Each co-major advisor must hold an appropriate Graduate Faculty appointment in the student's field of study and area of concentration (if applicable).

If a change of major advisor becomes necessary for any reason, the student must file a special form, bearing the signature of the new advisor, with the Graduate School. The Change of Major Advisor form can be found on the Registrar's website at: registrar.uconn.edu.

If a major advisor decides that it is not possible to continue as a student's major advisor and wishes to resign, the Graduate School must be notified in writing as soon as possible. The student is then provided with a reasonable opportunity to arrange for a new major advisor. If a new major advisor is not identified within 30 business days of the resignation of the former major advisor, the student's graduate degree program status is terminated. When the resignation occurs during a summer session or winter session, then the 30 business days begin on the first day of classes of the next fall or spring semester. A student whose status has been terminated may request a hearing by filing a written request within 30 days of receipt of the letter of termination.

Unless a field of study has established another advisory system, the advisory committee of a master's degree student is formed after consultation between the major advisor and the student. The advisory committee, if an advisory committee is required, must include at least two associate advisors, one of whom must hold a current appointment to the Graduate Faculty. An associate advisor must possess suitable academic or scientific credentials in the student's field of study. The advisory committee should be formed before the student has completed 12 credits of degree program coursework and shall then supervise the remainder of the student's degree program.

Unless a field of study has established another advisory system, the advisory committee of a doctoral degree student is formed after consultation between the student and the major advisor and shall consist of at least two associate advisors with suitable academic or scientific credentials. The major advisor and at least one associate advisor shall be members of the Graduate Faculty appointed to advise doctoral students in the student's field of study and area of concentration, if applicable. In addition to the three or more members, another member, ordinarily a member of the Graduate Faculty outside the student's field of study but in a related field may be appointed by the Dean. If the advisory committee consists of three members, decisions must be unanimous. If the advisory committee consists of four or more members, decisions are considered adopted if there are no more than one negative vote, although the major advisor must always vote in the affirmative. Advisory committee decisions involving the outcome of the General Examination, approval of the Dissertation Proposal, oral defense of the dissertation, or approval of the dissertation itself, must be a unanimous vote. Readers, examiners, or other reviewers who have not been recognized as associate advisors by the Graduate School are not members of the student's advisory committee.

A member of the University of Connecticut's Graduate Faculty who has retired from active service may be considered for appointment as major advisor for a newly-admitted master's or doctoral student. Application is made to the Executive Committee of the Graduate Faculty Council and requires submission of a curriculum vitae and the endorsement of the appropriate department or program head. The retired faculty member must present substantial evidence of ongoing research and scholarly activity in the field. Separate application is

required for each newly-admitted student for whom a retired faculty member wishes to serve as major advisor. Such appointments are made by the Dean with the advice of the Executive Committee.

A current graduate student may not serve as a member of another graduate student's advisory committee. If deemed appropriate by a graduate student's major advisor, the major advisor may request that a suitably qualified external associate advisor be appointed to the student's advisory committee by writing to the Graduate School. The request should be accompanied by curriculum vitae for the individual being recommended for appointment. Such appointments are made on the basis of advanced training and significant experience in the field of study. An appointment as external associate advisor is limited to an individual student's advisory committee and does not imply in any way membership on the Graduate Faculty of the University. Ordinarily, not more than one external associate advisor is appointed to any master's or doctoral student's advisory committee. The major advisor and at least one associate advisor on any doctoral student's advisory committee must be members of the University's Graduate Faculty.

The major advisor of any master's or doctoral student is responsible for coordinating the supervisory work of the advisory committee. Therefore, when the major advisor is to be on leave or is not in residence, it is the major advisor's responsibility to appoint an acting major advisor. The acting major advisor must be a member of the University's Graduate Faculty or be fully eligible for such an appointment. The acting major advisor will assume all duties and responsibilities of the major advisor for the duration of the appointment. The major advisor will inform the Graduate School of the appointment and provide any information that may be required concerning the credentials of the acting major advisor.

Students' advisory committees are accountable directly to the Dean of the Graduate School. For advisory committees of doctoral students, it is required that the written consent be obtained from the Graduate School before any changes are made in the membership of an advisory committee which has been duly established.

Scholarly Integrity and Misconduct

Scholarly activity at the graduate and postdoctoral level takes many forms, including, but not limited to, classroom activity, laboratory or field experience, writing for publication, presentation, and forms of artistic expression. Integrity in all of these activities is of paramount importance, and the Graduate School of the University of Connecticut requires that the highest ethical standards in teaching, learning, research, and service be maintained.

Scholarly integrity encompasses "both research integrity and the ethical understanding and skill required of researchers/scholars in domestic, international, and multicultural contexts." It also addresses "ethical aspects of scholarship that influence the next generation of researchers as teachers, mentors, supervisors, and successful stewards of grant funds" (Council of Graduate Schools, Research and Scholarly Integrity in Graduate Education: A Comprehensive Approach, 2012).

The Graduate Faculty Council, in accordance with the provisions of its By-Laws, has adopted this policy concerning scholarly integrity in graduate education and research and has approved the procedures set forth herein for addressing alleged violations. The Dean of the Graduate School shall coordinate the reporting, investigation, and determination of alleged breaches of scholarly integrity by graduate students and postdoctoral scholars in accordance with this policy. Members of the Graduate Faculty have primary responsibility to foster an environment in which the highest ethical standards prevail. All members of the University community have a responsibility to uphold the highest standards of scholarship, which encompasses activities of teaching, research, and service, and to report any violation of scholarly integrity of which they have knowledge. Instructors have a responsibility to take reasonable steps to prevent scholarly misconduct in their courses and to inform students of course-specific requirements.

Note: Student misconduct other than scholarly misconduct, as defined herein, is governed by The Student Code, which is administered under the direction of the Office of the Provost. Enforcement of its provisions is the responsibility of the Director of Community Standards. At the Health Center, student misconduct other than scholarly misconduct is governed by the Health Center Rules of Conduct.

Definitions of Scholarly Misconduct

Scholarly misconduct is broadly defined as a failure to uphold standards of scholarly integrity in teaching, learning, research, or service. For the purpose of this Policy, scholarly misconduct shall be deemed to include, but not be limited to, the following types of misconduct. The list is not intended to be exhaustive, but does identify major categories of scholarly misconduct, and provides illustrations where appropriate.

Cheating involves dishonesty during a course, on an examination required for a particular degree, or at other times during graduate study, e.g., copying the work of another student.

Plagiarism involves using another person's language, thoughts, data, ideas, expressions, or other original material without acknowledging the source. (Adapted from Council of Writing Program Administrators, *Defining and Avoiding Plagiarism: The WPA Statement on Best Practices*, 2003).

Distorted reporting involves "any omission or misrepresentation of the information necessary and sufficient to evaluate the validity and significance of research, at the level appropriate to the context in which the research is communicated" (D. Fanelli, *Nature*, 494:149; 2013).

Fabrication or falsification of grades involves any form of falsification of coursework or tampering with grades, e.g., a student making unauthorized changes to her/his own grades or an instructor consciously misreporting grades of students.

Misrepresentation involves taking an examination for another student, submitting work done by another individual as one's own, submitting the same work for evaluation in two or more courses without prior approval, unauthorized use of previously completed work or research for a thesis, dissertation, or publication, or making false, inaccurate, or misleading claims or statements when applying for admission to the Graduate School or in any scholarly or research activity, including publication.

Academic or research disruption involves unauthorized possession, use, or destruction of examinations, library materials, laboratory or research supplies or equipment, research data, notebooks, or computer files, or it might involve tampering with, sabotage of, or piracy of computer hardware, computer software, or network components.

Fabrication or falsification in research involves falsification of, tampering with, or fabricating results or data.

Research violations include violation of protocols governing the use of human or animal subjects, breaches of confidentiality, obstruction of the research progress of another individual, or disregard for applicable University, local, State, or federal regulations.

Professional misconduct involves violation of standards governing the professional conduct of students in particular fields (e.g., pharmacy, nursing, education, counseling, therapy).

Deliberate obstruction involves hindering investigation of any alleged act of scholarly misconduct.

Aiding or abetting involves actions that assist or encourage another individual to plan or commit any act of scholarly misconduct.

A version of this policy was first approved and adopted by the Board of Trustees on November 10, 1998. It was amended on April 24, 2013. This version was approved and adopted by the Board of Trustees on March 26, 2014.

Addressing Allegations of Scholarly Misconduct

Allegations of scholarly misconduct will be addressed in accordance with the procedures set forth below. If a graduate student accused of scholarly misconduct is part of a combined degree program, the appropriate Associate Dean of the Graduate School (whether for Storrs and the regional campuses or UConn Health) and the academic leader of the other degree program will determine whether the complaint will be addressed in accordance with these procedures or in accordance with those of the other degree program, using the procedures of the program to which the alleged misconduct is more germane.

Misconduct Allegedly Committed Within an Academic Course

When an instructor or relevant dean or department head believes that an act of scholarly misconduct within an academic course has occurred, the procedures set forth below shall be followed:

The instructor, dean or department head who believes that scholarly misconduct has occurred within an academic course (the Complainant) shall retain all evidence of the alleged misconduct in its original form.

Original papers or other materials need not be returned to the accused student. Copies of the accused student's work will be provided upon request. All instructors within the course shall be notified of the allegation and the proposed academic consequences before the student is notified of the alleged misconduct.

Within 30 business days of becoming aware of alleged misconduct, the Complainant shall notify the accused student and their major advisor in writing of the allegation of misconduct and the academic consequences to be imposed. The notice shall be sent by the Complainant to the accused student by email, to the student's official University email address, and, if appropriate, by first class mail, postage prepaid, to the mailing address on file with the University. The notification shall advise the student that they have 10 business days from the date the notice is sent via email to contact the Complainant to address the alleged misconduct and/or file an appeal, and that if the student fails to do so, the academic consequences described in the notice shall be imposed. The Complainant will provide a copy of the written notification sent to the accused student to the Graduate School, and also will maintain a copy. (Complainant may use the Scholarly Misconduct Graduate School Reporting Form). The Graduate School shall notify the Complainant of the receipt of an appeal filed by the accused student within five business days. If an appeal is filed, the Complainant shall within five business days forward to the Graduate School information supporting the allegation.

An accused student may file an appeal in writing with the Graduate School. Please see "Complaint, Appeal and Hearing Procedures."

The procedures for evaluating the appeal and referral to a hearing will follow the guidelines set forth in the Complaint, Appeal and Hearing Procedures of the Graduate School.

A student who has been notified that they have been accused of scholarly misconduct may not withdraw from the course in which the alleged misconduct

has occurred without the approval of the Dean of the Graduate School. If a semester concludes before a scholarly misconduct matter is resolved, the student shall receive a temporary "I" (Incomplete) grade in the course until the instructor submits the appropriate grade.

Misconduct Allegedly Committed Outside of an Academic Course

A substantial portion of graduate and postdoctoral study takes place in contexts where they are not students within a course (e.g., serving as a teaching or research assistant, working as an intern, conducting research and disseminating findings, and taking a written or oral general exam). Allegations of scholarly misconduct committed outside of an academic course will be addressed according to the procedures described in this section. When any person (the Complainant) believes that an act of scholarly misconduct outside of an academic course has occurred, the procedures set forth below shall be followed:

The Complainant shall retain the evidence of the alleged misconduct in its original form.

Within 30 business days of becoming aware of alleged misconduct, the Complainant shall notify the accused person and if applicable, their major advisor, in writing of the allegation of misconduct and the course of action to be taken. The course of action will include academic consequences and if appropriate, referral to entities inside or outside the University for further investigation. The Complainant shall send the notice to the accused person by email, to the student's official University email address, and if appropriate, by first class mail, postage prepaid, to the mailing address on file with the University. The notification shall advise the student that there are 10 business days from the date the notice is sent via email to file an appeal through the Graduate School and that if the student fails to do so, the course of action and any academic consequences described in the notice will be imposed. The Complainant will provide a copy of the written notification sent to the accused student to the Graduate School, and also will maintain a copy. The Graduate School shall notify the Complainant of the receipt of an appeal filed by the accused student within five business days. If an appeal is filed, the Complainant shall forward to the Graduate School information supporting the allegation within five business days.

The accused person may file an appeal through the Graduate School. Please see the Complaint, Appeal and Hearing Procedures of the Graduate School. Examples of referrals to inside or outside the University include:

Cases involving allegations of research misconduct on a sponsored project by graduate students or postdoctoral scholars enrolled at Storrs or regional campuses will be referred to the Vice President for Research for review under the Policy on Alleged Misconduct in Research. Cases involving allegations of research misconduct by students enrolled at the Health Center will be referred to the Research Integrity Officer for action under the Policy on Review of Alleged Misconduct of Research.

Cases involving alleged violation of standards governing the codes of conduct for students in professional fields (e.g., pharmacy, nursing, education, counseling, and therapy) may be subject to additional review by other entities inside or outside the University (e.g., professional organizations or credentialing boards).

Complaint, Appeal, and Hearing Procedures

The University of Connecticut is a community of scholars committed to integrity, freedom of inquiry and intellectual pursuit, respect for individuals and the rights of others, and tolerance for both individual differences and differing points of view. Accordingly, a fundamental responsibility of the Graduate School is to foster durable, harmonious, and productive working relationships among graduate students, postdoctoral scholars, faculty members, staff, and administrators.

Attempts by all parties to resolve disputes are strongly encouraged before pursuing resolution through the Graduate School. Assistance with problem-solving and mediation toward resolution should be pursued at local levels (e.g., program, department, and/or school) and also is available through the University Ombuds: ombuds.uconn.edu. In the event that a resolution is not reached following such good faith efforts, and as an action of last resort, either party may engage in the hearing procedure through the Graduate School. In rare cases, the actions or behaviors alleged in the dispute may be sufficiently extreme that it would be unreasonable to expect the Complainant, the person(s) filing the complaint or appeal, to attempt a prior resolution.

Pursuing Dispute Resolution through the Graduate School

To begin the formal dispute resolution process through the Graduate School, the Complainant will submit either an appeal form or a complaint form (See “Filing a Complaint” and “Filing an Appeal” later in this document). A staff member from the Graduate School will contact the person who submitted the form within two business days to discuss the hearing procedures, answer any questions, and collect any additional information. Information will then be forwarded to the Hearing Officer, the Associate/Assistant Dean of the Graduate School.

The Hearing Officer will review the information submitted, may request additional clarification from either party, and will consider all relevant information in determining whether the case should be referred to a Hearing Committee, a panel of two graduate faculty members and one graduate student. In particular, evidence of “good faith effort” at mediation will be considered. Within 25 business days of the student submitting the written complaint/appeal, the Hearing Officer will determine whether the case should be referred to a Hearing Committee. The following issues are not managed through the Graduate School Hearing Procedures and therefore will not be forwarded to a Hearing Committee: belief of an error in grading (Challenges to a Grade process-guide.uconn.edu/instruction/challenges-to-a-grade/) and matters addressed by other existing University policies or procedures including, but not limited to, allegations of research misconduct on federally sponsored projects, conduct proscribed by The Student Code, harassment, complaints of retaliation and/or retaliation, employment matters, and conflicts of interest.

If the case is forwarded to the Hearing Committee, both parties will be notified of the reason for the hearing and scheduled hearing date. The hearing will be scheduled by the Hearing Officer no later than 30 business days after notification to proceed with a hearing.

If the Hearing Officer decides not to convene a Hearing Committee a rationale will be provided and the decision cannot be appealed. If a “good faith effort” was not shown, the Complainant will be encouraged to seek resolution through direct communication with the person(s) against whom the complaint is directed and/or through procedures available through the relevant graduate program, department, school or college, and university, as applicable. If these attempts at resolution fail, the Complainant may file a new complaint or appeal no sooner than 30 business days after the notice declining to convene a Hearing Committee was sent.

Note: The Associate Dean/Assistant Dean of the Graduate School (the Hearing Officer) with jurisdiction (Storrs or UConn Health) may at their sole discretion determine that a complaint or appeal falls under the jurisdiction of The Student Code, the Policy on Scholarly Integrity in Graduate Education and Research, the Policy Statement on Harassment, the Policy on Conflict of Interest in Research, or any other existing University policy that provides for resolution of complaints. Should the Hearing Officer determine that the complaint should be addressed through other procedures, they will notify the parties involved and refer the complaint to the appropriate University officials.

Filing a Complaint

A graduate student may file a complaint with the Graduate School when they believe that actions or behaviors governed by this procedure have occurred and when all good faith efforts to resolve their complaint either through direct communication with the individual(s) involved or through applicable procedures in the graduate program, department, school, or college have failed.

To be addressed under this procedure, a complaint must be submitted using the Graduate School Complaint Form.

Categories of complaints to which this procedure applies include, but are not limited to the following:

- Unfair application of policies includes differential application of policies or regulations within a particular degree program or department that is not commensurate with individual differences in skills, contributions, or performance.
- A hostile environment involves personal conflict or behavior within a laboratory, degree program, or department that has the effect of interfering with a person’s performance; Note: A hostile environment claim may be referred to another office for resolution if it arises because a person is a member of a protected class under the University’s harassment policy.
- Unfair decisions related to differential work assignments, allocation of research resources, allocation of financial support, or allocation of authorship that are not commensurate with individual differences in skills, contributions, or performance.
- Interference or intimidation includes actions or behaviors that limit, impede, or delay a person’s completion of a task or degrade the person’s performance in any aspect of the person’s scholarly work.
- The complaint form must include:
- A detailed description of the actions or behaviors governed by this procedure giving rise to the complaint, including documentary evidence (e.g., correspondence, notes, descriptions of interactions, and dates of occurrence) supporting the allegation.
- A description of actions already attempted to resolve the complaint (e.g., correspondence with the person(s) against whom the complaint is lodged; records of meetings with graduate program directors, department heads, or deans).
- The names of those lodging the complaint.

Complaints to the Graduate School may not be filed anonymously. Anonymous complaints may be filed through the Workplace Alert Program at: safeworkplace.uconn.edu. The Graduate School may or may not become involved in the resolution of these anonymous complaints. If the Graduate School does become involved, it may be unable to resolve the complaint unless the accuser discloses their identity.

The complaint process will follow the guidelines set forth in the Graduate School Hearing Procedure.

Consistent with the University’s Non-Retaliation Policy at: policy.uconn.edu, retaliation against any person who makes or participates in a complaint under this policy is strictly forbidden.

Filing an Appeal

A graduate student may file an appeal with the Graduate School when they are in disagreement with actions taken or academic consequences imposed by an individual faculty member, graduate program, department, school, or college and when all good faith efforts to resolve their concern either through direct communication with the individual(s) involved or through applicable procedures in the graduate program, department, school, or college have failed.

An appeal must be filed in writing to the Graduate School using the Graduate School Appeal Form. All materials submitted during the appeal process should be clearly organized and labeled. Appeals will not be reviewed if the information is incomplete.

Categories of actions or academic consequences that an appeal might address includes, but is not limited to, those listed below.

- Academic Dismissal
- Termination of Status
- Allegation of Scholarly Misconduct
- Academic Consequences imposed by allegation of Scholarly Misconduct

Please note, the Graduate School endorses the process for appealing a final course grade as described in the University Senate By-Laws. Information regarding this process can be found at: guide.uconn.edu/instruction/challenges-to-a-grade.

The Appeal Form must include:

- A detailed description of the actions or academic consequences giving rise to the Appeal, including documentary evidence (e.g., correspondence, notes, descriptions of interactions, and dates of occurrence) supporting the allegation.
- A description of actions already attempted to resolve the concern (e.g., correspondence with the person(s) records of meetings with graduate program directors, department heads, or deans).
- The names of those requesting the Appeal.
- For academic dismissal and termination of status appeal: Provide a description of a plan for removing barriers to successful program completion.

Timeline for filing an Appeal:

1. Submit Appeal Form to the Graduate School within 10 business days of receipt of the notification of the action or academic consequence.
2. The Graduate School will notify the major advisor and graduate program/department of the student's intent to appeal the action or academic consequence within five business days.

The appeal process will follow the guidelines set forth in the Graduate School Hearing Procedure.

Consistent with the University's Non-Retaliation Policy at: policy.uconn.edu, retaliation against any person who makes or participates in an Appeal under this policy is strictly forbidden.

Graduate Hearing Procedure

When there is evidence that all good faith efforts to resolve disputes at the "local" level have failed, a complaint or appeal is filed with the Graduate School.

For cases forwarded for the consideration of the Hearing Committee, both parties will be notified of the reason for the hearing and scheduled hearing date. The hearing will be scheduled by the Graduate School no later than 30 business days after notification that a complaint or appeal has been submitted to the Hearing Committee.

For good cause shown, the Hearing Officer may reschedule the hearing at the request of either party. Hearings are not rescheduled based on availability of the support persons or the witnesses. If the complainant fails to appear at the hearing, the issue will be dismissed. If the respondent, the person(s) against whom the complaint or appeal is requested, fails to appear at the hearing, the Hearing Committee will hear evidence from the complainant and render its finding. A finding that arises from the complainant's or respondent's failure to appear at the hearing may be appealed in writing to the Graduate School, but only on the grounds that extreme circumstances prevented the person's attendance at the hearing. If the request to appeal is accepted, the Hearing Officer will determine a new period within which a hearing must be held, and no further extensions will be granted.

The Hearing Committee is composed of three voting members (two members of the graduate faculty and one graduate student). The Hearing Officer (Associate or Assistant Dean) shall conduct the hearing as a non-voting member. No member of the Hearing Committee may be a member of the program/department of either party to the hearing, nor may any member of the Hearing Committee have personal or professional associations with the parties. Both parties will be notified in writing of the composition of the Hearing Committee at least 10 business days prior to the scheduled hearing, and any objections to the appointment of any committee member on the grounds that the member's participation would jeopardize a fair hearing must be provided to the Graduate School no later than five business days prior to the hearing date. The Hearing Officer will determine whether any objections have merit and make adjustments to the committee membership as appropriate.

The hearing is not a court proceeding and will not be bound by the procedures and rules of evidence of a court of law. The Hearing Committee will determine whether the issue has merit, and will determine the appropriate response if merit is found. The Hearing Committee's decision shall be made by majority vote. The hearing will occur in private and will be audio recorded. The Graduate School will maintain the audio recording as required by Connecticut state law and it is the property of the University. Hearing participants are prohibited from making their own recording. Upon written request, a respondent or complainant may review the audio recording and make appropriate arrangements for it to

be transcribed on University premises. Arrangements for a transcriber and all associated cost involved in the transcription will be the responsibility of the requesting individual.

Both the complainant and respondent may each invite one person to attend the hearing as a support person. The support person may be consulted throughout the hearing, but is not permitted to directly participate in the hearing. Either party may invite witnesses to provide directly related information and must submit the names of support persons and witnesses or signed witness statements from witnesses unable to attend the hearing to the Graduate School at least 10 business days in advance of the hearing. Witnesses generally cannot serve as support persons. However, if a witness is also a support person, this person can submit a signed written witness statement prior to the hearing and will not be able to participate in the capacity of a witness during the hearing. The Graduate School will provide a list of all persons expected to be present to the Hearing Committee and both parties at least five business days before the scheduled hearing date.

All documentary evidence to be submitted should be clearly identified and provided to the Graduate School at least 10 business days before the hearing. New evidence will be allowed at the hearing at the sole discretion of the Hearing Officer. The party seeking to introduce new evidence must provide at least five additional copies of evidence for review. In all cases, the evidence must be clearly organized and labeled. The Graduate School will maintain one complete copy of all evidence submitted.

The Hearing Officer will conduct the hearing in accordance with the following procedures:

1. The Hearing Officer will identify the Complainant(s), Respondent(s), all other persons involved in the hearing and the members of the Hearing Committee.
2. The Hearing Officer will state the issue, as set forth in the notification sent to both parties.
3. Each party will be offered the opportunity to make brief opening statements. Each opening statement should consist of a brief summary and should not involve lengthy discussion or presentation of evidence. The Complainant will present their information first.
4. Each party will be offered opportunity to present evidence to support their position, which may include written statements, personal oral statements, witness oral statements, and physical exhibits. The Complainant will present their information first. Witnesses will be present in the hearing room only during the period in which their statement is provided.
5. The Hearing Committee will be offered the opportunity to question both parties and all witnesses. The Hearing Officer will determine the order in which witnesses will provide their statements.
6. Both parties will have the opportunity to present a closing statement. The Complainant will present their closing statement first. At the conclusion of closing statements, the hearing will conclude and immediately following the hearing the Hearing Committee will privately deliberate and render a decision. The Hearing Committee's decision will specify clearly whether the issue has merit and a recommendation for the appropriate course of action. Both parties will be notified in writing of the Hearing Committee decision within 10 business days.

During the hearing either party:

- May decline to make statements. A refusal to answer questions shall not be interpreted unfavorably with respect to that party's position; and
- May decline to appear at the hearing. The refusal of the respondent(s) shall not be interpreted as evidence that the issue is valid.

The decision will be sent to both parties, the major advisor, the graduate program coordinator and/or department head, the Dean of the school or college in which the issue occurred, and to the Dean of the Graduate School within 10 business days from the date of the hearing. The notice will be sent to all parties via their official University email address, and if appropriate, by first class mail, postage prepaid, to the mailing address on file with the University.

Final Appeal Process

A written appeal can be filed with the Dean of the Graduate School within 10 business days after email notification of the Hearing Committee's decision is sent. An appeal is not a new hearing. It is a review of the record of the original hearing. In order to prepare an appeal, the person filing the final appeal request shall have the right to review the records of the hearing, including the audio

recording. This review of records, including the audio recording, is limited to the purpose for preparation of the appeal only.

An appeal may be sought on the following three grounds:

On a claim of error in the hearing procedure.

- On a claim of new evidence or information material to the case that was not available at the time of the hearing.
- On a claim of substantive error arising from misinterpretation of evidence presented at the hearing.

The Dean of the Graduate School has (30) business days to consider and provide an outcome of the final appeal request. The Dean of the Graduate School approves or denies a final appeal. If a final appeal is approved, the Dean of the Graduate School may determine an appropriate course of action or return the case to the Hearing Committee with instructions to guide additional deliberations.

The decision of the Dean of the Graduate School concerning a final appeal is final.

A version of this policy was first approved and adopted by the Board of Trustees on November 10, 1998. It was amended on April 24, 2013. This version was approved and adopted by the Board of Trustees on March 26, 2014.

Course Descriptions

Course Offerings

The following lists include most of the graduate courses that the University has approved for offering. However, not all courses listed are offered every semester or every year. For actual current offerings, students should consult the appropriate schedule of classes which can be accessed from the Graduate School's registration website. Descriptions of undergraduate courses are contained in the Undergraduate Catalog. The University reserves the right to change announced offerings.

Course Numbering System

Undergraduate courses are numbered 1000-4999. Courses numbered 1000-1999 are primarily for freshmen, courses numbered 2000-2999 are primarily for sophomores, courses numbered 3000-3999 are primarily for juniors, and courses numbered 4000-4999 are primarily for seniors. A limited number of credits of coursework completed at the 4000-level (usually not more than six) may be applied, with the approval of the student's advisory committee, toward a graduate degree program provided certain conditions are met (See "Standards and Degree Requirements"). Graduate courses are numbered 5000-6999. This Catalog contains listings of graduate-level courses only. Courses numbered 5000-5999 are primarily for master's degree students, and courses numbered 6000-6999 are primarily for doctoral students.

Course Semesters

Class schedules for each semester and session can be accessed from the University's PeopleSoft website. Not all courses are offered every semester or every year. Information concerning the availability of particular courses may be obtained also from departmental and program offices. Courses carrying hyphenated numbers are full-year courses extending over two semesters. The first semester of such courses is always prerequisite to the second, but the student may receive credit for the first semester without continuing with the second.

Course Meeting Times

Information about the specific time(s) that a course will meet may be obtained from the appropriate departmental office at the time of registration or from appropriate class schedules.

Course Prerequisites

All course prerequisites must be met before a student is permitted to register for the particular course. If, however, the instructor of a course is convinced that the student has the equivalent of such a prerequisite, the instructor may admit the student by providing the student with a unique PeopleSoft permission number (which is valid only for that student to use in registering for the course in question).

Course Instructor

Students should consult the schedule of classes contained in the PeopleSoft database or contact the departmental office at the time of registration to obtain information concerning course instructor(s).

Accounting (ACCT)

5121. Financial Accounting and Reporting

Three credits. Prerequisite: Open only to MBA students. Not open to students who have passed ACCT 5182.

Introduces students to accounting concepts essential to the preparation and interpretation of financial statements issued to management and to external users such as stockholders and creditors. While appropriate consideration is given to procedural aspects of accounting, more emphasis is placed on understanding the conceptual bases of generally accepted accounting principles and the effects of using alternative accounting methods on financial statements.

5122. Financial Reporting I

Three credits. Prerequisite: A grade of B- or better in ACCT 2001 and 2101; ACCT 5121 and 5123.

An intensive study of financial accounting theory and practical applications as related to the preparation and analysis of financial statements, particularly focusing on assets, liabilities, owner's equity and income determination.

5123. Cost Analysis and Control

Three credits. Prerequisite: ACCT 5121; open only to MBA students. Not open for credit to students who have passed ACCT 5184.

Managerial uses of accounting information for decision-making within the business enterprise. Decisions considered include product pricing, transfer pricing, make or buy, and capital budgeting. Formation of budgets establishing an internal control structure, performance evaluation, and cost control techniques are also discussed.

5124. Financial Reporting II

Three credits. Prerequisite: a B- or better in ACCT 5122.

Continuation of an intensive study of financial accounting theory and practical applications as it relates to the preparation and analysis of financial statements, particularly focusing on pensions, bonds, leases, and intangibles. Also covered are accounting for consolidations, intercompany transfers, and multinational accounting.

5181. Financial Accounting and Reporting-Fundamentals

1.5 credits. Prerequisite: Open only to MBA students. Not open for credit to students who have passed BLAW 5182.

In order to make effective decisions, managers must be able to understand, analyze and evaluate financial statement data regarding the outcomes of previous decisions. Oriented towards "users" (versus "preparers") of financial statements and aims to help students develop a basic understanding of the financial accounting concepts and procedures that underlie corporate financial statements. The course objective is to provide students with a fundamental understanding of accounting methods and terminology so that the financial statements in corporate annual reports can be analyzed and evaluated.

5182. Financial Accounting and Reporting-Applications

1.5 credits. Corequisite: ACCT 5181.

Financial accounting for certain, specific economic transactions (e.g., debt issuance, granting stock-based compensation). Provides students with an introduction to fundamental finance concepts

and, in turn, a more nuanced understanding of the financial accounting concepts and procedures that underlie corporate financial statements.

5183. Cost Analysis

1.5 credits. Prerequisite: ACCT 5182.

This course provides a micro level understanding of various costing systems, e.g. job-order costing, process costing, and activity-based costing. Students comprehend the nature and behavior of cost and how cost is directly affected by resource (people, materials and capital) acquisition and allocation decisions. Students explore how management solves the interrelated problems of efficiency, productivity, and pricing.

5184. Managerial Controls

1.5 credits. Prerequisite: ACCT 5183.

This course takes a macro perspective of applying cost concepts to real-world managerial scenarios to make rational decisions, e.g. product pricing, transfer pricing, make or buy, performance measurement, and budgeting. Students explore how management solves the interrelated problems of capacity, sourcing, pricing, and profitability.

5243. Assurance Services

Three credits. Prerequisite: a B- or better in ACCT 2001 and 2101; or ACCT 5121 and 5123 or 5122.

An in-depth study of issues relevant to the public accounting profession, including legal liability and ethics, audit risk analysis, planning of audit engagements, auditor reports, and other assurance services and reports. Students will learn to think critically about issues facing the accounting profession primarily by analyzing cases and completing a number of individual and group research projects.

5260. Federal Income Taxation

Three credits. Prerequisite: a B- or better in ACCT 2001; ACCT 5121 or equivalent at an accredited U.S. university.

A study of the fundamentals of Federal income taxation for individuals and related issues of compliance, reporting, and planning. Focuses on income and deduction recognition, character, and timing and includes the tax treatment of property, investments, compensation, retirement, and estates.

5327. Financial Statement Analysis and Business Valuation

Three credits. Prerequisite: ACCT 5121 or 5182; open only to MBA students.

Addresses the use of financial statements to analyze and value firms. Topics include advanced issues in accounting, earnings quality, performance measurement, cash flows, and accounting-based valuation and trading strategies.

5505. Understanding the Responsibilities of an Accounting Professional

Three credits. Prerequisite: Open only to Accounting M.S. students; instructor consent.

The groundwork for fundamental issues that are included in the curriculum in the M.S. in Accounting Program relating to content and skills associated with professional success will be set.

5520. Financial Planning for Accounting Professionals

Three credits. Prerequisite: ACCT 5571. ACCT 5572 preferred but not required.

Designed for the accounting professional in the role of financial planner, this course covers all facets of a professional in financial planning practice. Topics include personal income tax planning, debt

management, investment and retirement planning, risk management and insurance, and estate planning.

5531. Contemporary Financial Accounting Issues

Three credits.

Study of major financial accounting issues, including the conceptual framework of accounting, the standard-setting process, asset valuation, income determination, and the agency theoretic perspective on managerial behavior and the use of accounting information in contracts. Other topics covered are fair value and derivatives accounting, and corporate governance issues related to the Sarbanes-Oxley Act of 2002. Concentrates on developing theories of the usefulness of accounting information in financial markets. This theoretical perspective is used to evaluate the conceptual framework, specific accounting standards, and issues related to international harmonization of accounting standards.

5533. Contemporary Managerial Accounting Issues

Three credits.

Study of major managerial accounting issues including analysis and evaluation of cost management systems. Overall focus is on the use of internally generated accounting data to support business strategy and maintain competitive advantages. Current research in the constantly evolving area of managerial accounting is emphasized.

5535. Global Financial Reporting and Analysis

Three credits.

Students will develop and test expectations about the content of financial reports based on an understanding of how national culture and subcultures affect financial reporting in a principles-based decision environment.

5539. Financial Services Reporting and Analysis in the Financial Services Industry

Three credits.

Introduces the nature of and accounting for financial services firms. The major emphasis is on insurance and banking. In each section of the course the student will learn about the nature of the business and the basic transactions in which the business engages. The unique accounting aspects of the businesses are discussed, including any special regulatory accounting rules. The analysis of firms in the industry will be covered.

5543. Advanced Assurance Services

Three credits.

Advanced treatment of significant assurance services issues. Intended for students with previous coursework in assurance services and/or auditing. The course demonstrates more detailed level of audit techniques: audit planning, risk analysis, assessing internal control, executing audit procedures to substantiate validity of key financial accounts, and a presenting the audit findings in a final audit report.

5545. Business Law, Business Ethics, and Public Accounting

Three credits. Not open only to MBA students, who should instead take BLAW 5175; instructor consent.

Covers the major legal and ethical issues in business and their significance for the accounting

profession and related stakeholders. Included among the topics are the tension between profit and the public interest, corporate responsibility to society, environmental concerns, consumer and employee relations, confidentiality, whistle blowing, advertising and hiring practices.

5546. Forensic Accounting and Fraud Examination

Three credits. Prerequisite: Instructor consent.

Develops a foundation upon which forensic accounting engagements are performed. Highlighting the many contexts within which forensic accounting can be performed, students learn the roles forensic accountants play within a wide range of engagements. Students will build their forensic accounting mindset and skill set through the readings and interactions with the professor, while working on a forensic accounting engagement from inception through successful resolution.

5549. Accounting and Disclosure for Not for Profit Entities

Three credits. Prerequisite: Instructor consent.

Accounting for not-for-profit organizations (NFPs), including educational institutions, hospitals and other health care entities, and civic and cultural organizations, is substantially different than for-profit entities. Examines topics relating to preparing and using financial statements for NFPs, including accounting, audit, and disclosure requirements and selected issues relating to government grants awarded to NFPs.

5553. Evaluating Internal Controls

Three credits. Prerequisite: Instructor consent.

Examines frameworks for evaluating the control practices that an organization relies on to help ensure the integrity of information provided by its accounting systems. Students will learn how to: (1) analyze an organization's control environment and processes to assess information integrity risks that can be managed with control procedures; (2) design, implement, and monitor internal controls for both manual processing procedures and information-technology-intensive accounting systems; and (3) test the effectiveness of controls in order to evaluate the extent to which deficiencies threaten the reliability of accounting information.

5559. Accounting and Auditing for Governmental Entities

Three credits. Prerequisite: Department consent.

Provides students with an understanding of how the characteristics and unique objectives of government entities are manifested in the accounting standards, audit risk and disclosure requirements. Topics addressed include the purpose of the various governmental financial statements, basis of accounting, measurement, audit focus, risk, fund types, and financial statement disclosures.

5563. Enterprise Risk Management: Identify Events as Risks to Manage or Opportunities to Seize

Three credits. Prerequisite: Department consent.

Provides students with the ability within the COSO framework to identify events that may impact a nonfinancial publicly traded enterprise's ability to realize value for its stakeholders using the concept of the triple bottom line of profit, people, and planet. Events will be evaluated as risks that have negative impacts and opportunities as well as potential positive impacts. ERM techniques applied in the course will include: risk control,

business continuity, reputation risk, supply-chain management, compensation system alignment, and strategic decisions.

5571. Taxation of Business Entities

Three credits.

Application of basic tax concepts to business entities, with particular emphasis on C corporations and partnerships. At the end of the course, students should be able to identify and address the tax issues faced when forming, operating, and liquidating a business entity.

5582. Research for Accounting Professionals

Three credits. Prerequisite: Instructor consent.

This course provides students with the information literacy skills required of an accounting professional to identify information needs, specify and implement research strategies, evaluate resources in order to fulfill those needs, and communicate findings.

5583. Financial Reporting and Auditing Implications Relating to Income Taxes

Three credits. Prerequisite: Instructor consent.

Focuses on the financial reporting and auditing provisions related to federal, foreign, and state income taxes. Students will learn how to: calculate income tax amounts reported on the income statement, balance sheet, and statement of cash flows; prepare the income tax footnote and related disclosures; identify substantive audit procedures relating to income tax balances and disclosures; and evaluate and recommend internal controls relating to income taxes.

5603. Advanced Accounting

Three credits. Prerequisite: ACCT 5622; not open to students who have passed ACCT 4203.

An in-depth study of accounting for business combinations. Coverage also is given to accounting for nonprofit entities and contemporary issues in financial accounting.

5894. Special Topics in Accounting

Variable (1-3) credits. Prerequisite: ACCT 5121 or 5182; open only to MBA students. May be repeated for a maximum of nine credits.

Investigation and discussion of special topics in accounting.

5895. Independent Study in Accounting

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of accounting. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

6200. Investigation of Special Topics

Variable (1-3) credits. May be repeated for credit.

6201. Introduction to Accounting Research

Three credits. Prerequisite: Instructor consent.

Introduces students to three major elements of accounting research. First, students are introduced to philosophy of science and how that translates into the major research paradigms in accounting. Second, students are introduced to basic research design issues and how those issues are illustrated in the accounting literature. Finally, students are introduced to the major research paradigms in accounting.

6202. Seminar in Accounting Research II: Organizational Behavior

Three credits.

Continuation of study in current research topics in accounting.

6203. Accounting and Capital Markets

Three credits. Prerequisite: Instructor consent.

Provides a broad survey of capital markets research in accounting and related fields. Students are introduced to major theoretical and methodological issues in this line of research. The seminar focuses on theoretical and intuitive constructs that frame accounting research questions and the methods that are used to address those research questions.

6204. Judgment and Decision Making in Accounting

Three credits. Prerequisite: Instructor consent.

Examines theories and empirical research related to individual judgment and decision making in accounting. Students are introduced to the major theoretical and methodological issues involved in this line of research, and develop the background for reading the literature and for further study.

6211. Seminar in Special Research Topics

One credit. Prerequisite: Instructor consent. May be repeated for a maximum of eight credits.

Students are exposed to a broad range of accounting research through reading and critiquing research papers presented at the Accounting Department Research Workshop (papers are presented by local scholars as well as scholars from other institutions). The seminar also focuses on how to present effective written and oral criticisms of research papers.

Administration (ADMN)

5301. Managing People: Communication Skills in Supervision, Personnel Management and Leadership

Three credits. Prerequisite: BASC 5390 and 5391, and FED 5351 and 5301; open only to M.S.W. students in the Administration concentration. Corequisites: FED 5352 and 5302.

Leadership theory and analysis, supervision, personnel/human resource management, with emphasis on interactional skills. Prepares students to function effectively in supervisory and administrative roles and to use themselves in creative professional ways in exercising leadership in human service settings. Required for students in the Administration concentration.

5302. Managing Money: Financial Management Strategies and Fiscal Responsibilities for Social Administrators

Three credits. Prerequisite: ADMN 5301, and FED 5352 and 5302; open only to M.S.W. students in the Administration concentration. Corequisites: ADMN 5353 and FED 5310.

The fundamental principles and processes in financial management processes, budgeting systems, preparation and execution of budgets, basics of accounting, use of computer spread sheets, managerial accounting, financial statements, cost analysis, inventory and fixed asset accounting, funding sources, financial performance measures, internal control and external audits, fiduciary relationships and responsibilities, liabilities in 501(c)3, ethics in finance, collaborating and

leveraging of resources. Required for students in the Administration concentration.

5303. Creating and Managing Opportunities in the Organization's Internal and External Environment

Three credits. Prerequisite: ADMN 5302 and 5353 and FED 5310; open only to M.S.W. students in the Administration concentration. Corequisite: ADMN 5354 and FED 5311.

Selected internal and external challenges and opportunities for the social work administrator. These include staff relations and organizational climate, the use and organization of the organization's physical environment, the voluntary board, public relations, and strategic alliances. The course gives students opportunities to develop a range of knowledge and skills in work with staff, volunteers, the media, and partners in the community to maximize opportunities to enhance the organization and its services to clients and the community. Required for students in the Administration concentration.

5353. Field Education in Administration III

Four credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Administration concentration. Corequisite: ADMN 5302 or POPR 5310 and FED 5310. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Administration concentration.

5354. Field Education in Administration IV

Four credits. Prerequisite: ADMN 5353 and FED 5310; open only to M.S.W. students in the Administration concentration. Corequisite: ADMN 5303 and FED 5311. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Administration concentration.

5355. Block Placement in Administration

Eight credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Administration concentration; instructor consent. Corequisite: POPR 5310 and FED 5350.

Field Education in Administration for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course. Required course for students in the M.S.W. program completing a Block Field Placement.

African Studies (AFRI)

5000. Seminar in African Studies

Three credits.

Interdisciplinary introduction to graduate level study of Africa.

5105. Special Topics in African Studies

Variable (1-9) credits. May be repeated for a total of 12 credits.

5110. Independent Study

Variable (1-9) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Agricultural and Resource Economics (ARE)

5150. Microeconomic Foundations for Sustainability

Three credits.

Theory and tools of microeconomic foundations for sustainable development. Intermediate understanding of applied microeconomics and practicing quantitative techniques for application to economic issues using electronic spread sheets.

5201. Microeconomics

Three credits.

Beginning graduate microeconomics covering consumer and producer theory, price determination, economic efficiency, and welfare analysis.

5211. Quantitative Analysis for Sustainable Development

Three credits.

Quantitative methods used in the analysis of problems related to sustainable economic development with a focus on agriculture, natural resources, and the environment. Regression analysis, economic impact analysis, feasibility studies, enterprise budgets, and survey methods.

5215. Sustainable Business Management

Three credits.

Principles of management strategy with a focus in agribusiness. Marketing, financial and human resource management as well as budgeting techniques and the legal and organizational structure of businesses from the perspective of sustainability.

5252. Planning for Economic Development

Three credits. Prerequisite: ARE 5150 and 5211.

Insight into domestic and international economic policy dynamics relevant to economic development as well as application of critical organizational skills to the development of a grant proposal and project development and management. Students are required to use theoretical, methodological and practical applications to sustainable economic development covered in previous courses.

5305. The Role of Agriculture and Natural Resources in Economic Development

Three credits. Prerequisite: Instructor consent.

The role of agriculture in the economic development of less developed economies. Microeconomic dimensions of agricultural development, economics of food consumption and nutrition, agricultural technology and productivity, agricultural supply, land tenure and agrarian reform, foreign assistance, trade agreements, and agricultural price policy.

5311. Applied Econometrics I

Three credits. Prerequisite: Instructor consent.

This course deals with the estimation and inference of statistical parameters that describe the data generating process of a society, the process that cannot be reproduced like in a pure science experimentation. In other words, the data are generated from economic systems of equations that are stochastic, dynamic, and simultaneous. An attempt is made to obtain the best, unbiased, and consistent estimates of the statistical parameters that describe the inherent economic phenomena.

5315. Mathematical Programming for Economists

Three credits.

Procedures for formulating and applying mathematical optimizing techniques. Emphasis is on the use of linear and nonlinear programming models for researching economic problems.

5462. Environmental and Resource Economics
Three credits.

Natural resource use and environmental quality analysis using economic theory. Reviews of empirical research and relevant policy issues.

5464. Benefit-Cost Analysis and Resource Management

Three credits. Prerequisite: Instructor consent.

Theoretical foundations and applications of benefit-cost analysis in project appraisal and in evaluation of public policies regarding resource management and environmental protection.

5474. Industrial Organization: Empirical Analysis

Three credits.

Analysis of the structure, conduct, and performance of industries with examples from the food sector and other industries. Explains the development of testable hypotheses from theory, empirical methods, evidence on the level and type of competition, economies of size, product differentiation, entry barriers, and the impact of alternative organizational forms including cooperatives on economic performance.

5495. Special Topics

Variable (1-3) credits. May be repeated for a total of 12 credits.

Topics and credits to be published prior to the registration period preceding the semester offerings.

5499. Independent Study in Agricultural and Resource Economics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 24 credits.

This course provides the opportunity for graduate students to carry on independent reading or research in the field of the student's needs and interests.

5991. Professional Internship

Variable (1-6) credits. Prerequisite: Instructor consent.

Project-based fieldwork with an approved partnering organization related to sustainable economic development, including agribusiness management, marketing and financial analysis, food systems, and economic development.

5992. Practicum in Economic Development

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 6 credits.

Project-based fieldwork with an approved partnering organization related to sustainable economic development, including agribusiness management, marketing and financial analysis, food systems, and economic development.

6311. Applied Econometrics I

Three credits. Taught with ARE 5311.

Expose students to techniques in applied economics research. Students will learn models - derivations, assumptions, and issues. The models will be practiced utilizing empirical data and interpreting results in light of economic and econometric theory.

6313. Applied Econometrics II

Three credits. Prerequisite: ARE 5311.

An introduction to econometric methods used in contemporary applied economic data analysis. Emphasis on learning how to operationalize different estimation techniques in standard statistical software.

6464. Experimental Methods for Program Evaluation

Three credits. Prerequisite: A graduate-level introduction to statistics or econometrics class or equivalent. Recommended preparation: A graduate-level macroeconomic theory course.

Theory and practice of field-based program experiments, often referred to as randomized controlled trials (RCTs). All aspects of experimental program evaluation, including the design of evaluation strategy and working with survey and program staff. Examples from both developing country contexts and Western country program evaluation.

6466. Environmental Economics

Three credits. Prerequisite: ARE 5201 or ECON 5201.

Economic analysis of environmental problems and corrective policy instruments. Theory of externalities and public goods, role of uncertainty and imperfect information in policy design, benefit-cost analysis, and non-market valuation. Applications to environmental problems (such as air and water pollution, hazardous waste, and occupational health and safety).

6468. Economics of Natural Resources

Three credits.

Economic concepts and issues related to the allocation of stock resources through time, the use and protection of flow resources, and the role of natural resources in economic growth.

6470. Applied Research in Environmental Economics

Three credits. Prerequisite: ARE 5201 or ECON 5201, and ARE 5311 or ECON 5312. Recommended preparation: ECON 6466 or ARE 6466 or 6468 or 5462.

Develops a broad perspective on the peer-reviewed literature concerning the frontier areas of contemporary environmental economics, with an emphasis on incentive and market-based approaches to ecosystem services, valuation of environmental quality and assets, interface between experimental and environmental economics, including such topics as land use change, conservation, pollution control, water resource services, forest ecosystem management. Students will develop critical thinking skills evaluating published studies and identifying gaps in methodology and knowledge for future research.

6472. Microeconomic Applications to Food Markets

Three credits. Prerequisite: ARE 5201 or ECON 5201 and ARE 5311 or ECON 5311.

Trains students in applied microeconomics, with particular emphasis on food markets and public policy. The course is divided into three broad areas: production economics, economics of consumer behavior, and market analysis. Particular emphasis is placed on quantitative tools using empirical models and welfare economics. Students design and undertake an individualized project in their area of interest.

6474. Empirical Industrial Organization I

Three credits. Prerequisite: Instructor consent.

Empirical Industrial Organization models that use simultaneous equations, discrete choice, and/or nonlinear econometric methods to analyze conduct and performance of brands and firms in noncompetitive industries. Includes static and dynamic modeling of pricing and advertising in differentiated product oligopolies. Antitrust policy applications in the U.S. and E.U.

6476. Empirical Industrial Organization II

Three credits.

Builds on Empirical IO I and explores the use of advanced applied methods to gauge consumer demand, firm conduct and relevant policy implications. The empirical methods covered include both structural models, static or dynamic, and reduced forms. To this end, we will discuss papers in class demonstrating these methods. The emphasis will be data, sources of identification, and estimation techniques.

6495. Graduate Research Seminar

One credit. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Participation in research seminars presented by invited scholars and departmental faculty. This course can be repeated to a maximum of 12 credits.

6695. Special Topics

Variable (1-3) credits. Prerequisite: Department consent. May be repeated for a total of 12 credits.

May be repeated to a maximum of 12 credits with a change of topic. Topics and credits to be published prior to the registration period preceding the semester offerings.

Agriculture and Natural Resources (AGNR)

5095. Special Topics

Variable (1-6) credits. Credits and hours by arrangement. Prerequisite: instructor consent. May be repeated for a total of 12 credits.

Topics relating to the College of Agriculture, Health and Natural Resources.

Allied Health (AH)

5005. Biostatistics for Health Professions

Three credits.

Basic statistical methods in a broad range of medical or public health problems. Emphasizes the use of these methods and the interpretation of results using biomedical and health sciences applications.

5095. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 36 credits.

Advanced topics and investigations in the field of Allied Health Sciences. Topics and credits to be published prior to the registration period preceding the semester offering.

5099. Independent Study for Allied Health

Variable (1-6) credits. May be repeated for a total of 6 credits.

Advanced study, project, or research of intensive, independent investigation in allied health consistent with the student's needs, interests and plan of study.

5309. Health and Aging

Three credits.

Examination of the theoretical and applied issues in optimizing health for older adults. Focus is on the bio-psycho-social aspects of health; application of current research, and leadership skill building for program development.

5314. Professional Development Project

Three credits. Prerequisite: At least nine credits in Allied Health courses; open only to non-thesis (Plan B) students; instructor consent. May be repeated for credit.

Examines contemporary issues and problems relevant to allied health practice. Focus is on interdisciplinary exchange of ideas and the development of a project relative to the student's particular program emphasis.

5317. Professional Development Practicum

Five credits. Prerequisite or corequisite: AH 5314; instructor consent required; open only to non-thesis (Plan B) master's students. May be repeated for a maximum of 24 credits.

The implementation and/or application of theory in AH 5314. A minimum of 300 practicum hours required.

5319. Health Education and Behavioral Interventions for At-Risk Populations

Three credits.

The study and application of current learning theories, models, and strategies used by experienced health professionals to become effective interventionists within didactic, clinical, and community settings.

5331. Nutrition for Healthy Communities

Three credits. Prerequisite: Instructor consent.

Development of knowledge and skills in public nutrition including community assessment, development of program policies, and program planning, implementation, and evaluation.

5350. Advanced Medical Nutrition Therapy

Three credits. Prerequisite: Open only to Dietetics majors, others by consent of the Director of Dietetics; instructor consent.

Provides student with advanced nutrition therapy information for the effective treatment of complex medical problems. Emphasizes all aspects of the nutrition care process as it relates to medical conditions. The research regarding the physiological, pathological and metabolic basis for nutrient modifications will be emphasized.

5351. Contemporary Nutrition Issues and Research

Three credits. Prerequisite: Open only to Dietetics majors, others by consent of the Director of Dietetics; instructor consent.

Critical thinking and application of research to contemporary issues in food and nutrition applied to clinical nutrition and community/public health nutrition. Learning occurs through classroom discussions, self-exploration through reading and applying scientific studies to issues, and participation in a research project.

5366. Environmental Health

Three credits.

Focuses on the environmental health consequences of exposure to toxic chemicals, food contaminants and radiation. Basic principles of environmental health are discussed, followed by lectures on specific topics such as: cancer and reproductive risks, occupational hazards, radiation, genetic biomonitoring, risk assessment techniques,

risk/benefit analysis, social/legal aspects of regulating toxic chemicals, and other related topics.

5370. Applied Advanced Nutrition

Three credits. Prerequisite: DIET 4727, 4350, 4360 and 4365 or equivalent.

Provides student with advanced nutrition information for the effective management of complex medical and public health problems. Emphasizes the impact of nutrients and food components on human health. The research regarding the physiological, pathological and metabolic basis for nutrients in health and disease will be emphasized.

5501. International Health

Three credits. Prerequisite: Instructor consent.

Examines international health challenges. Through case studies, other appropriate readings, and individual research students will gain a comprehensive understanding of global health related challenges (medical, economic and cultural), including children's health, women's health, communicable diseases, and non-communicable diseases.

5502. Complex Humanitarian Emergencies Seminar

Three credits. Prerequisite: Instructor consent.

In-depth examination of both theoretical and applied aspects of complex humanitarian emergencies. It provides students with a comprehensive, multidimensional understanding of the needs of displaced persons and systems and practices currently in place to meet these needs.

5503. Poverty and Public Health

Three credits.

Social determinants of health and poverty. Health impact assessments. Improving the social determinants of health and poverty, including countries in conflict.

5504. Nutrition During Human Emergencies

Three credits.

Examines the cycle of malnutrition and disease, and major food and nutrition challenges faced by refugee and displaced populations. Covers types of feeding and nutrition supplementation programs in emergencies, and nutritional assessment as a tool to design, target and evaluate feeding and supplementation programs in emergencies. Addresses feeding of special populations such as: infants, pregnant and lactating women, and the elderly during emergencies; international agencies, non-government organizations, and government programs involved with food aid and relief; and food as a human right.

5505. Principles of Sustainability

Three credits.

Provides students with an understanding of the basic principles of environmental, social, and economic sustainability and will assist students to develop the ability to apply these principles to current issues of sustainability.

5632. Vaccines: Mechanisms of Immune Protection

(Also offered as PVS 5632.) Three credits. Prerequisite: Instructor consent.

Focuses on several different approaches to inducing prophylactic immunity in the host. Both traditional and modern molecular approaches to vaccine design will be discussed. In addition, the mechanisms employed by pathogenic microbes to avoid hosts' immune responses will be examined

in the context of vaccine design. The students will gain an appreciation for the transition from basic research to practical applications.

5700. Ethical Considerations in Genetic Testing and Research

Three credits. Recommended preparation: a course in human genetics; instructor consent.

Conceptual and philosophical analysis of ethical issues specific and special to genetic testing and research. Presentations, case studies and readings will provide responsible conduct in research training and allow for analysis of World Wide Web genomics, access to genetic information, privacy and confidentiality, ownership, personal and societal perceptions, reproduction, utility and limitations of genetic data, education of physicians and patients, treatment versus enhancement, regulation and reimbursement, and other time-relevant issues.

5710. Genetics and Genomics of Health

Three credits. Prerequisite: A course in human genetics; instructor consent.

Interaction of genetic, environmental, and behavioral factors in the predisposition to disease, onset of disease, response to treatment and maintenance of health. Genetics and genomics in health promotion and disease prevention will be examined through seminars and literature review.

5715. Current Topics in Clinical Genetics

One credit. Prerequisite: Instructor consent. May be repeated for a total of two credits. Recommended preparation: a course in human genetics. Open by instructor consent.

Exploration of current research and advances in clinical genetic diagnosis and testing through primary literature review.

5720. Theory and Practice of Clinical Genomics

Variable (1-3) credits. Recommended preparation: a course in human genetics; instructor consent. May be repeated for credit with a change of content.

Theory and practice of diagnostic laboratory methodologies and genomic data analyses for the clinical scientist. Sections are taught in a series of modules and include clinical case scenarios and analyses. With a change of content, this course may be repeated for credit.

6005. Multilevel Mediation-Moderation Modeling for Health Sciences

Three credits. Prerequisite: a course in precalculus or higher; AH 5005 or other advanced/graduate course in statistics.

Presents advanced multivariate statistical methods focusing on statistical techniques commonly used in empirical research under a latent-variable approach. Teaches students multilevel mediation-moderation techniques in order to analyze complex or multilevel databases. At the end of the course, students will understand how to analyze multivariate data using multilevel mediation-moderation concepts to test a variety of health-related research hypotheses. Knowledge of linear models is needed for participants enrolling in this course.

6094. Health Promotion, Disease and Disability Prevention Research Seminar

Three credits.

Inquiry into the theory and nature of research in health promotion, disease and disability prevention. Students are encouraged to meet regularly with their major advisors.

6181. Experiential Learning in Health Promotion Research

Variable (1-6) credits. Prerequisite: AH 6324, and a graduate statistics course; open only to doctoral students after their first semester of doctoral work; instructor consent. May be repeated for a maximum of six credits.

Mentored research experiences on and/or off-campus to increase doctoral student's breadth and depth of knowledge, skills and competence in health promotion science.

6184. Graduate Seminar in Health Promotion Research

One credit. Prerequisite: Instructor consent. May be repeated for a total of five credits.

In a small learning environment under the direction of one or more faculty, students develop their research and academic abilities in health promotion sciences. Activities include: individual goal setting and implementing learning plans; attending scientific seminars; preparing and delivering research presentations; research writing; college-level teaching; grant and compliance administration; and applying for post-graduate employment.

6305. Program Planning and Evaluation for Health Professionals

Three credits. Prerequisite: Instructor consent.

A theoretical and practical introduction to program evaluation for health professionals who deliver health care services, manage departments and personnel, or provide training and continuing educational opportunities. Students apply the practical program evaluation framework for health-related intervention programs and document the impact of interventions within health promotion and disease and disability prevention programs. Skill development is facilitated.

6306. Research Methods in Allied Health

Three credits. Prerequisite: EPSY 5605 or a course in basic statistics.

An inquiry into the nature of research with emphasis on the spirit, logic, and components of the scientific method. Health related research literature is used to aid the student in learning to read, understand, and critically analyze published materials. The preparation of research proposals and reports is emphasized.

6324. Critical Issues in Health Promotion, Disease and Disability Prevention

Three credits. Prerequisite: Instructor consent.

An in-depth study of health promotion, disease and disability prevention policies, programs and strategies.

6405. Exercise Intervention for Health Promotion in Persons with Chronic Disease and Disability

Three credits. Prerequisite: Instructor consent.

In-depth information for determining functional capacity and developing appropriate exercise programming for optimizing functional capacity of persons with chronic disease and/or disabilities. Understanding the effects of exercise on the disease process as well as the effects of disease on the exercise responses in chronic disease and disability are explored.

6409. Geriatric Nutrition

Three credits. Prerequisite: Instructor consent.

In-depth information on nutritional problems and requirements for the healthy and ill older

adult. The focus is on design and critique of research methodology in the nutrition literature. Development and presentation of a major nutrition-related research proposal is required of all students.

6420. Clinical Management Models for Health Promotion

Three credits. Prerequisite: Instructor consent.

Systematic design and analysis of the roles of health service managers and clinicians in the delivery of services for managed care are addressed. The course will analyze health care delivery from an integrated management-clinician perspective. Attention will focus on patient care and the use of clinical algorithms and critical pathways in health-care delivery.

6421. Design and Implementing Health Promotion Programs

Three credits. Prerequisite: Instructor consent.

Designed to assist students with the skill development necessary to design and implement health promotion programs via a settings approach. Various program development models will be presented. Experts from the field will be integrated into the course from various programmatic settings.

6422. Writing Successful Grant Proposal

Zero credits. Prerequisite: Instructor consent.

Designed for advanced graduate student in a health field to obtain experience writing a scientific research proposal. Students will be expected to enter the course with both a fairly well developed research topic and an actual Request for Proposal in hand. The final outcome from this class will be a grant proposal that is suitable for submission to a funding agency.

6423. Advanced Topics in Stress and Health Promotion

Three credits.

Selected topics in assessing and treating stress related disorders in health care delivery are examined. Emphasis on diagnosis, treatment, and prevention interventions are examined. Current measures used in assessment along with self-management skills for patients are the focus of this course.

6424. Principles and Practices of Alternative/Complementary Medicine

Three credits.

Critically reviews the evolving modalities of alternative therapies and mind-body interventions. The major components of alternative medicine, providing a review of the scientific basis, physiology and psychoneuroimmunology of the disciplines of holistic mind-body therapies will be presented. The role of energetics and spirituality in human health promotion and disease prevention will be discussed.

American Studies (AMST)

6000. American Studies: Methods and Major Texts

(Also offered as ENGL 6800 and HIST 6000.)

Three credits. Prerequisite: Open only to graduate students in English, History, and Political Science, others with instructor consent.

Introduction to the methodologies and topics of American Studies through a survey of major texts in the field, past and present. Also provides a history of the field.

6500. American Studies: Special Topics

(Also offered as ENGL 6850 and HIST 6500.)

Three credits. Prerequisite: Open only to graduate students in English, History, and Political Science, others with instructor consent.

Detailed study of a specific topic in American cultural studies with an emphasis on developing skills in interdisciplinary research. Topics vary from semester to semester. May be repeated once for credit with a change in topic.

Animal Science (ANSC)

5601. Experimental Design in Animal Science

Three credits. Prerequisite: Instructor consent.

Discussion of the basic principles of design and analysis for experiments in animal and food science. Both theory and practical application of designing experiments will be included. Emphasis is placed on data analysis using SAS, highlighting determination of the most appropriate analysis for an experiment and interpretation of output.

5612. Advanced Nutrition

Two credits. Prerequisite: Instructor consent.

Critical review of current literature on digestive physiology, metabolism, feed processing and management related to ruminant animals.

5613. Growth and Metabolism of Domestic Animals

Three credits.

An assessment of animal growth and metabolism interrelated to nutrition, selection, environment, production and idiosyncrasies among species.

5614. Advanced Animal Nutrition

Three credits. Prerequisite: Instructor consent.

A comparative study of nutritional, physiological, microbiological, immunological and biochemical aspects of digestion and metabolism in the non-ruminant and ruminant animal. Topics include digestive system structures, utilization of nutrients, energy metabolism, control of nutrient metabolism, and experimental techniques used in the study of animal nutrition. Feedstuffs appropriate to meet nutrient requirements and ration formulation across various physiological stages, growth, gestation, and lactation will be covered in this course. There will be a focus on developing critical thinking skills, reading current literature, and assimilating scientific concepts in written and oral forms.

5615. Comparative Exercise Physiology

Three credits.

In depth discussion of the effects of exercise on the body with emphasis placed on the physiological mechanisms which allow for adaptation to periods of exercise and inactivity. Idiosyncrasies among the athletic species will be highlighted.

5616. Endocrinology of Farm Animals

Three credits.

In depth discussion on endocrine systems and endocrine function in farm animals with emphasis on hormones involved in metabolism, growth, lactation, feed intake and digestion in cattle, pigs, horses and poultry.

5618. Probiotics and Prebiotics

Three credits.

Biology, uses, effectiveness and safety of probiotics and prebiotics. Molecular mechanisms underlying the health benefits attributed to the consumption of pre and probiotics. Application of pre and probiotics to promote human and

animal health, including safety and regulation. A background in general microbiology or concurrent registration in a microbiology course is recommended.

5619. Signaling Pathways

Three credits. Recommended preparation: Previous three credit course in cell biology, molecular biology, or biochemistry.

Principles of cell signaling transduction. Major cellular regulatory pathways and interactions between pathway components. Regulatory mechanism of various cellular processes via specific signaling network, and methods used for studying cell-signaling pathways.

5621. Frontiers in Animal Embryo Biotechnology

Three credits.

Focuses on the epigenetics and molecular aspects of embryology such as genomic imprinting and X inactivation. Introduces the state of numerous established and emerging embryo biotechnologies such as assisted reproductive technologies; gamete cryopreservation; transgenesis; nuclear transfer (cloning); gene targeting/genome editing; xenotransplantation; embryonic and tissue stem cells, induced pluripotent stem cells and their applications.

5623. Current Advances in Epigenetics

(Also offered as MCB 5470.) One credit. Prerequisite: Instructor consent. May be repeated for a total of three credits.

A field of modern biological research that is concerned with influences on gene expression, developmental biology, and disease that are mediated by mechanisms independent of DNA sequence. Literature review in which each student will present and critically analyze primary literature in epigenetics. All students will present and participate in detailed technical evaluations of selected papers, and develop a written proposal for future research based on the paper(s) that they present individually. Topics include imprinting, X chromosome inactivation, chromatin dynamics, and cloning (nuclear transfer).

5641. Food Chemistry

Three credits. Prerequisite: Instructor consent.

Chemical, physical and biological changes in foods and food macromolecules that occur during processing and storage that affect texture, color, flavor, stability and nutritive qualities. Field trips may be required.

5683. Graduate Teaching Experience

One credit. Prerequisite: Instructor consent. May be repeated for a total of three credits.

Mentored experience in developing and presenting lectures and/or laboratory activities for existing ANSC undergraduate courses.

5692. Research

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 24 credits.

Independent research in animal science, livestock production, meats, dairy production, animal nutrition, growth, reproductive physiology, animal breeding, or environmental health.

5693. Graduate Presentation Skills

One credit. Prerequisite: Instructor consent.

Discussion-based class which prepares students to make oral presentations.

5694. Animal Science Seminar

One credit. Prerequisite: Instructor consent. May be repeated for a total of two credits.

Students present a seminar on the topic of their thesis research.

5695. Special Topics in Animal Science

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits. May be repeated for credit with a change of topic.

5699. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Anthropology (ANTH)

5305. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Special topic readings or investigations according to the needs of each student.

5306. Human Behavioral Ecology

Three credits.

Applies the theory of natural selection to the study of human behavior in an ecological setting, with particular focus on the adaptive features and biological design of human behavior.

5308. Human Evolutionary Theory

Three credits.

Evolutionary concepts applied to human body size and shape, diet, disease, group composition, and reproductive behavior.

5309. Violence, Stress, and Social Support

Three credits.

Surveys theory and observations bearing on the nature, sources and consequences of traumatic stress, stressors, and social support in human populations.

5311. History of Anthropological Theory

Three credits. Prerequisite: Instructor consent.

Development of theory from the nineteenth century through the 1970s. Required for graduate students in Cultural and Historical Anthropology.

5312. Seminar: Contemporary Theory in Social and Cultural Anthropology

Three credits. Prerequisite: Instructor consent.

Selected current issues and debates in the discipline.

5315. Gender and Culture

Three credits. Prerequisite: Instructor consent.

Anthropological perspectives on the analysis of gender with special focus on dynamics of gender, culture, and power.

5316. Globalization and Transnational Anthropology

Three credits.

Methods and theories in the study of cultural, social, political and economic phenomena spanning international frontiers; historical origins of transnational anthropology, theories of globalization, ethnographic case studies.

5321. Ethnographic Methods I

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Theoretical foundations and basic tools used to conduct professional field studies in anthropology. Research design; moral and ethical dimensions of field work; designing and conducting informal, semi-structured and structured interviews (one-on-one and in groups); managing field

notes, questionnaires, and data; computer data management; summary statistics and graphics; identifying and interpreting random variation; modeling and testing explanations.

5322. Research Methods and Design

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Selected topics in ethnographic methods and research design.

5332. Cognitive Anthropology

Three credits.

Study of how the content of thought or knowledge, is created, organized, and distributed in human communities. Topics include cultural models of the mind, emotions, personality, and relationships.

5333. Evolution and Cognition

Three credits.

Introduction to recent work in evolutionary psychology, exploring the variety of ways in which we can understand human cognition as a product of evolution.

5334. Culture and Religion

Three credits. Prerequisite: Instructor consent.

Theories and problems in the analysis of non-western religious systems.

5335. Psychological Anthropology

Three credits. Prerequisite: Instructor consent.

Exploration of theoretical and empirical relationships between the individual and sociocultural systems, and it seeks to identify worldwide principles of human behavior.

5336. Cultural Ecology

Three credits. Prerequisite: Instructor consent.

Interrelationships between population organization in contrasting preindustrial societies.

5337. Economic Anthropology

Three credits. Prerequisite: Instructor consent.

Issues of scope, method and epistemology. Economic organization and performance in preindustrial societies. Economic development and underdevelopment.

5339. Cultural Dynamics

Three credits. Prerequisite: Instructor consent.

Analysis and comparison of contemporary anthropological theories of sociocultural dynamics, with an investigation of selected problems in the study of change and persistence.

5341. Analysis of Rituals

Three credits. Prerequisite: ANTH 5311.

Examines various theoretical contributions to the anthropological study of ritual. Controversies and ambiguities surrounding the social and symbolic significance of the ritual act for both men's and women's experiences and participation are addressed.

5345. The Neanderthals

Three credits. Prerequisite: Instructor consent.

Biological, cultural, technological, and behavioral evolution of Neanderthals as understood through the fields of genetics, physical anthropology, palaeolithic archaeology, human behavioral ecology, hunter-gatherer ethnography, palaeoclimatology, chronometric dating, and geology. Neanderthal-Modern Human interactions and the Middle-Upper Palaeolithic transition are also considered.

5350. Physical Anthropology

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Critical review of selected topics and current issues in the theory and practice of physical anthropology.

5352. Medical Anthropology

Three credits. Prerequisite: Instructor consent.

Overview of current theory and practice in medical anthropology.

5353. Applied Anthropology

Three credits.

Overview of various applications of anthropology to solve human problems both internationally and within the United States. Emphasis upon history of applied anthropology, ethical considerations, and specific roles of anthropologists in development.

5354. Contemporary Issues in Archaeology

Three credits. Prerequisite: Instructor consent.

Critical review of current trends and developments in archaeological method and theory.

5356. History of Archaeological Theory

Three credits. Prerequisite: Instructor consent.

A critical review of the development of archaeology, with particular emphasis on the theoretical innovations of the 1960s and 1970s.

5357. Settlement Systems

Three credits. Prerequisite: Instructor consent.

Approaches to human systems of settlement, including the applications of locational models and hierarchical analysis of settlement system data.

5358. Analytical Methods in Archaeology

Three credits. Prerequisite: Instructor consent.

Use of qualitative and quantitative techniques in the analysis of archaeological data. Topics covered include seriation, sampling, data screening, statistical testing and numerical taxonomy.

5359. Advanced Analysis in Archaeology

Three credits. Prerequisite: ANTH 5358.

An examination of recent developments in archaeological analysis, with particular emphasis on multivariate techniques, new methods of spatial analysis, chronological seriation, and microcomputer applications.

5361. The Ecology of Human Evolution

Three credits.

Early human ancestors as components of past ecosystems. Recovery of ecological information from fossil sites; reconstruction of ancient behavior; relevance of ethology and the study of contemporary foraging people for reconstruction of the past.

5363. Archaeological Site Formation Processes

Three credits.

Creation of archaeological sites by human behavior and geological forces. The characteristics of various formation processes and identification of them in the archaeological record.

5364. New England Prehistory

Three credits.

Topics in the prehistory of New England. Regional chronology and cultural history, early Holocene adaptation, ecology of hunter-gatherers, coastal adaptations, development of horticulture, and the evolution of tribal societies.

5365. Northeast North American Ethnohistory

Three credits.

Ethnohistory of northeastern North America from the Contact Period through the 20th century. Social and political organization, land use, subsistence, trade and exchange, mortuary ritual, native responses to Christianity and European trade and settlement. Contemporary issues of reburial and repatriation, federal recognition, and federal and state trust responsibilities for Indian tribes.

5369. Culture and Reproduction

Three credits.

Cross-cultural overview of human reproduction. Biological, social, cultural, and behavioral factors; cultural patterning of fertility and perinatal behavior; fertility control; gender and power in reproduction.

5374. Culture, Power, and Social Relations

Three credits.

Power, cultural evolution, and social change; law, global relations, identity and ethnicity, revolution and revitalization, the power of numbers, parents and children, women and men.

5375. Ethnographic Methods Laboratory

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Intensive study of selected tools for ethnographic data collection and analysis. Design and implementation of specialized ethnographic interviews; protocols, event histories, life histories, censuses, identity construction. OLS and logistic regression, demographic methods, triads tests, consensus analysis, ProFit analysis, multidimensional scaling, cluster and factor analysis, scale construction and validation, and text analysis.

5376. Ethnomedicine

Three credits.

Medical systems in cultural context. Traditional healers, herbal medicine, culture bound systems, the meaning of illness, curing and disease. Impact of biomedicine on traditional and alternative medical systems.

5377. Global Health and Anthropology

Three credits. Prerequisite: Instructor consent.

Assessing global morbidity and mortality; global health governance; political economy of global health; health inequities; social determinants of health; syndemics; climate change and health; maternal and child health; nutrition; infectious diseases; and war, trauma, and complex emergencies.

5378. Anthropology of Infectious Diseases

Three credits. Prerequisite: Instructor consent.

Examination of medical anthropological research and insights on biosocial/biocultural factors in the spread of infectious diseases, including human understanding and responses across cultural groups and through time, anthropogenic factors in contagion, and the nature and pathways of adverse infectious disease interactions.

5381. Sex and Gender

Three credits.

Historical, structural, and personal influences that shape the biocultural phenomena of sex and sexuality.

5389. Population Ecology

Three credits. Prerequisite: Instructor consent.

Survey of theory and observations bearing on the causes and consequences of changes in fertility and

mortality rates, and in the configuration of causes of mortality and morbidity in human populations.

5390. Cultural Rights

Three credits. Prerequisite: Instructor consent.

Politics of culture and cultural rights, minority rights, indigenous rights, multicultural policies, race, difference and law, cosmopolitanism, globalization and human rights.

5391. Human Rights in a Diverse World

Three credits.

Basic issues, methods and theories in the anthropological study of human rights; cultural relativism, the international human rights system, social movements, transnational activist networks, media and representation are studied in their relationship to rights claims, adjudication, and outcomes.

5400. Introduction to Stable Isotopes

Three credits. Prerequisite: Open only to graduate students; instructor consent.

Introduction to stable isotope theory, methodology, and applications.

5450. Paleoclimate Reconstruction

Three credits. Prerequisite: Open only to graduate students; instructor consent.

The impact of past climate on human societies, from Mid-Pleistocene to late Holocene, discussed in light of modern climatology and paleoclimate reconstruction methods.

5500. Professional Development in Anthropology

Three credits. Prerequisite: Open only to Anthropology graduate students; instructor consent *required*

Hands-on survey of practical skills required for professional anthropology, including writing research plans, grant applications, manuscript preparation, teaching philosophies, professional behavior and ethics.

5510. The Neanderthals

Three credits. Prerequisite: Instructor consent.

Interdisciplinary understanding of the biological, cultural, technological and behavioral evolution of Neanderthals and their societies.

5512. Modern Human Origins

Three credits. Prerequisite: Instructor consent.

Earliest modern people in Africa: their way of life seen from the archaeological, fossil, and genetic evidence.

5513. Modern Human Dispersals

Three credits. Prerequisite: Instructor consent.

Interdisciplinary understanding of the tempo and mode of modern human dispersals across Europe, Asia, Australia, and the Americas.

5515. Ancient Civilizations of the Old World

Three credits. Prerequisite: Instructor consent.

Examination of early civilizations in Mesopotamia, Egypt, the Indus Valley, and sub-Saharan Africa. Theories explaining the development and collapse of early state-level societies are critically considered.

5517. Hunter-Gatherers Past and Present

Three credits. Prerequisite: Instructor consent.

Investigation of recent and prehistoric hunter-gatherer societies informed by human behavioral ecology, archaeology, and ethnoarchaeology.

5522. Ecological Anthropology

Three credits. Prerequisite: Instructor consent.

Interdisciplinary study of human ecology integrating ecological and anthropological theory with archaeological, historical, and contemporary case studies.

5609. Quantitative Zooarchaeology

Three credits. Prerequisite: Instructor consent.

Archaeological problem solving using zooarchaeological and taphonomic data; the evolutionary ecology of human economies; evaluation and quantification of zooarchaeological data; formation of faunal assemblages

5706. Archaeobotany

Three credits. Prerequisite: Instructor consent.

Method and theory of studying archaeological plant remains in the laboratory, including sampling, identification, and interpretation of data.

5708. Plants and People Through the Ages

Three credits.

Survey of the dynamic relationship between plants and people using an inter-disciplinary approach. Readings draw from anthropology, archaeology, botany, ecology, history, and agricultural and environmental sciences.

Art (ART)

5301. Graduate Studio Art (Ceramics)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5303. Graduate Studio Art (Painting)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5304. Graduate Studio Art (Photography)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5305. Graduate Studio Art (Printmaking)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5306. Graduate Studio Art (Sculpture)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5307. Graduate Studio Art (Drawing)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5308. Graduate Studio Art (Video)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students; instructor consent. May be repeated for credit.

5309. Graduate Studio Art (Performance)

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students; instructor consent. May be repeated for credit.

5310. Graduate Art Seminar

Three credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

Discussions, readings, and analyses relating current studio work to contemporary trends in art.

5320. Issues in Art Criticism

Three credits. Prerequisite: Open only to Art MFA students; Instructor consent required.

Seminar investigating selected critical and theoretical issues of significance to the visual arts, involving a core of general reading and discussion on historical and contemporary topics in art from the 20th century to the present day. An individual research project culminating in an oral presentation and a final paper on the research are required.

5330. Interdisciplinary Study

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

Special course work that combines resources in art and/or areas outside of art.

5340. Studio Art Instruction and Curriculum Planning

Three credits. Prerequisite: Open only to Studio Art MFA students. Must be taken in the second semester in the initial program year by all graduate students with teaching appointment.

Teaching methods, strategies, and curriculum planning in studio art instruction.

5383. Special Topics in Studio Art

Three credits. Prerequisite: Instructor consent. With change of content, may be repeated for a total of 12 credits.

Seminar focused on special, limited topic relating to practices in studio art. The content will vary from semester to semester.

5392. Independent Study

Variable (3-6) credits. Prerequisite: Open only to Studio Art MFA students, others with consent. May be repeated for credit.

5397. M.F.A. Project

Six credits. Prerequisite: Open only to Studio Art MFA students, others with consent.

Seminar and studio work culminating in required exhibition, supported by a written statement, public presentation and photographic color-transparency portfolio.

Art History (ARTH)

5319. Introduction to Art History Methods and Theories

Three credits. Prerequisite: Open only to graduate students.

This seminar focuses on developing visual analysis, critical reading, and writing skills by exploring the historiography and most theoretically relevant methods of Art History and Visual Culture. Taught by the full complement of art history faculty and museum and gallery professionals, focus varies with instructor. Possible topics include: social history, gender, sexuality, psychoanalysis, formalism, aesthetics, post-structuralism, post-colonialism, critical race studies, media, and technologies.

5320. Issues in Art Criticism

Three credits. Prerequisite: Open only to graduate students. May be repeated to a maximum of six credits with a change in course content.

Topics in visual arts criticism, including art criticism debates, practices, writing art criticism, and the impact and use of social networking media. Components vary. May be offered online or as seminar.

5321. Historiography of Art History

Three credits.

Philosophical, theoretical, cultural and historical issues that underwrite art historical methods.

5322. Theory in Art History

Three credits. Prerequisite: ARTH 5319 and 5321. Department consent required. May be repeated to a maximum of six credits with a change in course content.

Selected topics in theory and/or methodology.

5330. Curatorial Practices

Three credits. Prerequisite: Open only to graduate students.

Issues facing curators working in the arena of contemporary art today in a globalized art world.

5340. Advanced Studies in Museum and Exhibition Practices

Three credits. Prerequisite: ARTH 5321 and 5322; department consent required.

Contemporary and theoretical issues in museum and exhibition practices directed toward their application in various internship contexts. Components vary. May be offered online or as seminar.

5370. Issues in Contemporary Art

Three credits. Prerequisite: Open to graduate students in Studio Art or Art History; instructor consent.

Critical and theoretical issues in twentieth and twenty-first century art production and reception including modernism, postmodernism, feminism, technology, and globalization.

5383. Special Topics in Art History

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Seminar focusing upon a special, limited topic in the history of art. The content will vary from semester to semester.

5392. Independent Study

Three credits. Prerequisite: Instructor consent. With a change of content, may be repeated for a total of six credits.

Independent study in Art History.

5397. Museum Studies Internship

Three credits. Prerequisite: Instructor consent. With a change of content, may be repeated for a total of six credits.

Internship practicum in museum, gallery, or other curatorial context.

Basics (BASC)

5300. Human Oppression: The African-American and Puerto Rican Perspective

Three credits. Prerequisite: Open only to Social Work students in the M.S.W. program and non-degree students. Must be taken prior to or concurrent with first year of field education.

Examines economic, political, social and cultural forces operating at global, national and local levels, which generate and maintain oppression based on race and ethnicity in the United States. Focuses on the oppression of the Black and Latino populations in the United States, highlighting the African-American and Puerto Rican experiences and perspectives. It will provide a framework for analyzing and understanding oppression. A historical perspective will be utilized to explore past and current oppression related to race and color, culture and ethnicity, social class, gender, sexual/emotional orientation and religion. Intercultural, intracultural, psychosocial, social and political responses to oppression will be addressed

throughout the course. Required course for students in the M.S.W. program.

5333. Research Methods for Social Work Practice

Three credits. Prerequisite: Open only to Social Work students in the M.S.W. and STEP programs.

Provides an understanding of the basic foundation of social work research. Students will learn to: 1) develop critical thinking and knowledge of the principles and methods of research as tools for evaluating their practice; 2) become acquainted with the process and function of research in the advancement of social work theory, knowledge, and practice; 3) value ethical practices in conducting research with diverse individuals and vulnerable populations; 4) judge the adequacy and value of research findings in social work by the use of generally accepted criteria; 5) incorporate computer-based technology in accessing information; and 6) understand the researcher/evaluator role in social work practice.

5350. Analysis of Social Welfare Policy and Social Service Delivery Systems

Three credits. Prerequisite: Open only to Social Work students in the M.S.W. program and non-degree students. Must be taken prior to or concurrent with first year of field education. Policy Practice students must take this course prior to or concurrent with POPR 5301.

Provides a critical analysis of the historical roots of American social welfare policy, the formulation of policy, and the economic and political determinants of contemporary policy development. Examination and analysis of the inter-relationship between social welfare policy, the service delivery systems, and practice implications for private and public agencies and programs. Also includes the examination of international issues in social welfare policy and social service delivery. Students will analyze and apply the results of policy research relevant to social service delivery; understand and demonstrate policy practice skills in regard to economic, political and organizational systems; use them to influence, formulate, and advocate for policy consistent with social work values, and identify financial, organizational, administrative, and planning processes required to deliver social services. Required course for students in the M.S.W. program.

5360. Human Behavior in the Social Environment: Macro Theories

Two credits. Prerequisite: Open only to Social Work students in the M.S.W. program and non-degree students.

Emphasizes social work's "person-and-environment" frame of reference. Major themes include theories and research about the interdependence of persons and their environments (physical and social), political, economic, and cultural contexts, including values and ethical issues, in which our social welfare institutions function. Cultural and ethnic diversity, institutional prejudice, especially racism and sexism, issues of social, economic, and political justice and the process of social change will be stressed. Values and ethical issues relevant to macro social work will also be considered. This course is one of two required courses for students in the M.S.W. program on human behavior in the social environment. Both courses must be taken prior to

or concurrent with the first semester of the first year of field placement.

5361. Human Behavior in the Social Environment: Micro Theories

Two credits. Prerequisite: Open only to Social Work students in the M.S.W. program and non-degree students.

Focuses on the individual and the family in transaction with social, economic, political, and cultural contexts and forces. Content areas emphasize current theories, empirical evidence to support these theories, ethical implications, and critical analysis. The course is organized around a systems perspective through a biopsychosocial lens. Variations arising from culture, ethnicity, social class, gender, sexual orientation are considered in this course. This course is one of two required courses for students in the M.S.W. program on human behavior in the social environment. Both courses must be taken prior to or concurrent with the first semester of the first year of field placement.

5362. Human Behavior in the Social Environment: Macro and Micro Theories

Three credits. Prerequisite: Must be taken prior to or concurrent with first semester of first year of field placement.

Emphasizes social work's "person in environment" frame of reference from both micro and macro perspectives. Content areas stressed throughout the course include theories and research about the interdependence and impact of social, political, economic, and cultural contexts on societal and individual well-being. Micro content areas include theories related to the biopsychosocial functioning of individuals, small groups and families in transaction with social, economic, political, and cultural contexts and forces. Cultural and ethnic diversity, institutional prejudice, especially racism and sexism, issues of social, economic and political justice and the process of social change as they impact micro and macro systems will be stressed. Values and ethical issues relevant to macro and micro social work will also be considered.

5390. Macro Foundation Practice

Three credits. Corequisite: BASC 5391 and FED 5351 and FED 5301.

Focus on macro practice foundation knowledge and skills associated with generalist practice in administration, community organizing and policy practice. Explores the history and place of macro methods in the evolution of the social work profession. Students are introduced to the unique language and perspective of macro practice as a capacity building and strength based intervention. Definitions of and ways to analyze communities, organizations and policies. Emphasis is given to strategies and tactics for achieving change in communities, organizations and policies, to improving services for populations at risk, and promoting diversity and distributive justice, including an international context. Particular ethical and value mandates and dilemmas associated with macro practice are identified throughout. Required course for students in the M.S.W. program. One of the two foundation practice courses taken the first semester of the first year of field placement.

5391. Micro Foundation Practice

Three credits. Prerequisite: BASC 5360 and 5361; open only to M.S.W. students. Corequisite: BASC 5390 and FED 5351 and FED 5301.

Provides a history of and a foundation for micro social work theory and practice emphasizing ecological, strengths and capacity building perspectives. Knowledge, values and skills associated with generalist practice with individuals, families and groups within the context of organizations and communities. Examines the mission of the social work profession and its value and ethical base, including its commitment to diversity, populations-at-risk and social and economic justice. Strategies for helping client-systems will include preparing for practice; developing mutual working agreements; engaging, assessing and formulating goals; implementing interventions; monitoring and evaluating progress; and terminating services. Emphasizes integration of course content with field experience. One of the two foundation practice courses taken the first semester of the first year of field placement. Required course for students in the M.S.W. program.

Biomedical Engineering (BME)

5000. Physiological Systems I

Three credits. Prerequisite: instructor consent. Recommended preparation: BME 3100.

Eleven major human organ systems are covered in this course, including: integumentary, endocrine, lymphatic, digestive, urinary, reproductive, circulatory, respiratory, nervous, skeletal, and muscular.

5010. Research Methods in Biomedical Engineering

(Also offered as GPAH 6306.) Three credits.

Inquiry into the nature of research with emphasis on the spirit, logic, and components of the scientific methods. Health related research literature is used to aid the student in learning to read, understand, and critically analyze published materials. The preparation of research proposals and reports is emphasized.

5020. Clinical Engineering Fundamentals

Three credits. Prerequisite: Instructor consent.

Provides the fundamental concepts involved in managing medical technology, establishing and operating a clinical engineering department, and the role of the clinical engineering designing facilities used in patient care. Topics covered include managing safety programs, technology assessment, technology acquisition, the design of clinical facilities, personnel management, budgeting and ethical issues of concern to the clinical engineer.

5030. Human Error and Medical Device Accidents

Three credits.

Basic principles needed to analyze medical devices, medical device users, medical device environments and medical device accidents. It particularly focuses on human factors engineering as an important step to minimizing human error. The role of medical device manufacturers, medical device regulators and medical device owners are examined to identify their role in reducing medical device use errors and medical device accidents. The nature and types of human error as

well as a taxonomy of medical device accidents are presented. Investigative techniques involving root cause analysis and failure modes and effects analysis are taught and applied to industrial and medical device accidents. Operating room fires, electrosurgical and laser burns, anesthesia injuries, infusion device accidents, catheters and electrode failures and tissue injury in the medical environment are in detail. A semester project will require the student to employ these tools and techniques to analyze a medical device accident.

5040. Medical Instrumentation in the Hospital

Three credits.

This course will examine current major technologies in use by healthcare practitioners. It will review the physiological principles behind each technology, the principles of operation, major features, methods for testing and evaluating each technology and will highlight available versions of the devices on the market today. Technologies to be covered will be selected from anesthesia equipment, surgical and ophthalmic lasers, cardiac assist devices, surgical and endoscopic video systems, radiographic and fluoroscopic devices, CT, MRI, ultrasound imaging equipment, radiation therapy, nuclear medicine, clinical chemistry analyzers, spectrophotometers and hematology analyzers. Course is based on one text, selected manufacturers training documents as well as journal articles from current medical publications. Grading will be based on exams, quizzes, a semester project and class participation. Several classes will take place on site in Hartford area hospitals in order to observe and examine the equipment being discussed.

5050. Engineering Problems in the Hospital

Three credits. Prerequisite: Instructor consent.

Covers engineering solutions to problems that are found in the healthcare environment. Includes wide variety of topics such as electrical power quality of and the reliable operation of high tech medical equipment; electrical safety in the patient care environment; electromagnetic compatibility of various medical devices and electromagnetic interference; radiation shielding and radiation protection; medical gas systems, medical ventilation systems and indoor air quality; fire protection systems required in the hospital; networking medical devices, patient information systems, digital imaging and image storage systems; telemedicine and medical image transmission; and finally, hospital architecture and the design of patient care facilities.

5060. Clinical Engineering Rotations I

Three credits.

Associated with the clinical engineering rotations that interns experience in hospitals, such as surgeries, CT, MRI, ICU, clinical laboratory and physical therapy.

5061. Clinical Engineering Rotations II

Three credits.

Associated with the clinical engineering rotations that interns experience in hospitals, such as surgeries, CT, MRI, ICU, clinical laboratory and physical therapy.

5070. Clinical Systems Engineering

Three credits. Prerequisite: Instructor consent.

Primarily covers medical device connectivity and interoperability. This includes connecting medical devices to the hospital computer network

to pass data to the patient medical record or to other medical devices for the purpose of feedback and control. The course will cover basic networking concepts, hospital network architecture, medical systems security and risk management, the role of interconnecting middleware, HL7 and DICOM data standards, moving data on the network, clinical information systems, digital imaging and image storage systems, medical device plug-and-play concepts, and a medical device integration project walk-thru.

5099. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Individual exploration of special topics as arranged by the student with an instructor of his or her choice.

5100. Physiological Modeling

Three credits. Prerequisite: instructor consent required. Recommended preparation: BME 3100 and 3400.

Unified study of engineering techniques and basic principles in modeling physiological systems. Focuses on membrane biophysics, biological modeling, and systems control theory. Significant engineering and software design is incorporated in homework assignments using MATLAB and SIMULINK.

5150. Dynamical Modeling of Biochemical Networks

Three credits.

Recent advances in biological measurement technology have opened up a new era in quantitative biology. Part of this revolution is the new field of systems biology, which consists of viewing processes in biological cells as a whole, rather than considering one gene or protein at a time. Systems biology relies heavily on mathematical models of cellular processes, often derived from the microscopic laws of chemical and enzyme kinetics. Focus primarily on continuum (differential equation) models of cellular processes arising from these microscopic laws. Because most of these models wind up being nonlinear, time is devoted to learning techniques to analyze systems of nonlinear ordinary differential equations, and we will explore the fundamental differences between linear and nonlinear systems. Biological applications will include modeling observed error rates in protein translation, using system nonlinearities to design biological toggle switches, and exploring biological motifs that lead to oscillations, switches, and other behaviors.

5210. Biomedical Optics: Tissue Optics, Instruments and Imaging

Three credits. Prerequisite: PHYS 1502Q and ENGR 3101.

Principles and imaging of biomedical optics. Optical absorption, scattering and their biological origins, radiative transfer equation and diffusion theory, diffuse optical tomography, Monte Carlo modeling and photon transport in biological tissue, ballistic light imaging, time domain, frequency domain and continuous light measurement systems, optical coherence tomography, and photoacoustic tomography.

5302. Biochemical Engineering for Biomedical Engineers

Three credits. Not open for credit to students who have passed BME 3300.

Introduction to chemical reaction kinetics; enzyme and fermentation technology; microbiology, biochemistry, and cellular concepts; biomass production; organ analysis; viral dynamics.

5339. Introductory Ergonomics for Biomedical Scientists and Engineers

Three credits. Prerequisite: BME 5600. Recommended preparation: BME 3600 and CE 3110.

This problem-based course begins with a work-related overview of the design strengths and limitations of human anatomy and physiology (molecular, tissue and systems levels) and the contribution of work/worker mismatches to the development of disease. Measurement of the response of these biological tissues and systems to work-related stressors is examined, to define the mechanism and presentation of musculoskeletal disorders. Addresses physiological and anatomical damage due to biomechanical, psychosocial and work organization stressors and explores the range of possible control strategies of interest to the engineer and public health practitioner. To measure presence and levels of risk factors, students will be introduced to the use of laboratory techniques (e.g., EMG, digital motion capture, force cells) as well as field methods used in ergonomic work-site assessment, ranging from simple check-lists (geared towards worker-based interventions), through detailed time/motion studies, self-report effort scales, epidemiological instruments, and psychosocial and organizational measurement tools. A research project is required.

5341. Exposure Assessment in Ergonomics

Three credits. Prerequisite: BME 5339.

The goal of the course is to develop a broad understanding of ergonomic risk factors, knowledge of the measurement modalities available for characterizing workplace risk, and an appreciation of the advantages and disadvantages of each modality. Students will be introduced to the use of laboratory techniques (EMG, videotaping and digitization, digital motion capture, force cells, accelerometry and exercise physiology). They will also be instructed in methods used in ergonomic work-site assessment, ranging from simple checklists (geared towards worker-based interventions), through detailed time/motion studies, self-report effort scales, epidemiological instruments, and psychosocial and organizational measurement tools. The grade will depend on completion of a laboratory-based, field or epidemiological project.

5500. Clinical Instrumentation Systems

Three credits. Recommended preparation: ECE 2001W; BME 3400 and 3500.

Analysis and design of transducers and signal processors; measurements of physical, chemical, biological, and physiological variables; special purpose medical instruments, systems design, storage and display, grounding, noise, and electrical safety. These concepts are considered in developing devices used in a clinical or biological environment.

5600. Human Biomechanics

Three credits. Prerequisite: instructor consent required. Recommended preparation: BME 3600W.

Applies principles of engineering mechanics in the examination of human physiological

subsystems such as the musculoskeletal system and the cardiovascular system. Topics drawn for biosolid mechanics, biofluids, and biodynamics, the viscoelastic modeling of muscle and bone, non-Newtonian fluid rheology, blood flow dynamics, respiratory mechanics, biomechanics of normal and impaired gait, and sport biomechanics.

5700. Biomaterials and Tissue Engineering

(Also offered as MSE 5700.) Three credits. Prerequisite: instructor consent required. Recommended preparation: BME 3700.

A broad introduction to the field of biomaterials and tissue engineering. Presents basic principles of biological, medical, and material science as applied to implantable medical devices, drug delivery systems and artificial organs.

5800. Bioinformatics

Three credits. Recommended preparation: BME 280 (or equivalent).

Advanced mathematical models and computational techniques in bioinformatics. Topics covered include genome mapping and sequencing, sequence alignment, database search, gene prediction, genome rearrangements, phylogenetic trees, and computational proteomics.

6086. Special Topics In Biomedical Engineering Variable (1-6) credits. May be repeated for a total of 12 credits.

Classroom and/or laboratory courses in special topics as announced in advance for each semester.

6094. BME Graduate Seminar

One credit. May be repeated for a total of 10 credits.

Presentations will be given by invited speakers from outside, faculty members, and student presenters on current research topics in biomedical engineering.

6110. Computational Neuroscience

Three credits. Prerequisite: Instructor consent.

Explores the function of single neurons and neural systems by the use of simulations on a computer. Combines lectures and classroom discussions with conducting computer simulations. The simulations include exercises and a term project.

6120. Neuronal Information Processing and Sensory Coding

Three credits. Prerequisite: BME 5100. Not open for credit to students who have passed ECE 6311.

Processing, transmission, and storage of information in the central and peripheral nervous systems. Mechanisms of signal generation, transmission and coding by neurons and dendrites. Analysis of invertebrate and vertebrate visual and auditory systems, including: mechanisms of neurosensory transduction, coding, and signal-to-noise ratio enhancement. Neural spatio-temporal filters for feature extraction and pattern recognition. Information theoretic analysis of signal encoding and transmission in the nervous system. This course assumes a background in linear systems and feedback control systems.

6125. Digital Image Processing

(Also offered as ECE 6125.) Three credits.

Problems and applications in digital image processing, two-dimensional linear systems, shift invariance, 2-D Fourier transform analysis, matrix Theory, random images and fields, 2-D mean square estimation, optical imaging systems, image sampling and quantization, image transforms, DFT, FFT, image enhancement, two-dimensional

spatial filtering, image restoration, image recognition, correlation, and statistical filters for image detection, nonlinear image processing, and feature extraction.

6126. Optics for Biomedical Engineers

(Also offered as ECE 6126.) Three credits.

Learning optical imaging fundamentals. Topics include review of two-dimensional linear system theory; scalar diffraction theory, wave optics, Fresnel and Fraunhofer diffraction; imaging properties of lenses; image formation; optical resolution in imaging, frequency analysis of optical imaging systems; imaging with coherent and incoherent light sources, coherent transfer function; optical transfer function, point spread function, fundamentals of microscopy, two-dimensional spatial filtering; coherent optical information processing; frequency-domain spatial filter synthesis; holography.

6140. Cellular Systems Modeling

Three credits. Prerequisite: BME 5600.

Cellular response to drugs and toxins, as well as normal cell processes such as proliferation, growth and motility often involve receptor-ligand binding and subsequent intracellular processes. Focuses on mathematical formulation of equations for key cellular events including binding of ligands with receptors on the cell surface, trafficking of the receptor-ligand complex within the cell and cell signaling by second messengers. Background material in molecular biology, cell physiology, estimation of parameters needed for the model equations from published literature and solution of the equations using available computer programs are included. Examples from the current literature of cell processes such as response to drugs and proliferation will be simulated with the model equations.

6143. Image Recognition

(Also offered as ECE 6143.) Three credits.

Review of probability and stochastic processes. Statistical pattern recognition. Nonlinear signal processing and feature extraction. Correlation filters. Metrics for pattern recognition. Bayesian classifiers. Minimum probability of error processors. Supervised and unsupervised learning. Perception learning methods. Multilayer neural networks. Applications to security and encryption.

6160. Computational Genomics

Three credits. Prerequisite: CSE 5800 or BME 5800.

Advanced computational methods for genomic data analysis. Topics covered include motif finding, gene expression analysis, regulatory network inference, comparative genomics, genomic sequence variation and linkage analysis.

6180. Computational Foundations of Systems Biology

Three credits. Not open for credit to students who have passed BME 4985.

Focuses on studying dynamic and intelligent features (e.g., adaptation and robustness) of biological systems such as gene networks. Emphasizes the tools and methods of computational systems biology come from other computation-oriented fields such as computational physics, digital signal processing, control engineering, and digital logic. Programming using MATLAB, LabVIEW, and C# in the context of modeling, analyzing, estimating, and controlling

real biological systems. Through a variety of assignments and projects, students will obtain a deeper understanding of physical and engineering principles applied to biological systems. Students will also read and present journal articles on topics covered in class, which will expose them to interdisciplinary research and views.

6400. Biomedical Imaging

Three credits. Prerequisite: instructor consent required. Recommended preparation: BME 3400 or ECE 3111.

Fundamentals of detection, processing and display associated with imaging in medicine and biology. Topics include conventional and Fourier optics, optical and acoustic holography, thermography, isotope scans, and radiology. Laboratory demonstrations will include holography and optical image processing. Assumes a background in linear systems.

6420. Medical Imaging Systems

Three credits. Prerequisite: BME 5500 or BME 6500.

This course covers imaging principles and systems of x-ray, ultrasound, optical tomography, magnetic resonance imaging, positron emission tomography.

6450. Optical Microscopy and Bio-imaging

(Also offered as MEDS 6450.) Three credits.

Presents the current state of the art of optical imaging techniques and their applications in biomedical research. The course materials cover both traditional microscopies (DIC, fluorescence etc.) that have been an integrated part of biologists' tool-box, as well as more advance topics, such as single-molecule imaging and laser tweezers. Four lab sessions are incorporated in the classes to help students to gain some hand-on experiences. Strong emphasis will be given on current research and experimental design.

6500. Biomedical Instrumentation I

Three credits. Prerequisite: BME 5500 or instructor consent.

Origins of bioelectric signals; analysis and design of electrodes and low noise preamplifiers used in their measurement. Statistical techniques applied to the detection and processing of biological signals in noise, including the treatment of nerve impulse sequences as stochastic point processes. Methods of identifying the dynamic proper ties of biosystems. Assumes a background in linear systems and electronics.

6510. Biomedical Instrumentation Laboratory

Three credits. Prerequisite: Instructor consent.

Experimental investigation of electrodes, transducers, electronic circuits and instrumentation systems used in biomedical research and clinical medicine.

6520. Biosensors

Three credits. Prerequisite: BME 5500 or instructor consent.

Principles and design of acoustic imaging transducers, and force, pressure and hearing sensors. Covers also optical biosensors including oxygen monitoring sensors, glucose sensors and optical sensors used in imaging.

6620. Biosolid Mechanics

Three credits. Prerequisite: BME 5600. Recommended preparation: BME 3600 and CE 3110.

Mechanical behavior of biological solids. Applications of the theories of elasticity, viscoelasticity, and poroelasticity to bones, ligaments and tendons, skeletal muscle, and articular cartilage. Axial, bending, shearing and torsional loadings. Bone morphology and growth. Biphasic theory. Failure theories. Research paper. Topics may be modified slightly to accommodate student interests.

Biostatistics (BIST)

5099. Investigation of Special Topics

(Also offered as STAT 5099.) Variable (1-6) credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent. May be repeated for credit.

5361. Statistical Computing

(Also offered as STAT 5361.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Use of computing for statistical problems; obtaining features of distributions, fitting models and implementing inference. Basic numerical methods, nonlinear statistical methods, numerical integration, modern simulation methods.

5505. Applied Statistics I

(Also offered as STAT 5505.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Exploratory data analysis: stem-and leaf plots, Box-plots, symmetry plots, quantile plots, transformations, discrete and continuous distributions, goodness of fit tests, parametric and non-parametric inference for one sample and two sample problems, robust estimation, Monte Carlo inference, bootstrapping.

5515. Design of Experiments

(Also offered as STAT 5515.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

One way analysis of variance, multiple comparison of means, randomized block designs, Latin and Graeco-Latin square designs, factorial designs, two-level factorial and fractional factorial designs, nested and hierarchical designs, split-plot designs.

5525. Sampling Theory

(Also offered as STAT 5525.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Sampling and nonsampling error, bias, sampling design, simple random sampling, sampling with unequal probabilities, stratified sampling, optimum allocation, proportional allocation, ratio estimators, regression estimators, super population approaches, inference in finite populations.

5585. Mathematical Statistics I

(Also offered as STAT 5585.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Introduction to probability theory, transformations and expectations, moment generating function, discrete and continuous distributions, joint and marginal distributions of random vectors, conditional distributions and independence, sums of random variables, order statistics, convergence of a sequence of random variables, the central limit theorem.

5605. Applied Statistics II

(Also offered as STAT 5605.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Analysis of variance, regression and correlation, analysis of covariance, general liner models, robust regression procedures, and regression diagnostics.

5625. Introduction to Biostatistics

(Also offered as STAT 5625.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Rates and proportions, sensitivity, specificity, two-way tables, odds ratios, relative risk, ordered and non-ordered classifications, trends, case-control studies, elements of regression including logistic and Poisson, additivity and interaction, combination of studies and meta-analysis.

5635. Clinical Trials

(Also offered as STAT 5635.) Three credits. Prerequisites: open only to Biostatistics graduate students; instructor consent.

Basic concepts of clinical trial analysis; controls, randomization, blinding, surrogate endpoints, sample size calculations, sequential monitoring, side-effect evaluation and intention-to-treat analyses. Also, experimental designs including dose response study, multicenter trials, clinical trials for drug development, stratification, and cross-over trials.

5645. Concepts and Analysis of Survival Data

(Also offered as STAT 5645.) Three credits.

Survival models, censoring and truncation, nonparametric estimation of survival functions, comparison of treatment groups, mathematical and graphical methods for assessing goodness of fit, parametric and nonparametric regression models.

5665. Applied Multivariate Analysis

(Also offered as STAT 5665.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Multivariate normal distributions, inference about a mean vector, comparison of several multivariate means, principal components, factor analysis, canonical correlation analysis, discrimination and classification, cluster analysis.

5685. Mathematical Statistics II

(Also offered as STAT 5685.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

The sufficiency principle, the likelihood principle, the invariance principle, point estimation, methods of evaluating point estimators, hypotheses testing, methods of evaluating tests, interval estimation, methods of evaluating interval estimators.

5725. Linear Statistical Models

(Also offered as STAT 5725.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Linear and matrix algebra concepts, generalized inverses of matrices, multivariate normal distribution, distributions of quadratic forms in normal random vectors, least squares estimation for full rank and less than full rank linear models, estimation under linear restrictions, testing linear hypotheses.

5825. Applied Time Series

(Also offered as STAT 5825.) Three credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent.

Introduction to prediction using time-series regression methods with non-seasonal and seasonal data. Smoothing methods for forecasting. Modeling and forecasting using univariate autoregressive moving average models.

6494. Seminar in Applied Statistics

(Also offered as STAT 6494.) Variable (1-6) credits. Prerequisite: Open only to Biostatistics graduate students; instructor consent required. May be repeated for credit.

Business Administration (BADM)

5151. US Capital Markets and Institutions

Zero credits. Prerequisite: Open only to MBA students, others with consent.

Designed for students who have limited experience and knowledge of US capital markets and business institutions.

5170. Foundations of Economic Environments

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182

Provides students with applied knowledge of key economic and psychological concepts that ground interactions among individuals and organizations in the global business environment.

5180. Core Statistics

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Covers classical inference procedures and basic statistical concepts often essential to interpretation of business data. Students will learn to ask probing questions about the specifics of data and statistical techniques, to understand the conditions for drawing reliable inferences, and to assess the validity of statistical evidence. Topics include: discrete and continuous random variables, sampling, confidence intervals and hypothesis testing.

5181. Spreadsheet Modeling for Business Analysis

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Builds students' abilities for effective quantitative business analysis and communication, using a spreadsheet program such as Excel. Spreadsheet modeling uses such as regression, forecasting, simulation and decision models will be covered, in different functional areas including finance, marketing, operations, and management.

5182. Communicating for Impact A

1.5 credits. Prerequisite: Open only to MBA students, others with consent.

Creating value for an organization depends on the ability to effectively translate expertise into business results. This requires the ability to connect with and communicate with others across the organization, to gather information to identify challenges and opportunities, to frame these in ways that build momentum for change, to work with people across functional and geographic lines to develop solutions, to gain buy-in for those solutions in a form that resonates with

stakeholders, and to implement solutions in ways that are sustainable for the people they touch. This course focuses on understanding this consultative process and improving student performance in the integrative skills on which it depends. These skills include oral and written communications, effective collaboration in a variety of environments, adapting communications and implementation approaches to different audiences, and improving the ability to perceive, evaluate, and manage emotions.

5183. Communicating for Impact B
1.5 credits. Prerequisite: BADM 5182.
Continuation of BADM 5182.

5190. Sustainability in the Global Business Environment

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Examines approaches to meeting complementary and competing needs of shareholders, customers, employees and communities through the design and maintenance of global value chains. Students will assess alternative business models and management practices designed to enhance sustainability for an increasingly global array of stakeholders. Specific topics may include social enterprise management, environmental strategy, corporate social responsibility, serving “Base of the Pyramid” markets, socially responsible investing alongside issues relating to social, environmental and economic ecosystems.

5254. Managing the Future of Social Enterprise
(Also offered as BLAW 5254 and HRTS 5254).
Three credits.

Developing and managing market-based approaches to global human rights and social issues. Strategizing how companies create value both for society and business, including role of for-profit businesses as agents for positive social impact in changing legal, regulatory, policy, and market environments. Regulatory and business strategies that serve markets and promote long-term economic viability, sustainability, and human rights. Managerial perspectives on social innovation, statutory benefit corporations, corporate social certifications, social investment, shared value, strategic philanthropy and business opportunities serving emerging markets.

5310. Experiential Learning Collaborative Project

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Graduate elective focusing on the real-life projects run by the Experiential Learning Collaborative for the client-partners including corporations, startups, government, and non-for-profit organization. It involves scoping a project, conducting industry research, development of the deliverables, writing reports, and presenting solutions to the client-partner executive team. Student teams work in the competitive environment under the guidance of an experienced Project Mentor (academic or industry practitioner). Open to graduate students who pass a personal interview and are accepted to the project.

5311. Experiential Learning Collaborative Advanced Project

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Graduate elective focusing on the advanced real-life projects run by the Experiential Learning Collaborative for the client-partners including corporations, startups, government, and non-for-profit organization. It involves scoping a project, conducting industry research, development of the deliverables, writing reports, and presenting solutions to the client-partner executive team. Student teams work in the competitive environment under the guidance of an experienced Project Mentor (academic or industry practitioner). Open to graduate students who pass a personal interview and are accepted to the advanced project.

5320. Innovation Accelerator I: Evaluation of New Ventures -- Business Process

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

This practicum provides students hands on experience working with the founders of a high-tech entrepreneurial venture. Students, working in a team, are empowered to act as the CEO of the start-up venture focusing on developing innovative and implementable strategic solutions to a defined mission-critical problem faced by the venture. Students develop an expert knowledge with respect to the venture’s industry, markets, products, competitors, etc. that serve as a foundation for recommending evidence-based transformational solutions. Emphasis is placed on skill acquisition such that students can effectively frame the problem, research it and acquire 360 degree views/voices of the issues.

5321. Innovation Accelerator II: New Venture Analytics

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Practicum provides the students with hands on experience working with the founders of a high-tech entrepreneurial venture. Under a faculty mentor, the lab provides the students with hands-on experience collecting both primary and secondary data. Students acquire skills related to identifying targeted survey populations, the development of unambiguous survey questions, as well as best methods for survey implementation. Furthermore, students learn how to analyze the resultant data, combine it with other secondary research, extract relevant, non-duplicative findings, and develop evidence-based conclusions and strategic recommendations/solutions for the client venture.

5330. SCOPE I: Social Entrepreneurship Processes

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Practicum provides students with hands on experience in working with social entrepreneurs at work in start-up or existing organizations (private, public or not-for-profit). Experiences may include helping organizations identify social needs, evaluate alternative methods for improving social conditions and develop programs to implement solutions. Meaningful social entrepreneurship can be local in scope, or contribute to the development of cities, regions, nations or even be global in its reach. Under a faculty mentor, students work on projects which will provide the opportunity to make a positive difference by applying their skills and training to address critical social needs.

5331. SCOPE II: Social Innovation Processes

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Practicum examines how innovation by organizations can be used to develop responses to social problems. Social innovators employ “entrepreneurial skills,” such as finding opportunities, inventing new approaches, securing and focusing resources to meet social needs and managing risk, in the service of creating social value. We see social innovation, defined as innovative, social value creation, occurring within or across nonprofit, governmental, and for profit organizations. Under a faculty mentor, students in this course will work with an organization to help it improve people’s lives through the development of innovative programs to meet social needs.

5350. Fund Management I

Three credits. Prerequisite: FNCE 5101; instructor consent. Corequisite: FNCE 5202.

First part of a two-part Fund Management course. Develops the objectives and goals, the process, and the procedure for execution for management of funds in conformity with the SMF Prospectus. The purpose is to train students in the art of asset allocation, security selection, portfolio construction, risk management, preparing analysts’ reports for trade recommendations, monitoring of positions, and preparing reports for presentation to the Investment Advisory Board.

5351. Fund Management II

Three credits. Prerequisite: FNCE 5101 and BADM 5350; instructor consent. Corequisite: FNCE 5202.

Second part of a two-part Fund Management course. In addition to all the activities in the first part during fall, this course focuses on portfolio management, performance evaluation, attribution analysis, development of various trading and risk management strategies, and technical analysis. Students prepare the final annual report for presentation to the UConn Foundation.

5894. Special Topics

Variable (1-9) credits. Prerequisite: Open only to MBA students, others with consent. May be repeated for a maximum of 12 credits.

Special topics.

6201. Introduction to Research and Teaching

One credit. Prerequisite: Open only to Ph.D. students in the School of Business.

Introduces students to important dimensions of an academic career. The role and importance of research and teaching is stressed with emphasis on philosophy of science, as well as appreciation of research in other business administration areas of concentration. Teaching methods and values in higher education are covered. Guest speakers discuss research in their areas. Practical aids such as how to write a research proposal and how to manage a dissertation are covered.

Business Law (BLAW)

5175. Business, Law, and Ethics in Modern Society

Three credits. Prerequisite: Open only to MBA students. Not open to students who have passed BLAW 5182.

The formulation, interpretation, and application of law to business. Incorporates the study of ethical issues that arise in contemporary business settings, including professional conduct and corporate social responsibility. Major areas of legal regulation to which businesses are subject,

including tort liability, contract law, partnership and corporate law, employment and labor law, intellectual property law, environmental regulation and sustainability, and financial regulation. Emphasis on active, experiential application of legal reasoning and analysis and on the global and comparative dimensions of legal and ethical issues.

5181. Government and the Legal Environment of Business

1.5 credits. Prerequisite: Open only to MBA students. Not open to students who have passed MKTG 5182.

Introduces the essential functions and roles of the legal environment of business. The fundamentals of the legal and ethical environment of business are explored, including legal institutions and legal process. Intentional torts and negligence, common, statutory and administrative law, and alternative dispute resolution. Selected topics in the legal environment of business are also examined, including employment law, securities law, and intellectual property.

5182. Business Responsibility, Accountability and Ethics

1.5 credits. Prerequisite: BLAW 5181.

Examines the essentials of legal astuteness, enabling students to ensure regulatory compliance, manage legal counsel, minimize liability and reach value-added business decisions in an increasingly complex regulatory environment. Examines the leading societal issues relevant to a firm's responsibilities toward its business environment. Topics covered include fairness in the workplace, corporate governance, bribery and corruption, corporate responsibility, and firm-regulator relations. Pillars of responsible business conduct are also introduced in order to develop to values-driven decision-making skills in the social and ethical environment of business.

5220. Employment Law

Three credits.

Examines federal and state laws regulating the employer-employee relationship and the dynamics of the contemporary workplace, as well as different legal forums and regulatory mechanisms impacting U.S. employment law. Introduces students to a wide range of problems involving hiring, firing, discrimination, harassment, and accommodation, emphasizes the importance of managing employer-employee relationships to resolve disputes and grow productivity, and addresses the prevention of claims and mitigation of legal risk in the context of business drivers, operational strategy, and the economic realities of today's workplace.

5254. Managing the Future of Social Enterprise (Also offered as BADM 5254 and HRTS 5254.) Three credits.

Developing and managing market-based approaches to global human rights and social issues. Strategizing how companies create value both for society and business, including role of for-profit businesses as agents for positive social impact in changing legal, regulatory, policy, and market environments. Regulatory and business strategies that serve markets and promote long-term economic viability, sustainability, and human rights. Managerial perspectives on social innovation, statutory benefit corporations, corporate social certifications, social investment, shared value, strategic philanthropy and business opportunities serving emerging markets.

5660. International Business Law

Three credits. Prerequisite: Open only to MBA students, others with consent.

Examines major issues in international law by focusing primarily on the extensive legal and ethical environment of the modern international marketplace. Key topics to be explored include jurisdiction, international dispute resolution, contract law and the international sale of goods, intellectual property, employment, and environmental issues. Will also help students understand key institutions in the international legal system and learn about current legal topics related to international trade and foreign investment.

5680. Securities Law

Three credits. Prerequisite: Open only to MBA students, others with consent.

Examines U.S. federal securities law, the Securities and Exchange Commission and other regulatory bodies to provide knowledge of the rules and institutions of securities regulation as well as related policy issues and strategic considerations by market participants. Emphasis on the legal and ethical responsibilities of corporate managers and executives, accountants, underwriters, and broker-dealers, and on the global and transnational aspects of securities transactions. The Securities Act of 1933, the Securities Exchange Act of 1934, and reforms implemented by the Sarbanes-Oxley Act and the Dodd-Frank Wall Street Reform and Consumer Protection Act are covered.

5894. Seminar

Variable (1-3) credits. Prerequisite: Open only to MBA students, others with consent. Not open for credit to students who have passed BLAW 5182. May be repeated for a maximum of 12 credits.

Investigation and discussion of special topics in law.

5895. Special Topics in Business Law

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of law. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

Casework (CSWK)

5301. Casework Helping Process: The Work and Ending Phases

Three credits. Prerequisite: BASC 5390 and 5391; FED 5301 and 5351; open only to M.S.W. students in the Casework concentration. Corequisite: FED 5302 and 5352.

Builds upon foundation theory of ecological strengths and capacity building perspectives and the method base of social work practice. Course content focuses on the interventive facet and transactional nature of the casework process in helping people with a wide range of life transition stressors and environmental obstacles. Substantial attention is paid to working with people of special populations. Students focus upon the development of critical thinking and decision-making skills and the ability to be self-observant. Required course for students in the Casework concentration.

5302. Casework Practice Approaches: Differential Applications

Three credits. Prerequisite: CSWK 5301, FED 5352 and FED 5302; open only to M.S.W. students

in the Casework concentration. Corequisite: CSWK 5353 and FED 5310.

Builds upon knowledge, skills, and values developed previously and deepens the understanding of theoretical, method, and empirical bases of casework practice, while maintaining simultaneous concern for people and environments. Examines the ways that assessment and interventive strategies are informed by different theoretical orientations and research findings. Students continue to develop skills related to work with special populations and to develop professional self-awareness. Required for students in the Casework concentration.

5303. Casework with Vulnerable and Resilient Populations

Three credits. Prerequisite: CSWK 5302 and 5353 and FED 5310; open only to M.S.W. students in the Casework concentration. Corequisite: CSWK 5354 and FED 5311.

Consolidates casework theory and methods established in the prior casework courses. Unifying concept is the application of differential casework interventions with vulnerable and resilient populations over the life course. Also focuses on contemporary issues and ethical dilemmas affecting professional function, roles and identity. Students are challenged to locate and critically examine empirical and practice theory literature necessary for working with different populations. Required for students in the Casework concentration.

5340. Skills Laboratory in Casework Practice

One credit. Prerequisite: Open only to students in the Advanced Standing option in the M.S.W. Casework concentration. Corequisite: BASC 5301 and CSWK 5301.

Builds upon casework interviewing, assessment, and intervention skills developed in the student's BSW coursework and fieldwork. Students will have the opportunity to identify, practice, and critique a range of assessment, intervention skills. Students will use materials and cases from the concurrent CSWK 301 course to further develop their casework skills. Required course for students in the Advanced Standing option in the Casework Concentration and must be taken in the summer prior to the beginning of full time study for the M.S.W. degree.

5345. Clinical Conditions with Children and Adolescents

Three credits. Prerequisite: FED 5301 and 5351. Corequisite: FED 5302 or 5310 or 5311.

Practice course that pays equal attention to the values, skills, and knowledge required for social work practice with children and adolescents and their families. These youth have a range of bio psychosocial problems related to mental disorders. Students will learn a range of assessment and intervention skills and will become familiar with current psychiatric classification systems, such as the Diagnostic and Statistical Manual (DSM) and the International Classification of Diseases (ICD). Students will demonstrate the ability to access the most recent empirical and practice knowledge, and to develop skills related to work in a variety of mental health settings. Mental disorders will be learned within the context of larger bio psychosocial systems. Attention is paid to differences based upon such variables as age, gender, ethnicity, race, religion, sexual orientation, and physical ability.

5346. Clinical Conditions with Adults and Older Adults

Three credits. Prerequisite: FED 5301 and 5351. Corequisite: FED 5302 or 5310 or 5311.

Practice course that pays equal attention to the values, skills, and knowledge required for social work practice with adults and older adults who have a range of bio psychosocial problems related to mental disorders. Students will learn a range of assessment and intervention skills and become familiarized with current psychiatric classification systems, such as the Diagnostic and Statistical Manual (DSM) and the International Classification of Diseases (ICD). Students will demonstrate the ability to access the most recent empirical and practice knowledge and to develop skills related to work in a variety of mental health settings. Mental disorders will be learned within the context of the larger bio psychosocial system and attention is paid to differences based upon such variables as age, gender, ethnicity, religion, sexual orientation, and physical ability.

5353. Field Education in Social Casework III

Four credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Casework concentration. Corequisite: CSWK 5302 and FED 5310. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required for students in the Casework concentration.

5354. Field Education in Social Casework IV

Four credits. Prerequisite: CSWK 5353 and FED 5310; open only to M.S.W. students in the Casework concentration. Corequisite: CSWK 5303 and FED 5311. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required for students in the Casework concentration.

5355. Block Placement in Casework

Eight credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Casework concentration. Corequisite: CSWK 5302 and CSWK 5303 and FED 5350; instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Field Education in Casework for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method/s course. Required for students in the M.S.W. program completing a Block Field Placement.

Chemical Engineering (CHEG)

5301. Chemical Engineering Thermodynamics I

Three credits.

An advanced study of classical thermodynamics with emphasis on phase and chemical equilibria and applications to the chemical process industries. Kinetic theory and statistical thermodynamics with emphasis on the prediction and correlation of physical and chemical properties of gases and liquids, including mixtures. Theory and application of flames, plasmas, and shock waves.

5302. Chemical Engineering Thermodynamics II

Three credits.

An advanced study of classical thermodynamics with emphasis on phase and chemical equilibria and applications to the chemical process industries. Kinetic theory and statistical thermodynamics with emphasis on the prediction and correlation of physical and chemical properties of gases and liquids, including mixtures. Theory and application of flames, plasmas, and shock waves.

5315. Transfer Operations I

Three credits.

An advanced study of momentum, heat and mass transfer with application to complex problems. Cartesian tensors, non-Newtonian flow, statistical theory of turbulence. Mass transfer in multicomponent systems and with chemical reaction. Mass transfer in drops and bubbles; two-phase flow and fluidization.

5321. Reaction Kinetics I

Three credits.

Chemical kinetics and reactor design. An advanced study of chemical reaction engineering with emphasis on catalysis. Applications to stirred-tanks, fixed-bed, and fluidized bed reactors.

5336. Optimization

Three credits. Prerequisite: Department consent.

Advanced topics in optimization such as linear and nonlinear programming, mixed-integer linear and nonlinear programming, deterministic and stochastic global optimization, and interval global optimization. Example applications drawn from engineering.

5351. Polymer Physics

Three credits.

Modern concepts relating to glassy, rubbery and organized states of bulk polymers. Considers rubber elasticity, glass-to-rubber transitions, networks, elements of crystallization, blends and interfacial phenomena.

5352. Polymer Properties

Three credits.

Interrelationships between solid state structure, dynamics, and mechanical properties of non-crystalline and semi-crystalline polymers. Considers polymer viscoelasticity, diffusion, failure mechanism, and elementary polymer rheology.

5358. Composite Materials

Three credits.

An introduction to the mechanical properties of fiber reinforced composite materials. Included are discussions of the behavior of unidirectional composites, short fiber composites and laminates. Special topics such as fatigue, fracture and environmental effects are also included.

5363. Electrochemical Engineering

Three credits. Prerequisite: Instructor consent.

Principles underlying electrochemical processes. Transformation of chemical and electrical energy. Applications of fundamental electrochemical laws to industrial processes, energy conversion, and electrometallurgical operations.

5367. Polymer Rheology

Three credits.

Analysis of the deformation and flow of polymeric materials. Topics include non-

Newtonian flow, viscoelastic behavior and melt fracture with application to polymer processing.

5373. Biochemical Engineering

Three credits.

Principles and design of processes involving biochemical reactions. Nature of biological materials, biochemical kinetics, heat and mass transfer, application to fermentation and other biological processes. Also offered as BME 321.

5393. Seminar

Zero credits.

5394. Seminar

Zero credits.

5395. Investigation of Special Topics

Variable (1-3) credits. May be repeated for a total of 12 credits.

Designed for special topics, or for individual students who desire to pursue investigations in a specialized field.

5399. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Independent study under the supervision of a Chemical Engineering faculty member.

Chemistry (CHEM)

5300. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

5310. Seminar

One credit. May be repeated for a total of 3 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Reports and discussion of topics of current interest in a variety of fields of chemistry.

5324. Advanced Inorganic Chemistry I

Three credits.

Synthetic methods in inorganic chemistry; the application of physical methods to the investigation of inorganic compounds.

5325. Advanced Inorganic Chemistry II

Three credits. Prerequisite: CHEM 5324.

In-depth study of general principles of inorganic chemistry; the structure of the elements and of inorganic compounds; group theory; different approaches to understanding the chemical bond.

5326. Advanced Inorganic Chemistry III

Three credits. Prerequisite: CHEM 5325.

Main group and transition metal compounds with inorganic and organic ligands; the study of the transition metals is in preparation for CHEM 5327.

5327. Advanced Inorganic Chemistry IV

Three credits. Prerequisite: CHEM 5326.

Transition metal chemistry; organometallic and coordination compounds of the transition elements, including the lanthanides and actinides; selected topics in bioinorganic chemistry.

5336. Electroanalytical Chemistry

Three credits.

A study of the theoretical and practical basis for electroanalytical methods. Topics include voltammetric methods of analysis (including polarography, cyclic voltammetry, rotating disk voltammetry, pulse and square-wave methods, and stripping analysis), coulometric, and chronoamperometric methods. Recent advances using micro- and modified electrodes, thin-

layer and flow cells, electrochemical sensors and detectors, and bioelectrochemistry may be included.

5337. Optical Methods of Analysis

Three credits.

A discussion of fundamental principles, instrumentation and applications of some spectroscopic techniques of analytical chemistry including Raman spectroscopy, molecular fluorescence spectroscopy, atomic spectroscopy.

5338. Separation Methods

Three credits.

A study of the theoretical and practical basis for modern separation methods. Topics to be discussed include the various methods dealing with gas-liquid, liquid-liquid, liquid-solid, gas-solid, ion-exchange, size exclusion, chromatography, electrophoresis, and mass spectrometry.

5340. Electronic Interpretation of Organic Chemistry

One credit.

Approaches to writing organic reaction mechanisms.

5341. Advanced Organic Chemistry

Three credits.

Review of the fundamentals of bonding, stereochemistry and conformations and basic reactions from undergraduate organic chemistry. These fundamental principles will then be elaborated to include more advanced concepts of reactions and reactivity.

5343. Organic Reactions

Four credits.

Nomenclature. Classes of compounds. A focus upon those reactions in which C-C bonds are formed. Emphasis on the fundamentals of each reaction, their utility and applications. A background of functional group exchanges; reaction control by steric, electronic, and topological considerations.

5344. Concepts in Organic Chemistry

Three credits. Prerequisite: CHEM 5343.

Structure and mechanism. Such topics as chemical bonding, stereochemistry, conformation, molecular orbital theory and applications, acids and bases, and study of organic reaction mechanisms, including kinetics, substitutions, rearrangements and photochemical reactions.

5345. Determination of Organic Structures

Three credits. Prerequisite: CHEM 5343.

Structural problem solving using fundamental data including spectroscopic and wet chemical techniques.

5347. Organic Synthesis

Three credits. Prerequisite: CHEM 5343 and 5344.

An investigation of efficient strategies for the synthesis of natural and unnatural organic molecules. Topics include: retrosynthetic analysis, synthetic strategies, common carbon-carbon bond formation reactions, multiple bond disconnection strategies (applications of pericyclic reactions), organometallic coupling reactions, radical and carbene reactions in organic synthesis, strategies to construct carbocyclic and heterocyclic ring systems.

5350. Advanced Physical Chemistry I

Three credits. Prerequisite: instructor consent required. Not open to students who have passed CHEM 5351, 5352, 5353, or 5356.

Thermodynamics, quantum mechanics and reaction dynamics, including enthalpy, entropy, free energy, equilibrium, quantum behavior of electrons and molecules, atomic and molecular spectroscopy, and theories of reaction rates.

5351. Quantum Chemistry I

Three credits.

Concepts of the quantum theory starting with an historical introduction and proceeding to the formulation of the Schrödinger equation and its exact solutions. Other topics include group theory, angular momentum, and approximate methods with applications to atomic and molecular structure and spectroscopy.

5352. Quantum Chemistry II

Three credits. Prerequisite: CHEM 5351.

Selected topics in quantum chemistry, building on the concepts developed in CHEM 5351.

5353. Chemical Kinetics

Three credits.

Empirical and theoretical treatment of reaction rates. Experimental methods and treatment of data. Simple kinetic forms. Deduction of reaction mechanisms. Reaction energetics. Theories of elementary reaction rates. Diffusion. Homogeneous and heterogeneous catalysis. Extrakinetic probes of mechanism.

5356. Statistical Mechanics

Three credits.

Equilibrium properties of macroscopic systems from a molecular point of view.

5360. Biological Chemistry I

Three credits. Prerequisite: Instructor consent.

Recent advances in understanding the mechanisms of chemical processes in biological systems. Chemical perspectives or problems of biological significance at the interfaces of the various divisions of chemistry.

5361. Biological Chemistry II

Variable (1-3) credits. Prerequisite: Instructor consent.

Selected topics in Biological Chemistry. Building on the concepts developed in CHEM 5360.

5370. Environmental Chemistry I

Three credits.

Sources, transport, effects, fate, analytical chemistry, monitoring and management of chemical species; chemical principles, equilibria and reactions. Water and atmospheric pollution; acid rain, global warming, ozone.

5371. Environmental Chemistry II

Three credits. Prerequisite: CHEM 5370 or 4370.

Inorganic metals and organic chemicals in the environment; energy sources; fossil fuels, nuclear power, fuel cells, and alternatives.

5380. Polymer Synthesis

Three credits. Not open for credit to students who have passed POLY 5380.

Chemistry of the formation of high polymers, including kinetics, mechanisms, and stereochemistry of step growth and addition polymerization. Recent advances in polymer synthesis.

5381. Polymer Physical Chemistry

Three credits.

A molecular description of the fundamental physico-chemical aspects of polymer solutions and

solids. Considers thermodynamics, chain statistics, dynamics, and structure of polymer molecules.

5382. Polymer Characterization I

Three credits. Not open for credits to students who have passed POLY 5382.

Experimental techniques for characterizing polymers on a molecular level, with emphasis on the provision of a working knowledge of instrumental analysis. Experiments include dilute solution viscosity, vapor pressure osmometry, gel permeation chromatography, chemical and spectroscopic analysis.

5384. Polymer Characterization II

Three credits.

Experimental techniques for characterizing polymers on a macroscopic scale, with emphasis on provision of a working knowledge of instrumental analysis. Experiments include calorimetry, mechanical analysis, surface characterization, and structure determination.

5388. Infrared Spectroscopy of Polymers

Three credits.

The nature of the interaction of IR radiation with molecules, modern spectrometer design, non-conventional sampling techniques, and applications to polymer-related problems.

5393. Special Topics in Physical Chemistry

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

5394. Special Topics in Polymer Chemistry

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

5395. Special Topics in Analytical Chemistry

Variable (1-3) credits. May be repeated for a total of 12 credits.

5396. Special Topics in Inorganic Chemistry

Variable (1-3) credits. May be repeated for a total of 12 credits.

5397. Special Topics in Organic Chemistry

Variable (1-3) credits. Prerequisite: CHEM 5343. May be repeated for a maximum of 12 credits.

5398. Variable Topics in Chemistry

Variable (1-3) credits. Prerequisite: Open only to graduate students in Chemistry and related areas. May be repeated for a maximum of 12 credits.

Themes applicable to students in all divisions of chemistry.

Civil and Environmental Engineering (CE)

5010. Seminar in Structures and Applied Mechanics

Zero credits.

Presentations and discussions contributed by staff, students and outside speakers. Required every semester for all full-time students in the Structures and Applied Mechanics Area of Concentration in the Civil Engineering Field of Study.

5020. Independent Graduate Study in Civil Engineering

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Special problems in civil engineering as arranged by the student with a supervisory instructor of his or her choice.

5030. Seminar in Transportation and Urban Engineering

Zero credits.

Extended discussions on presentations contributed by staff, students and outside speakers. Required every semester for all full-time students in the Transportation and Urban Engineering Area of Concentration in the Civil Engineering Field of Study.

5090. Advanced Topics in Civil Engineering

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Classroom or laboratory courses as announced for each semester. For independent study see Civil Engineering 300.

5122. Advanced Mechanics of Materials

Three credits.

Stress and strain, combined stress, and theories of failure. Torsion of non-circular sections. Shear center, unsymmetrical bending, curved flexural members, and beams on elastic foundations. Energy methods. Plane theory of elasticity, plate bending, and pressurized cylinders.

5128. Elastic Stability

Three credits.

Buckling of elastic and inelastic columns; lateral buckling of beams; buckling of plates, rings and tubes; stability of frames.

5130. Numerical Methods in Civil Engineering

Three credits.

Solution of linear and nonlinear systems of equations and algebraic eigenvalue problems. Interpolation, numerical integration, and regression. Ordinary and partial differential equations by finite difference method. Computer programming.

5150. Structural Vibrations

Three credits.

Vibrating systems; application to design; discrete and continuous systems, free and forced vibrations; response to periodic and non-periodic loads; analytical and numerical techniques; earthquake loading; response spectra.

5151. Experimental Structural Dynamics

Three credits.

Characteristics of random data; vibration test hardware; data acquisition and analysis; and experimental modal analysis and system identification. Laboratory experiments will be used to enhance understanding of taught concepts.

5161. Structural health monitoring and sensors

Three credits.

Concepts and applications of structural health monitoring using sensors. Data acquisition, digital signal processing, random vibration, basic control theory, modal analysis, damage detection algorithms, and decision support system. Experimental methods for structural health monitoring of civil structures.

5163. Fracture Mechanics

Three credits.

Focuses on fundamental concepts and applications of fracture mechanics. Topics include linear elastic fracture mechanics, elastic plastic fracture mechanics, computational fracture mechanics, fracture mechanisms in metals and non-metals, fracture testing, dynamic and time-dependent fracture, fatigue crack growth,

interfacial fracture, fracture in advanced materials, and engineering applications.

5164. Finite Element Methods in Applied Mechanics I

Three credits. Not open for credit to students who have passed CE 5162 or CE 5164.

Formulation of finite elements methods for linear static analysis. Development of two and three dimensional continuum elements, axisymmetric elements, plate and shell elements, and heat transfer elements. Evaluation of basic modeling principles including convergence and element distortion. Applications using commercial finite element programs.

5166. Finite Element Methods in Applied Mechanics II

Three credits.

Formulation of finite elements methods for modal and transient analysis. Development of implicit and explicit transient algorithms. Stability and accuracy analysis. Formulation of finite element methods for material and geometric nonlinearities. Development of nonlinear solution algorithms. Applications using commercial finite element code.

5370. Environmental Monitoring

(Also offered as ENVE 5370.) Three credits.

Introduction to complexities and challenges associated with acquisition of information on environmental processes and characteristics of natural systems. Hands-on experience with selection of measurement strategy and sensing technology; sampling network and protocol design; and deployment, acquisition and interpretation of measurements in natural systems.

5380. Bridge Structures

Three credits.

Common types of bridges; AASHTO bridge loads; design of composite plate girders; fatigue; design of bridge substructure; design project.

5530. Advanced Soil Mechanics

Three credits. Not open for credit to students who have passed CE 4541.

Introduction of soil as a multi-phase material; stress and strain analysis in soil; soil compression and consolidation; shear strength of sand and clay; critical state soil mechanics; advanced topics in complex constitutive relationships; introduction to fracture mechanics; term paper.

5541. Advanced Soil Mechanics

Three credits.

Introduction of soil as a multi-phase material; stress and strain analysis in soil; soil compression and consolidation; shear strength of sand and clay; critical state soil mechanics; advanced topics in complex constitutive relationships; introduction to fracture mechanics; term paper.

5542. Earthquake Engineering

Three credits. Not open for credit to students who have passed CE 4542.

Global tectonics and earthquake sources, seismic wave propagation, strong ground motion analysis, seismic hazards, site effects and liquefaction, seismic load to slopes, retaining structures and foundations, structure response to dynamic loads; term paper.

5543. Advanced Foundation Design

Three credits.

Soil behavior in retaining systems, shallow foundations, deep foundations.

5549. Soil Shear Strength

Three credits.

Failure theories for particulate media, plastic equilibrium, laboratory testing and interpretation.

5570. Bituminous Materials

Three credits.

Properties, performance and design of bituminous materials for highway and airport paving; physical and chemical properties of binders; testing methods; specifications; production and construction.

5610. Advanced Reinforced Concrete Structures

Three credits.

Behavior and design of reinforced concrete for flexure, shear, torsion, bond, and axial loads; two way slabs; beam-column joints; general flexure theory; seismic considerations; review of design specifications.

5620. Advanced Steel Structures

Three credits.

Metal plasticity; plastic hinging and plastic analysis of beams; bolted and welded connections; seismic lateral load resisting systems; prequalified moment-resisting connections; blast design considerations for steel structures, term project.

5630. Wood Design

Three credits.

Physical and mechanical properties of wood. Behavior of wood beams, columns, beam columns, connectors and fasteners; introduction to plywood and glued-laminated members; analysis and design of structural diaphragms and shear walls.

5640. Prestressed Concrete Structures

Three credits.

Analysis, design, and behavior of pretensioned and post-tensioned concrete; simple and continuous span structures; time dependent behavior; review of design specifications.

5650. Structural Health Monitoring and Sensors

Three credits.

Concepts and applications of structural health monitoring using sensors. Data acquisition, digital signal processing, random vibration, basic control theory, modal analysis, damage detection algorithms, and decision support system. Experimental methods for structural health monitoring of civil structures.

5710. Case Studies in Transportation Engineering

Three credits. Prerequisite: department consent required. Not open for credit to students who have passed CE 4710.

Analysis of transportation case studies in transportation design, and transportation and land use planning. Application of transportation engineering and planning skills. Oral and written group reports, group discussions, individual papers.

5715. Sustainable Transportation

Three credits. Recommended preparation: CE 2710.

Assesses the role of the land-based transportation system in terms of how it affects the environmental, social and economic goals for a sustainable society. How the concept of sustainability can be used as a holistic framework for assessing the transportation and land use system. Strategies for reducing the

environmental, social and economic footprint of the transportation/land use system and ways they can be implemented.

5720. Street and Highway Design

Three credits. Not open for credit to students who have passed CE 4720.

Urban street and highway design: vertical and horizontal alignment, cross-section elements, traffic barriers, interchanges and intersections, pedestrian and bike facilities, traffic calming, community and roadside elements

5730. Transportation Planning

Three credits. Not open for credit to students who have passed CE 4730.

Transportation economics, urban transportation planning process, local area traffic management, evaluation of transportation improvements, land use and transportation interaction.

5735. Public Transportation Systems

Three credits.

Characteristics of public transportation systems, public transport network planning, station spacing and design, public transportation and land use development, public transportation network design problems, and introduction to transit assignment.

5740. Traffic Engineering Characteristics

Three credits. Not open for credit to students who have passed CE 4740.

Relationships among traffic flow characteristics; microscopic and macroscopic representations of traffic flow; capacity of highways; traffic stream models; shock wave analysis; queueing analysis; traffic simulation.

5750. Pavement Design

Three credits. Not open for credit to students who have passed CE 4750.

Analysis and design of flexible and rigid pavements; testing and characterization of paving materials.

5812. Ecohydrology

(Also offered as ENVE 5812.) Three credits.

Focuses on the interactions between ecological processes and the water cycle, emphasizing the hydrological mechanisms underlying various terrestrial ecological patterns and the ecological properties controlling the hydrologic and climatic regimes. Topics include conceptual understanding of hydrological cycle over vegetated land, quantifying and modeling flux exchanges in the soil-vegetation-atmosphere continuum, case studies on the hydrological impact of land use land cover changes, ecosystem response to environmental changes, and vegetation-climate feedback at the regional and global scales.

5820. Unsaturated Flow and Transport

(Also offered as ENVE 5820.) Three credits.

Modern approaches to water flow and solute transport in partially-saturated porous media including media characterization (review); unsaturated flow in porous media (governing equations, hydraulic functions, numerical and analytical solution methods); solute transport in unsaturated media (convection dispersion, transfer functions, solutions); modeling and observational scales; coupled water flow and solute transport (model applications); special topics (preferential flow, effects of spatial variability, stochastic aspects of flow and transport, gas exchange and transport measurement methods).

6730. Travel Demand Forecasting

Three credits.

Alternative formulations and calibration of trip generation, trip distribution and travel mode choice prediction models. Traffic network equilibrium and assignment.

6735. Transportation Network Analysis

Three credits. Prerequisite: CE 5730. Recommended preparation: CE 4210.

Network modeling and graph theoretical applications to transportation systems. Algorithmic approaches to common network problems. System optimal and user equilibrium traffic assignment modeling and solution techniques.

6740. Traffic Engineering Operations

Three credits.

Driver, pedestrian and vehicle operating characteristics. Traffic data collection. Accident and safety analysis. Highway capacity analysis. Traffic signs and markings. Traffic signal timing and operation. Traffic management.

6830. The Flood Problem

Three credits.

Flood hazards. Preventing or alleviating damages. Flood frequency analysis. Effect of land-use/land-cover and soil moisture on flooding. Remote sensing in flood prediction. Flood and dam-break modeling. Multiple purpose projects.

6920. Doctoral Teaching Practicum

(Also offered as ENVE 6920.) Variable (0-3) credits.

Offered by special arrangement. Practical experience in classroom teaching with mentoring from a member of the graduate faculty.

Classics and Ancient Mediterranean Studies (CAMS)

5301. Special Topics in Latin Literature

Variable (1-6) credits. May be repeated for credit.

5302. Special Topics in Ancient Greek

Three credits. Prerequisite: Open only to Comparative Literature and Cultural Studies, Medieval Studies, and Judaic Studies graduate students; instructor consent. May be repeated for credit with a change in topic.

Reading of Ancient Greek texts in the original language.

5328. Advanced Latin Composition

Three credits.

Clinical and Translational Research (CLTR)

5000. Graduate Seminar in Clinical and Translational Research

Three credits. Prerequisite: Department consent.

Introduction to clinical research, utilizing lecture, the textbook *Designing Clinical Research* by Hulley and Cummings, et al. (Third Edition) and practical application writing a research proposal, provides training in the methods of clinical investigation to physicians and other health professionals.

5020. Biostatistical Methods in Clinical Research

(Also offered as NURS 5020.) Three credits. Prerequisite: Department consent.

Quantitative procedures including descriptive and inferential statistics, non-parametric

approaches to data, and parametric analyses through factorial analysis of variance.

5022. Graduate Seminar in Clinical and Translational Research

One credit. Prerequisite: Department consent.

Reading and discussion of methodological and statistical developments in various areas of clinical and translational research

5099. Independent Study in Clinical and Translational Research

Variable (1-3) credits. May be repeated for a total of six credits.

A reading course for those wishing to pursue special topics in the clinical and translational research under faculty supervision.

5252. Cond/Translational Clinical Community-Based Research to Improve Healthcare Policies and Practices

Three credits. Prerequisite: Instructor consent.

Learning objectives: Students taking this course will learn how to: 1. design effective investigations of healthcare practices and programs; 2. design, implement, and translate effective clinical and health-related interventions; 3. design effective evaluations of clinical and community-based practices and programs; 4. develop competitive applications for external funding.

5357. Principles of Clinical and Translational Research I

Three credits.

First core course in research methods, biostatistics and topics in clinical and translational research. In the methods section, the topics covered include Defining a Research Question, Cross-Sectional Studies, and Case-Control Studies. The Biostatistics section covers Probability Distributions, Sample Size Calculations, Hypothesis Testing, Odds Ratios and Logistic Regression. The major other topic is ethical issues in research, including specifically those related to the conduct of research with human beings.

5358. Principles of Clinical and Translational Research II

Three credits.

Second core course in research methods, biostatistics and topics in clinical and translational research. The methods section covers Observational Perspective Studies, Randomized Controlled Trials, and Information Synthesis. The biostatistics section covers Analysis of Variance, Survival Analysis, Analysis of Randomized Controlled Trials, and Methods of Meta-Analysis. The major other topics are data management and other informatics.

5359. Principles of Clinical and Translational Research III

Three credits.

Third core course in research methods, biostatistics and topics in clinical and translational research. The methods section includes Instrument Development, Cross Cultural Adaptation of Research Instruments, Genetic Epidemiology, Pharmacoepidemiology, Pharmacogenomics, and Secondary Data Analysis. The biostatistics section includes Handling Missing Data, Analysis of Genetic Epidemiologic Studies, Structural Equation Modeling, and Economic Analyses. The other topics include writing and presenting scientific information.

5360. Critical Issues Involving Science Publication: The Scientific Review

Three credits.

Provides comprehensive, systematic strategies for summarizing the current state of understanding in a given field. Each student will be required to identify and work with an academic mentor of that given field throughout the course. The purpose of this review course may be to present a coherent argument, or to highlight scientific gaps in the literature. Teaches students to be able to identify the *why* behind a new study, find and analyze other studies that address similar research questions, or studies that address your research question on a different level. Will enable students to learn how to synthesize the current state of knowledge (either clinical or research) of the chosen topic as a first step of becoming a clinical/translational researcher.

5407. Clinical and Translational Research Practicum

Variable (1-12) credits. Prerequisite: Open only to Clinical and Translational Research M.S. students; department consent required. May be repeated for a maximum of 12 credits.

Provides practical training in the formulation and conduct of clinical and translational research. Specific aspects that will be covered during the 9-12 total hours of the practicum will be: the identification of a specific research question and its specification as one or more aims, review of the relevant literature, and specification of the methods to be employed in the conduct of the study, including experience in recruitment and retention of subjects, an IRB application and HIPAA documents preparation. The student will initiate a research project and participate in data collection and analysis, culminating in a report of the findings. These activities will be monitored and mentored by a research advisor who is a member of the Graduate Faculty.

5497. Minority Health and Health Disparities

Three credits.

Health outcomes in the U.S. vary dramatically as a function of race and ethnicity. The course will highlight research that explores this issue from social, behavioral and psychological perspectives, as well as physical environment and biological perspective. The course will discuss ideas about the meaning of race and ethnicity in American society.

Cognitive Science (COGS)

5001. Cognitive Science Pro-seminar

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

A survey of current research in cognitive science, with presentations by cognitive science faculty.

5120. Structure, Acquisition and Processing of Language

Three credits. Prerequisite: Instructor consent.

Selected topics in syntax, semantics, phonology, morphology. Connections to current research in language acquisition, sentence processing, neurogenic disorders.

5130. Neurodevelopment and Plasticity

Three credits. Prerequisite: Open only to graduate students in Psychological Sciences; Speech, Language and Hearing Sciences; and Physiology and Neurobiology.

Overview of brain development including: embryonic neurogenetics; evolution and evo-

devo; how emergent behavioral capabilities reflect neural growth in neurobehavioral development; and how disruptions of neurodevelopment cause developmental disabilities. Offered alternating years in Spring semester.

5140. Neurobiology of Language: Typical and Atypical Cognition and Language Development

Three credits. Prerequisite: Open only to graduate students in Psychological Sciences; Speech, Language and Hearing Sciences; and Physiology and Neurobiology.

Survey of current research on language acquisition in developmentally delayed/pathological populations, including but not restricted to Autism, Williams Syndrome, Down Syndrome, and Specific Language Impairment. Examination of what the language delays and deficits reveal about each disorder, the processes of language acquisition, the representation and organization of language, and the biology/neuropsychology/genetics of language.

5150. Cognitive Neuroscience of Language Across the Lifespan

(Also offered as PSYC 5424.) Three credits. Prerequisite: Open only to Psychological Sciences, Linguistics, and Speech, Language and Hearing Sciences graduate students.

The cognitive neuroscience approach to the study of language across the lifespan. Recent advances in neuroimaging techniques such as MRI, ERP, TMS, and fNIRS are combined with classic lesion studies to address the neurobiological bases of typical and atypical language processing.

Communication (COMM)

5001. Introduction to Graduate Communication Research

Three credits.

An introduction to quantitative research methods and statistics. Issues of measurement and design of communication studies as well as basic descriptive and inferential statistics are covered.

5002. Research Methods

Three credits.

Integrative approach to modeling theory, research design, and statistical analysis, including mathematical models, scale construction, measurement issues, correlation, regression, and analysis of variance.

5003. Advanced Communication Research Methods

Three credits. Prerequisite: COMM 5002.

Research techniques and procedures for the study of communication. Research design, multivariate statistics, and structural modeling.

5010. Theory Construction and Research Design

Three credits. Prerequisite: COMM 5002.

Conceptualization, theory construction, and review of communication methodologies. Students will write a proposal for independent research, thesis, or dissertation.

5100. Persuasion Theory and Research

Three credits.

Evaluation of current and traditional theories of persuasion and attitude change from communication, social psychology, and related disciplines.

5101. Motivation

(Also offered as PSYC 5101.) Three credits.

Theories of motivation considered in relation to their supporting data.

5120. Communication Campaigns

Three credits.

Campaign theory and planning. Students learn how to conduct interviews and focus groups with members of a target audience, and work with non-profit organizations to design a campaign.

5150. Crisis and Risk Communication

Three credits. Prerequisite: Open only to Communication graduate students.

Research, theory, and best practices in crisis and risk communication.

5200. Interpersonal Communication

Three credits.

Cognitive, emotional and behavioral interactions in specific contexts, including interpersonal relationships, groups, and work.

5220. Group Communication Research

Three credits.

The group communication process with emphasis upon research methodologies for the study of interactions in a group setting.

5230. Organizational Communication: Theory and Research

Three credits.

Relationship of prescribed and informal communication networks to organizational goal achievement and individual integration. Emphasis on frequently used research methodologies.

5300. Mass Communication Theory

Three credits.

Introduction to major theories, with emphasis on the structure, function, and effects of mass media.

5310. Seminar in Mass Communication Research

Three credits.

Recent theories of social and political effects of mass communication, and the cognitive processing of media messages.

5330. Children and Mass Media

Three credits. Prerequisite: Open only to Communication graduate students; instructor consent.

This course provides an overview of important issues, theoretical perspectives, and research regarding children's and adolescent's reactions to mass media including developmental differences in the processing of media content and in the effects of such materials.

5500. Nonverbal Communication

Three credits.

The study of metacommunication: Kinesics, space, time and other concomitants of verbal messages. How the non-verbal band helps in the interpretation of verbal messages.

5501. Seminar in Nonverbal Communication and Persuasion

Three credits.

Role of media nonverbal communication in persuasion and media preferences. Affective and analytic communications in attitude formation, structure, and change.

5640. Social Media Use and Effects

Three credits. Prerequisite: Open only to Communication graduate students, others with consent.

Research and theory on the social and psychological predictors and effects of social media use as well as social media platforms: their technology, functions, and analysis of collected data.

5650. Communication Technology and Society: Theory and Research

Three credits.

Theory and research associated with the study of emerging communication technologies. Provides a comprehensive foundation in the scholarly literature addressing the content, adoption, uses and effects of new media.

5660. Computer Mediated Communication

Three credits.

Communication networks, human-computer interaction and interface design, social and collaborative communication via computer.

5770. Health Communication

Three credits.

Overview of health communication, including health behavior change interventions, emergency communication, risk assessment, media influences, provider-patient communication, socialization and identity, stereotyping, social support, diverse populations, and new communication technologies.

5892. Practicum in Research

Variable (1-6) credits. May be repeated for a total of 18 credits.

May be repeated for credit.

5895. Variable Topics in Communication

Variable (1-3 credits). Prerequisite: Instructor consent. May be repeated for credit.

Instructor consent required. May be repeated for credit with a change in topic.

5899. Independent Study in Communication

Variable (1-6) credits. May be repeated for credit.

This course is an independent study course in which periodic conferences with the instructor are required.

5900. Professional Communication

Three credits. Prerequisite: Open to graduate students.

Theories and applications of communication in professional settings. Focus on effective design of relevant messages to reach various audiences. Preparation for future employment by cultivating high-caliber communication skills through lecture content and workshops.

5991. Internship in Communication

Variable (1-3) credits. Prerequisite: Open to graduate students.

Students complete a departmentally approved internship within one semester.6001. Proseminar in Communication Research

Three credits. Prerequisite: COMM 5002, 5003, and 5010.

Advanced topics in communication research presented by faculty and specialists. Topics include information theory, survey of sampling and data collection, time series analysis (time-domain and panel design), physiological measurement, interaction analysis, and meta-analysis.

6800. Seminar and Directed Research in Communication

Variable (1-6) credits. Prerequisite: Open to graduate students in the Marketing Communication Program. May be repeated for a maximum of 12 credits.

6850. Seminar in Marketing Communication Research

Three credits.

Theories of emotional and cognitive processing of communications; cognitive mapping and message construction; design, implementation and evaluation of information campaigns.

6895. Topics in Applied Communication Research

Three credits.

Investigation of special research techniques and findings in selected areas of applied communication research.

Community Organization (CORG)

5300. Advanced Macro Practice

Three credits.

Contemporary and historical overview of how the macro practice methods independently and collectively can be leveraged for social change. Provides a foundation for addressing ethical obligations and challenges in macro practice, with particular focus on historically oppressed populations. In addition, students will gain an understanding of the role of leadership and use of power in community organizations and policy and practice.

5301. Essential Theory and Intervention Practice in Community Organization

Three credits. Prerequisite: BASC 5390 and 5391, FED 5351 and 5301; open only to M.S.W. students in the Community Organization concentration. Corequisite: FED 5352.

Builds on content covered in micro and macro foundations of social work practice and reviews in greater depth community organization history, values and assumptions, Rothman models of organizing, roles of the community social worker, and strategies used by community organizers to bring about change. Promotes in-depth understanding of the various types of communities and enhances skills for community analysis. Essential information for grassroots organizing and community and coalition building is covered. Incorporates content on providing community based services to oppressed population groups, including leadership development and advocacy. Highlights the importance of power theory and dynamics in selecting models and strategies for intervention. The importance of relationship building and attention to process tasks and goal achievement are covered. Required for students in the Community Organization concentration.

5302. Theory and Practice of Social Movements for Community Organizers

Three credits. Prerequisite: CORG 5301; open only to M.S.W. students in the Community Organization concentration. Corequisite: CORG 5354.

Integrates Community Organization foundation and advanced method practice knowledge, values and skills. Students will be asked to select an agency-based Community Organization assignment that they have been working on during the academic year as the basis for a capstone

assignment. Appropriate literature that will help students in conceptualizing and writing their capstone assignments will also be distributed and discussed. Concentration on addressing social movement theory and implications for social change and community social work. A minimum of two social movements will be analyzed and one or more social movement related projects will be selected as an in-class project(s). Required for students in the Community Organization concentration.

5340. Advanced Macro Practice Skills Laboratory

One credit.

Focuses on gaining knowledge and skills in the elements of program planning and proposal writing, and includes application of these through development of a program proposal for funding. The skills laboratory will provide an additional opportunity for students to apply knowledge and skills through a proposal review and evaluation exercise. The exercise will be conducted on the last day of the course after the final projects have been submitted. The instructor will choose one final project for the purposes of the review exercise with the students name removed. Note: more than one proposal can be selected offering an opportunity for ranking them in the exercise.

5353. Field Education in Community Organization III

Four credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Community Organization concentration. Corequisite: POPR 5310 and FED 5310. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required for students in the Community Organization concentration.

5354. Field Education in Community Organization IV

Four credits. Prerequisite: CORG 5353 and FED 5310; open only to M.S.W. students in the Community Organization concentration. Corequisite: CORG 5302 and FED 5311. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required for students in the Community Organization concentration.

5355. Block Placement in Community Organization

Eight credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Community Organization concentration. Corequisite: POPR 5310 and FED 5350; instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Field Education in Community Organization for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course. Required for students in the M.S.W. program completing a Block Field Placement.

5370. Grassroots Neighborhood Organizing

Three credits. Prerequisite: Open only to M.S.W. students. Corequisite: CORG 5353.

Provides intensive instruction for students who wish to become practitioners or trainers in grassroots neighborhood model of organizing. Examines Alinsky's model of organizing and the refinement of that model. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Comparative Literary and Cultural Studies (CLCS)

5301. Variable Topics

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Possible topics include literature and the other arts, the sociology of literature, literature and psychology, and themes. May be repeated for up to nine credits with a change of topic.

5302. Introduction to Literary Theory

Three credits. Prerequisite: Instructor consent.

Historical survey of theoretical paradigms or schools of literary theory. Topics may include literary representation, the relationship between literature and society, interpretation and meaning, ideology. Emphasis on the aims of theory, its object, and its status vis à vis other disciplines of the human sciences.

5304. Studies in Literary History

Three credits. Prerequisite: Instructor consent.

Periods, movements, and literary relations involving several national literatures. Possible topics include the Baroque, the Enlightenment, Symbolism, and the Avant-Garde.

5305. Comparative Studies in Romanticism

Three credits.

West European Romanticism, the Bildungsroman, the quest, stories of the fantastic, and the greater Romantic lyric. Includes works of Goethe, Coleridge, Poe, Hugo and Leopardi.

5306. Studies in Form and Genre

Three credits.

Aspects of epic, drama, poetry, or narrative, such as the classical epic, the historical drama, the pastoral poem, or the picaresque novel.

5308. Marxist Literary Criticism

Three credits.

Introduction and survey of Marxist texts from Marx and Engels to Gramsci, Lukacs, Frankfurt School theoreticians, and contemporary theorists, feminists, and third-world practitioners.

5310. Psychoanalysis and Literature

Three credits.

Introduction to the literary and cultural application of psychoanalytic theory to the reading of literary texts; psychoanalytic interpretation from Freud to Lacan and feminist Lacanians.

5311. Introduction to Semiotics

Three credits. Prerequisite: Instructor consent.

Historical development and fundamentals of semiotics. Classical and structural models. Varying emphasis on a particular theory and its development.

5313. Theory and Practice of Translation

Three credits.

5317. Studies in Comparative Culture

Three credits. Prerequisite: Instructor consent.

The intersection of ideas concerning urbanization and modernism through the medium of literature, architecture, fine arts, and film.

5318. Special Studies

Variable (1-6) credits. May be repeated for a total of nine credits.

Computer Science and Engineering (CSE)

5095. Special Topics in Computer Science and Engineering

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. May be repeated for credit.

Classroom courses in special topics as announced in advance for each semester.

5097. Seminar

One credit. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. May be repeated for a maximum of eight credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Presentation and discussion of advanced computer science problems.

5099. Independent Study in Computer Science and Engineering

Variable (1-6) credits. Prerequisite: Open only to Computer Science and Engineering graduate students; instructor consent. May be repeated for credit.

Individual exploration of special topics as arranged by the student with an instructor.

5102. Advanced Programming Languages

Three credits. Prerequisite: Open to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 4102 and 3502 or the equivalent.

The theory and pragmatics of modern programming languages. Topics include syntax, semantics, type systems and control mechanisms. Key contributions from Functional and Logic Programming including first-order functions, closures, continuations, non-determinism and unification are studied. Study of declarative and operational semantics of recent entries in the field like Constraint Programming and Aspect Oriented Programming.

5103. Performance Engineering

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 3504 and CSE 4500.

Study of performance engineering techniques for the development of software systems to meet performance objectives. Software performance principles, hierarchical performance modeling, and current research trends related to Software Performance Engineering. Methods for computer performance evaluation and analysis with emphasis on direct measurement and analytic modeling, including queuing networks, computation structure models, state charts, probabilistic languages, and Petri-nets. Case studies for the evaluation and analysis of software architecture and design alternatives.

5105. Software Reliability Engineering

Three credits. Prerequisite: Open to Computer Science and Engineering graduate students, others with consent. Recommended Preparation: CSE 2102 and 3504 or equivalent.

State-of-the-art as well as emerging reliability assessment techniques. Topics covered will include reliability modeling paradigms, software reliability growth models, software metrics and reliability, software testing and reliability, and architecture-based reliability assessment. Hands-on experience in the application of these techniques.

5300. Advanced Computer Networks

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 3300 or equivalent. Not open for credit to students who have passed ECE 6431.

Advanced fundamental principles of computer networks. Topics include network design and optimization, protocol design and implementation, network algorithms, advanced network architectures, network simulation, performance evaluation, and network measurement.

5302. Computer Architecture

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 4302 or the equivalent.

Provides an in-depth understanding of the inner workings of modern digital computer systems. Traditional topics on uniprocessor systems such as performance analysis, instruction set architecture, hardware/software pipelining, memory hierarchy design and input-output systems will be discussed. Modern features of parallel computer systems such as memory consistency models, cache coherence protocols, and latency reducing/hiding techniques will also be addressed. Some experimental and commercially available parallel systems will be presented as case studies.

5304. High-Performance Parallel Computing

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 4302 and 4500.

Topics in high-performance computing such as the following (1) Parallel Algorithms and Parallel Computation: including programming models (Circuits and PRAMs), complexity analysis, modern parallel platforms and programming libraries; (2) Shared- and Distributed-Memory Parallel Architectures: including cache coherence, Memory consistency, processor synchronization, latency tolerance and hiding; (3) Interconnection Networks: including quantitative measures, topologies, switch architectures, routing strategies; as well as (4) Contemporary and Future HPC Systems.

5306. Advanced Operating Systems

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 4300 or equivalent.

Topics in modern operating systems with the focus on distributed computing, communication, and concurrency. Selected topics from current research in the theory, design, implementation, and verification of operating systems.

5309. Networked Embedded Systems

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 2300W, 3300, and 3666.

Introduction to the design, analysis and implementation of networked embedded systems that interact with the physical environment. Applications of such systems include environmental monitoring, consumer electronics, medical devices, automotive systems, industrial process control, distributed robotics, and smart structures. Topics covered include concepts, technologies and protocols for low-power and resource-restricted wireless networks; models of computation and physical systems; embedded system architectures; and real-time system concepts, theory and design principles.

5500. Algorithms

Three credits. Prerequisite: Open to Computer Science and Engineering graduate students. Recommended preparation: CSE 3500 or equivalent.

Introduction to the design and analysis of algorithms. The course will discuss fundamental design techniques and related issues such as amortized analysis, linear programming, network flow, NP-Completeness, approximation algorithms, randomized algorithms, advanced data structures, and parallel algorithms.

5506. Computational Complexity

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 3500 and 3502; MATH 3160 or equivalent.

Systematic study of resource-bounded computation, including time and space complexity, hierarchy theorems, nondeterministic and randomized computation, and reduction and completeness. Advanced topics may be introduced such as relativized computation, derandomization, communication complexity, lower bounds on circuit complexity, and probabilistically checkable proofs.

5510. Distributed Computing and Fault Tolerance

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students; instructor consent. Recommended preparation: CSE 4300 and/or 4500.

Topics in the design and analysis of robust distributed algorithms that combine efficiency and fault tolerance. Models of distributed computation and failures. Inherent limitation in achieving fault tolerance in distributed systems. Basic problems considered include communication services, robust cooperation, agreement, consistent distributed memory.

5512. Introduction to Quantum Computing

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students; instructor consent. Recommended preparation: CSE 3500, 3502, and MATH 2420Q.

Introduction to quantum computing, quantum algorithms, and quantum information theory. Quantum mechanics including elementary aspects of its mathematical formalism; quantum circuit model and quantum complexity theory; development and analysis of several fundamental quantum algorithms, focusing on Grover's algorithm for database search and Shor's number-theoretic algorithms. Second half covers the density matrix formalism of quantum mechanics, von Neumann entropy, quantum channels, and quantum error-correction. If time permits, some

implementations of quantum computers and current progress will be discussed.

5514. Computational Geometry

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: MATH 2110Q and 2210Q or equivalent.

Algorithms and data structures for constructing geometric objects, computing geometric properties, and answering geometric queries as well as techniques for the analysis of their correctness and complexity.

5600. Computer Science and Engineering Research Laboratory

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. May be repeated for credit with a change in content.

Experimental investigation of current research topics in computer science.

5707. Discrete Optimization

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 3500 and MATH 2210.

Methods and techniques used to solve combinatorial optimization problems with examples drawn from industry such as scheduling, resource allocation, and routing. Features a mix of theory and practice using state-of-the-art tools to solve classic problems.

5713. Data Mining

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent.

Introduction to data mining algorithms and their analysis. Application of and experimentation with data mining algorithms on real-world problems and domains, with a dual focus on addressing the solution quality issue and the time efficiency issue.

5717. Big Data Analytics

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 3500 and MATH 2210.

Focuses on data science and big data analytics. Introduces basic concepts of data science and analytics. Different algorithmic techniques employed to process data will be discussed. Specific topics include: Parallel and out-of-core algorithms and data structures, Rules mining, Clustering algorithms, Text mining, String algorithms, Data reduction techniques, and Learning algorithms. Applications such as motif search, k-locus association, k-mer counting, error correction, sequence assembly, genotype-phenotype correlations, etc. will be investigated.

5800. Bioinformatics

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent.

Advanced mathematical models and computational techniques in bioinformatics. Topics covered include genome mapping and sequencing, sequence alignment, database search, gene prediction, genome rearrangements, phylogenetic trees, and computational proteomics.

5810. Introduction to Biomedical Informatics

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students;

instructor consent. Recommended preparation: CSE 4102, 4701 or 4300.

Introduction to biomedical informatics theory and practice with an emphasis on data management for information classification (ontologies), collection, storage, analysis, dissemination, etc., applied to medical, clinical, and public health domains. Topics include: software architectures, security and privacy, interoperability and data exchange, standards and the semantic web, health care systems, clinical decision support, data mining, health care systems, monitoring and sensor devices, and cloud/grid computing.

5815. Systems Biology: Constructing Biological Knowledgebase

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent.

Design and architecture of biological knowledge base. Topics covered include biological/biomedical data modeling, knowledge representation techniques of biological and biomedical information, review of existing inference methods, methods of assessing evidence quality, design of inference-enabling genomics annotation system, various meta-data analysis methods involving genomics and biomedical data.

5820. Machine Learning

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 3500; MATH 2110, 2210, and 3160 or equivalent.

Enables students to understand and use machine learning methods across a wide range of settings. Mixture of theory, algorithms, and hands-on projects with real data. Besides traditional machine learning topics, e.g., supervised learning, unsupervised learning and semi-supervised learning, introduces advanced topics such as dimension reduction; structured data learning; kernel learning; imprecisely supervised learning; longitudinal data analysis; causal inference, etc.

5840. String Algorithms and Applications in Bioinformatics

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students; instructor consent.

Classic string matching algorithms (e.g. Knuth-Morris-Pratt, Karp-Rabin, suffix tree and arrays) and more advanced string algorithms (e.g. Burrows-Wheeler transform). With a particular focus on rigorous treatment of string processing algorithms and their analysis. Applications of string algorithms to bioinformatics problems. Students are expected to have basic prior knowledge of algorithm design and analysis.

5850. Information and Data Security

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: CSE 4701 and 4300 or equivalent.

Introduction to computer security and the design of secure systems. Security and threat modeling. Entity authentication and privacy, data integrity and confidentiality. Crypto-graphic tools: symmetric and asymmetric encryption, digital signatures, message authentication codes, hash functions. Security at the operating system level, access control, security enforcement, memory protection. Network security, firewalls, internet worms and viruses, intrusion detection. Digital

rights management, software security, program obfuscation, implementation flaws, buffer overflow attacks. Case studies in topical areas.

5852. Modern Cryptography: Foundations

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others with consent. Recommended preparation: MATH 3160, CSE 3500, and 3502 or equivalent.

The foundations of modern cryptography introducing basic topics such as one-way functions, pseudorandom generators, and computational hardness assumptions based on number theory. Fundamental cryptographic constructions such as hard-core predicates, secure symmetric encryption and message-authentication codes, and public-key cryptography.

5854. Modern Cryptography: Primitives and Protocols

Three credits. Prerequisite: Open only to Computer Science and Engineering graduate students, others by consent. Recommended preparation: MATH 3160; CSE 3500, 3502, and 4702 or equivalent.

Modern cryptography, emphasizing provable security and concrete constructions based on the hardness of specific computational problems. After surveying some basic cryptographic primitives and associated number-theoretic constructions, focuses on public-key infrastructure and protocols: it will cover such topics as digital signatures, identification and key-exchange schemes, distributed key generation, blind signatures, zero-knowledge proofs, and private function computation.

5860. Computational Problems in Evolutionary Genomics

Three credits. Prerequisite: CSE 5800; open only to Computer Science and Engineering graduate students, others by consent.

Computational and algorithmic approaches for problems arising in evolutionary genomics. Topics may include phylogenetic trees inference, population evolutionary models and theory, understanding complex evolutionary processes and other related topics. Both combinatorial optimization and stochastic approaches will be covered.

6300. Research Topics in Computer Networks

Three credits. Prerequisite: CSE 5300; open only to Computer Science and Engineering graduate students, others with consent.

Current research issues in the Internet, wireless and mobile networks, as well as emerging concepts such as sensor networks. Overview of the fundamental design principles underlying these networks. Discussion and exploration of the advanced research topics in these and other areas.

6512. Randomization in Computing

Three credits. Prerequisite: CSE 5500; open only to Computer Science and Engineering graduate students; instructor consent.

Introduction to the theory and practice of randomization and randomized algorithms as a technique for science and engineering problem solving. Topics covered include: probability theory, types of randomization, sorting and selection, hashing and skip list, finger-printing, packet routing, geometry and linear programming, graph algorithms, combinatorial optimization, and external memory algorithms.

6514. Computational Topology

Three credits. Prerequisite: MATH 5310 and 5311; open only to Computer Science and Engineering graduate students, others with consent.

Topology has traditionally generalized concepts of real analysis to metric spaces and set axioms. The new field of computational topology has great potential for encompassing abstractions to unify domain-specific techniques now used in computational geometry, geometric modeling, visualization, image processing, engineering analyses and molecular simulation. Includes perspectives from traditional topology and show how these need to be modified for realistic use in modern computing environments. Topics and emphases will vary.

6800. Computational Genomics

Three credits. Prerequisite: CSE 5800 or BME 5800; open only to Computer Science and Engineering graduate students; instructor consent.

Advanced computational methods for genomic data analysis. Topics covered include motif finding, gene expression analysis, regulatory network inference, comparative genomics, genomic sequence variation and linkage analysis.

Dental Science (DENT)

5430. Advanced Oral Histology

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Oral tissues, their embryological origin, histology and function. Structure of developing teeth, alveolar bone, temporo-mandibular joint, oral mucosa, gingiva and salivary glands. Lecture, slide review, and student-led discussions of papers from the research literature.

5431. Advanced Oral Pathology and Diagnosis

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Seminars on current developments in oral disease processes, with an emphasis on the clinical. Student presentations and lectures covering principles of Oral Diagnosis.

5432. Biomaterials for Dental Graduates

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Literature review/seminar covering various subjects of current interest in dental materials. Some prior knowledge of dental materials or of materials science is assumed.

5434. Functional Oral Anatomy

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Anatomic structures and relationships of the head and neck emphasizing surgical anatomy for oral, periodontal and endodontic surgery. Lectures and dissections.

5435. General Pathology

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

5437. Principles of Oral Microbiology and Infections

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Oral flora with emphasis on recent research developments. Ecology of the oral cavity, dental caries and periodontal disease, viral and yeast infections. Prior knowledge of microbiology and biochemistry assumed. Lectures and discussions, term paper required

5438. Craniofacial Growth and Development

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Part of a core series in the postgraduate program of orthodontics. Provides systematic coverage of basics in growth and development of the human face. Review and critique of selected articles from the research literature of the following areas: Physiology of facial growth, theories in growth mechanisms, pre- and postnatal growth of the face, normal and abnormal courses of the facial growth.

5439. Research Methods in Epidemiology and Behavioral Sciences

One credit. Prerequisite: DENT 5456 or equivalent; only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Provides students with an applied understanding of behavioral science research methods, building off of concepts introduced in DENT 5456. Featured topics include: theoretical and methodological issues in research design; data collection strategies, focusing on survey measurement and the design and evaluation of survey questions; population sampling; data entry and variable construction; strategies for analyzing quantitative data, focusing in particular on regression analysis with dichotomous outcomes; and issues in analyzing longitudinal data.

5440. Biodontics: Integrating Biotechnology with Clinical Dentistry

Three credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

The goal of the Biodontics educational program is to explore the process of introduction of biotechnology-based innovations into clinical dentistry. The course will focus on a variety of innovations, including those considered "disruptive," and explore the laboratory and clinical studies underlying their translation from the bench to chairside. The course will also consider the process of "diffusion" of innovations into dental practice and examine the barriers to acceptance by dental office personnel. Students, working in teams, will be required to present a business plan for the development and marketing of a new dental product.

5441. Biomechanics in Dental Science

Four credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Physics and engineering principles applied to clinical and research problems in dentistry. Principles of statics and mechanics of materials. Engineering analysis of orthodontic appliances. Lectures, seminars, and demonstrations.

5442. Biomechanics in Dental Science

One credit. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

History and critical review of orthodontic appliance systems. The relationship between treatment planning and therapy is explored. Detailed biomechanical analysis of appliance therapy. Lectures, seminars and demonstrations.

5443. Biology of Tooth Movement

One credit. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Hard and soft tissue responses to tooth movement caused by orthodontic appliances; theory of related bone resorption and apposition from a morphological and biochemical standpoint. Seminars.

5444. Epidemiology of Oral Diseases: Interpreting the Literature

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Provides a basic understanding of epidemiologic principles to enable the critical review of the literature and to provide a methodological framework with which to better understand basic statistics. An overview of the specific epidemiology of oral diseases will be provided.

5455. Scientific Writing

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

The basics of effective scientific writing in a six-week combined lecture and workshop format. Lectures cover scientific style, clarity in writing, development of hypothesis and organization of abstracts and manuscripts. Guest lectures and workshops provide specific direction in summarizing clinical, laboratory or social/biobehavioral research studies. Students are required to write and revise an extended abstract of their research and to present their abstract in small groups on the final class day.

5456. Biostatistics

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Introduction to biostatistics and overview of key concepts, including data measurement and summarization, probability, populations and samples, drawing inferences, and specific statistical analyses for testing differences in means and proportions, correlation, regression, multivariate analysis, and survival analysis. Special attention is placed upon understanding how to evaluate the appropriateness of and best interpret specific statistical tests and measures. An introduction to study design and the critical review of the literature is provided with emphasis on interpretation of presented statistics.

5457. Evidence Based Dentistry: Critical Reading of System Reviews, Meta-Analyses and Expert Panel Reports

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Provides dental residents with the information necessary to (1) de-mystify the methods typically used under the heading of evidence based dentistry

and (2) to be able to critically assess those methods, so as to best be empowered to integrate evidence based information into their day to day practices.

5495. Independent Study

Variable (1-6) credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program. May be repeated for a maximum of 24 credits.

A reading course for those wishing to pursue special topics in dental science under faculty supervision.

5500. Oral and Maxillofacial Diagnostic Imaging and Interpretation Part A

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

The first part of a three-part seminar course examining the interpretation of images produced by various techniques used in the diagnosis of diseases involving the oral maxillofacial complex. Part A emphasizes anatomy seen on intraoral, extraoral and volumetric image acquisition, image appearances of the common dental diseases - caries, marginal periodontitis and apical periodontitis and the pathophysiologic changes that lead to their image appearances.

5501. Oral and Maxillofacial Diagnostic Imaging and Interpretation Part B

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

The second part of a three-part seminar course examining the interpretation of images produced by various techniques used in the diagnosis of diseases involving the oral maxillofacial complex. Part B addresses lesions of bone and soft tissues of the maxillofacial complex, including cysts, neoplasms and lesions that have similar appearances.

5502. Oral and Maxillofacial Diagnostic Imaging and Interpretation Part C

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

The third and final part of a three-part seminar course examining the interpretation of images produced by various techniques used in the diagnosis of diseases involving the oral maxillofacial complex. Part C addresses the appearances on dentomaxillofacial imaging of genetic and acquired abnormalities, systemic diseases, temporomandibular joint disorders, salivary gland disorders and dentomaxillofacial trauma.

5503. Perio-Pathobiology I Part A

One credit. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Allows residents in Periodontology to develop an in-depth knowledge of the periodontal literature as it relates to research and clinical practice. Includes both clinical and basic science covering essential etiology concepts. Taught in a seminar format with all graduate faculty members participating as discussion leaders. Residents are assigned a group of related articles that should be read and reviewed each week prior to discussion at the scheduled seminar.

5504. Perio-Pathobiology I Part B

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Allows residents in Periodontology to develop an in-depth knowledge of the periodontal literature as it relates to research and clinical practice. Includes both clinical and basic science covering essential etiology concepts. Taught in a seminar format with all graduate faculty members participating as discussion leaders. Residents are assigned a group of related articles that should be read and reviewed each week prior to discussion at the scheduled seminar.

5505. Perio-Pathobiology II Part A

One credit. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Allows Periodontology residents to develop an in-depth knowledge of the periodontal literature as it relates to research and clinical practice. Gives evidential support to all clinical procedures performed. Taught in a seminar format with all graduate faculty members participating as discussion leaders. Graduate faculty will present and discuss topics in their areas of expertise. Residents will be assigned articles related to the topic of discussion that need to be reviewed each week prior to the scheduled seminar. The assigned literature will be reviewed from a historical perspective with recent updates included as necessary (a separate current literature review will run concurrently). Allow residents to not only develop critical reading and thinking abilities but also aid in developing verbal communication skills and confidence.

5506. Perio-Pathobiology II Part B

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

A continuation of Part A. Allows Periodontology residents to develop an in-depth knowledge of the periodontal literature as it relates to research and clinical practice. Gives evidential support to all clinical procedures performed. Taught in a seminar format with all graduate faculty members participating as discussion leaders. Graduate faculty will present and discuss topics in their areas of expertise. Residents will be assigned articles related to the topic of discussion that need to be reviewed each week prior to the scheduled seminar. The assigned literature will be reviewed from a historical perspective with recent updates included as necessary (a separate current literature review will run concurrently). Allows residents to not only develop critical reading and thinking abilities but also aid in developing verbal communication skills and confidence.

6000. Full Time Residency

Zero credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

Full time residency for dental master's students only.

6461. Clinical Radiation Sciences: Physics and Biology I

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

A continuous pair of semester lecture/seminar courses which examines the physical

and biological principles underlying the uses of radiation and allied radiation sciences in clinical diagnosis and therapy. Characteristics of imaging systems, Nuclear Medicine, Radiation Therapy, biological effects of ionizing radiation, radiation measurement and dosimetry and quality assurance will be covered through critical readings in texts and the literature.

6462. Clinical Radiation Sciences: Physics and Biology II

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

A continuous pair of semester lecture/seminar courses which examines the physical and biological principles underlying the uses of radiation and allied radiation sciences in clinical diagnosis and therapy. Characteristics of imaging systems, Nuclear Medicine, Radiation Therapy, biological effects of ionizing radiation, radiation measurement and dosimetry and quality assurance will be covered through critical readings in texts and the literature.

6463. Radiation Physics, Safety and Biology in Oral and Maxillofacial Diagnostic Imaging

Two credits. Prerequisite: only open to current UConn Health Dental Residents in the combined Certificate/Master of Dental Science Program.

A lecture, seminar and discussion-based course examining the fundamentals of the physics involving the most commonly used diagnostic imaging modalities in oral and maxillofacial radiology. The first part of the course deals with the physics of plain film radiography, panoramic radiography, CT, CBCT, MRI. Fundamentals of digital imaging will also be discussed. The last part of the course deals with radiation safety. Radiation safety measures and guidelines for practicing safe radiation techniques that will minimize the risk for patients and the operators during image acquisition will be discussed.

Digital Media and Design (DMD)

5000. Creative Digital Fundamentals

Three credits. Online course. Prerequisite: Open to graduate students in the Digital Media and Design online graduate certificate program or non-degree graduate students; not open to full-time Digital Media and Design graduate students; instructor consent.

Introduces core concepts for developing skills to create and implement digital graphics utilizing a combination of techniques and effects working with the applications: Photoshop, PowerPoint, After Effects and Premiere. Acquisition of these skills will prepare students to create their own animated promotional videos, edit raw video, manipulate graphic elements for posting to websites, the production of infographics and for insertion of digital elements into PowerPoint presentations.

5010. Digital Culture

Three credits. Prerequisite: Instructor consent.

Development and use of digital media and technology in different social and cultural contexts. Digital technology is treated as a cultural construct, the characteristics and impact of which are analyzed through social science theories of the interplay between technology and society. Ethnographies of digital media used in different parts of the world

and in different digital environments will be used to examine issues such as culture, identity and social networks. Examination of different ethnographic research methods for digital anthropology.

5020. Design Thinking

Three credits. Prerequisite: Instructor consent.

Exploration of the nature of design thinking about how a process that employs immersion, empathy, ideation, definition, prototyping and testing can lead to innovative discovery. We will explore the ways in which diversity of culture, experience and thought lead to innovation while examining the value of a human based design process on the growth and direction of culture and society at large and how can we as designers participate in driving that process.

5021. Design Lab

Three credits. Prerequisite: Open only to Digital Media and Design graduate students; instructor consent.

The theory, principles and practices of digital screen-based visual communication. Through a multi-disciplinary perspective involving art, design, art history, and media studies, students will address how culture visualizes screen-based communication through both image and type.

5025. Portfolio and Professional Development - Putting It All Together

Two credits. Prerequisite: Instructor consent.

Preparation for the transition to work by developing a professional grade portfolio, website, social media presence and communications collateral and skills. Intended for advanced students.

5030. Narrative Workshop

Three credits. Prerequisite: Instructor consent.

Designed for students to "workshop" their own narratives and works-in-progress for animation, short/long films, commercial media, interactive media, game creation, graphic novels, and short or long form pieces of writing (novels, children's books, short stories, etc.). Open forum/roundtable where students can bring pieces of writing or media into the class and share with other students, using each other as editors, collaborators, ideators while incorporating guest artists, writers, scientists and media makers to visit, help critique and weigh in on how their work and process has evolved given the cultural shift from printed page to e-readers, apps and the invention of viral marketing or internet video shorts, for example.

5035. Interaction Design

Three credits. Prerequisite: DMD 5070; open only to Digital Media and Design graduate students; instructor consent.

Provides a critical overview of interaction design (including usability, evaluation, and cultural aspects) and a practical program of website and computer software interface creation.

5040. UConn Student Agency

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Exposes students to and builds an understanding of the principles necessary to communicate the essence of a commercial brand through the ideation and creation of digital and social media structures and artifacts. Based on the principles of experiential learning promoting effective ideation, development, production, and implementation of

digital and social media marketing strategies and artifacts.

5070. Introduction to Web Design

Three credits. Prerequisite: Instructor consent.

Survey of the concepts and methodologies of Web design. Introduction to the key concepts of Web design and development as well as the software that facilitates it. No prior experience in Web design is necessary, but students must be willing to embrace a new perspective on the design process as it pertains to the creation of functioning, interactive sites. Both technically and conceptually demanding. Will require, in addition to design time, many hours of self-initiated software exploration. Comprised of a series of exercises and projects beginning with basic HTML and increasing in complexity to include multiple pages sites using CSS and simple scripting.

5075. MFA Final Project

Three credits. Prerequisite: Instructor consent. To be taken twice in two consecutive semesters in the student's final year. To fulfill the graduation requirement for M.F.A., students must pass with a grade of C or better. May be repeated for a total of six credits.

Development of a project in the student's area of concentration that demonstrates vigorous and consistent thematic engagement and articulates both technical and conceptual sophistication.

5086. MFA Thesis in Digital Humanities

Three credits. Prerequisite: Instructor consent.

Preparation and presentation of a thesis that demonstrates vigorous and consistent intellectual engagement and articulates technical, conceptual, and scholarly sophistication. To be taken twice in two consecutive semesters in the student's final year.

5095. Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits with a change of content.

5099. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 15 credits.

Independent study in a Digital Media area of concentration. May be repeated for a total of 15 credits with a change in content.

5200. Introduction to Motion Graphics

Three credits. Prerequisite: Instructor consent.

Provides to digital filmmakers instruction and guidance in the technique and critical understanding of motion effects, animation, and compositing. The technical instruction will be focused around the use of Adobe After Effects CS in the handling of both animated still and motion imagery. Students will create visual effects and animated graphics for television, film, web, and other types of multimedia productions using software including Adobe After Effects, Final Cut, Photoshop. The course will involve weekly technical exercise projects, practicing techniques covered in class, as well as a self-proposed midterm and final project.

5201. Advanced Motion Graphics

Three credits. Prerequisite: DMD 5200 and instructor consent.

Allows digital animators and filmmakers to fully develop advanced skills and large scale/longer format projects, drawing from a combination of techniques including: green screen, 2D particle

systems, mattes, rotoscoping, sound sync, 2D character set up and animation, hand-drawn/frame-by-frame, 3D integration, digital cut-out animation, and/or live-action compositing. Relies primarily on After Effects, particularly exploring its 2D/3D/effects capabilities; Maya; Photoshop; Final Cut; Toon Boom and other programs may also be utilized as necessary. Draws upon a canon of films to observe successful techniques that can be applied in computer work, and also to develop sensitivity to the artistry of moving images, cinema and storytelling.

5205. History of Animation

Three credits. Prerequisite: Instructor consent.

Survey of animation. From the early magic lantern shows of the late nineteenth century to current and emerging digital animation technologies. Series of discussions, lectures, assignments, as well as viewing and evaluating animated work. Exploration of this subject from various perspectives: by chronology, from its prehistory before the invention of film to the present day; by form, including method and medium; by culture, comparing the US to Japan, Russia, Europe and others; by subject; and by personality, concentrating on the figures who have shaped the art form and continue to influence it through their example. Students are expected to bring an enthusiastic interest in the medium, and to devote serious effort to reading about, viewing, researching and discussing animation and the artists who have created it.

5210. Moving Image and Sequence (Editing)

Three credits. Prerequisite: Instructor consent.

The ability to create a high-quality audiovisual experience that has the potential to reach millions of people is critical to your success and is more possible now than ever before. Video Editing with Final Cut Pro/Adobe Premiere teaches all the steps and tools necessary to create and deliver compelling music video, montages, trailers, and much more- including how to assemble, enhance, and maximize the use of video, audio, and graphic content. Geared toward media makers who would like to create and produce their own videos, instructional videos, or anyone wanting to create and assemble video content and share it online.

5211. Experimental and Alternative Techniques

Three credits. Prerequisite: DMD 5200 and instructor consent.

Explores non-traditional techniques/mediums for creating motion graphics and animation. Some common forms of experimental techniques include: stop motion (photographing physical models), pixilation (stop motion with people), collage, direct-to-film, filming with/out a lens, tilt-shift, mixed media compositing, the exquisite corpse, digital cell animation, among others.

5220. Broadcast Graphics and Title Sequence

Three credits. Prerequisite: Instructor consent.

Survey of broadcast design and title sequences made for film, games and television. Students will develop a deep understanding of the evolution of broadcast television and film graphics, as well as a command of several methods of producing graphics.

5230. Cinematic Storytelling

Three credits. Prerequisite: DMD 5200 and instructor consent.

A survey of film and media, in particular, the close analysis of graphic storytelling techniques in television, animation, shorts, and movies. Alternates between explanation of specific filmmaking techniques (such as continuity editing) and discussion of the ways in which media implicitly reflect and subtly influence cultural attitudes and values. Requires a research paper to be submitted for midterm evaluation, and a project component – or demonstration of the craft – for your Final Project.

5300. Introduction to 3D Animation

Three credits. Prerequisite: Instructor consent.

Introduction to 3D animation emphasizing traditional animation principles as applied to 3D animation. Topics will include principles of animation, transformations and deformations of 3D objects, rigging, and rendering. Its purpose is to familiarize the students with working in a 3-D environment and build a working knowledge of the basic tools used in 3D animation. This course will be required for future advanced 3D related classes. Students will develop their skills using key-frame animation and the graph editor. Students will also learn techniques for researching and using reference. Students can apply skills learned in this class in other areas including game art, motion graphics and 2D Animation.

5301. Advanced 3D Animation

Three credits. Prerequisite: DMD 5300 and instructor consent.

Students bring characters to life, applying core animation principles learned in DMD 5300 to visually convey weight, force, self-impulse, and emotion to bipedal CG characters. Students leverage principles of human mechanics and classic animation process to analyze and interpret reference footage. Best practices are learned using industry standard 3D software, resulting in appealing character animation that is mechanically sound and communicates emotion.

5305. History of Computer Graphics

Three credits. Prerequisite: Instructor consent.

History of computer-generated imagery (CGI) from its beginnings to present. Students will learn how CGI began and the problems that existed in its infancy. Trends and future of computer animation and visual effects.

5310. Introduction to 3D Modeling

Three credits. Prerequisite: Instructor consent.

Creation of polygonal 3D models using industry standard modeling tools. The aesthetics of simplicity are important as it relates to edge flow and geometry construction for both software and real-time rendering application. Comprised of in class labs and take home tests. Labs and tests will assess and inform both the instructor and the student of their progress and overall modeling skill level.

5311. Advanced Modeling, Lighting and Rendering

Three credits. Prerequisite: Instructor consent.

Illumination of the connection between the audience and the image on screen. Students learn how lighting creates mood in a scene and the technical ways in which CG lighting is achieved. Students will learn what types of lights to use, how and when to use them, and techniques to achieve realistic lighting while being resource savvy. Lighting in theater as well as in traditional film will

be studied to give students a solid understanding of why certain lighting choices are made and why they work, whether in live action or CG applications.

5315. Character Rigging

Three credits. Prerequisite: Instructor consent.

Rigging concepts with a specific emphasis on animated props and characters. Techniques for using and creating bones, constraints, skeletons, skinning, and weight painting. Students will come to understand the connection between animation and rigging, and specifically, how rigging increases quality and productivity in animation production.

5320. Introduction to Lighting and Rendering

Three credits. Prerequisite: Instructor consent.

Explanation of the connection between the audience and the image on screen. Students learn how lighting creates mood in a scene and the technical ways in which CG lighting is achieved. Students will learn what types of lights to use, how and when to use them, and techniques to achieve realistic lighting while being resource savvy. Lighting in theater as well as in traditional film will be studied to give students a solid understanding of why certain lighting choices are made and why they work, whether in live action or CG applications.

5340. Compositing for Visual Effects

Three credits. Prerequisite: Instructor consent.

Working with Film Students, students shoot plates on HD that fulfill the desire and needs another. Will work with “client” to achieve the desired effect on time, and on-budget. The students hone their effects skills, as they learn to track the motion of on-set cameras, objects and elements. They will learn that the best way to do an effect isn’t always to pick up a computer mouse, but might be to go out and shoot elements to be manipulated in 2D after the fact.

5350. Simulation and Technical Directing

Three credits. Prerequisite: Instructor consent.

Art and science of creation of physical simulations using particle systems and collision detection. Creation of complicated rendering and compositing setups that make their animations both easier to render and more flexible within the bounds of any animation or VFX sequence.

5420. Wearable Electronics and Interactive Objects

(Also offered as DRAM 5420.) Three credits. Prerequisite: Instructor consent.

Provides a basic understanding of electronics, key components, function, construction, and project design. Course fee: \$75.

5440. Mobile Application Development 1

Three credits. Prerequisite: DMD 5070; open only to Digital Media and Design graduate students; instructor consent.

Provides an introductory experience into mobile application development. Through lecture and hands-on exercises, students will be introduced to the progresses, technologies, an environment or mobile applications. Emphasis will be on building simple android applications with the MIT App inventor to gain introductory knowledge of programming concepts and design.

5470. Advanced Web Design and Development

Three credits. Prerequisite: DMD 5070; open only to Digital Media and Design graduate students; instructor consent.

Explores intermediate and advanced web design and development techniques, covering

Cascading Style Sheets, XML, dynamic HTML with JavaScript, common frameworks, and the principles of site management. Through projects, the course will also cover more advanced design concepts in Website creation, such as efficient navigation design, designing for portability and accessibility, separating content from presentation for easy site updating and maintenance, planning interactivity, and search engine optimization.

5500. Introduction to Digital Game Design

Three credits. Prerequisite: Instructor consent.

Introduction to the principals of video game design and development. Exploration of the history of the industry, investigation of the theory of story, game mechanics and level progression, development of creativity skills that can be applied through an ideation process, and design and develop a 2D video game. Participation is conducted in a game-based environment.

5522. The Story in Video Games

One credit. Prerequisite: Instructor consent.

Focusing toward story and character development, students are challenged to generate an idea for a Role-Playing Video Game. Participants examine the relationship of story, character and player, investigate a selection of popular RPGs, and explore ways to visualize and communicate their story and game idea to a group of would be investors.

5530. 3D Virtual World and Simulations

Three credits. Prerequisite: Instructor consent.

Students are challenged to design and develop a virtual simulation that will train, educate or replicate a historical, military or scientific event. Participants investigate a selection of different virtual environments, simulations and serious games, explore some of the basic principles of 3D modeling, and examine how game engines can be used to generate a three-dimensional computer-based environment.

5531. Game System Design

Three credits. Prerequisite: DMD 5500; open only to Digital Media and Design graduate students.

Students will be challenged to create a new game system within an existing game engine. This system will expand and change existing gameplay based on an in-class prompt. They will utilize their knowledge of player psychology and their analysis of other gameplay systems to develop a deeper understanding of the internal mechanics of games

5536. Disruptive Technologies in Games

Three credits. Prerequisite: DMD 5500 and 5542; open only to Digital Media and Design graduate students; instructor consent.

Exploration of emerging interactive technologies, creating rapid-fire prototypes utilizing experimental hardware and software. These skills enable students to develop interactive installations and unique gameplay scenarios.

5540. Multiplayer Game Development

Three credits. Prerequisite: DMD 5531; open only to Digital Media and Design graduate students.

Students examine an array of gameplay interactions and how different types of interactions create a different experience for players. Students create a multiplayer map based in a relevant game engine that adheres or modifies the core mechanics to create a new game experience.

5542. Introduction to Scripting for Games

Three credits. Prerequisite: Open only to Digital Media and Design graduate students; instructor consent.

Introduction to the fundamentals of gameplay scripting utilizing a current game engine. At the end of this course students will have a basic understanding of scripting concepts, constructs like numbers, strings, assignment, loops, functions, arrays and available engine commands.

5550. Game Production

Three credits. Prerequisite: DMD 5500; open only to Digital Media and Design graduate students; instructor consent.

A practical examination into the successful management of video game products. Students in the class will be required to develop budgets, asset management plans and evaluate risk of game development options. As part of the design process, participants will explore relationship management, team management, investigate the business aspect of the video game industry, and deliver a series of documents as part of the development of video game project.

5560. Advanced Digital Game Design and Development

Three credits. Prerequisite: Instructor consent.

Practical examination into the development of three-dimensional video games. Students are required to design and develop a video game and extensive game design document. Participants explore a selection of advanced game engines, share and critique ideas, investigate the business aspect of the video game industry, and deliver a series of progress reports as part of the development of a video game project.

5700. Digital Media Strategies for Business

Three credits. Prerequisite: Instructor consent.

Introduction to digital media concepts and platforms that are being used in companies' marketing strategies and plans.

5710. Social Media Business Applications

Three credits. Prerequisite: DMD 5700 and instructor consent.

An introduction to social media marketing, focusing on the platforms and strategies being employed by brands.

5720. Digital Media Analytics

Three credits. Prerequisite: DMD 5700 and instructor consent.

Provides a working knowledge of the array of metrics and analytics needed to understand the digital consumer and measure the effectiveness of digital media marketing.

5730. Digital Consumer Behavior

Three credits. Prerequisite: Instructor consent.

Exploration and analysis of the changes in consumer decision-making and behavior in today's digital world.

5998. Variable Topics

Variable (1-6) credits. Prerequisites and recommended preparation vary. May be repeated for credit with a change of content.

Direct Service Elective (DSEL)

5310. Current Trends in Family Intervention: Evidence-Based and Promising Practice Models of In-Home Treatment

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Exposes students to several nationally acclaimed Evidence-Based Practice (EBP) treatment programs for families that are widely practiced. Students are introduced to competencies associated with EBP and an overview of several empirically supported therapy programs that are designed to address psychiatric, behavioral and/or substance abuse concerns in children and adolescents including Multisystem Therapy (MST), Multidimensional Family Therapy (MDFT), Intensive Home Child and Adolescent Psychiatric Services (IICAPS), Functional Family Therapy (FFT) and Brief Strategic Family Therapy (BSFT). Case presentations from local providers of these models and testimonials from families.

5320. Direct Practice in School for Children with Educational Disabilities and Their Families

Three credits. Prerequisite: Open only to students in the M.S.W. program.

Meets state requirements for school work certification, approved by the Bureau of Certification and Professional Development. The practice of social work in schools requires that the social worker possess knowledge and skills to provide social work services for students with educational impairments and their families. To provide such service, the social worker must be able to engage in effective partnerships with parents and other multi-disciplinary team members and possess a repertoire of interventions appropriate for this population. Presents and discusses controversies and issues relative to labeling and testing procedures, such as the impact of racial and ethnic differences. Covers six areas of impairment as designated by law (Emotionally Impaired, Mentally Impaired, Learning Disabled, Autistic Impaired, Physically and Otherwise Health Impaired, and Speech and Language Impaired). Stimulates further study in impairment areas and lays a basic knowledge and skill foundation of social work services appropriate for these populations.

Dramatic Arts (DRAM)

5000. Studies in Voice and Diction

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Voice-related topics and skills not included in DRAM 5001-5007. May include work in specialized areas of applied speech such as (but not limited to) analysis of heightened text, spoken choral performance, and oral interpretation of poetry or narrative prose.

5001. Voice and Diction I

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Development of breath support, vocal expressiveness, and basic diction, articulation, and phonetics skills.

5002. Voice and Diction II

Three credits. Prerequisite: Instructor consent.

Developing vocal range and intelligibility with text and emotional content. Continued work with consonant and vowel sounds.

5003. Voice and Diction III

Three credits. Prerequisite: Instructor consent.

Developing analytical and performance skills in heightened language and poetic text to be applied primarily to the works of Shakespeare and other classical playwrights.

5004. Voice and Diction IV

Three credits. Prerequisite: Instructor consent.

Applying diction and phonetics skills to specialized speech styles including accents and dialects.

5005. Voice and Diction V

Three credits. Prerequisite: Instructor consent.

Applying voice and diction skills to additional classical and contemporary dramatic forms.

5006. Voice and Diction VI

Three credits. Prerequisite: Instructor consent.

Exploring additional vocal skills and resources required for professional acting.

5007. Singing for Actors

One credit. Prerequisite: Instructor consent. May be repeated for a total of three credits.

Developing singing skills required for performance in musical theatre productions.

5110. Core Concepts in Arts Administration

Three credits.

History of the field, principles and practices of arts management theory, leadership models, and contemporary issues facing arts organizations. Research methods and practices in the field.

5111. Arts Administration Professional Internship

Twelve credits.

Completion of an internship, at a professional arts organization, fulfills the internship requirement of the MFA in Arts Administration. Faculty assists in arranging internships at professional organizations.

5112. Arts Administration Advanced Topic Research

Three credits.

Coursework consists of a single major research project, or series of smaller projects, in preparation for the student's MFA project. The Advanced Topic Research project, or projects, may or may not be directly related to the candidate's MFA Project, but must serve in some direct way to help prepare the students for the MFA Project.

5113. Arts Administration MFA Project

Six credits.

The MFA Project is required for all MFA students completing the non-thesis option within the Graduate School at UConn. It must include evidence of all aspects of both conceptual learning and skill development training contained in the MFA Arts Administration program and must be approved by the graduate advisory committee. The MFA Project will also form the basis for the Final Examination, conducted by the advisory committee, as required by the Graduate School. The Final Examination will occur in the same semester as the submission of the MFA Project.

5114. Arts Administration Studio I

One credit.

Seminar-based course. Meets with Arts Administration Studio II, III, IV, and V. Case

studies, and other forms of research, in arts administration.

5115. Arts Administration Studio II

One credit. Prerequisite: DRAM 5114.

Seminar-based course. Meets with Arts Administration Studio I, III, IV, and V. Case studies, and other forms of research, in arts administration.

5116. Arts Administration Studio III

One credit. Prerequisite: DRAM 5115.

Seminar-based course. Meets with Arts Administration Studio I, II, IV, and V. Case studies, and other forms of research, in arts administration.

5117. Arts Administration Studio IV

Three credits. Prerequisite: DRAM 5116.

Seminar-based course. Meets with Arts Administration Studio I, II, III, and V. Case studies, and other forms of research, in arts administration. Leadership models and techniques. Research projects required.

5118. Arts Administration Studio V

Three credits. Prerequisite: DRAM 5117.

Final in series of seminar-based courses. Meets with Arts Administration Studio I, II, III, and IV. Case studies, and other forms of research, in arts administration. Leadership models and techniques. Research projects required.

5120. Financial Management for the Arts

Three credits.

An introduction to key elements of nonprofit financial management in the arts, including basic accounting, financial statement analysis, and budgeting. Using current articles, reference texts, and business cases, students will develop an understanding of nonprofit accounting and will follow daily transactions through to the financial statements. The relationships between budgeting, financial reporting, and financial statements will be explored using readings and case studies.

5121. Governance and Leadership in the Arts

Three credits.

This course will provide instruction in basic concepts of governance and leadership of nonprofit arts organizations by focusing on how arts organizations are structured, how they function, and a particular emphasis on how they are led.

5122. Fund Raising and Development for the Arts

Three credits.

This course addresses best practices for fund raising and development for arts organizations including practical exercises and case study analysis.

5123. Marketing the Arts

Three credits.

Build knowledge of marketing theories, approaches, and methodologies that are used across all industries and then highlight their application for the arts. Develop an understanding of the following areas: analysis of the competitive environment; developing audience insight and segmentation; positioning and targeting a unique value proposition; developing and delivering the unique value proposition; and evaluating the performance of techniques.

5130. Introduction to Graduate Studies in Stage Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Projects in scenery, lighting and costume design for first-year graduate students in stage design and puppetry. Reading and discussion of various 20th century works on design theory for the theatre.

5131. Studies in Theatre History

Variable (1-3) credits. Prerequisite: Instructor consent.

A survey course focusing on selected dramatic writings from Classic Greek to the 21st century. The application of text analysis tools for the actor will be examined.

5132. Survey of 20th Century Theatrical Design

Three credits.

A survey of the basic aesthetics available to the modern theatre designer, seen through the lens of designers and design movements of the 20th century. The use of Form, Color, Scale, Materials, and their relative importance will be examined, as will the concepts of Stylization, Theatricality, and Abstraction.

5134. Design Drawing

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Studio course in figure drawing and perspective drawing as foundation for students in theatre costume, scenic, and lighting design and puppetry arts.

5159. Practicum in Theatre Studies

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Special projects in Theatre Studies, usually related to a production of the Department of Dramatic Arts/Connecticut Repertory Theatre.

5189. Field Studies Internship in Design/ Technical Theatre

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Supervised practical experience in professional/regional theatres or academic institutions.

5190. Internship in Dramatic Arts

Zero credits. Prerequisite: Open only to Dramatic Arts graduate students holding a dramatic arts graduate assistantship; instructor consent.

Internships in acting, costuming, lighting, management, media, puppetry, pedagogy and technical theatre.

5192. Independent Study in Theatre Studies

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Independent study under the direction of an appropriate faculty member.

5197. Special Topics in Theatre Studies

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

A reading course under the direction of an appropriate staff member.

5200. Studies in Technical Production

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Study of any topics in in Stagecraft, Technical Production, or sound not included in DRAM 5201-5213.

5201. Production Drafting

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Emphasis on preparation of plans appropriate for scenic studio bidding procedures.

5202. Technical Direction

Three credits. Prerequisite: Instructor consent.

A study of the planning, management and execution of all technical aspects of production.

5204. Technical Analysis

Three credits. Prerequisite: Instructor consent.

Analysis of scenic structures and materials, including stress and vector analysis, static and dynamic loading of beams and battens, truss design, and time/cost studies.

5205. Audio Production

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Audio recording and playback techniques used in the preparation of theatrical sound scores.

5206. Sound Technology

Three credits. Prerequisite: Instructor consent.

Application of signal processing devices and signal modification for specialized audio effects for production.

5207. Electricity and Electronics for the Theatre

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Study of current electrical technology and applications, including AC theory and codes.

5208. Computer Applications

Three credits. Prerequisite: Instructor consent.

Survey of current software available for application to production management and technical design and production.

5209. Studies in Theatre Design

Three credits. Prerequisite: Instructor consent.

Investigates the physical problems and codes involved in integrating theatre technology into the architectural requirements of a performance facility.

5210. Properties Construction

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Fabrication of unusual stage properties and study of the application of experimental materials.

5211. Advanced Rigging Techniques

Three credits. Prerequisite: Instructor consent.

Technology and materials used in conventional and specialized rigging systems.

5212. Shop Technology

Three credits. Prerequisite: Instructor consent.

Use of materials, equipment and processes required in special fabrication techniques.

5213. Stage Technology

Three credits. Prerequisite: Instructor consent.

Power sources and drive mechanisms for stage machinery including electro-mechanical, hydraulic and pneumatic systems.

5292. Independent Study in Technical Theatre

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

An independent project course under the direction of an appropriate staff member.

5296. MFA Project in Technical Theatre

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

A major technical direction project for a production in the Department of Dramatic Arts/Connecticut Repertory Theatre.

5297. Special Topics in Technical Production

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

A reading course under the direction of an appropriate staff member.

5300. Studies in Scenic Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Study of any topics in Scenic Design not included in DRAM 5301-5320.

5301. Scenic Design: Single Set Plays

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Exploration of the various methods of solving the scenic design for plays requiring only one location.

5302. Scenic Design: Multi-Set Play

Three credits. Prerequisite: Instructor consent.

Investigating the range of methods of solving the scenic design for plays with several locations.

5303. Scenic Design: The Musical I

Three credits. Prerequisite: Instructor consent.

Solutions for designing scenery for the Traditional American Musical. This topic examined from both historical and contemporary points of view.

5304. Scenic Design: The Musical II

Three credits. Prerequisite: DRAM 5303; instructor consent.

The examination and study of scenery-design solutions for complex musicals in unconventional spaces.

5305. Scenic Design: Art Direction for TV and Film

Three credits. Prerequisite: Instructor consent.

Developing skills for relating traditional scenic design to feature films and television with an emphasis on creating storyboards.

5306. Scenic Design: Opera and Ballet

Three credits. Prerequisite: Instructor consent.

Operas and Ballets from around the world will be analyzed and designed for various proscenium theatres.

5310. Scenic Design: Event Planning

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Examining approaches to designing special events for unique spaces.

5311. Scenic Design: Design Drafting

Three credits. Prerequisite: Instructor consent.

The study of hand-drafting styles and conventions, and the study of computer drafting software and techniques.

5312. Scenic Design: Perspective Drawing and the Pencil Sketch

Three credits. Prerequisite: Instructor consent.

A study of one point, two point, three point and measured perspective in order to create pencil sketches for the theatre.

5313. Scenic Design: The Color Sketch

Three credits. Prerequisite: Instructor consent.

Techniques and skills for building a scale model for a scenic design using a variety of materials and methods.

5314. Scenic Design: Model Building Techniques

Three credits. Prerequisite: Instructor consent.

Techniques and skills for building a scale model for a scenic design using a variety of materials and methods.

5315. Scenic Design: Rendering with Watercolor

Three credits. Prerequisite: Instructor consent.

The study of how to use watercolor to create the theatrical sketch.

5316. Scenic Design: Computer Rendering for the Theatre

Three credits. Prerequisite: Instructor consent.

The use of mainstream computer programs to create digital renderings and media for the theatre.

5317. Scenic Design: 3D Computer Rendering for the Theatre

Three credits. Prerequisite: Instructor consent.

The use of mainstream 3D programs to render and draft scenic designs for the theatre.

5318. Scenic Design: Creating a Portfolio On and Off Line

Three credits. Prerequisite: Instructor consent.

Students will create a dynamic, interesting portfolio for off-line presentations and then turn that portfolio into a web site.

5319. Scenic Design: Styles of Ornamentation

Three credits. Prerequisite: Instructor consent.

An exploration of architecture and period style from the earliest times to the present.

5320. Scene Painting

Three credits. Prerequisite: Instructor consent.

Scene painting using a variety of media and techniques. The student also explores a number of faux finish techniques.

5329. Technical Research and Writing

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Application of writing techniques and research methods used in preparation of technical reports and project documentation.

5355. Studies in Television

Variable (1-3) credits. Prerequisite: Instructor consent.

5392. Independent Study in Scenic Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Independent study under the direction of an appropriate faculty member.

5396. MFA Project in Scenic Design

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

The design of costumes for a production in the Department of Dramatic Arts/Connecticut Repertory Theatre.

5397. Special Topics - Scenic Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

A reading course under the direction of an appropriate staff member.

5400. Studies in Costume Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit with a change of topic.

Study of any topics in costume design art and theory not included in DRAM 5401-5407.

5401. Costume Design: Poetic Realism

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

An examination of the relationship between poetic realism and costume design, explored through a series of design projects.

5402. Costume Design: Comic Exaggeration

Three credits. Prerequisite: Instructor consent.

An examination of the relationship between comedy and costume design, explored through a series of design projects.

5403. Costume Design: Tragedy and Post Modernism

Three credits. Prerequisite: Instructor consent.

An examination of the relationship between tragedy and costume design and also between post modernism and costume design explored through a series of design projects.

5404. Costume Design: Fantasy and Opera

Three credits. Prerequisite: Instructor consent.

An examination of the relationship between fantasy and costume design and also between opera and costume design explored through a series of design projects.

5405. Costume Design: Dance and Musicals

Three credits. Prerequisite: Instructor consent.

An examination of the relationship between dance and costume design and also between musicals and costume design explored through a series of design projects.

5406. Costume Design: Performance Art

Three credits. Prerequisite: Instructor consent.

An examination of the relationship between performance art and costume design, explored through a series of design projects.

5407. Costume Design: Film

Three credits. Prerequisite: Instructor consent.

An examination of the relationship between film and costume design, explored through a series of design projects.

5410. Studies in Applied Costume Craft

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit with change of topic.

Study of any topic in applied costume craft not included in DRAM 5411-5421.

5411. Color Theory / Light and Fabric

Three credits. Prerequisite: Instructor consent.

The first part of this course focuses on the study of textile names and properties. The second part of the course explores the relativity of color, color properties, and the interaction of light and color.

5412. Dyeing and Fabric Modification

Three credits. Prerequisite: Instructor consent.

Focusing on dyes and their interaction with various fabrics and selecting the correct dyes and the colors to achieve the desired effects. Investigating new fiber-modification technology.

5413. Computer Costume Rendering and Website Design

Three credits. Prerequisite: Instructor consent.

The use of mainstream computer programs to create digital renderings as part of the costume-design process. Learning how to use those images along with computer manipulated production photos for presentation on the web.

5414. Costume Design: Period Costume Rendering

Three credits. Prerequisite: Instructor consent.

Exploring sketching techniques with a variety of media while learning to capture period fabrics and

styles using primary source images for research and inspiration.

5415. Advanced Make-up: Prosthetics and Wigs

Three credits. Prerequisite: Instructor consent.

Acquiring techniques for creating period effects in make-up and hairstyles. Learning proper wig ventilation and safe casting practices for gelatin and latex prosthetics.

5416. Costume Design: Millinery Techniques

Three credits. Prerequisite: Instructor consent.

Acquiring techniques for designing and constructing different types and styles of men's and women's hats from various historic periods.

5417. Costume Design: Flat Pattern Costume Drafting

Three credits. Prerequisite: Instructor consent.

Focusing on the art and mathematical formulas that create a basic sloper for patterning garments. Understanding shaping through dart manipulation, curved seams, and inserted panels or shapes.

5418. Costume Design: Draping Patterns

Three credits. Prerequisite: Instructor consent.

Developing techniques, for draping shapes and patterns over a dress-maker's mannequin, using the drape of various fabrics and the straight of the grain (versus the bias) to create specific effects.

5419. Tailoring Period Costumes for the Theatre

Three credits. Prerequisite: Instructor consent.

Exploring the traditional art of tailoring and various patterning techniques for constructing garments from the major historical periods often depicted on the stage or screen.

5420. Wearable Electronics and Interactive Objects

(Also offered as DMD 5420.) Three credits. Prerequisite: Instructor consent.

This course provides a basic understanding of electronics, key components, function, construction, and project design. Course fee: \$75.

5492. Independent Study in Costume Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Independent study under the direction of an appropriate faculty member.

5494. Costume Design Seminar

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

This course provides an avenue for discussion and learning activities related to realized design work and career development. Each week, students will present to the group the most recent development of their work on CRT assignments, D-Series, and professional jobs, allowing for a group discussion of best practices, next steps, and group problem-solving of challenges. This course will additionally be used for ongoing career development work such as regular resume, website, and portfolio critiques, as well as for discussion of career opportunities, contract negotiations, and professional expectations and processes.

5496. MFA Project in Costume Design

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

The design or assistant design of costumes for a production in the Department of Dramatic Arts/ Connecticut Repertory Theatre.

5497. Special Topics in Costume Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

A reading course under the direction of an appropriate staff member.

5500. Studies in Lighting Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit with change of topic.

Study of any topics in Lighting Design not included in DRAM 5501-5514.

5501. Lighting Design: The Single Set Play

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

The development of lighting designs for single set dramas and musicals.

5502. Lighting Design: Opera

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

The design process for Operatic Theatre, emphasizing concepts and visual metaphors for the lighting of Opera.

5503. Lighting Design: Dance

Three credits. Prerequisite: Instructor consent.

The methods and process of creating a dance lighting design while learning how to document and communicate ideas, analyze movement, and understand the vocabulary of the dance world.

5504. Lighting Design: The Broadway Musical

Three credits. Prerequisite: Instructor consent.

The design process for Musical Theatre productions, developing concepts and visual metaphors to be used in lighting Musicals.

5505. Lighting Design: Non-Proscenium Spaces

Three credits. Prerequisite: Instructor consent.

The design process for productions within Non-Proscenium and Non-Traditional spaces, emphasizing production concepts and visual metaphors for lighting thrust stages, black box spaces, hotel ballrooms, arenas, public spaces, and outdoor venues.

5506. Lighting Design: Angles and Systems

Three credits. Prerequisite: Instructor consent.

Tracing how, from initial concept to final plot, Lighting Concept and Visual Metaphor influence lighting angles, textures, and the positioning of fixtures. Using side light, back light, booms, ladders, box booms, coves, and cyc lighting to realize the range of designer choices.

5507. Lighting Design: Angles and Systems

Three credits. Prerequisite: Instructor consent.

Tracing how, from initial concept to final plot, Lighting Concept and Visual Metaphor influence lighting angles, textures, and the positioning of fixtures. Using side light, back light, booms, ladders, box booms, coves, and cyc lighting to realize the range of designer choices.

5508. Lighting Design: From Concept to Opening Night

Three credits. Prerequisite: Instructor consent.

Following a lighting design from its conception through to its opening night. Exploration of multiple genres of theatre including drama, musicals, dance, opera, events and concerts.

5509. Lighting Design: Concept Development

Three credits. Prerequisite: Instructor consent.

Importance of lighting concept and visual metaphor in developing a show's design. Tools

and strategies (scene break-down, mood boards, concept statement, concept presentation, and others) for communicating with the director and other production personnel.

5510. Color Theory and Light

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Examining the characteristics of color: hue, value, saturation, color perception, and the psychology of color to aid in the artistic choice of colors for theatrical productions.

5511. Digital Design for Projection and LED

Three credits. Prerequisite: Instructor consent.

Exploring the emerging world of digital media, video projection design and LED system design with emphasis on the philosophy, software, hardware and technology used to create digital imagery.

5512. Lighting Technology

Three credits. Prerequisite: Instructor consent.

Applying the technologies for lighting, dimming, video projection, and LED imaging design to the protocols used in contemporary lighting and projection design for theatre, live events, and architecture.

5513. Lighting Computer Applications

Three credits. Prerequisite: Instructor consent.

Developing skills in 2D and 3D digital animation using current media programs for theatrical, concert, corporate and architectural projection.

5514. Production Lighting Design and Business Practices

Three credits. Prerequisite: Instructor consent.

Advanced study of a lighting designer's role and the design process from interview through completed design. Additional focus on the marketing, financial, and personnel elements of the lighting-design business.

5515. History of Lighting Design

Three credits.

Historical survey of how practitioners of lighting and theater design have been able to develop lighting technology and the concept of lighting design from the time of the Renaissance to the present day. Particular attention will be given to the eras of transition in the technology of producing light: from candlelight to gaslight, and from gaslight to the early electric era. The effects of the new light on performance style and the changes that ensued will be discussed.

5516. Lighting Design: Non-Traditional Performance

Three credits.

Concentrates on the unique conceptual, stylistic, and technical problems of lighting performances that fall outside the category of traditional theatre, dance, and opera productions. Develops proficiency in recognizing and meeting the unique challenges these types of productions pose for designers.

5517. Projection and Lighting Design

Three credits.

Concentrates on the increasingly important relationship between projected images and lighting design in the modern theatre. Live performances are using a variety of new methods to incorporate projection technology, and the role of the lighting designer is distinct in productions of this kind. The goal of this class is to discover ways to use

projections and light to form 3-dimensional space in ways that knit the properties of the projection and the composition of the space into an environment that humans can inhabit and perform in.

5530. Studies in Digital Media

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits with a change of topic.

Study of any topics in visual Digital Media not included in DRAM 5531-5535.

5531. Digital Design for Projections I

Three credits. Prerequisite: Instructor consent.

Advanced exploration of the philosophy, software, hardware, and technology used to create digital imagery, including video-projection and LED system designs. Special emphasis is on the aesthetics of media design and the systems for displaying digital imagery.

5532. Digital Design for Projections II

Three credits. Prerequisite: Instructor consent.

Building on Projections I, students conceive, design, and produce digital media for video projection using LED systems, particular emphasis on exploring and developing aesthetics of digital media design.

5533. 2D Digital Animation I

Three credits. Prerequisite: Instructor consent.

With 2D animation and compositing programs currently used in film, television, commercial and corporate production, students will explore digital media development and design, beginning with principles of composition, design, and production and moving on to the composition of 2D graphic elements.

5534. 2D Digital Animation II

Three credits. Prerequisite: Instructor consent.

Expanding on 2D Animation I, students will explore 3D space (or the "Z dimension"), learning to manipulate the camera around objects in space. This study will focus on the basics of the digital camera, virtual lighting, and the value of shadow relative to image development and recognition.

5535. 3D Digital Animation I

Three credits. Prerequisite: Instructor consent.

Using professionally current 3D computer-animation programs, this study begins with virtual scene development. Students will then construct a 3-dimensional space, model 3D objects within that space, create and map textures and finishes onto that object, and then animate it.

5592. Independent Study in Lighting Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Independent study under the direction of an appropriate faculty member.

5596. MFA Project in Lighting Design

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

The lighting design for a production in the Department of Dramatic Arts/Connecticut Repertory Theatre.

5597. Special Topics in Lighting Design

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

A reading course under the direction of an appropriate staff member.

5600. Studies in Puppet Arts

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Study of any topics in puppet design, construction, or performance not covered in DRAM 5601-5618. May be repeated for credit with a change in topic.

5601. Advanced Mask

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Study of Mask design, construction and performance through practical work with face casting, neutral masks, exaggerated masks, and Commedia dell'Arte masks.

5602. Advanced Paper Sculpture

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Practice in design, sculpting, patterning, and finishing techniques using the "Roser Papier Methode" for Puppetry leading to full realization and performance of the sculptures as puppets.

5603. Puppet Theatre Production

Three credits. Prerequisite: Instructor consent. May be repeated credit.

Strategies for developing and executing the skills involved in mounting Puppet Productions, includes planning, scripting, designing, scheduling, budgeting, and identifying appropriate personnel.

5604. Advanced Rod Puppet Theatre

Three credits. Prerequisite: Instructor consent.

Consideration of a world-wide range of design, construction, and manipulation techniques for several forms of Rod Puppets, with emphasis on Chinese performance skill development.

5605. Advanced Puppetry in Television

Three credits. Prerequisite: Instructor consent.

Research and practical exploration of techniques for presenting Puppet Arts on television, includes planning, design, construction and performance of a short program and development using current video editing software.

5607. Advanced Materials Techniques

Three credits. Prerequisite: Instructor consent.

Puppet Character design using a full range of fabrication techniques (including sculpting, molding, casting, painting, and carving) to design and fully realize a puppet character.

5608. Marionette Performance

Three credits. Prerequisite: Instructor consent.

Exploration and skill development with the pendular attributes of a string puppet using several different performance figures.

5609. Marionette Construction

Three credits. Prerequisite: Instructor consent.

Design, construction and performance of a full figure string puppet.

5610. Advanced Hand Puppet Theatre

Three credits. Prerequisite: Instructor consent.

Consideration of a world-wide range of design, construction, and manipulation methods for Hand Puppetry, Glove Puppetry, and mouth-moving skills.

5611. Advanced Ultraviolet Light/Czech Black Theatre

Three credits. Prerequisite: Instructor consent.

Exploration of U.S. applications of UV (Black Light) and Czech Black Theatre (Curtain of Light) and its practical application to Puppet Theatre.

5612. ISM's: Art Movements of the Early 20th Century

Three credits. Prerequisite: Instructor consent.

Examination of Puppet Arts' contributions to the Art Movements of the Early 20th Century, including the production of a Puppet Arts event within a selected "ism."

5613. Advanced Shadow Theatre

Three credits. Prerequisite: Instructor consent.

Research and study of all design, story, construction, and performance elements within worldwide Shadow Theatre for both direct-screen and projected presentations.

5614. Puppet Production Seminar

Three credits. Prerequisite: Instructor consent.

Dramaturgical, directorial and design research and study related to current department productions using Puppetry.

5615. Puppet Arts Aesthetics

Three credits. Prerequisite: Instructor consent.

Research and study of the myriad forms of Puppet Arts expression and the aesthetics that guide them.

5616. Trends in Contemporary American Puppet Theatre

Three credits. Prerequisite: Instructor consent.

An in-depth study of Puppetry as it has been practiced in North America from pre-colonial days to the present.

5617. World Puppet Theatre

Three credits. Prerequisite: Instructor consent.

A worldwide survey of the Puppet Arts as they are practiced in religious expression, societal commentary, cultural celebration, and public entertainment.

5618. Production Planning and Development

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Students independently research, conceptualize, and prepare preliminary scripts or designs for future performance projects.

5619. Movement-Based Performance for the Puppet Theatre I

Three credits.

Designed to awaken and develop imaginative and skilled theatrical performers through the exploration of movement concepts, movement-based theatre techniques and devising work. Develop performance skills, imagination, creativity, and ability to devise original and inspired theatre work. Will include a component of a rigorous physicality using elements of creative movement, physical theatre, and yoga to allow freedom of mind and body.

5620. Directing for Puppet Theatre I

Three credits.

Designed to awaken, develop, and prepare innovative directors in the field of Puppet (but also Alternative) Theatre in the 21st century. Study of the historic and theoretical foundations of theatre directing. Develop understanding of narrative structure. Engagement in practical exercises designed to develop directorial skills.

5692. Independent Study in Puppet Arts

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Independent study under the direction of an appropriate faculty member.

5696. MFA Project in Puppetry

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Major artistic contribution(s), (writing, designing, building, directing) to a puppetry production or related theatre or film project in the Department of Dramatic Arts/Connecticut Repertory Theatre.

5697. Special Topics in the Puppet Arts

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

A reading course under the direction of an appropriate staff member.

5700. Studies in Professional Acting

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Topics and skills not taught in DRAM 5701-5706. May include work with the techniques of specific master acting teachers such as (but not limited to) Sanford Meisner, Stella Adler, Tadashi Suzuki, and Utah Hagan. May be repeated with change of topic.

5701. Professional Acting I

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Acquiring core tools and exploring skills required for professional acting. Applying basic skills to a full-length Shakespeare (or other heightened language) performance project.

5702. Professional Acting II

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Exploring and applying the core techniques required for acting in realistic and naturalistic plays; including the principles of characterization.

5703. Professional Acting III

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Developing and applying skills for acting through poetic language with particular attention paid to acting Shakespeare and the Folio's Guide for the Actor.

5704. Professional Acting IV

Three credits. Prerequisite: Instructor consent.

Working with techniques and styles for performing comedy; both in scripted plays and other performance modes.

5705. Professional Acting V

Three credits. Prerequisite: Instructor consent.

Additional work in analyzing and performing contemporary scripts written for both stage and screen.

5706. Professional Acting VI

Three credits. Prerequisite: Instructor consent.

Preparation for the world of professional theatre, including development of audition techniques, learning the workings of the industry, and establishing career connections.

5711. Studies in Directing

Variable (1-3) credits. Prerequisite: Instructor consent.

5721. Performance Techniques

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Performance study and practice in selected areas of dramatic arts.

5759. Practicum in Performance

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Special projects in performance, usually related to a production of the Department of Dramatic Arts/Connecticut Repertory Theatre.

5792. Independent Study in Performance

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Independent study under the direction of an appropriate faculty member.

5796. MFA Project in Performance

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Research and preparation for an assigned MFA performance project, usually acting a major role in a production of the Department of Dramatic Arts/Connecticut Repertory Theatre.

5800. Studies in Movement for the Actor

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 9 credits.

Topics and skills not normally included in DRAM 5801-5807. Content may include (but is not limited to) stage violence, armed or unarmed combat, gymnastics, and T'ai Chi. May be repeated with changes in topic.

5801. Movement for the Actor I

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Exploration of the actor's physical instrument.

5802. Movement for the Actor II

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Physical conditioning and techniques of characterization.

5803. Movement for the Actor III

Three credits. Prerequisite: Instructor consent.

Exploration of theatrical styles in the dramatic space, including work in the Commedia form.

5804. Movement for the Actor IV

Three credits. Prerequisite: Instructor consent.

Physical expression for the actor through expressive mask work and physical storytelling.

5805. Movement for the Actor V

Three credits. Prerequisite: Instructor consent.

Developing styles of comedic physical movement, including the art of clowning.

5806. Movement for the Actor VI

Three credits. Prerequisite: Instructor consent.

Continued development of styles and techniques for expressive movement and their application to the world of Physical Theatre.

5807. Alexander Technique for the Actor

One credit. Prerequisite: Instructor consent.

Body alignment, release, and constructive rest techniques developed by F. M. Alexander are applied to actors' posture, movement, and breathing.

Ecology and Evolutionary Biology (EEB)

5100. Preparing for a Career in Ecology and Evolutionary Biology

One credit. Prerequisite: Open to first and second year graduate students in EEB, others with permission.

Introduction to the design and execution of scientific research, career planning, communication

of science to multiple audiences, and broader impacts of scientific work.

5110. Writing Research Proposals and Fellowship Applications

Two credits. Prerequisite: Open only to Ecology and Evolutionary Biology graduate students; instructor consent. May be repeated for a maximum of six credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The craft of writing persuasive fellowship applications and funding proposals in ecology, evolutionary biology, systematics, and conservation biology. Students apply for financial support from agencies, foundations, and other sources. Includes peer review.

5200. Biology of Fishes

Four credits. Prerequisite: Instructor consent.

Introduction to the biology of fishes, with an emphasis on adaptation and evolutionary diversification. Topics include the evolution of major groups, morphology, physiology, behavior, and population and community ecology. Lectures, critical discussions of current journal articles, student presentations, and exercises in the field and laboratory. A research paper and class presentation are required on a topic pre-approved by the instructor.

5203. Developmental Plant Morphology

Four credits.

Exploration and analysis of diversity in plant form using basic principles of plant construction and development. A research paper is required, in which the principles learned in lecture are applied to the analysis of the development of a plant from seed through reproductive maturity.

5204. Aquatic Plant Biology

Four credits.

Field and laboratory-oriented study of the anatomy, morphology, ecology, physiology, systematics and evolution of vascular aquatic and wetland plants. A research paper and class presentation are required on a topic pre-approved by the instructor.

5215. Physiological Ecology of Animals

Three credits. Prerequisite: Instructor consent.

Physiology of animals in an evolutionary context. Lectures and critical discussions of current journal articles. A research paper and class presentation are required on a topic pre-approved by the instructor.

5220. Evolution of Green Plants

Four credits.

Evolution of morphological and genomic traits marking the conquest of land, the diversification of land plants, and the significance of plants in the evolution of life on earth, global climates and human civilizations. Laboratory session includes study of morphological and anatomical characters of extant and fossil plants, phylogenetic inference from morphological and molecular characters, and discussion of primary literature.

5240. Biology of Bryophytes and Lichens

Four credits.

Diversity, evolution, ecology, development and taxonomy of the bryophytes (mosses, liverworts, and hornworts) and lichen-forming fungi.

5250. Biology of the Algae

Four credits.

Laboratory and field-oriented study of the major groups of algae, emphasizing structure, function, systematics, and ecology.

5254. Mammalogy

Four credits.

Lectures cover diversity, natural history (including behavior, ecology, reproduction, etc.), and evolution of mammals; readings from original literature are included. Laboratories cover anatomy, systematics, and distribution of major groups of mammals.

5265. Herpetology

Four credits. Prerequisite: Instructor consent.

Lectures cover environmental physiology, ecology, and behavior of amphibians and reptiles. Emphasis is on readings from the original literature. Laboratories cover evolution, systematics, and distribution of major groups of the world.

5271. Systematic Botany

Four credits. Prerequisite: Instructor consent.

Classification, identification, economic importance, evolution and nomenclature of flowering plants. Laboratory compares vegetative and reproductive characteristics of major families. A research paper and class presentation are required on a topic pre-approved by the instructor.

5300. Practical Genomics in Ecology and Evolution

Three credits. Prerequisite: Open only to graduate students in biological sciences and related fields, others with consent.

Computational biology skills. Focused training on analytical approaches for genomic data generated in ecology and evolutionary biology. Practical activities include writing basic scripts, accessing public data repositories, and analyzing genomic data with existing open source software to answer questions of biological interest.

5301. Population and Community Ecology

Three credits. Prerequisite: Open only to Ecology and Evolutionary Biology graduate students, others with consent.

Overview of population and community ecology, including population regulation and dynamics, metapopulations, species interactions, biodiversity, community structure, and evolutionary ecology. Theoretical and case-history approaches, emphasizing plants, invertebrates, and vertebrates. Lecture, discussion, and exercises in analysis and modeling.

5310. Conservation Biology

Three credits.

Case studies and theoretical approaches to conservation of biological diversity, genetic resources, plant and animal communities, and ecosystem functions. Topics emphasize ecological and evolutionary principles that form the scientific basis of this emerging, interdisciplinary field, as well as socio-political, legal, economic, and ethical aspects of conservation.

5333. Evolutionary Developmental Biology

Three credits.

Advanced course in evolutionary biology, emphasizing the underlying developmental bases of evolutionary change. Concepts of homology, constraint, and heterochrony, with examples from both animal and plant systems.

5335W. Vertebrate Social Behavior

Three credits.

Lectures and discussions dealing with various aspects of vertebrate social behavior, including territoriality, mating systems, sexual selection, and group behavior. The emphasis is on reading and critical analysis of original literature.

5347. Principles and Methods of Systematic Biology

Four credits. Prerequisite: Instructor consent.

Basic concepts and modern procedures employed in systematic biology: literature retrieval, species description, phylogenetic inference, nomenclature, and current conceptual issues. Laboratories include computer techniques in phylogenetic analysis.

5348. Population Genetics

Three credits.

Provides a theoretical background for studies in evolution. Emphasis is placed on understanding the conceptual foundations of the field and on the application of these concepts to an understanding of the roles of mutation, evolution of populations.

5349. Phylogenetics

Four credits. Prerequisite: EEB 5347.

Estimation of genealogies at the level of species and above, and their application and relevance to various biological disciplines, including systematics, ecology, and morphological and molecular evolution. Surveys both parsimony and model-based methods, but emphasizes maximum likelihood and Bayesian approaches.

5350. Molecular Systematics

Two credits. Prerequisite: Instructor consent.

Exploration of key literature focusing on the practical aspects of incorporating knowledge of DNA sequence evolution into phylogenetic tree construction. Laboratory methods for collection of molecular data including management, extraction, amplification, and sequencing.

5360. Functional Ecology of Plants

Three credits.

Physiological, morphological, and structural responses of plants to the physical and biotic environment and to environmental change. Readings, lectures and discussions emphasize plant responses at all levels of organization, from cells to whole plants. Themes include organismal integration, consequences and constraints in plant adaptation, and the functioning of plants within communities and ecosystems.

5369. Current Topics in Biodiversity

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature on biodiversity.

5370. Current Topics in Conservation Biology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature on conservation.

5449. Evolution

Three credits.

A review of our current understanding of the patterns and processes of organic evolution. Class periods will include discussion and critical analysis of primary literature.

5477. Insect Phylogeny

Three credits.

A review of our current understanding of the evolutionary relationships of the major orders and families of insects, including the phylogenetic position of Insecta within Arthropoda.

5500. Introduction to Natural History Collections

One credit. Prerequisite: Open only to Ecology and Evolutionary Biology graduate students; instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Training required for work in the EEB Biodiversity Research Collections Facility. The uses of natural history collections; policies, resources, and databases of the Collection Facility; specimen preparation and labeling; legal and ethical issues; threats to natural history collections.

5881. Internship in Ecology, Conservation, or Evolutionary Biology

Zero credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

An internship with a non-profit organization, a governmental agency, or a business under the supervision of Ecology and Evolutionary Biology faculty. Activities relevant to the practice of ecology, biodiversity science, evolutionary biology, or conservation biology will be planned and agreed upon in advance by the job site supervisor, the faculty coordinator, and the intern.

5889. Research

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Conferences and laboratory work covering selected fields of Ecology and Evolutionary Biology.

5891. Internship in Ecology, Conservation, or Evolutionary Biology

Variable (1-9) credits. Prerequisite: Instructor consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

An internship with a non-profit organization, a governmental agency, or a business under the supervision of Ecology and Evolutionary Biology faculty. Activities relevant to the practice of ecology, biodiversity, evolutionary biology, or conservation biology will be planned and agreed upon in advance by the job site supervisor, the faculty coordinator, and the intern. One credit may be earned for each 42 hours of pre-approved activities up to a maximum of nine credits.

5894. Seminar

Variable (1-3) credits. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Study and discussion of current researches, books and periodicals in the field of Biology. Subtopic designations: Ec, Ecology; M, Mammalogy; Mec, Marine Ecology; Pr, Parasitology; En, Entomology; Bi, Biogeography; Ev, Evolution; Sy, Systematics.

5895. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Advanced study in a field within Ecology and Evolutionary Biology.

5899. Independent Study

One credit. Prerequisite: Instructor consent. May be repeated for credit.

A reading course for those wishing to pursue special work in biology. It may also be elected by undergraduate students preparing to be candidates for degrees with distinction.

6480. Seminar in Vertebrate Biology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in vertebrate biology.

6481. Seminar in Biodiversity

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Provides the opportunity for students to present research plans, reports of work in progress, and full-length seminars on completed research projects in ecology, systematics, and evolutionary biology to a supportive but critical audience.

6482. Seminar in Spatial Ecology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in spatial ecology.

6483. Seminar in Marine Biology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in marine biology.

6484. Seminar in Plant Ecology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in plant ecology.

6485. Seminar in Comparative Biology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in evolution and comparative ecology.

6486. Seminar in Systematics

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in systematic biology.

6487. Seminar in Parasitology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in parasitology.

6490. Seminar in Behavioral Ecology

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Analysis and discussion of current literature in behavioral ecology.

Economics (ECON)

5101. European Economic History

Three credits.

The economic development of Europe from the Industrial Revolution to World War I. Emphasis

on the economic and social factors that led to the industrialization of Europe.

5102. American Economic History

Three credits.

The growth and development of the American economy and the evolution of its economic institutions from the colonial period to the present. Assessment of agriculture, industry, transportation, commerce, finance, government, and population; and of their interaction with the physical environment, technology, public policy, and the world economy.

5110. History of Economic Thought

Three credits.

History and methodological underpinnings of economic ideas from ancient times to the present. Particular attention to Smith, Marx, Marshall, and Keynes.

5128. Economic Rights

Three credits. Prerequisite: Instructor consent.

Explores the conceptual bases, measurement, and policy applications of economic rights. Specific topics will include: child labor, the right to development, non-governmental initiatives, and the institutionalization of economic rights (e.g., constitutionalization versus statutory implementation versus discretionary policies).

5198. Topics in Economic History

Three credits. Prerequisite: Instructor consent.

Focuses on critical episodes and salient turning points in the history of European, American, and Third World economic development; emphasis on institutional and technological factors. Evaluates different approaches.

5201. Microeconomics

Three credits. Not open for credit to students who have passed ECON 2211Q.

Beginning graduate microeconomics covering consumer and producer theory, price determination, economic efficiency, and welfare analysis.

5202. Macroeconomics

Three credits. Not open for credit to students who have passed ECON 2212Q.

Survey of the field: its historical foundations and development, conceptual framework, and application to current macroeconomic problems.

5298. Topics in Microeconomics

Three credits.

Topics in microeconomic theory. Students choose the material to be covered.

5301. Mathematical Economics

Three credits.

Use of mathematical concepts such as matrix algebra, optimization, and comparative statics, to study economic problems.

5311. Applied Econometrics I

Three credits.

Statistical theory and linear regression applied to business and economic problems.

5312. Applied Econometrics II

Three credits. Prerequisite: ECON 5311.

5314. Causal Program Evaluation

(Also offered as PP 5314.) Three credits.

Survey of the statistical methods and tools commonly used to evaluate causal claims about the impact of public policies and programs. This course is a required MPP course.

5348. Economic Development Policy

Three credits.

The role of government in the economic development of underdeveloped countries. Topics include alternative paradigms of development and the resulting place for government in the economy; the theory, institutions, and policies of government in planning, fiscal, and monetary concerns; analysis of policy instruments influencing international trade and financial flows; and the influence of international organizations on the development process.

5411. Monetary Theory and Policy

Three credits.

Theoretical analysis of the role of money in the economy, including general equilibrium and monetarist frameworks, the demand for and supply of money, channels of monetary influence, and determinants of long-term and short-term interest rates. Problems of monetary policy, such as selection of instruments and targets, use of discretionary policy, and stability of the money multiplier.

5416. Issues in Monetary Theory and Policy

Three credits. Prerequisite: ECON 5411.

Contemporary theoretical and policy issues in money, such as portfolio theory, the money supply process, the mechanics of policy implementation, "crowding out," dynamic macro models, disequilibrium macro models, and rational expectations.

5421. International Trade: Theory and Policy

Three credits.

The economic aspects of international relations, including the pure theory of international trade and the instruments of commercial policy. Topics include comparative advantage; international economic policies; and regional economic integration.

5422. International Finance: Theory and Policy

Three credits.

Theoretical and historical analysis of international finance, including balance-of-payments adjustments, foreign-exchange markets, international capital flows, and the effectiveness of macroeconomic policies in open economies.

5433. Federal Finance

Three credits.

Theories of government in the economy including general equilibrium, public choice and institutional economics. Government expenditures: budgeting, cost-benefit studies and analysis of specific expenditure programs. Taxation: equity and efficiency criteria for evaluating taxes, with application to major sources of revenue; public debt.

5434. State and Local Finance

Three credits.

Taxes and expenditures in a federal system, with particular emphasis on intergovernmental relationships. Rationale for federalism, problems of public choice, and tax incidence analysis.

5439. Urban and Regional Economics

Three credits.

Theoretical and empirical analysis of urban and regional systems in developed and developing economies. Special emphasis on the spatial characteristics and problems of metropolitan markets for housing, transportation services,

productive factors, and final products; land-use controls, housing subsidies, public transit, and other forms of public sector intervention.

5441. The Labor Market

Three credits.

A thorough examination of the labor market. Topics include human capital, wage determination, public policy, and money wage rates.

5461. Industrial Organization

Three credits.

Survey of contemporary theory and models of the organization of industry. Topics include oligopoly; product differentiation; advertising; innovation; contestable markets; the financial theory of the firm; dynamic and evolutionary models; and transaction-cost economics.

5462. Topics in Public Policy Toward Industry

Three credits. May be repeated for a maximum of 12 credits.

Theories of economic regulation. U.S. antitrust policy. Regulation of natural monopolies in theory and practice. Health and safety regulation.

5463. The Economics of Organization

Three credits.

Surveys the modern agency, transaction-cost, and evolutionary theories of organization. Topics include measurement and monitoring costs, asset specificity, incomplete-contracts theory, the dynamic capabilities approach, and alternative organizations.

5473. Economic Development

Three credits.

An examination of the problems facing the less developed nations. Comparisons of alternative paradigms of economic development (orthodox to political economy) and the strategies and policies they imply.

5474. Seminar in Development and Growth

Three credits.

A continuation of ECON 5473. Topics include agriculture and industry in development, investment criteria, essentials of developing planning, the promotion of domestic saving and fixed investment, foreign aid, improvements in international trade, and human capital formation.

5479. Economic Growth and Fluctuations

Three credits.

Economic growth and business cycles in the economically advanced countries, with emphasis on both theory and evidence.

5494. Applied Research Seminar

Three credits.

A survey of research methods in economics and development of individual research projects.

5495. Topics in Economics

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5499. Independent Study in Economics

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

5500. Writing in Economics

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Techniques for, and practice in, research, writing, citation, and data presentation in economics.

6110. History of Economic Thought

Three credits.

Advanced treatment of the history and methodological underpinnings of economic ideas from ancient times to the present. Particular attention to Smith, Marx, Marshall, and Keynes.

6201. Microeconomic Theory I

Three credits. Prerequisite: ECON 5201 or ARE 5201.

Neoclassical consumer and producer theory, choice under uncertainty, competitive and monopoly markets, and an introduction to general equilibrium.

6202. Macroeconomic Theory I

Three credits. Prerequisite: ECON 5202.

A rigorous course in dynamic general equilibrium models. Emphasis on analytical techniques and numerical solution methods.

6211. Microeconomic Theory II

Three credits. Prerequisite: A grade of B- or better in ECON 6201.

Game theory, information, and related topics.

6212. Macroeconomic Theory II

Three credits. Prerequisite: A grade of B- or better in ECON 6202.

Stochastic modeling, recent developments in the literature, and policy applications. Topics may include real business cycle theory, new classical economics, neo-Keynesian theory and growth models.

6301. Advanced Mathematical Economics I

Three credits.

An introduction to advanced mathematical topics with applications to economics. Topics and applications may include set theory, logic, topology, difference and differential equations, game theory, preference theory and matching models.

6302. Advanced Mathematical Economics II

Three credits. Prerequisite: A grade of B- or better in ECON 6301.

Topics and applications may include: dynamic programming, fixed-point theorems, measure theory, Markov chains and processes, functional analysis, and advanced optimization.

6310. Econometrics I

Three credits. Prerequisite: Open only to Economics graduate students.

First advanced course in econometrics methods used in economics. Properties of classical linear regression. Statistical theories that underpin econometric methods.

6311. Econometrics II

Three credits. Prerequisite: ECON 6310.

Large sample linear regression, time series analysis, maximum likelihood, GMM, and qualitative choice models.

6312. Econometrics III

Three credits. Prerequisite: A grade of B- or better in ECON 6311.

Special topics from recent advances in econometrics.

6400. Independent Study

Variable (1-3) credits. May be repeated for a maximum of nine credits.

Students pursue an in-depth study of an area of interest under the guidance of a faculty member.

6411. Advanced Macroeconomics I

Three credits. Prerequisite: ECON 6212.

Advanced treatment of material covered in ECON 6202 and ECON 6212.

6412. Advanced Macroeconomics II

Three credits. Prerequisite: ECON 6411.

Advanced treatment of material covered in ECON 6202 and ECON 6212.

6421. Advanced International Trade: Theory and Policy

Three credits. Prerequisite: ECON 6211.

Advanced treatment of material covered in ECON 5421.

6422. Advanced International Finance: Theory and Policy

Three credits. Prerequisite: ECON 6212.

Advanced treatment of material covered in ECON 5422.

6435. Government Expenditures

Three credits. Prerequisite: ECON 6211.

Theory and evidence of government expenditure policy.

6436. Government Revenues

Three credits. Prerequisite: ECON 6211.

Positive and normative analysis of alternative government resource uses.

6441. Advanced Labor Economics I

Three credits. Prerequisite: ECON 6211.

Labor supply with an emphasis on the family. Applications in the area of demography, development, and health.

6442. Advanced Labor Economics II

Three credits. Prerequisite: ECON 6211.

Labor demand and other applied topics in labor economics.

6461. Industrial Organization

Three credits. Prerequisite: ECON 6211.

Advanced treatment of the behavior and performance of firms in imperfectly competitive markets. Topics include the theory of the firm and costly contracting; information and strategic behavior; and product differentiation.

6462. The Organization of Industry

Three credits. Prerequisite: ECON 6211.

Advanced treatment of the behavior and performance of firms in imperfectly competitive markets. Topics include advertising, industrial R&D, and two-sided markets.

6463. Economics of Organization

Three credits.

Advanced treatment of material covered in ECON 5463.

6466. Environmental Economics

Three credits. Prerequisite: ECON 5201 or ARE 5201.

Economic analysis of environmental problems and corrective policy instruments. Topics covered will include the theory of externalities and public goods, the role of uncertainty and imperfect information in policy design, benefit-cost analysis, and non-market valuation. Applications to various environmental problems (such as air and water pollution, hazardous waste, and occupational health and safety) will be discussed.

6473. Economic Development: Microeconomic Issues

Three credits.

Overview of current literature on microeconomics of development, including human capital, internal structure of households,

functioning of factor markets, and the role of institutions in mediating change.

6494. Graduate Seminar

One credit. May be repeated for a maximum of eight credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Participation in departmental research seminars and presentation and discussion of original research projects.

6498. Variable Topics

Three credits. May be repeated for credit.

Education Curriculum and Instruction (EDCI)

5004. History of Educational Thought

Three credits.

Leading educational ideas and how these ideas influence theory and professional practice. The contributions of key individuals in the ancient, medieval and modern worlds are the basis for course organization.

5006. Comparative and International Education

Three credits.

Education and educational systems in comparative and international perspective, with emphasis on the interaction of educational institutions with other social, cultural and political institutions in society.

5008. Philosophical Analysis in Education

Three credits.

Introduction to philosophical analysis of significant educational concepts.

5040. Popular Music and Informal Education

Three credits. Prerequisite: Open only to Music Education M.A. students, others with consent.

Exploration of how popular music intersects with education, including the production and consumption of popular music and use of related informal pedagogies. Critical theory, cultural theory, feminism, and race studies will be used to explore these issues. Methods in "popular music" instruments and technology will also be covered.

5041. Theoretical Foundations of Music Education

Three credits. Prerequisite: Open only to Music Education M.A. students, others with consent.

Considers issues including music education programs, practices, curricula, and policies. Objectives for the course are to: (a) develop professional rationales for broadly used music education practices that involve information derived from relevant research in history, sociology, and philosophy, and critical theory; (b) analyze and critique selected music education programs, practices, curricula, and policies; (c) write a paper that reviews and critiques a broad area of practice in music education and recommends policy alternatives.

5047. Music Across the Curriculum

Three credits. Prerequisite: Open only to Music Education M.A. students, others with consent.

Strategies and theories for the integration of music experiences across the curriculum.

5050. TCPCG Seminar I: Student Teaching Seminar

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

Analysis of instructional practice in the clinical setting. Relationship of instruction to theory, and implications for instructional evaluation, are emphasized.

5055. TCPCG Seminar II: Teacher as Professional

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

Culminating seminar experience in the TCPCG program.

5060. Social and Multicultural Foundations of Education

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

An introduction to the social and multicultural foundations of contemporary public education in U.S. society. Includes discussion of the nature, organization and purposes of public education in a democratic society, cultural diversity in U.S. schools and society, the role of the classroom teacher, professional ethics, and contemporary issues in U.S. education.

5065. Learning Theories

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

Introduction to learning theories as they are applied to educational contexts. Topics include instructional objectives, behavioral analysis, social cognitive theory, cognitive psychology, social emotional development, and cognitive development.

5070. Methods of Instruction and Evaluation

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

Selection and organization of learning experiences, instructional activities and materials, and methods of instruction. Course activities include a combination of lecture and seminar experiences.

5080. Reading and Literacy in the Content Areas

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

Effective use of reading and writing to help students learning content material. Includes selection of reading materials that are appropriate for individual students with diverse reading abilities, understanding reading diagnosis provided by other professionals, using reading material in ways that facilitate comprehension and learning, and using written assignments to increase understanding and recall.

5085. Subject Area Methods

Three credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required. May be repeated for credit.

Selection and organization of learning experiences, instructional activities and materials, and methods of instruction related to the subject

area. Course activities include a combination of lecture and seminar experiences, as well as extensive practice teaching.

5090. TCPCG Directed Student Teaching

Nine credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; department consent required.

Supervised student teaching in a subject-specific content area.

5092. Practicum

Variable (1-6) credits. Prerequisite: Open to M.S. students in Curriculum and Instruction, Special Education, or the Educational Psychology concentration in Special Education. May be repeated for credit.

The implementation and application of theory in the student's area of specialization. Open primarily to master's and Sixth-Year students.

5093. Advanced Practicum

Variable (1-6) credits.

The implementation and application of theory in the student's area of specialization. Open primarily to master's and Sixth-Year students.

5094. Seminar

Variable (1-3) credits. May be repeated for a maximum of 6 credits.

Analysis of the issues and research in the field of education. Open primarily to master's and Sixth-Year students.

5095. Advanced Seminar

Variable (1-6) credits.

Analysis of the issues and research in the field of education. Open primarily to master's and Sixth-Year students.

5099. Independent Study in Education

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Students requesting this course should have a significant background in education and should present to the instructor problems, well-defined and well laid out for investigation, which hold special interest for them and which will be pursued on the plan of advanced study.

5100. Teaching Reading and Writing in the Primary Grades

Three credits.

Processing unique to beginning reading and writing with emphasis on emerging literacy and promoting literacy development.

5105. Teaching the Language Arts

Three credits.

Teaching integrated language arts including oral and written communication, creative language, and spelling development with an emphasis on current research.

5110. Teaching Writing

Three credits.

A course for K-12 teachers with emphasis on teaching the writing process in persuasive, narrative and expository writing; evaluation of errors; developing appropriate curricular sequences; and research in the writing process.

5115. The Teaching of Reading

Three credits.

An overview of process and program; theoretical models of the reading, guidelines for a total school reading program, definition of terminology and principles of instruction. Analysis of available

material made when appropriate. Intended as a background course for teachers with no previous course work or experience in teaching reading.

5120. Introductory Reading Clinic

Three credits.

Clinical practice in instruction of persons with corrective reading disabilities.

5125. Teaching Reading and Writing in Middle and Junior High School

Three credits.

Process and problems unique to reading and writing needs in the middle and junior high school. Emphasis on the development of reading and writing strategies as well as diagnostic teaching methods appropriate to this level.

5130. Teaching Children's Literature in the Elementary School

Three credits.

Literature for elementary school children, techniques for developing interest in independent and recreational reading.

5135. Literacy in the Secondary School

Three credits.

Process and problems unique to literacy needs in the secondary school. Emphasis on differentiated instruction for students with diverse backgrounds and abilities.

5140. Content Area Reading and Disciplinary Literacy

Three credits.

The purpose of this course is to explore and develop teaching strategies, practices and classroom routines that are supportive of both literacy development and disciplinary learning. Current research in disciplinary literacy (DL) will provide a frame for discussing these topics. DL as an approach to content-area teaching is still emerging and we will use this course as an opportunity to learn about best practices associated with content-area learning while also exploring ways to make that learning more authentic to the disciplines they represent and more meaningful to adolescents.

5145. Classroom Assessment and Correction of Reading Difficulties

Three credits.

Types of reading difficulties and the remediation methods appropriate for use by the classroom teacher.

5150. Clinical Diagnosis and Correction of Reading Difficulties

Three credits.

Severe reading disabilities and clinical methods of remediation utilizing the case study approach.

5155. Advanced Reading/Language Arts Clinic

Six credits. Prerequisite: EDCI 5150; instructor consent.

For prospective reading/language arts specialists. A laboratory course in planning and implementing remedial reading/language arts instruction for persons with severe or complex reading and writing disabilities.

5160. Design, Management, and Supervision of Reading Programs

Three credits. Prerequisite: EDCI 5150 and 5155; instructor consent.

Designing, supervising and evaluating reading programs on a school and system-wide basis.

5165. Introduction to Deaf Education

Three credits.

In this course we will explore current issues and approaches to teaching deaf and hard of hearing students by examining historical trends and current research in deaf education, language policy, deaf culture, speech and hearing development, and deaf studies.

5170. Literacy and Deafness

Three credits.

In this course, we will explore current issues and approaches to teaching reading and writing to deaf and hard of hearing students, and examine current research on literacy and deafness drawn from a range of relevant perspectives.

5250. Teaching Literature to Adolescents

Three credits.

A study of competing theories of literary response with an emphasis on implications for the teaching of literature and research on the teaching of literature. Includes some reading of literature for young adults.

5255. Teaching Composition (7-12)

Three credits.

A study of composition theory, with an emphasis on implications for the teaching of writing and research on the teaching of writing.

5350. Teaching Elementary and Middle School Social Studies

Three credits.

A study of curriculum alternatives, techniques of individual and small-group instruction, evaluation and the development of teaching materials.

5355. Trends in Social Studies Curricula

Three credits.

New curricula and developments. For teachers and supervisors of social studies.

5360. Education and Popular Culture

Three credits. Prerequisite: Instructor consent.

This course examines important and timely issues around popular culture and education with a focus on film, television, music, and students and teachers. The class will explore popular culture images of students and teachers and how these influence societal views of teaching and learning, analyze classroom practices with popular culture and develop skills and understanding applicable to teaching, study the history of film and television, and investigate issues of media literacy both in and out of the classroom.

5369. The Teaching and Learning of Mathematical Problem Solving

Three credits.

Focuses on the processes involved in mathematical thinking and mathematical problem solving. Classroom discussions will address those aspects associated with expert problem solving-domain knowledge, problem solving skills, metacognition (belief and issues of control), and aesthetic judgements. Students will have an opportunity to discuss and solve various types of mathematics problems and develop instructional strategies to teach and assess mathematical problem solving at the middle and secondary school levels.

5450. The Teaching and Learning of Mathematics in the Secondary School

Three credits.

Examination of current approaches to the teaching and learning of mathematics in the

secondary school. Emphasis will be placed on issues surrounding content knowledge, curriculum, pedagogy, epistemology, assessment, and technology with respect to recent national initiatives and instructional techniques impacting on the secondary school mathematics curriculum.

5455. Curricula in Mathematics Education

Three credits.

Exploration of significant curricula in mathematics education for teachers and supervisors of mathematics. Emphasis is placed on research and development related to content and techniques.

5460. The Teaching and Learning of Mathematics in the Elementary School

Three credits.

Investigates the teaching and learning of mathematics in the elementary school. Emphasis will be placed on issues surrounding content knowledge, curriculum, pedagogy, epistemology, assessment, and technology with respect to national initiatives and instructional techniques impacting elementary school mathematics.

5465. The Teaching and Learning of Mathematics in the Middle School

Three credits.

Investigates the teaching and learning of mathematics in the middle school. Emphasis will be placed on issues surrounding content knowledge, curriculum, pedagogy, epistemology, assessment, and technology with respect to national initiatives and instructional techniques impacting middle school mathematics.

5500. Teaching Science in the Middle and Secondary School

Three credits.

Materials and advanced methods in the teaching of science in grades 7-12.

5505. Materials and Methods in the Teaching of Elementary School Science

Three credits.

A systematic examination of major science and curriculum program for the elementary school, the selection and design of materials, the development of teaching techniques.

5550. Problems in the Teaching of Science

Three credits.

Theories of teaching science with emphasis on studies of research related to current problems.

5555. Environmental Education

Three credits.

Exploration of state, national, and international environmental issues and instructional approaches for developing student awareness, knowledge, and concern for the environment, K-12. Includes classroom and field study.

5700. Foundations of Bilingual Education

Three credits.

Study of the political, social and legal aspects of bilingual education, including principles of second language acquisition.

5705. Curricular Issues in Bilingual Education

Three credits.

Current approaches, methods and techniques with respect to curricular issues in contemporary bilingual education programs.

5715. Bilingualism and Second Language Acquisition

Three credits.

Developmental sequences and theories of first and second language acquisition.

5720. Bilingual Education and Biliteracy

Three credits.

Current methods, strategies and techniques of reading in the mother tongue (L1); transfer of reading skills into English (L2); and, evaluation and adaptation of L1 and L2 reading materials. Principles of second language acquisition.

5740. Latinos and U.S. Education

Three credits.

Conditions of schooling Latinos in the U.S. educational system via an historical and economic context, including principles of second language acquisition. Policy issues and theoretical discussions of underachievement. Relationship between dominant and subordinate cultures and their effect on classroom discourses.

5742. Sheltered English Instruction for English Language Learners

Three credits.

Current approaches and techniques with respect to academic language development in sheltered environments. This course attempts to disclose the most important issues surrounding content area teaching for English Language Learners (ELLs). Special attention is placed on the teaching of mathematics, science, and literacy in English for second language learners, including second language acquisition and development within the content areas.

5750. Language Diversity and Literacy

Three credits.

Overview of issues and debates concerning the theory and practice of literacy development for non-native English speaking students in the United States. Includes principles of second language acquisition.

5755. Teaching English as a Second Language

Three credits.

Examination of current research on the acquisition and learning of English as a second language (ESL) in school settings. Critical issues in the application of research on ESL to the bilingual classroom are discussed.

5765. Assessment of Bilingualism

Three credits.

Principles of assessment for bilingual learners, including language proficiency and dominance, (b) literacy development, and academic content knowledge. Current assessment approaches for bilingual learners in different context (e.g., bilingual, ESL classes) and for various purposes (e.g., screening, placement, evaluation). Principles of second language acquisition.

5802. Lectures in Education

One credit.

A course in which staff members and authorities in education and related fields discuss selected problems.

5804. Curriculum Planning

Three credits.

Examines teachers' issues and problems from real-life cases with theoretical perspectives and pedagogical methods.

5810. Workshop in Education

Variable (1-3) credits. May be repeated for a maximum of nine credits. Students taking

this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Professional personnel to work cooperatively on problems arising out of actual school situations.

5820. Media Literacy in an Information Age

Three credits.

Study of the growing field of media literacy and the media's influence upon our culture and education. Includes major principles, development of media analysis skills, and integration with the school curriculum.

5825. Enhancing Classroom Curriculum with Computers and Electronic Media

Three credits.

Effective use of microcomputers and other electronic media to strengthen and enhance classroom instruction in the basic content and skill areas. Emphasis upon specific curriculum applications of technology rather than on its basic operation, mechanics, and programming.

5830. Curriculum Laboratory

Variable (1-6) credits. May be repeated for a maximum of nine credits.

Open to teachers and administrators seeking practical solutions to curriculum problems in elementary and secondary schools. Reorganization of courses, reorientation of the program of studies, articulation of administrative units, and development of new materials are considered in relation to the local situation. Students make individual studies of their specific problems, and group studies of related problems.

5845. Seminar in International Education

Three credits.

Concentrated study of culture and education in a major geographical region such as Africa, Asia, or Latin America; or cross-cultural studies of educational issues.

5850. Introduction to Curriculum

Three credits.

Philosophy, theory, and practice employed in curriculum development and change.

5875. Multicultural Education

Three credits.

Interrelationships between education and various sociocultural aspects of cultural diversity and cultural pluralism, including language acquisition and diversity.

5885. Introduction to Critical Pedagogy

Three credits.

Theory and practice in teaching for social justice with an emphasis on issues of class, race, gender and ethnicity.

5890. Educational Linguistics

Three credits.

Overview of the study of language and linguistics, and especially applied linguistics, with emphasis on their implications for classroom teacher. Includes principles of second language acquisition.

5895. Language Ideology and Education

Three credits.

Interrelationship among language, ideology, education and society, including examination of issues of social classes, ethnicity, gender, social context, power, and politics. Also covered are literacy, language prescriptivism and standardization, language policy and discourse in

critical perspective. Principles of second language acquisition.

6000. Qualitative Methods of Educational Research

Three credits.

Purposes and nature of qualitative research, including selected techniques for conducting various types of qualitative and naturalistic research in educational settings.

6005. Advanced Methods of Qualitative Research

Three credits.

Field-based methods of collecting data in qualitative research studies in educational settings, coding and analysis of qualitative data, use of computer programs to analyze data, and methods and procedures for ensuring trustworthiness in qualitative research.

6010. Writing for Educational Publications

Three credits.

Designing, writing, editing, and marketing material for professional publication.

6092. Practicum

Variable (1-6) credits.

The implementation and application of theory in the student's area of specialization.

6094. Seminar

Variable (1-6) credits. May be repeated for a maximum of nine credits.

Cooperative study of developments and problems in the student's area of specialization.

6200. Theoretical Foundations of Teaching English

Three credits.

A sociocognitive perspective on teaching the English language arts, including the historical, sociological, linguistic, and psychological foundations of teaching English.

6410. Learning Theories for Mathematics Instruction

Three credits. Prerequisite: EPSY 5510.

Examines various learning theories and their influence on mathematics instruction. In particular, understanding the processes involved in mathematical thinking, the impact of learning theory on mathematics instruction, expert-novice models of mathematical behavior, and ways to enhance mathematics learning in the classroom.

6415. Research in Mathematics Education

Three credits.

Analysis of research in mathematics education, methods of research, and design and research studies.

6500. Research in Science Education

Three credits.

An analysis of current research in science education. Emphasis on evaluation of research as well as the design and implementation of research.

6860. Research in Multicultural Education

Three credits.

Advanced study in the processes and findings of research in multicultural education.

Educational Leadership (EDLR)

5085. Capstone Project in Sport Management

Variable (1-6) credits. Prerequisite: Open only to Kinesiology M.A. students in the Sport Management concentration who have completed

all coursework toward the degree and are in the final semester; instructor consent.

Students develop and present a semester-long research project in an area of sport management.

5001. Lectures in Education

One credit.

A course in which staff members and authorities in education and related fields discuss selected problems.

5002. Workshop in Education

Variable (1-6) credits. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Professional personnel to work cooperatively on problems arising out of actual school situations.

5015. Teacher Leadership and Organizations

Three credits.

Teachers' role in providing leadership that extends beyond the walls of the individual classroom and includes collaboration with other adults.

5091. Internship

Six credits. May be repeated for credit.

The application and implementation in a work situation of theories and practices related to the student's area of specialization.

5092. Practicum: Administrative Field Experience

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Provides an opportunity for educators who wish to become administrators of educational organizations to become familiar with the functions and tasks that certified administrators perform. Intended primarily for Sixth-Year students.

5094. Seminar

Three credits. May be repeated for a maximum of 12 credits.

Analysis of the issues and research in the field of education. Open primarily to Master's and Sixth-Year students.

5099. Independent Study in Education

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Students requesting this course should have a significant background in education and should present to the instructor problems, well-defined and well laid out for investigation, which hold special interest for them and which will be pursued on the plan of advanced study.

5102. Assessment, Evaluation, and Research in Student Affairs I

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

The role of assessment and evaluation to address current student affairs issues in higher education settings. Focus on skill development in problem identification, research question formulation, qualitative design, interview protocol development, and critique and applications of professional literature.

5103. Assessment, Evaluation, and Research in Student Affairs II

Three credits. Prerequisite: EDLR 5102; open only to Higher Education and Student Affairs M.A. students; instructor consent.

Application of assessment and evaluation research methodologies to address genuine problems in student affairs contexts. Focus on development of theoretical framework, quantitative methods, reporting results, and formulating recommendations for improving practice and policy.

5105. Structured Group Dialogue in Student Affairs

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

Explore basic approaches to structured intergroup and intragroup dynamics and implications for personal and educational development of students and student affairs professionals.

5107. Resource Management in Student Affairs Administration

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

Analysis of higher education resource development and management with an emphasis on issues in student affairs administration; including, financial management and analysis, human resource management, and management of information technology resources.

5108. Leadership Challenges in Higher Education

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

Application of leadership theory to challenges faced by higher education professionals. By developing critical thinking and problem solving skills, students will learn to identify a crisis, provide leadership for crisis management, and utilize methods of managing communication regarding incidents.

5112. Alcohol and Other Drugs and their Influence on Higher Education

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

Examination of alcohol and other drug issues in higher education, substance abuse, and modalities of intervention for individual students. Includes current research on the complexity of environmental, cultural, and political issues of alcohol and other drug uses on college campuses.

5113. College and University Environments

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

Seminar designed to explore various institutional types, missions, and cultures including private liberal arts colleges, community colleges, comprehensive, research-extensive and special purpose universities. Primary emphasis is on the effect of institutional structure on higher education and student affairs administration.

5114. Access to Higher Education

Three credits.

Provides students with an opportunity to examine and discuss research on individual, institutional, and political factors that are known to impact participation in higher education. Particular attention is given to stratification in higher education including but not limited to the historical and legal context of access; points of access;

pathways to higher education; state and federal policies; and college affordability. In addition to learning and discussing various topics related to college access, students in the course will engage in indirect or direct service around college access in the local community.

5117. The College Student

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students.

Characteristics of today's college students. Student behavior theory. Impact of college on students.

5118. Seminar in Higher Education

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students.

Seminar designed to promote the integration of the core curriculum and practitioner experiences of the Master's degree program in Higher Education and Student Affairs and to prepare students for transition to professional positions within student affairs upon graduation.

5119. The Law, Ethics, and Decision-making in Student Affairs

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students.

Survey of case law and statutory provisions related to higher education with a focus on student affairs administration. Students will develop an understanding of ethical decision-making and its application to relevant student affairs scenarios.

5121. Introduction to Student Services in Higher Education

Three credits. Prerequisite: Open only to Professional Higher Education Administration students.

A survey of student services and personnel functions in higher education, including an examination of philosophies, goals, objectives and procedures.

5122. College Student Development: Programs and Services

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

History and philosophy of student personnel work related to contemporary and projected student developmental programs and services. Rights, freedoms and responsibilities of students in relation to the college.

5123. Administration of Student Affairs in Higher Education

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students.

Administration of student affairs and services and applications of student development theory in the college community.

5124. Higher Education in Film

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students; instructor consent.

An exploration of the portrayals of higher education in film, this course will establish a theoretical base for evaluating film and apply the constructs as a means for understanding the college experience. Focus on applications of film as a tool for student learning and programming.

5125. Issues in Student Affairs Administration

Three credits. Prerequisite: Open only to Professional Higher Education Administration students.

An examination of issues that affect the new student affairs administrator. Topics vary per semester.

5126. Leading Toward a Multicultural Educational Environment

Three credits. Prerequisite: Open only to Higher Education and Student Affairs M.A. students.

American higher education continually struggles with issues of difference, particularly racial, ethnic, gender, ability, religion, sexual orientation, and other cultural differences. Course participants are challenged to reflect on their personal experiences and examine their values, beliefs, and attitudes with regard to multicultural difference as a means to deepen a critical understanding of multicultural issues in higher education.

5201. Influences on Adult Learning

Three credits. Prerequisite: Instructor consent.

Interaction of person and environment. Culture. Role of environment. Situational barriers. Motivation. Self-regulation. Personality. Gender. Life transitions. Self-directed learning.

5202. Workplace Learning

Three credits.

Trends in workplace learning and workforce development. Conceptual models of performance improvement and transfer of training. Focus on individual, work team, and organizational variables related to learning, performance, and transfer of training.

5203. The Brain, Experience, and Adult Learning

Three credits.

Four learning systems within the brain. Role of experience in learning. Implications for adult learning and professional development programs.

5204. Organizational Learning

Three credits.

Group and collective learning in organizational settings, with an emphasis on adaptive and generative learning processes.

5205. Professional Development

Three credits.

Using research on how adults learn best and principles of human resource development to implement effective, job-imbedded professional development programs. Using professional development to advance organizational goals. Examination of best practices.

5206. Development of Programs for Adult and Human Resource Education

Three credits. Prerequisite: Instructor consent.

Program development for adult learners; emphasis on collaborative planning, needs assessment, effective learning strategies, transfer of training, evaluation, principles of good practice.

5207. Methods for Facilitating Adult Learning

Three credits. Recommended preparation: EDLR 5201.

Focuses on principles and practices of adult learning facilitation, including situational and methodological factors that impact how adults learn in conventional and multimedia contexts.

5300. Management of Sport Services

Three credits.

Management processes and practices involved in operating sport organizations.

5301. The School Principalship (K-12)

Three credits.

Roles and functions of the principal, problem solving, decision-making, school culture, curriculum leadership.

5302. Program Evaluation for School Improvement

Three credits.

Program evaluation issues critical to effective school leadership.

5303. Supervision of Educational Organizations

Three credits.

Supervision models; teacher selection and induction; teacher evaluation; staff development and organizational change.

5304. Curriculum Laboratory

Variable (1-3) credits.

Open to teachers and administrators seeking practical solutions to curriculum problems in elementary and secondary schools. Reorganization of courses, reorientation of the program of studies, articulation of administrative units, and development of new materials are considered in relation to the local situation. Students make individual studies of their specific problems, and group studies of related problems.

5305. Legal Aspects of Education

Two credits.

Legal status of public schools; legal rights and responsibilities of administrators, parents, students, school board members, and teachers.

5306. School Leadership and Administration of Educational Organizations

Three credits.

Introduces students to concepts and skills which are fundamental to the successful administration of educational organizations. Provides pragmatic knowledge which will give students an understanding and appreciation of the complexity of educational organizations. Uses Bolman and Deal's conceptual framework (multi-frame thinking) which borrows ideas from sociology, management science, psychology, political science as well as social and cultural anthropology.

5307. Contemporary Educational Policy Issues

Three credits.

Study of current educational policy issues.

5308. Psychological Foundations of Education

Three credits.

Learning and related psychological theories and their implications for curriculum, teaching methods, and other aspects of educational practices.

5310. Creating and Sustaining a Positive School Climate

Three credits. Prerequisite: Department consent.

Gives aspiring school administrators practices and processes for establishing and sustaining a positive school climate for the purpose of improving student achievement. The aspiring school administrator will recognize the necessity of developing a clear vision for education and applying it when building a positive school culture.

5315. Sport in Society

Three credits.

The structure and function of sport as an institution, including issues and controversies

involving gender, race, and intercollegiate, professional, and children's sports.

5325. Legal Aspects of Sport

Three credits.

Tort law principles specific to sport, fitness and recreational activities.

5340. Educational Planning

Three credits.

An overview of the educational planning process and its relationship to the concepts of systems and futurism. Attention will be given to specific planning models and techniques such as needs assessment, PERT, PPBS, MBO, delphi, ZBB, and cost benefit analysis.

5342. Effective Departmental Leadership

Three credits.

Concepts and practices required of departmental leaders in today's secondary schools.

5343. Women, Education and Social Change

Three credits.

Examination of the lives of girls and women as students, teachers and academics. Emergence of teaching as a hierarchically sex-segregated profession. Effect of gender on the status and organization of the profession. Changing women's roles and social ideologies as related to women's educational aspirations, career achievement and leadership.

5344. Time Management and Personal Organization

Three credits.

Principles and practices of time management. Including interdisciplinary studies relating time usage to organizational behavior and personal effectiveness.

5346. Personnel Evaluation

Three credits.

Issues critical to the design and implementation of effective personnel evaluation programs.

5347. Improving Teacher Evaluation Practice

Three credits.

Improving the teacher evaluation skills of principals and department heads through guided practice experiences that allow them to reflect on what they are doing now in light of promising alternatives.

5349. Issues in Teacher Assessment and Evaluation

Three credits.

Critical review and analysis of current issues and emerging methodologies in teacher assessment and evaluation.

5351. Budgeting and Resource Management

Three credits.

Analysis of educational budget formats: program, capital, function, objective and zero based; budget planning, procedures, forms, documents, codes; political-economic issues in educational budgeting; case studies of program budgeting and site-based budgeting in education; cost reduction and analysis; resource management research.

5354. Human Resources Administration

Three credits.

Study of personnel management in education, including current laws, policies, practices and problems such as recruitment, tenure, promotion, retirement; performance evaluation; motivation; salary, benefits, welfare; staff development; data

collection; layoff procedures; grievances; contract administration.

5355. Seminar in Change and Innovation in Education

Three credits.

Innovation has been widely acknowledged as a driving force in all areas of human activity. The need for innovation in business receives much of this attention, but the need for creative solutions to vexing problems has also been noted in human services, such as education, social welfare, etc. Introduces current and future educational leaders to the ways in which creativity and change leadership can help them promote real, lasting change in their work.

5360. Leadership in Sport Organizations

Three credits.

Examines multiple perspectives of leadership, from original theories of leadership through to the most contemporary forms of collaborative and team-based leadership. Examines the personal, interpersonal, and team-based skills that are required in leadership roles. Explores the practice of effective leadership, understanding how leadership roles require different skills during times of change or crisis, and in different contexts (intercollegiate, professional, sport for development, etc.).

5365. Managing Diversity in Sport Organizations

Three credits.

Managing sport as a social and cultural phenomenon. Using management theories, sociological concepts and critical thinking to investigate such issues as: how sport impacts our ideas about masculinity, femininity, sexual orientation, class inequality, race and ethnicity, dis/ability, achievement, competition, and individualism; how the organization and management of sport is connected with social relations in groups and societies; and how sport extends beyond competitive outcomes and deals with issues of power and power relations in society.

5370. Ethical Leadership in Sport Organizations

Three credits.

A broad understanding of ethics, ethical theory development and the importance and relevance of ethics to the sport management profession. Students will examine ethical frameworks as they relate to the sport industry, the environment, and the individual within a sport organization. Students will work to develop personal and professional codes of ethics and ethical leadership based on sound ethical theory, and apply critical thinking and ethical decision making skills to contemporary ethical and legal issues within the sport context.

5375. Strategic Human Resource Management in Sport Organizations

Three credits.

Sport management is the coordination of several factors and the most significant of those factors is human resources. Students will understand that managing human resources requires more knowledge, time, and patience than managing any other resource. Students will examine the technical and legal aspects of human resource management from a strategic sport business perspective. They will learn from faculty and industry professionals on how to direct a sport organization through decisions on staffing patterns and responsibilities, evaluation of and rewards for performance, and

establishing a fair and just work environment. Emphasis on how to integrate human resource management into overall strategy in a sport organization.

5380. Sport Marketing

Three credits.

Examines the application of marketing principles to collegiate and professional sport, event promotions, and commercial and public organizations.

5385. Sport Facility and Event Management

Three credits.

Examines all aspects of the management of sport facilities and events, including development, planning, staffing, operations, and evaluation.

5518. Introduction to Sport Based Youth Development

Four credits. Prerequisite: Instructor consent.

This is a service learning course that requires both classroom participation and community involvement.

6001. Legal Issues in Student and Parent Rights

Three credits.

Examines the legal issues that arise with respect to student and parent rights, such as search and seizure, student discipline, speech and religion, and homeless children.

6002. Legal Issues in School Employment

Three credits.

Examines the legal issues that arise with regards to employment in K-12 education, such as tenure, employment discrimination, due process, and collective bargaining.

6004. Legal Issues in Educational Technology

Three credits.

Examines the legal issues that arise with respect to special education in K-12 education, such as intellectual property, social media, cyberbullying, sexting and virtual schools.

6050. Dissertation Proposal/Prospectus Development I

Three credits. Prerequisite: Department consent.

Open to students enrolled in doctoral programs. Systematic development of dissertation proposal components, including Introduction, Problem Statement, Conceptual Framework and/or Review of Literature, and Research Questions.

6051. Dissertation Proposal/Prospectus Development II

Three credits. Prerequisite: Department consent.

Open to students enrolled in doctoral programs. Systematic development of dissertation proposal components, including Methodology, Methods, Procedures, Limitations, all related appendices, IRB application, and proposal defense.

6052. Qualitative Methods of Educational Research II

Three credits. Prerequisite: EDCI 6000.

Companion to EDCI 6000. Provides the opportunity for students to more closely examine qualitative methodology and methods to ensure that students are able to synthesize an analysis of qualitative data. Specifically, students will generate credible units from narrative and visual data and develop categories from the units through comparing, contrasting, aggregating, and ordering data. Students will present findings in a chronological or thematic case example or case

history, in an essay formulated around topics or theses, or in an alternative format appropriate to the analysis.

6054. Inquiry and Research in Educational Leadership I: Foundations, Design, and Use

Three credits. Prerequisite: Open only to Educational Leadership Ed.D. students.

Explicates knowledge production through systematic inquiry in education, including processes, questions, and strategies used to conduct meaningful research in schools. Explores the intersection of theory and practice with emphasis placed on the critical analysis and interpretation of the research literature to the practice of school leadership.

6055. Inquiry and Research in Educational Leadership I: Implementation, Analysis, and Discovery

Three credits. Prerequisite: Open only to Educational Leadership Ed.D. students.

A continuation of EDCI 6054. Elaborates the strategies and tools used to conduct meaningful research in schools with emphasis in the actual conduct of research in school settings. Explores the link between research findings and the improvement of practice.

6092. Practicum

Variable (1-9) credits. May be repeated for credit.

The implementation and application of theory in the student's area of specialization.

6094. Seminar

Variable (1-3) credits. May be repeated for a total of 12 credits.

Cooperative study of developments and problems in the student's area of specialization.

6201. Strategic Applications of Adult Learning

Three credits. Prerequisite: EDLR 5201, 5202, 5203, and 5204; open only to students in the Adult Learning graduate program; instructor consent.

Case study analysis and live case study consultation to develop innovative approaches to adult learning to address the challenges of employee development in corporate, education, public sector, and private sector settings

6202. Research Seminar in Adult and Vocational Education

One credit.

Advanced research issues in adult learning.

6300. Organizational Theory in Sport

Three credits. Prerequisite: Open only to doctoral students with instructor consent.

Exposes students to some critical areas of management and the theories associated with these areas.

6301. School District Executive Leadership

Three credits. May be repeated for a maximum of six credits.

Seminar and practicum experiences focusing on leadership and policy issues facing school superintendents, central office administrators, and senior state education agency officials.

6302. School District Policy, Politics, and Governance

Three credits. Prerequisite: Instructor consent.

Study of educational policy and school governance; the politics of educational administration; reform; finance; and the processes of district policy formulation, implementation,

and analysis. Specific school district policy and governance issues are examined.

6303. Data-Driven Decision Making for School Improvement and Policy Development

Three credits. Prerequisite: Instructor consent.

Provides school leaders with the knowledge necessary to improve instructional programs and improve policy by relying on data-driven strategies and tools. The course meets in seminar/lab format with students working on data-driven problems, analyses and developing action plans as a result. Students work on several case studies and a major project of personal, professional significance.

6304. Financial and Human Resources Management in Education

Three credits. Prerequisite: Instructor consent.

Study of human resources development practices in school systems, with emphases on central office and school unit responsibilities for attracting, selecting, developing, evaluating, and retaining competent faculty and staff. This course also includes the study of concepts in school finance and school business management. Attention is given to national, state, and local issues. Emphasis is also given to school support services including transportation, faculty planning and maintenance, food service, and risk management.

6310. Organizational Behavior in Sport

Three credits. Prerequisite: Open only to doctoral students with instructor consent.

A discourse on theories related to behavior of individuals and groups in sport and exercise organizations.

6311. Organizational Behavior in Educational Administration

Three credits.

Advanced course focusing on interdisciplinary research about organizations, leadership behavior, and management processes.

6312. Leadership for Teaching and Learning: The Role of the Leader in School Improvement

Three credits.

Explores leadership skills required to improve instruction and student learning in the school and district. Students develop and apply models to address an instruction/achievement issue in practice.

6313. Educational Policy and Politics

Three credits.

Study of educational policy; the politics of educational administration; and the processes of policy formulation, implementation and analysis. Specific educational policy areas are examined.

6314. Legal Issues in Organizational Management

Three credits. Prerequisite: Open only to Educational Leadership Ed.D. students.

The legal process and understanding of legal issues in education involving students, teachers, and boards of education.

6315. Current Research in Sport Management

Three credits. Prerequisite: Open only to doctoral students with instructor consent.

Research in the field of sport management. Each week one or more researchers will present their completed work, studies in progress, or proposed research.

6320. Micro Theories for Policy Research

Three credits. Prerequisite: Instructor consent.

Theoretical perspectives on policy formulation and implementation. Case examples illuminate the origin, development, and interpretation of policies by various policy actors across a range of contexts.

6321. Evaluation Theory

Three credits. Prerequisite: Instructor consent.

Addresses conceptual underpinnings of contemporary approaches to evaluation. Major theories of evaluation in education policy are examined through a case study approach.

6322. Economics of Education Reform

(Also offered as PP 5337.) Three credits. Prerequisite: Instructor consent.

Examines a number of prominent education reform strategies, using economics as a lens through which to understand the motivations for and potential impacts of each. Economics enables us to focus on the incentives created by these policies, allowing us to predict their intended and unintended consequences. We will utilize this framework throughout the course as we read about and evaluate the effectiveness of various educational interventions and policy reforms. Topics include (among others): class size reduction, teacher quality and teacher certification, merit pay, school accountability, school choice, school finance reform, early childhood education, and topics in higher education.

6323. Seminar in the History of K-12 Education Reforms, 1890-present

Three credits. Prerequisite: Instructor consent.

Seminar examining the history of K-12 education reforms from the 1890s to the present day.

6460. Collective Bargaining in Education

Three credits.

This course concerns resolving conflict through self-help, negotiations and arbitration, understanding the Teacher Negotiations Law and methods of dealing with impasses under the law. The course also deals with preparing for negotiations by teacher unions and boards of education.

6461. Resources Management II

Three credits. Prerequisite: Instructor consent.

Students will apply the principles of financial and human resources management to advanced educational leadership positions.

6462. Legal Issues in Human Resources Administration for School Leaders

Three credits. Prerequisite: Instructor consent.

Provides legal bases for human resources decision-making through reading of primary source materials (statutes, administrative decisions, judicial decisions) and related materials, and related class discussion. Provides students with practical experience in analysis and advocacy in human resource disputes, through mock negotiations, writing model briefs and conducting mock hearings.

6464. Seminar: Leadership and School Organizations

Three credits.

Study of organizations and leadership from the perspective of the humanities and the social and behavioral sciences.

6465. Educational Administration Issues and Research

Three credits. Prerequisite: EPSY 5605, 5607, and 6601. May be repeated once for credit.

Designing educational research studies; current topics in school administration. Ordinarily meets for 10 full days for special research activities.

6466. Policies for Improvement: Mobilizing School and Community

Three credits.

Advanced seminar explores perspectives on the policy environment for school improvement. Students identify policy issues, collect data, conduct analyses, and propose actions.

6467. Social Justice Leadership, Equity and School Change

Three credits.

Exploration of various tenets, theoretical tensions, and transformative applications of social justice leadership in American education.

Educational Psychology (EPSY)

5092. Practicum

Variable (1-6) credits. Prerequisite: Open to master's and Sixth-Year students. May be repeated for credit.

The implementation and application of theory in the student's area of specialization.

5107. Curriculum Issues in Special Education

Three credits.

Program and curriculum planning for students with moderate to mild disabilities with particular attention given to relating individual education plans to school curricula.

5108. Students with Special Needs in the Classroom Environment

Three credits.

Methods for identifying, planning for, and working effectively with children with special needs in the general education classroom. Intended for non-SPED majors only.

5113. Beginning Reading Supports for Students with Learning Difficulties

Three credits. May be repeated for a maximum of six credits.

Provides graduate level students with knowledge and skills related to supporting early reading success for students with disabilities and at risk for experiencing learning difficulties.

5114. Adolescent Reading Supports for Students with Learning Difficulties

Three credits. May be repeated for a maximum of six credits.

Research-based instructional interventions and infrastructure supports (e.g., SRBI, RtI) necessary to improve reading comprehension outcomes for struggling adolescent readers including students with high-incidence disabilities.

5115. Writing Supports for Students with Learning Difficulties

Three credits. May be repeated for a maximum of six credits.

Writing instruction and assessment designed to support K-12 students who are at-risk for or experiencing learning difficulties or disabilities, with an emphasis on incorporating evidence-based methods into a rich, engaging, and meaningful writing curriculum.

5116. Assessment in Special Education

Three credits.

Application of assessment in special education focusing on current purposes, policies, and practices in schools.

5119. Policy, Law, and Ethics in Special Education

Three credits.

The impact of policy and law on the professional role of special educators.

5121. Developmental Foundations of Exceptionality

Three credits.

An exploration of the link between normative theory and research in child development with assessment, understanding, and intervention for children and youth with exceptionalities.

5123. Instructional Strategies and Adaptations for Students with Special Learning Needs

Three credits.

Principles and practices for the provision of effective instruction for students with special learning needs.

5127. Administrative Supervision in Special Education

Three credits.

Administrative supervision in special education.

5135. Creating and Sustaining a Positive School Climate

Three credits. Prerequisite: Open only to students in the UConn Administrator Preparation Program; instructor consent.

Designed to help aspiring school administrators develop practices and processes for establishing and sustaining a positive school climate for the purpose of improving student achievement.

5138. Responding to Violence in the Schools

One credit.

Addresses how incidences of violence in the schools can be prevented, contained, and kept at a minimum with prevention programs, and immediate interventions to contain incidents of violence.

5140. Transition Planning for Students with Disabilities

Three credits.

An examination of relevant legislation and recommended practices related to person-centered transition planning for students with disabilities in post-school and adult life, including postsecondary education, employment, community participation, and independent living.

5142. Individualized Positive Behavior Support

Three credits. Prerequisite: EPSY 5141.

Approaches for adapting programs to the behavioral, social and emotional needs of exceptional learners.

5141. Classroom and Behavior Management for Special Educators

Three credits.

An introduction to Positive Behavior Interventions and Supports (PBIS), including theoretical and empirical support, three-tiered model, and implementation strategies.

5145. Issues in Postsecondary Disability Services

Three credits.

An examination of issues relating to the assurance of equal educational access for students with disabilities in postsecondary settings.

5146. Advanced Topics in Secondary Transition

Three credits.

An in-depth overview of the transition planning process. Highlights the importance of person-centered planning, encouraging self-determination, and involving individuals and families in the assessment and transition programming process.

5160. Considerations in the Provision of Assistive Technology

Three credits.

Considering assistive technology in the educational environment and the scope of activities involved in considering whether assistive technology is needed for a student to receive a free and appropriate education. This course is a required prerequisite for all other course work in the assistive technology emphasis.

5161. Assistive Technology for Access

Three credits. Prerequisite: EPSY 5160.

Introduction to alternate access to the computer as a tool for the performance of educational tasks. Exploration of alternate and adaptive pointing and keyboard devices as well as software to enhance accessibility and productivity for persons with motor impairment, sensory challenges, and cognitive difficulties. Assistive technology solutions and applications for persons with significant disabilities in the educational environment.

5163. Assistive Technology for the Struggling Learner

Three credits. Prerequisite: EPSY 5160.

Use of assistive technology tools across a continuum of low to mid to high tech aid in the efficiency, organization, and productivity of the struggling learner.

5170. Family Centered Practices in Early Childhood Intervention

Three credits. Prerequisite: Instructor consent.

Illustrates the centrality of the family in the life of infants and young children with disabilities and, subsequently, early childhood intervention. This course relies on outside readings, discussions, and completion of performance-based competencies where concepts are interpreted and applied to early childhood intervention.

5171. Evaluation and Assessment of Infants and Young Children with Disabilities or Delayed Development

Three credits. Prerequisite: Instructor consent.

Designed for students who are preparing to work with infants and young children who have disabilities (birth through age five) and their families. Focuses on five functions of assessment relative to young children with disabilities: identification and referral, evaluation to determine eligibility for special education, assessment for program planning, monitoring of individual child progress and program evaluation.

5172. Intervention of Early Childhood Disabilities or Delayed Development and Their Families

Three credits. Prerequisite: Instructor consent.

Illustrates the importance of well planned and executed interventions for infants and young children with high needs and/or disabilities who receive early childhood services under

the Individuals with Disabilities Education Act (IDEA). Creation of intervention programs with integrated (across developmental domains) outcomes that stem from a functional assessment and a collaborative team process. This includes interventions and services designed to maximize natural learning opportunities and the use of evaluation tools and progress monitoring for individual children and families as required for federal reporting. Outside readings, class discussions, interactive web-based assignments and completion of performance-based competencies where concepts are interpreted and applied to infants and young children and their families.

5173. Teaching and Collaborating of Infants and Young Children with Disabilities and their Families

Three credits. Prerequisite: Instructor consent.

Provides a foundation for the inclusion of infants and young children with disabilities and their families into inclusive community settings and programs. Inherent within this framework is the ability for personnel to demonstrate strategic planning to accomplish this on a family, community and program. Outside readings, in-class activities, and individual and group applications of competencies.

5183. Lectures in Education

One credit.

Staff members and authorities in education and related fields discuss selected problems.

5187. Clinical Experiences in Integrated Settings

Variable (1-6) credits.

An intensive supervised clinical experience that provides opportunities for students to plan and deliver integrated programs for students with and without special needs. A cooperative venture between the School of Education and the Professional Development Centers (public schools).

5188. School-based Practicum in Communication Disorders

Six credits. Prerequisite: Open only to Communication Disorders M.A. students; instructor consent.

100 clock hours of practicum in assessment, treatment, and prevention of communication disorders in children PreK-Grade 12.

5194. Seminar

Three credits. Prerequisite: Open to master's and Sixth-Year students. May be repeated for credit.

Analysis of the issues and research in the field of education.

5195. Workshop in Education

Variable (1-3) credits. May be repeated for credit.

Professional personnel to work cooperatively on problems arising out of actual school situations.

5198. Curriculum Laboratory

Variable (1-6) credits. May be repeated for credit.

Reorganization of courses, reorientation of the program of studies, articulation of administrative units, and development of new materials are considered in relation to the local situation. Students make individual studies of their specific problems, and group studies of related problems.

5199. Independent Study in Education

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

Students requesting this course should have a significant background in education and should present to the instructor problems, well-defined and well laid out for investigation, which hold special interest for them and which will be pursued on the plane of advanced study.

5210. Learning with Technology

Three credits.

Uses a problem-based design format to integrate learning theory and principles with educational technology to develop an integrated lesson plan in a content area. Students select meaningful authentic problems to integrate.

5215. Professional Seminar in Learning Technologies

Three credits. Prerequisite: Open to cohort members in the Two-Summers Master's Program.

Professional issues in the wise integration of learning technologies to classroom instruction.

5220. Introduction to Educational Technology

Three credits.

Instructional applications of productivity software and educational technology.

5225. Learning Technology Applied in Schools

Three credits. Prerequisite: Open only to students in the Two Summers program in Learning Technology.

Applied project work integrating technology into classroom instruction.

5230. Web-Based Learning

Three credits. Prerequisite: EPSY 5220, 5240, 5510, and 5520.

Design, development, delivery and evaluation of web-based instruction.

5235. Design and Production of Multimedia Presentations

Three credits.

Students will prepare presentations using slides, motion pictures, audiotapes and overhead transparencies; and will explore application of other technological developments to multimedia uses.

5240. Interactive Learning Environments

Three credits. Prerequisite: EPSY 5510 and 5220.

Broad overview of the interactive learning environments (ILEs) that are being used in Education. Introduces students to current research in development and implementation of ILEs.

5245. Capstone Course in Learning Technologies

Three credits. Prerequisite: Open only to students in the Two Summers program in Learning Technology.

E-Portfolio preparation, technology-based professional development design, and program completion artifacts.

5250. Software Design and Evaluation

Three credits.

This course provides students with the knowledge and experience in design and evaluation of educational software.

5301. Group Processes in Counseling

Three credits.

Experiential and theoretical introduction to group process and dynamics.

5304. Foundations and Contents of School Counseling

Three credits.

Basic philosophical and professional premises of the counseling profession. History of counseling profession, counselor's roles and functions, role of research/theory in counseling, and professional ethics. Individual group, and preventive counseling approaches.

5306. Principles of Career Development in Counseling

Three credits.

Career development and career psychology. Adolescents and adults.

5307. Professional Orientation of School Counseling

Three credits.

Principles and practices of pupil personnel work in educational institutions including all aspects of pupil personnel services; the role of the school counselor as a pupil personnel worker; and as a consultant on teacher-pupil relations.

5308. Counseling: Theory and Practice

Three credits. Prerequisite: EPSY 5307.

Contemporary theories and practices of essential helping skills.

5309. Gender Role Conflict Issues for Helping Professionals

Three credits.

Intensive review of gender role socialization in a workshop setting, emphasizing men's and women's gender role conflicts across the life span. Lectures, readings, discussions, self-assessments, and media are used to explicate core concepts and themes.

5313. Multi-Cultural Parent-Professional Alliances

Three credits.

Alliance-building processes between helping professionals and parents. Multi-cultural relationship development.

5314. Appraisal Procedures in Counseling

Three credits. Prerequisite: EPSY 5306 and 5602.

Use of instruments for estimating abilities, achievements, interest and personality; interpretation of appraisal procedures in counseling.

5315. Counseling: Advanced Practice

Three credits. Prerequisite: EPSY 5308 Instructor consent required.

Continuing the work begun in EPSY 5308; to strengthen and extend helping skills.

5316. Cross-Cultural Counseling

Three credits. Prerequisite: EPSY 5308 and 5315.

Theories, skills and practices of counseling with culturally different persons in mental health settings.

5317. Field Work in Counseling and Personnel

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Supervised experience in counseling and related practices in schools and agencies with a concurrent supervisory seminar.

5318. Human Growth and Development over the Lifespan: Implications for Counselors

Three credits. Prerequisite: Department consent.

A review of human growth and development over the lifespan using psychosocial theory with an emphasis on individual and family transitions, learning processes, personality, developmental crises, gender role conflicts and transitions, ethical issues, and strategies to optimize human potential.

5319. School Counseling Internship

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Post practicum experience in school counseling under the supervision of a fully trained and certified professional school counselor for the duration of one school year along with an accompanying on-campus seminar. All core courses in the school counseling program must be completed prior to beginning the internship.

5320. Critical Issues in School Counseling

Three credits. Prerequisite: Instructor consent.

An introduction to the broad profession of counseling; the ethical standards of the American Counseling Association and the American School Counseling Association; and a review and analysis of the critical and emerging issues and incidents facing today's professional school counselors.

5339. Assistive Technology for Curriculum Access

Three credits.

Explores the range of assistive technology devices and software for curriculum access from the preschool through secondary environments.

5396. Directed Student Teaching for Students in the Teacher Certification Program for College Graduates

Nine credits. Prerequisite: Open only to students enrolled in the Teacher Certification Program for College Graduates; instructor consent.

Supervised student teaching in special education.

5402. Individual Differences in Learners

Three credits.

Foundations for individual differences among elementary and secondary school pupils.

5403. Intellectual Assessment

Three credits. Prerequisite or corequisite: EPSY 5602; open only to students in the School Psychology program; instructor consent.

Administration of the standard instruments of intellectual assessment and synthesis of the test information into an assessment report.

5404. Pupil Behavior: Studies in Clinical Diagnosis

Three credits. Prerequisite: Instructor consent.

Diagnosis of school problems, report writing for school purposes, and analysis of needs for referral.

5405. Applied Behavior Analysis

Three credits.

Introduction to theories and application of behavioral techniques.

5406. Consultation Theories and Practices

Three credits.

Theories and practices of professional consultation with an emphasis on actual interventions in schools, corporations and social service agencies.

5408. Ethics in Educational and Professional Psychology

Three credits.

Explores the nature of professional virtue in psychology and related educational and human service disciplines.

5491. School Psychology Internship

Variable (3-6) credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Post practicum experience in School Psychology under the supervision of a fully trained and certified professional School Psychologist for the duration of one school year along with an accompanying on-campus seminar. All core courses in the School Psychology program must be completed prior to beginning the internship.

5510. Learning: Its Implication for Education

Three credits.

Nature and types of learning, transfer of training, motivation, nature of instructional outcomes, with particular attention to individual differences among elementary and secondary school pupils.

5515. Professional Seminar in Cognition and Instruction

One credit. May be repeated for a maximum of three credits.

A professional seminar designed to present topics, paradigms, models, and theories in the various fields of educational psychology. The current research programs of the graduate faculty in Cognition and Instruction are presented for discussion in a seminar format.

5520. Instructional Design

Three credits.

Overview of the field of instructional design: instructional theories, prescriptive models, instructional strategies, issues and trends as they relate to the comprehensive development of instructional systems.

5530. Theories of Learning, Cognition and Instruction

Three credits.

Behavioral and cognitive psychology as it applies to instruction.

5540. Research Ethics in Education and Psychology

Two credits.

Ethical issues related to educational and psychological research, including working with institutional review boards, informed consent, deception research, conducting research, reporting research findings, sharing and storing data, record keeping, and APA, APS, ACA, and AERA ethics policies.

5601. Principles and Methods in Educational Research

Three credits.

Methods of research in education designed for Master's level students.

5602. Educational Tests and Measurements

Three credits.

The development of measurement and evaluation techniques.

5603. Methods of Inquiry

Three credits.

Fundamentals of qualitative and quantitative research in education.

5605. Quantitative Methods in Research I

Three credits.

Quantitative procedures and analysis of computer output including descriptive and inferential statistics through one-way analysis of variance.

5607. Quantitative Methods in Research II

Three credits.

Quantitative procedures and analysis of computer output including factorial analysis of

variance, analysis of covariance, and multiple regression.

5610. Applied Regression Analysis for the Education Sciences

Three credits.

Multiple regression analysis and related techniques with applications to research in education. Topics include assumptions and inference; matrix representations; diagnostics and remedial measures; polynomial regression and interaction models; treatment of categorical independent variables, autocorrelation of errors in time series data, problems of missing values and selection bias, and logistic and ordinal regression models.

5613. Multivariate Analysis in Educational Research

Three credits. Prerequisite: Instructor consent.

An extension of EPSY 5607. Practical emphasis on multiple regression, canonical correlation, multivariate analysis of variance and covariance, discriminant function analysis, and factor analysis.

5621. Construction of Evaluation Instruments

Three credits.

The theory and construction of assessment instruments in the affective domain.

5645. Computer Methods in Educational Research

Two credits. Prerequisite: EPSY 5605.

Introduction to the UConn mainframe and microcomputers, data preparation and verification, Job Control Language, XEdit procedures, and SPSS-X.

5671. School-Based Systems Interventions

Three credits.

Examination of current professional issues, theoretical models, and research related to the design interventions.

5710. Introduction to Gifted Education and Talent Development

Three credits.

Issues encountered in developing giftedness and talents in students: the nature of exceptional abilities, the history of special provisions, major scientific studies dealing with superior abilities, and contemporary educational systems and models.

5720. Developing Schoolwide Enrichment Programs

Three credits.

An overview of the theory and research behind and components within the Schoolwide Enrichment Model. Practical techniques for implementing the model in classrooms and school districts.

5740. Strategies for Differentiating the Grade Level Curriculum

Three credits.

Instructional and managerial techniques for use within or between classrooms to address learning differences among students. Strategies for improving academic achievement and success of diverse learners. Current and promising practices, as well as relevant research.

5750. Enhancing Creativity in the Classroom

Three credits.

The identification of creative thinking and problem solving and the development and implications of creativity training materials and teaching strategies for the classroom.

5760. Improving Students' Thinking Skills

Three credits.

Designed for teachers and administrators who wish to acquire more information about current research, trends and practices within the field of thinking skills instruction. An overview of the field, with special emphasis on research-based practices, major programs, and models for the improvement of thinking skills.

5780. Social and Emotional Components of Giftedness and Talent Development

Three credits.

Review of current research on affective growth and potential adjustment problems of gifted and talented youth. Vocational concerns, self-concept, self-esteem, and the teacher's role in preventing or remediating affective problems related to giftedness.

5850. Introduction to the Science of Creativity

Three credits.

Compare and contrast major definitions, theories and measures of creativity; to explain how creativity interacts with other related constructs (such as intelligence, personality and motivation); critique past empirical work on creativity; and apply past research toward forming your own research question.

6103. Grant Writing

Three credits.

The grant procurement process is covered from identifying funding sources through initial grant management with a focus on actually writing a grant proposal.

6194. Doctoral Seminar

Variable (1-3) credits. May be repeated for credit.

Cooperative study of developments and problems in the student's area of study.

6220. Video Design for Learning

Three credits.

Advanced principles of the video medium and its application to the learning process, instructional message design and the implementation of existing and emerging video delivery systems.

6230. Advanced Educational Technology

Three credits.

Readings, research and development of instructional materials using applications of advanced educational technology.

6240. Academic Motivation: Theory, Research and Practice

Three credits. Prerequisite: EPSY 5510.

Examines theory, research and practice related to motivation, particularly the motivation to learn in academic settings. Introduces students to the field of the psychological study of motivation to learn in school settings; to explore the conceptual and practical value of framing of school and learning from a motivational and developmental perspective; to assist students in exploring how motivational theory and research may relate to their own areas of interest and help them in integrating motivational constructs into their research; and for participants to learn from each other and together read interesting new work on motivation to learn (a caring community is the crucible within which learning of enduring value unfolds). Designed for graduate students who are studying issues related to motivation to learn in school settings during the first two decades of life.

6301. Advanced Group Processes

Three credits. Prerequisite: Instructor consent.

Participants and observers in a basic group course. Processing and analyzing of group processes.

6302. Prevention and Intervention in Schools, Education, and the Community

Three credits.

The theory, practice, and science of primary prevention of human problems in schools, education, and the community. Prevention concepts and case studies are presented by the faculty. Students give analysis and critique of course content and develop personal perspectives on prevention interventions and skills in the context of their careers.

6304. The Psychology of Men and Boys in Counseling and Education

Three credits.

The negative effects of men's socialization and gender role conflicts are reviewed from the theory and empirical research in the psychology of men. Lectures, discussions, experiential activities, and psychobiographies of famous men and women are used to promote personal learning and psychoeducational outcomes. Implications for counseling, teaching, and more positive views of men are explored.

6469. Single Subject Research in Education

Three credits.

Introductory and advanced content related to features, types, development, and use of "Single Subject Research Designs" to study of interventions and programs for improving the academic and social behavior outcomes for children and youth in schools.

6491. Doctoral Internship in School Psychology

Variable (3-6) credits. May be repeated for a maximum of 12 credits.

Intensive, one year supervised experience in school psychology setting totaling 1,500 or 2,000 hours of service.

6494. Doctoral Practicum

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

The implementation and application of theory in the student's area of specialization.

6550. Situated Cognition

Three credits. Prerequisite: EPSY 5510, 5520, and EPSY 5530.

Theory, research and applications of situated cognition and situated learning.

6560. Instructional Psychology

Three credits. Prerequisite: EPSY 5520, 5530, and 5602.

An advanced course relating theories of cognition, behaviorism and instructional design. Topics include thinking, problem solving, the development of expertise and both automatic and controlled processing.

6601. Methods and Techniques of Educational Research

Three credits. Prerequisite: EPSY 5605 or a master's level introductory educational statistics class.

A survey of the principal methods employed in the investigation of educational problems, including problem formulation, stating hypotheses,

sampling, instrument design, types of research methods and design principles.

6611. Hierarchical Linear Modeling

Three credits.

Theory and applications of hierarchical linear modeling, including organizational and longitudinal multilevel models.

6615. Structural Equation Modeling

Three credits.

An introduction to structural equation modeling. Develop, modify, and interpret a variety of structural equation models commonly used in social science research. Linear models with only observed variables (path analysis), latent variable models without causal paths (confirmatory factor analysis), and latent variable models with causal paths (structural equation modeling). Conceptual understanding, application, and interpretation of structural equation models.

6619. Advanced Modeling Using Latent Variable Techniques

Three credits. Prerequisite: EPSY 6611 and 6615.

Covers several advanced modeling techniques, including multilevel confirmatory factor analysis, multilevel structural equation modeling, latent class analysis, factor mixture modeling, and growth mixture modeling. Emphasis will be on specification, application, evaluation, and interpretation of these models.

6621. Program Evaluation

Three credits. Prerequisite: EPSY 5605, 5607, and 6601.

An overview of quantitative and qualitative procedures used in the evaluation of educational programs. Current trends and practical applications are stressed.

6626. Sampling Designs and Survey Research Methods in Education

Three credits. Prerequisite: EPSY 5607.

Probability and non-probability sampling, single- and multi-stage sampling, sampling errors, design effects, unit-of-analysis concerns, confidentiality/anonymity issues, questionnaire design, interview procedures, item development, question format, ethics.

6635. Measurement in Cognitive Psychology

Three credits.

Review of theory and research related to the measurement of variables in cognitive psychology such as domain knowledge, strategy knowledge, and motivation. Specific emphasis will be placed on the use of statistical theories and tools employed to study the reliability and validity of test scores. These tools include generalizability theory, factor analysis, item response theory, and multidimensional scaling.

6636. Measurement Theory and Application

Three credits.

Advanced course in measurement and evaluation. Emphasizes current issues in measurement and the scientific procedures reflected in the literature that suggest alternative solutions to these issues.

6637. Item Response Theory

Three credits.

Advanced course in educational and psychological testing theory. Emphasizes the principles and processes of the most sophisticated

approach to educational test construction and scoring available today.

6638. Advanced Topics in Item Response Theory

Three credits. Prerequisite: EPSY 6637; instructor consent.

Applications of IRT to measurement problems such as equating, detection of differential item functioning, and adaptive testing. Extensions of unidimensional dichotomous models to polytomous responses and multidimensional tests. Extensive use of Monte Carlo data to investigate psychometric issues.

6639. Advanced Techniques for Psychometric Research

Three credits.

Monte Carlo techniques for psychometric research. Design and carry out research studies for investigating new and existing psychometric and statistical procedures using simulated data. Estimation procedures for linear and nonlinear models for observed and latent variables. Students will develop their own custom computer programs and use existing software packages. Programs will primarily be written in Fortran 90.

6651. Introduction to Methods for Causal Inference Using Educational Data

Three credits. Prerequisite: EPSY 5605 and 5607.

A survey of four main designs for making causal inferences from educational data and the rationales for the use of these designs. The designs considered are: Randomized experiments, regression discontinuity, instrumental variables and non-equivalent control group. The course introduces Campbell's validity framework and applies this framework to the designs considered. Techniques for sample size planning and power analysis are introduced. Other topics covered include: mediation and moderation analysis and the ethics on research on human populations.

6655. Advanced Causal Inference with Data

Three credits. Prerequisite: EPSY 5610 and 6651.

This course is an exploration of the problems that arise in making inferences about causal effects from non-experimental data and some potential solutions to those problems. Topics covered include: regression approaches to causal inference; paradoxes that arise when interpreting non-experimental data; the "potential outcomes" approach to causal inference (often called Rubin's Causal Model); univariate and multivariate matching methods; multivariate distance measures; propensity score estimation methods; using the propensity score to match, subclassify and weight; Instrumental Variables applications of Rubin's Causal Model; Directed Acyclic Graphs.

6770. Curricular Options for High Ability Learners

Three credits.

Curriculum theory and techniques with special attention to the development of instructional materials.

Electrical and Computer Engineering (ECE)

5101. Introduction to System Theory

Three credits. Recommended preparation: ECE 3101.

Modeling and analysis of linear systems. Introduction to functions of a complex variable.

Linear algebra with emphasis on matrices, linear transformations on a vector space, and matrix formulation of linear differential and difference equations. State variable analysis of linear systems. Transform methods using complex variable theory, and time-domain methods including numerical algorithms.

5121. Multivariable Digital and Robust Control Systems

Three credits. Prerequisite: Instructor consent.

Analysis and design of robust multivariable control systems incorporating a digital computer as the controlling element. Topics include: Mathematical models of discrete-time systems, Discretization of continuous-time systems, Measures of control system performance, Classical single input-single output design methods, Compensator design via discrete-equivalent and direct design methods, State variable design via discrete equivalent and pole placement methods, Linear quadratic regulator (LQR) control, H₂ and H-∞ optimal control, numerical optimization and nonlinear control.

5201. Electromagnetic Wave Propagation

Three credits.

Engineering application of Maxwell's field theory to electromagnetic wave propagation in various media. Reflection, refraction, diffraction, dispersion, and attenuation. Propagation in seawater and in the ionosphere.

5211. Semiconductor Devices and Models

Three credits.

Band theory, conduction in semiconductors, carrier statistics, deep levels, impurities with multiple charge states, heavy doping effects, non-uniform doping. Non-equilibrium processes, carrier scattering mechanisms, the continuity equation, avalanche multiplication, carrier generation, recombination, and lifetime. P-n junctions, non-abrupt junctions, various injection regimes, and device models. Metal semiconductor junctions, current transport mechanisms, and models. BJT, JFET, MESFET, and MOSFET, and device models.

5212. Fundamentals of Opto-Electronic Devices

Three credits.

Absorption and emission mechanisms in direct and indirect semiconductors. Semiconductor optoelectronic devices such as light-emitting diodes, injection lasers, photocathodes, solar cells, and integrated optics.

5213. MOS Device and VLSI Fundamentals

Four credits.

Physics of MOS capacitors and transistors, derivation of V-I relation expressing subthreshold, threshold, and saturation region behavior; short-channel effects in scaled-down transistors; scaling laws; VLSI fabrication technologies; design and layout gates and gate arrays; physics, device layout and design of semiconductor memories including static and dynamic RAMs. Laboratory emphasizes introduction to nonvolatile RAMs; computer aids in VLSI design; schematic capture, SPICE simulation, layout of custom IC's, and VHDL.

5223. Nanophotonics

Three credits. Prerequisite: ECE 3223 or instructor consent.

Principles and applications of nanophotonics with focus on optical metamaterials, plasmonics,

and photonic bandgap crystals. Topics covered include electric plasma, magnetic plasma, optical magnetism, negative index metamaterials, localized and non-localized surface plasmon polaritons, photonic bandgap structures, superlens, optical cloaking, surface enhanced Raman spectroscopy, transformation optics, plasmonic sensors, plasmonic waveguides.

5225. Electron Device Design and Characterization

Three credits. Prerequisite: instructor consent. Recommended preparation: ECE 4211.

Design and evaluation of micro/nano electronic devices using state-of-the-art computer simulation tools, experimental electrical characterization of semiconductor devices and overview of modern electronic devices such as high-performance MOSFETs, TFTs, solar cells, non-volatile memories, CCDs, thermoelectric power generators. The electronic device (such as nanometer scale field effect transistor) design project will involve use of Synopsys tools to simulate the fabrication process, device simulation and performance evaluation.

5231. Fund of Photonics

Three credits. Prerequisite: Instructor consent.

Principles of optics including rays, waves, beams, electromagnetics, polarization and statistics. Basic postulates, simple optical components, graded index and matrix optics, monochromatic waves, interference, polychromatic light, Gaussian beams and propagation, diffraction, Fourier transforms, holography, dispersion and pulse propagation, polarizing devices and applications. Concepts of coherence and partial coherence as applied to various light sources in optical experiments and systems.

5232. Optoelectronic Devices

Three credits.

Optoelectronic devices as applied to fiber optic communications, optical switching and interconnects. Semiconductor laser devices, including dc, ac small signal, ac large signal, and noise with emphasis upon analytical models. Vertical cavity devices and technology. Semiconductor optical amplifiers, waveguide and vertical cavity modulators, photodetectors, optical switches, receivers and transmitters. Techniques for OE integration and the relevance of bipolar and field-effect devices for monolithic integration. Technologies for optoelectronic integration for telecom and datacom optical interconnect. WDM techniques for optical networks.

5233. Optical Systems Engineering

Three credits.

Design and analysis of paraxial optical systems, including stable and unstable laser resonators, and the propagation of geometric beams, Gaussian beams, and plane waves through complex optical systems. Topics include ray optics; ray matrices; polarization of light; diffraction theory; the connection between geometrical optics and diffraction; and performance analysis.

5234. Optical Waveguides

Three credits.

Propagation of electromagnetic waves in dielectric slab and fiber waveguides as described by geometrical ray optics and normal mode analysis. Integrated optical guides, step and graded index fiber

guides. Single mode vs. multimode transmission, coupling, and other system considerations.

5242. Micro-Optoelectronic Devices and IC Fabrication

Three credits. Prerequisite: ECE 3221 and 4211; not open for credit to students who have passed ECE 4242.

Semiconductor wafer characterization using Hall effect, X-ray diffraction, and Photoluminescence; Semiconductor wafer processing using Diffusion, Oxidation, Epitaxial growth and/or Qdot self-assembly, Photolithographic techniques; Project work including design, modeling and fabrication of solar cells, FETs, Memory, LED and Lasers, sensors, and IC building blocks for digital and analog circuits.

5261. Memory Device Technologies

Three credits. Not open for credit to students who have passed ECE 4261.

Current and future digital solid-state memory device technologies including DRAM, SRAM, flash memory, ferroelectric memory, magnetoresistive memory, phase-change memory and resistive memory, with an emphasis on the underlying physical mechanisms.

5301. Engineering Problems in the Hospital

Three credits. Prerequisite: Instructor consent.

Given in collaboration with staff from the University's School of Medicine and from hospitals in Hartford. Aim is to familiarize the student with engineering problems in a modern hospital. Role of the small computer in the hospital; implanted pacemakers; heart catheterization. Students are expected to investigate and solve an engineering problem associated with clinical medicine as a semester project.

5402. Computer Architecture

Three credits. Recommended preparation: CSE 4302 or the equivalent.

Provides an in-depth understanding of the inner workings of modern digital computer systems. Traditional topics on uniprocessor systems such as performance analysis, instruction set architecture, hardware/software pipelining, memory hierarchy design and input-output systems will be discussed. Modern features of parallel computer systems such as memory consistency models, cache coherence protocols, and latency reducing/hiding techniques will also be addressed. Some experimental and commercially available parallel systems will be presented as case studies.

5451. Introduction to Hardware Security and Trust

Three credits. Prerequisite: ECE 3401. This course and ECE 4451 may not both be taken for credit.

Fundamental hardware security and trust issues related to integrated circuits. Cryptographic hardware, physical and invasive attacks, side-channel attacks, physically unclonable functions, hardware-based true random number generators, watermarking of Intellectual Property (IP) blocks, FPGA security, IC/IP piracy, access control, hardware Trojan detection and prevention in IP cores and integrated circuits.

5510. Power System Analysis

Three credits. Prerequisite: ECE 2001 or equivalent.

Fundamentals of power system planning, operation, and management. Power generation and distribution. Modeling of AC generator, AC

and DC motors, transformer and cable. Power flow solution. Modern power system monitoring/control, fault analysis, and transient stability analysis using computer tools. Use of power system simulation tools for power system planning and design.

5512. Power Distribution

Three credits. Prerequisite: ECE 3231.

Principles of distribution system planning, automation and real-time operation with applications. Concepts of AC/DC Electricity. Three-phase power distribution as well as DC and Hybrid circuits. Load flow calculations, fault analysis, and reliability evaluation. Distributed power resources. Distribution system protection and reconfiguration. Smart distribution technologies. Efficient and resilient energy utilization.

5520. Advanced Power Electronics

Three credits. Prerequisite: ECE 3211.

Advanced converter and inverter topologies for high efficiency applications. Non-ideal component characteristics. Necessary components such as gate drive circuits and magnetic component design (that are not covered in introductory power electronics courses).

5530. Modeling and Control of Electric Drives

Three credits. Prerequisite: ECE 3212.

Several topics related to modeling and control of electric drives. Fundamental equations related to inductance and flux variations in a rotating machine, leading to torque production. Reference frame theory and transformations for modeling purposes. Dynamic models of three-phase induction and permanent-magnet synchronous machines. Basic modeling of power electronic converters for electric drives, with focus on three-phase DC/AC inverters. Various control strategies with focus on vector control and different power electronic switching schemes in electric drives.

5540. Electrical System Protection and Switchgear

Three credits. Prerequisite: Instructor consent.

Methods to sense voltage and current in medium and low voltage applications. Voltage sensing techniques include differential voltage amplifiers, shunt voltage measurement, and potential transformers. Current sensing techniques include current transformers, Rogowski coils, series voltage measurement, and Hall-effect sensors. Solid-state and mechanical relays and timing functions. Fuses and circuit breakers at medium voltage levels with focus on ratings, application-specific selection, and response time. Protection methods, e.g. differential protection, of transformers, generators, and cables with focus on distance relays and specialized devices.

5544. Electrical Insulation System

Three credits. Recommended preparation: ECE 3001 and 3231 or equivalent; instructor consent.

Introduction to electrical insulation system for low and medium voltages. Gas discharge physics and dielectrics. Sulfur hexafluoride. Outdoor insulation. Dielectric breakdown in liquids and solids. Power capacitors and inductors. MV cables and accessories. Voltage transients in MV power systems. Thermal model for MV transformers (steady-state, transient, and hot-spot temperatures identification and verification). Insulation coordination design for MV transformers, load capacity and service lifting trade-off study based

on electrical and thermal over-stress analysis. Insulation system for MV and LV rotating machines (form and random wound), insulation system optimization for torque density and payload efficiency. Insulation system testing and qualification. Monitoring and diagnosis.

6094. Seminar

One credit. May be repeated for a maximum of eight credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Presentation and discussion of advanced electrical engineering problems.

6095. Special Topics in Electrical and Systems Engineering

Variable (1-3) credits. May be repeated for credit.

Classroom and/or laboratory courses in special topics as announced in advance for each semester.

6099. Independent Study in Electrical Engineering

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Individual exploration of special topics as arranged by the student with an instructor of his or her choice.

6101. Linear Multivariable System Design

Three credits. Prerequisite: ECE 5101.

Observability and controllability. Application of canonic forms in system design. Methods of pole placement. Observer design. Non-interacting multivariable systems.

6102. Optimal and Model Predictive Control

Three credits. Prerequisite: ECE 5101 and 6111; instructor consent.

Optimal Control, including optimization techniques for linear and nonlinear systems, calculus of variations, dynamic programming, the Pontryagin maximum principle, and computational methods. Linear Model Predictive Control, including process models and model prediction methods of state space description, transfer matrix representation, and neural network representation; and optimization methods without and with constraints. Nonlinear Model Predictive Control.

6103. Nonlinear System Theory

Three credits. Prerequisite: ECE 5101.

Stability of time-varying nonlinear systems. Liapunov's direct method. Describing functions. Popov's stability criterion. Adaptive control.

6104. Information, Control and Games

Three credits. Prerequisite: ECE 5101 and 6111.

Problems of dynamic optimization where more than one decision maker is involved, each having own payoff and access to different information. Rules of the game and roles of information; Dynamic games with symmetric information or incomplete information or asymmetric information; Moral hazard; Mechanism design; Signaling, Auctions and Pricing.

6105. Man-Machine Systems Analysis

Three credits. Prerequisite: ECE 5101 and 6111.

Role of the human as a decision and control element in a feedback loop. Mathematical models of human control characteristics and instrument monitoring behavior. Effects of human limitations upon overall task performance. Parallel discussion of measurement and experimental techniques. Validation of theoretical results by comparisons with existing human response data.

6106. Experimental Investigation of Control Systems

Three credits. Prerequisite: ECE 6103 and 6111; instructor consent.

A study of experimental techniques and advanced design of control systems.

6107. Stochastic Control

Three credits. Prerequisite: ECE 5101 or 6111.

Methods of decision-making and control in a stochastic environment. Elements of utility theory. Principle of optimality and deterministic dynamic programming. Stochastic dynamic programming. Control of dynamic systems with imperfect state information. Certainty equivalence and the control's dual effect. Sequential hypothesis testing. Passive and active stochastic adaptive control algorithms. Decentralized control methods.

6108. Linear Programming and Network Flows

Three credits. Prerequisite: ECE 5101.

Computational methods for linear programming with special emphasis on sequential and parallel algorithms for Network Flow Problems. Standard and canonical forms of linear programming, revised Simplex methods, basis updates, decomposition methods, duality, shortest paths, minimal spanning trees, maximum flows, assignment problems, minimum cost network flows, and transportation problems.

6111. Applied Probability and Stochastic Processes

Three credits.

Statistical methods for describing and analyzing random signals and noise. Random variables, conditioning and expectation. Stochastic processes, correlation, and stationarity. Response of linear systems to stochastic inputs. Applications.

6121. Information Theory

Three credits. Prerequisite: ECE 6111.

Basic concepts: entropy, mutual information, transmission rate and channel capacity. Coding for noiseless and noisy transmission. Universal and robust codes. Information-theoretic aspects of multiple-access communication systems. Source encoding, rate distortion approach.

6122. Digital Signal Processing

Three credits.

Discrete-time signals and systems. The z-transform. The Discrete Fourier Transform (DFT). Convolution and sectioned convolution of sequences. IIR and FIR digital filter design and realization. Computation of the DFT: The Fast Fourier Transform (FFT), algorithms. Decimation and interpolation. Parametric and nonparametric spectral estimation. Adaptive filtering. Finite word length effects.

6123. Advanced Signal Processing

Three credits. Prerequisite: ECE 6111 and 6122.

Wiener filter theory. Linear prediction. Adaptive linear filters: LMS and RLS algorithms, variants, lattice structures and extra-fast implementation. Convergence properties. High-resolution spectral estimation. Hidden Markov models, Monte-Carlo methods for signal processing. Multiresolution decomposition and wavelets. Blind methods.

6124. Advanced Signal Detection

Three credits.

Focus on discrete-time detection of signals in noise that is not necessarily Gaussian. Topics include: classical Neyman-Pearson and Bayes theory, efficacy and asymptotic relative efficiency;

some canonical noise models; quantized detection; narrowband signal detection; distance measures and Chernoff bounds; sequential detection; robustness; non-parametric detection; continuous-time detection and the Karhunen-Loève expansion.

6125. Digital Image Processing

Three credits.

Problems and applications in digital image processing, two-dimensional linear systems, shift invariance, 2-D Fourier transform analysis, matrix Theory, random images and fields, 2-D mean square estimation, optical imaging systems, image sampling and quantization, image transforms, DFT, FFT, image enhancement, two-dimensional spatial filtering, image restoration, image recognition, correlation, and statistical filters for image detection, nonlinear image processing, and feature extraction.

6126. Fundamentals of Optical Imaging

Three credits.

Learning optical imaging fundamentals. Topics include: review of two-dimensional linear system theory; scalar diffraction theory, wave optics, Fresnel and Fraunhofer diffraction; imaging properties of lenses; image formation; optical resolution in imaging, frequency analysis of optical imaging systems; imaging with coherent and incoherent sources, coherent transfer function; optical transfer function, point spread function, fundamentals of microscopy, two-dimensional spatial filtering; coherent optical information processing; frequency-domain spatial filter synthesis; holography.

6141. Neural Networks for Classification and Optimization

Three credits.

This course provides students with an understanding of the mathematical underpinnings of classification techniques as applied to optimization and engineering decision-making, as well as their implementation and testing in software. Particular attention is paid to neural networks and related architectures. The topics include: Statistical Interference and Probability Density Estimation, Single and Multi-layer Perceptions, Radial Basis Functions, Unsupervised Learning, Preprocessing and Feature Extraction, Learning and Generalization, Decision Trees and Instance-based Classifiers, Graphical Models for Machine Learning, Neuro-Dynamic Programming.

6142. Fuzzy and Neural Approaches to Engineering

Three credits. Prerequisite: ECE 5101.

Fuzzy sets, applications to fuzzy logic and fuzzy control, and concepts and methodologies for fuzzy optimization. Fundamental models of neural networks, learning rules, and basic recurrent networks for optimization. The integration of fuzzy systems with neural networks. Examples from engineering applications.

6143. Pattern Recognition and Neural Networks

Three credits.

Review of probability and stochastic processes. Statistical pattern recognition. Nonlinear signal processing and feature extraction. Correlation filters. Metrics for pattern recognition. Bayesian classifiers. Minimum probability of error processors. Supervised and unsupervised learning. Perception learning methods. Multilayer neural networks. Applications to security and encryption.

6151. Communication Theory

Three credits. Prerequisite: ECE 6111.

Design and analysis of digital communication systems for noisy environments. Vector representation of continuous-time signals; the optimal receiver and matched filter. Elements of information theory. Quantization, companding, and delta-modulation. Performance and implementation of common coherent and non-coherent keying schemes. Fading; intersymbol interference; synchronization; the Viterbi algorithm; adaptive equalization. Elements of coding.

6152. Wireless Communication

Three credits. Prerequisite: ECE 6122 and 6151.

Introduces basic concepts in wireless communication and networks with emphasis on techniques used in the physical layer of current and future wireless communication systems. Covers channel modeling, modulation, spread spectrum techniques, multiuser communication theory, wireless network protocols, and current cellular and PCS systems. Special topics in equalization and array signal processing are included.

6161. Modern Manufacturing System Engineering

Three credits.

Issues and methods in modern manufacturing systems. Integrated product and process development. Design for quality, on-line quality control and improvement, reliability during product development, and design for testability. Computer-aided production management, production planning and scheduling, and optimization-based planning and coordination of design and manufacturing activities. Targeted toward students, professional engineers, and managers who want to have an impact on the state-of-the-art and practice of manufacturing engineering, and to improve manufacturing productivity.

6171. Mobile Robotics

Three credits. Recommended preparation: MATH 2410; MATH 3160 or STAT 3345; ECE 3111; familiarity with MATLAB programming.

Coordinate transformation, kinematics and dynamics, sensor modeling, specifics of camera sensors, inertial measurement unit (IMU) sensor, simultaneous localization and mapping (SLAM), EKF-SLAM, Monte Carlo localization, SLAM observability, robot control, specifics of vision-based control, and aspects of human-robot interaction; class project with a project report.

6211. Antenna Theory and Applications

Three credits.

Analysis and synthesis of antenna systems including electric- and magnetic-dipole, cylindrical, helical, reflector, lens, and traveling-wave antennas. Theory of arrays including patterns, self and mutual impedances.

6212. Microwave Techniques

Three credits.

A theoretical analysis of microwave components, systems, and measuring techniques. Scattering matrix analysis is applied to microwave devices having two or more ports.

6221. Transport in Semiconductors

Three credits. Prerequisite: PHYS 5401.

Topics include theory of energy bands in crystals; carrier scattering; the Boltzman equation and its approximations; low field transport; high

field effects; transport in heterojunctions; quantum effects; and Monte Carlo simulation.

6222. Advanced Semiconductor Devices

Three credits.

Fundamental properties of heterostructures, strained-layer superlattices, NIPI structures, multiple quantum well, quantum wire, and quantum dot structures. Operation, modelling of the electrical characteristics, design, and applications of HBJT, HEMT, and resonant tunneling devices. Second-order effects in submicron MOSFETs and MESFETs.

6226. Power Network Dynamics and Simulation

Three credits. Prerequisite: ECE 5101 or 6122 or instructor consent.

Introduction to power network dynamics with emphasis on numerical simulation techniques. Numerical integration rules for large-scale power networks, numerical oscillation and its solution, power system components, frequency-dependent transmission network, nonlinear elements, network equivalents, power network stability. Applications of network simulation to microgrid stability analysis and control design. Real-time simulation algorithms for interdependent infrastructures analysis.

6231. Advanced Optoelectronics

Three credits. Prerequisite: ECE 5212.

Review of optoelectronic devices and integrated circuit (IC) technologies (analog and digital); logic gates; self-electro-optic devices (SEEDs), microlasers, Fabry-Perot (F-P) etalons and optoelectronic IC (OEICs); modulators: F-P modulators (absorptive and refractive), spatial light modulators (SLMs) and their applications; bistable devices; bistable laser amplifiers, resonant tunneling transistor lasers, and polarization bistability; optical interconnects; architectural issues and optical processors based on S-SEED, optical neural networks, and other devices.

6232. Nonlinear Optical Devices

Three credits. Prerequisite: ECE 5231.

Wave propagation in nonlinear media, generation of harmonics in optical materials, optical parametric processes, stimulated emission and scattering processes. Device modeling and application of fiber and semiconductor lasers, optical amplifiers and modulators. Electro-optic, acousto-optic, and magneto-optic devices. Soliton generation and propagation.

6241. Electronic Materials

Three credits. Prerequisite: MSE 5313.

Physical and electronic properties, and device applications of disordered materials including amorphous semiconductors, liquid crystals, bubble-memory magnetic materials. Applications of amorphous semiconductors including xerography and solar cells.

6242. VLSI Fabrication Principles

Three credits. Prerequisite: Instructor consent.

Semiconductor materials and processing, emphasizing compound semiconductors, optoelectronic materials, shallow devices, and fine-line structures. Semiconductor material properties; phase diagrams; crystal growth and doping; diffusion; epitaxy; ion implantation; oxide, metal, and silicide films; etching and cleaning; and lithographic processes.

6243. Nanotechnology

Three credits.

Nanoelectronic and optoelectronic devices: Quantum confinement in 1D, 2D and 3D (quantum wells, wires, and dots) structures; density of states and carrier density in low-dimensional structures; fabrication methodology for quantum wire transistors and lasers; single-electron transistors/tunneling devices; growth and characterization of nanostructured materials with grain sizes in the range of 10-50 nm. Organic monolayers: Langmuir-Blodgett monolayers, Self-Assembled monolayers, Multi-layer structures, technological applications of organic thin films.

6244. Nanotechnology - II (Laboratory Course)

Three credits. Prerequisite: Instructor consent.

Growth and characterization of carbon nanotubes using vapor phase nucleation; Growth of cladded quantum dots using liquid and/or vapor phase techniques; Characterization using AFM and TEM and Dynamic scattering techniques; Nano-device processing highlighting E-Beam lithography, and self-assembly techniques; Project work involving fabrication of devices including LEDs, FETs and memor, detectors and sensors using quantum dots and nanotubes/wires.

6246. Heteroepitaxy of Semiconductors

Three credits. Prerequisite: Instructor consent.

Properties of semiconductors, including crystal structure, elastic properties, and properties of defects. Surface considerations in heteroepitaxy. Heteroepitaxial growth methods, including molecular beam epitaxy and metalorganic vapor phase epitaxy. Mismatched heteroepitaxy of a single, uniform layer, including pseudomorphic growth, equilibrium considerations, kinetically-limited strain relaxation, and threading dislocations. Design and growth of graded and multilayered metamorphic structures, and dislocation dynamics in them. Characterization of heteroepitaxial structures. Defect and strain engineering in semiconductor heterostructures.

6247. Dielectric and Magnetic Materials Science

Three credits.

The macroscopic and microscopic views of dielectric and magnetic materials. Theories of spontaneous polarization and magnetization. Applications of anisotropic materials. Non-linear dielectrics at radio and optical frequencies. Superconductivity and superconducting magnets.

6301. Biomedical Instrumentation I

Three credits. Prerequisite: ECE 6111.

Origins of bioelectric signals; analysis and design of electrodes and low-noise preamplifiers used in their measurement. Statistical techniques applied to the detection and processing of biological signals in noise, including the treatment of nerve impulse sequences as stochastic point processes. Methods of identifying the dynamic properties of biosystems.

6302. Biomedical Imaging

Three credits.

Fundamentals of detection, processing and display associated with imaging in medicine and biology. Topics include conventional and Fourier optics, optical and acoustic holography, optical and digital image enhancement, ultrasonography, thermography, isotope scans, and radiology. Laboratory demonstrations will include holography and optical image processing.

6303. Advanced Ultrasonic Imaging Technique

Three credits. Prerequisite: ECE 6302 or BME 6400.

Introduction to advanced techniques of ultrasonic image formation for biomedical applications. Introduction to acoustic wave propagation. A, B, C, M and Doppler ultrasonic imaging modes. Interaction of ultrasound with biological tissues. Acoustical holography. Ultrasonic transducer design and calibration. Transducer arrays. Ultrasound detection modes. Laboratory demonstrations will include Schlieren visualization of ultrasound fields and transducer calibration techniques.

6304. Biomedical Instrumentation Laboratory

Three credits. Prerequisite: Instructor consent.

Experimental investigation of electrodes, transducers, electronic circuits, and instrumentation systems used in biomedical research and in clinical medicine.

6305. Medical Imaging Systems

(Also offered as BME 6420.) Three credits.

Medical imaging principles and systems of x-ray, ultrasound, optical tomography, magnetic resonance imaging, positron emission tomography. The students are required to have the courses of instrumentation, signal analysis using Fourier Transform and Laplace transform. Students are also required to have advanced mathematics on differential equations and matrix calculations.

6311. Communication and Control in Physiological Systems

Three credits.

Processing, transmission, and storage of information in nerve systems. Mechanisms of neuro-sensory reception, coding and signal-to-noise ratio enhancement. Analysis of invertebrate and vertebrate visual systems. Neural spatio-temporal filters in feature extraction and pattern recognition. Analysis of control systems and regulators associated with vision: e.g., gaze control, accommodation, pupil area, and intra-ocular pressure.

6421. Advanced VLSI Design

Three credits. Recommended preparation: ECE 3421 and ECE 3302 (or equivalent).

Advanced concepts of circuit design for digital VLSI components in state of the art MOS technologies. Emphasis is on the circuit design, optimization, RTL design, synthesis, and layout of either very high speed, high density or low power circuits and systems for use in applications such as micro-processors, signal and multimedia processors, memory and periphery. Other topics include challenges facing digital circuit designers today and in the coming decade, such as the impact of scaling, deep submicron effects, interconnect, signal integrity, power distribution and consumption, and timing.

6422. VLSI CAD Algorithms

Three credits.

Very large-scale integrated circuit (VLSI) computer-aided design (CAD) tools, optimization techniques, and design automation algorithms, such as branch and bound, genetic algorithms, simulated annealing, and linear programming. VLSI physical design process including partitioning, floor planning, placement, routing, compaction, and pin assignment.

6432. VLSI Design Verification and Testing

Three credits. Prerequisite: Instructor consent.

Introduction to the concepts and techniques of VLSI (very large scale integration) design verification and testing, details of test economy, fault modeling and simulation, defects, automatic test pattern generation (ATPG), design for testability (DFT), scan and boundary scan architectures, built-in self-test (BIST) and current-based testing. State-of-the-art tools are used for ATPG, DFT, test synthesis and power analysis and management.

6433. Stochastic Models for the Analysis of Computer Systems and Communication Networks

Three credits. Prerequisite: ECE 6111.

Continuous and discrete-time Markov chains and their applications in computer and communication network performance and reliability evaluation. Little's theorem and applications; review of stochastic processes; simple Markovian queues; open, closed, and mixed product-form networks; computational algorithms for closed and mixed product form networks; flow-equivalence and aggregation; M/G/1 queue with vacations and applications to time-division and frequency-division multiplexing; reservations and polling; multi-access communication; reliability and performance models of computer systems.

6435. Advanced Numerical Methods in Scientific Computation

Three credits. Prerequisite: ECE 5101.

Development, application and implementation of numerically stable, efficient and reliable algorithms for solving matrix equations that arise in modern systems engineering. Computation of matrix exponential, generalized inverse, matrix factorizations, recursive least squares, eigenvalues and eigenvectors, Lyapunov and Riccati equations.

6437. Computational Methods for Optimization

Three credits. Prerequisite: ECE 5101.

Computational methods for optimization in static and dynamic problems. Ordinary function minimization, linear programming, gradient methods and conjugate direction search, nonlinear problems with constraints. Extension of search methods to optimization of dynamic systems, dynamic programming.

6439. Estimation Theory and Comp Algorithms

Three credits. Prerequisite: ECE 5101 and 6111.

Estimation of the state and parameters of noisy dynamic systems with application to communications and control. Bayesian estimation, maximum-likelihood and linear estimation. Computational algorithms for continuous and discrete processes, the Kalman filter, smoothing and prediction. Nonlinear estimation, multiple model estimation, and estimator Kalman, multiple model estimation, and estimator design for practical problems.

Engineering (ENGR)**5300. Special Topics in Engineering**

Variable (1-6) credits. May be repeated for a maximum of 12 credits.

Classroom and/or laboratory course in special topics as announced in advance for each semester.

5311. Professional Communication and Information Management

Three credits.

Development of the advanced communication skills as well as information management required of engineers and engineering managers in industry, government, and business. The design and writing of technical reports, articles, proposals and memoranda that address the needs of diverse organizational and professional audiences; the preparation and delivery of organizational and technical oral and multimedia presentations and briefings; team building skills with an emphasis on communications; and knowledge management.

5312. Engineering Project Planning and Management

Three credits. Prerequisite: Department consent.

The methodology for managing engineering projects; including project lifecycle, strategic planning, budgeting, and resource scheduling. Also, work estimating, evaluating risk, developing the project team, project tracking and performing variance analysis. Case studies are used as class and homework assignments to focus the class on the topics presented.

5314. Advanced Engineering Mathematics

Three credits.

Advanced math topics including Laplace, Fourier and z-Transform methods, probability theory, ordinary differential equations and systems of ODEs, partial differential equations, vector calculus, elements of statistics, linear and non-linear optimization, matrix theory, and special functions like Bessel, Legendre, and gamma. This course is set up as modules. Students will be required to complete certain modules depending on their background and concentrations.

English (ENGL)**5100. The Theory and Teaching of Writing**

Three credits. Prerequisite: Open only to English graduate students, others with consent.

An exploration of the relationship between the theories and practice of writing, with attention given to the teaching of writing and recent developments in rhetoric and composition.

5150. Advanced Research Methods

One credit. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Consideration of the question, "What is a research method?" and introduction to critical methods relevant to humanities-based research.

5160. Professional Development in English

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

Includes critical reflection on the academy, as well as practical instruction in writing application materials for conferences, grants, and academic employment, and in revising a seminar paper for publication.

5182. Practicum in the Teaching of Writing

One credit. Prerequisite or corequisite: ENGL 5100.

Guided development of teaching in the University of Connecticut First-Year Writing Program. Implementing theories of teaching and writing; meeting program goals and objectives; selecting texts; drafting writing assignment

prompts; developing classroom work; guiding peer feedback; reading, responding to and evaluating student work. Supervision includes one-on-one, group, and peer. Required of all incoming graduate-student FYW instructors.

5200. Children's Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

A study of Children's Literature from the aesthetic, historic, psychological and sociological points of view. Major themes and genres. Standards of literary criticism.

5220. History of the English Language

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

The development of the sounds, forms, order, and vocabulary of Standard English; an introduction to the methods of modern descriptive linguistics, and to the application of linguistic fact and theory to the teaching of English.

5240. The Bible as Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

A study of major themes and literary characteristics of writing from the Hebrew Bible and New Testament. The Bible's relevance to modern literary criticism.

5270. Modern Poetry: Problems in Critical Analysis

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5280. Modern Drama

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5310. Old English

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

A study of the language and literature of pre-conquest England.

5315. Medieval Literature

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

A study of medieval literature, exclusive of Chaucer.

5318. Chaucer

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

5320. Shakespeare

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5323. Renaissance Drama

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

5325. Renaissance I: 1485-1603

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

A study of major writers and literary traditions of the sixteenth century, exclusive of the drama.

5326. Seventeenth-Century Literature

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

5329. Milton

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

5330. Restoration and Eighteenth Century Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5335. Later Eighteenth Century Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5340. Romantic Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

Open to graduate students in English, others with permission.

5345. Studies in Victorian Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5350. Modern British Writers

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5360. Irish Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5410. American Literature to 1776

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5420. American Literature 1776-1865

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5430. American Literature 1865-1914

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5440. American Literature since 1914

Three credits. Prerequisite: Open only to English graduate students, others with consent.

5500. Literary Criticism

Three credits. Prerequisite: Open only to English graduate students, others with consent.

A study of the major documents of literary criticism and theory from Plato and Aristotle to the present.

5530. World Literature in English

Three credits. Prerequisite: Open only to English graduate students, others with consent.

Selected works of colonial and post-colonial literature from Africa, South Asia, the Caribbean, Australia, New Zealand, Canada, etc.

5550. Rhetoric and Composition Theory

Three credits. Prerequisite: Open only to English graduate students, others with consent.

Classical and contemporary rhetorical theory, current research in composition.

5650. Digital Humanities

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

An introduction to the histories, methodologies, and theories of the digital humanities, and to the practices and tools of digital humanities projects.

6000. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

A reading course normally open only to doctoral candidates.

6200. Seminar in Children's Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for credit.

Major authors, themes, or literary movements in American or British children's literature.

6260. Seminar in Modern Fiction

Three credits. Prerequisite: Open only to English graduate students, others with consent.

6270. Seminar in Modern Poetry

Three credits. Prerequisite: Open only to English graduate students, others with consent.

6290. Seminar in Non-Fiction Prose

Three credits. Prerequisite: Open only to English graduate students, others with consent.

6310. Seminar in Beowulf

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

6312. Seminar in Old Irish

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent. With a change of content, may be repeated for credit.

Language and literature of Medieval Ireland.

6313. Seminar in Old Norse

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent.

Old Norse language and literature.

6315. Seminar in Medieval Literature

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent. May be repeated for credit.

6320. Seminar in Shakespeare

Three credits. Prerequisite: Open only to English graduate students, others with consent. May be repeated once for credit.

6325. Seminar in Renaissance Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for a total of six credits.

6330. Seminar in Eighteenth-Century Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for a total of six credits.

6340. Seminar in Romantic Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. May be repeated for a maximum of 12 credits.

6345. Seminar in Victorian Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for a total of six credits.

6360. Seminar in Irish Studies

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for credit.

Major authors, movements, or themes in Irish literature.

6400. American Ethnic Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for credit.

6410. American Literature and Culture

Three credits.

An introduction to a particular literary era and the cultural influences on its literature. The influence of a literary era on cultural change.

6420. American Literary Movements

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for a total of six credits.

Introduction to a particular American literary movement.

6450. Special Topics in American Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for credit.

6500. Seminar in Literary Theory

Three credits. Prerequisite: Open only to English graduate students, others with consent. May be repeated for a maximum of 12 credits.

6530. Seminar in World Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for credit.

Major authors, movements, or themes in world literature written in English.

6540. Seminar in Literature and Human Rights

Three credits. Prerequisite: Open only to English graduate students, others with consent. May be repeated for a maximum of nine credits.

The interdisciplinary study of literature and human rights discourse.

6550. Seminar in Rhetoric and Composition Theory

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for a total of six credits.

6575. Seminar in Women and Literature

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent. With a change in content, may be repeated for a total of six credits.

6600. Creative Writing Workshop

Three credits. Prerequisite: Open only to English graduate students, others with consent. May be repeated for a maximum of 12 credits.

6650. Seminar in Digital Humanities

Three credits. Prerequisite: Open only to English and Medieval Studies graduate students, others with consent. With a change in content, may be repeated once for credit.

Focused study of histories, methodologies, and theories of the digital humanities, and practices and tools of digital humanities projects.

6700. Seminar in Major Authors

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for a total of nine credits.

6750. Special Topics in Language and Literature

Three credits. Prerequisite: Open only to English graduate students, others with consent. With a change in content, may be repeated for credit.

6800. American Studies: Methods and Major Texts

(Also offered as AMST 6000 and HIST 6000.) Three credits. Prerequisite: Open only to English, History, and Political Science graduate students.

Introduction to the methodologies and topics of American Studies through a survey of major texts in the field, past and present. Course also provides a history of the field.

6850. American Studies: Special Topics

(Also offered as AMST 6500 and HIST 6500.) Three credits. Prerequisite: Open only to English, History, and Political Science graduate students. With a change in topic, may be repeated once for credit.

Detailed study of a specific topic in American cultural studies with an emphasis on developing skills in interdisciplinary research. Topics vary from semester to semester.

Environmental Engineering (ENVE)**5020. Independent Graduate Study in Environmental Engineering**

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Special problems in environmental engineering as arranged by the student with a supervisory instructor of his or her choice.

5090. Advanced Topics in Environmental Engineering

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Classroom or laboratory courses as announced for each semester.

5094. Seminar in Environmental Sciences and Engineering

Zero credits.

Extended discussions on presentations contributed by staff, students and outside speakers. A certificate of completion will be issued from the Environmental Engineering Program.

5210. Environmental Engineering Chemistry - I

Three credits.

Quantitative treatment of chemical behavior in environmental systems. Thermodynamics and kinetics of acid/base, complexation, precipitation/dissolution, sorption and redox reactions; degradation and partitioning of organic contaminants; software for speciation and partitioning computation.

5211. Environmental Organic Chemistry

(Also offered as CE 5211.) Three credits.

Environmental organic chemistry: ideal and regular solution thermodynamics; linear free energy relations; estimation of vapor pressure, solubility, and partitioning behavior, abiotic organic compound transformations; chemical fate modeling.

5221. Transport and Transformation of Air Pollutants

(Also offered as CE 5221.) Three credits.

Transport and deposition of gaseous and aerosol pollutants; chemical formation and reactions of oxidants and acidic compounds.

5240. Biodegradation and Bioremediation

Three credits.

Biochemical basis of the transformation of key organic and inorganic pollutants; quantitative description of kinetics and thermodynamics of

pollutant transformation; impact of physiochemical and ecological factors on biotransformation.

5252. Environmental Remediation

(Also offered as CE 5252.) Three credits.

Regulatory framework. Soil clean-up criteria. Risk analysis. In situ and ex situ Treatment technologies: chemical oxidation, chemical reduction, pump-and-treat, permeable reactive barriers, solidification, stabilization, thermal processes, bioremediation.

5310. Environmental Transport Phenomena

Three credits.

Development and solutions of partial differential equations describing diffusion, advection, and sources/sinks common to transport of mass, energy, and momentum. Mass sources/sinks used to describe sorption and chemical reaction. Extension to dispersion and turbulent mixing. Applications to predicting the movement of environmental contaminants.

5311. Environmental Biochemical Processes

Three credits.

Major biochemical reactions; stoichiometric and kinetic description; suspended and attached growth modeling; engineered biotreatment systems for contaminant removal from aqueous, gaseous, and solid streams; process design.

5320. Quantitative Methods for Engineers

Three credits. Not open for credit to students who have passed NRME 5605.

Topics on data analysis: random variables and probability distributions, parameter estimation and hypothesis testing, simple and multiple regression; Monte Carlo simulation; autoregression and models for time series; analytical solutions of ordinary and partial differential equations; Fourier series; numerical solutions of ordinary differential equations; solution of partial differential equations with finite differences; basics of modeling.

5330. Probabilistic Methods in Engineering Systems

Three credits.

Common probabilistic models used in engineering and physical science design, prediction, and operation problems; derived distributions, multivariate stochastic models, and estimation of model parameters; analysis of data, model building and hypothesis testing; uncertainty analysis.

5331. Predictive Analytics for Scientists and Engineers

Three credits. Prerequisite: Instructor consent.

Topics include exploratory data analysis, clustering, dimensionality reduction, classification and regression models, text mining, geospatial data processing and more. Individual in-depth data analysis projects. Some background in programming and statistics desired.

5330. Geoenvironmental Engineering

Three credits.

Principles of solid waste management; design of landfills and waste containment systems; compacted clay liners and slurry walls; site investigation, soil and groundwater sampling and testing; overview of soil remediation techniques.

5810. Hydrometeorology

Three credits.

Global dynamics of aquatic distribution and circulation. Hydrologic cycle, atmospheric

circulation, precipitation, interception, storage, infiltration, overland flow, distributed hydrologic modeling, and stream routing.

5811. Hydroclimatology

Three credits.

Focuses on the physical principles underlying the spatial and temporal variability of hydrological processes. Topics include atmospheric physics and dynamics controlling the water/energy budgets; global water cycle, its dynamics, and causes of variability/changes; occurrence of drought and flood; climate teleconnections and their hydrological application; hydrological impact of global changes; quantitative methods in hydroclimatic analysis.

5812. Ecohydrology

(Also offered as CE 5812.) Three credits.

Focuses on the interactions between ecological processes and the water cycle, emphasizing the hydrological mechanisms underlying various terrestrial ecological patterns and the ecological properties controlling the hydrologic and climatic regimes. Topics include conceptual understanding of hydrological cycle over vegetated land, quantifying and modeling flux exchanges in the soil-vegetation-atmosphere continuum, case studies on the hydrological impact of land use land cover changes, ecosystem response to environmental changes, and vegetation-climate feedback at the regional and global scales.

5820. Unsaturated Flow and Transport

(Also offered as CE 5820.) Three credits.

Modern approaches to water flow and solute transport in partially-saturated porous media including media characterization (review); unsaturated flow in porous media (governing equations, hydraulic functions, numerical and analytical solution methods); solute transport in unsaturated media (convection dispersion, transfer functions, solutions); modeling and observational scales; coupled water flow and solute transport (model applications); special topics (preferential flow, effects of spatial variability, stochastic aspects of flow and transport, gas exchange and transport measurement methods).

5821. Vadose Zone Hydrology

Three credits.

Theoretical and experimental elements of primary physical and hydrological properties of porous media and processes occurring in partially-saturated soils. Practical experience in measurement and interpretation of hydrological information and methods of analysis for vadose-zone related environmental problems.

5830. Groundwater Flow Modeling

Three credits. Prerequisite: Department consent.

Basics of modeling with Finite Difference and Finite Element Methods. Modeling flow in saturated and unsaturated zones. Model calibration and validation. Parameter estimation. Treatment of heterogeneity. Basic geostatistics. Modeling surface-groundwater interactions. Application to field sites.

5850. Sustainable and Resilient Water Governance and Management

Three credits.

Overview and assessment of water institutions and management approaches that contribute (or not) to sustainable and resilient water resources under changing climate conditions, demographic

and economic shifts. Course requirements include translating scientific information for water managers or writing a publishable co-authored research paper.

6920. Doctoral Teaching Practicum

(Also offered as CE 6920.) Variable (0-3) credits.

Offered by special arrangement. Practical experience in classroom teaching with mentoring from a member of the graduate faculty.

European Studies (ES)

5105. Independent Study in European Studies

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Executive MBA (EMBA)

5001. Current Business Topics

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Pertinent business issues impacting the local and global economy. Topics vary year to year.

5111. Core Financial Statements

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Analysis and interpretation of the financial statements prepared under generally accepted accounting principles (GAAP) in the United States; financial statements prepared under other international standards, particularly international financial reporting standards (IFRS), will be addressed. Students are exposed to the theories, concepts, and mechanics used to prepare the core financial statements of the enterprise, specifically the Statement of Financial Position, Statement of Net Income, Cash Flow Statement, Statement of Changes in Owners' Equity and Statement of Comprehensive Income.

5161. Customer Insights

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Focus on the customer as the individual decision maker to understand why and how customers make consumption decisions. Students explore qualitative and quantitative methods for understanding customer's consumption practices with attention to understanding the extent to which consumers value product benefits and the emotional aspects of consumption. Students learn the process of segmenting consumers with similar needs and desires into target groups, and examine how markets change as groups of customers collectively adopt new ways of satisfying their needs.

5191. Value Creation and Competition

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students analyze the challenges inherent in navigating competitive markets with the objective of adopting strategies to achieve value creation, and assess the fit between internal capabilities and the competitive landscape to identify and plan for potential threats and opportunities from environmental change.

5212. Financial Statement Analysis

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students gain in-depth knowledge of accounting principles used to record assets, liabilities, and owner's equity and the effects of these accounting

principles on the analysis of the enterprise. Students construct and interpret the major metrics that are used in financial statement analysis, and apply the techniques to create pro-forma financial statements.

5231. Fundamentals of Financial Management

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students gain tools and frameworks to analyze financial decisions based on principles of modern financial theory. Covers concepts such as discounted cash flow techniques, and its applications to valuation of common stock and bonds and lease vs. buy decisions. The time value of money is examined for both personal financial planning and business applications, and is used to value financial instruments, including common stock and bonds.

5281. Leadership

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

The characteristics and practice of effective leadership, which can vary in times of change or crisis and in different contexts. Students examine and assess leadership in the context of teams, small and medium-sized enterprises, and multinational corporations.

5301. Using Statistics in Business

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Aims to improve the student's sophistication at interpreting data and their ability to use data as evidence in support of strategic decisions. Students will learn to ask probing questions about the specifics of data and statistical techniques, to understand the conditions for drawing reliable inferences, to assess the validity of statistical evidence, to master fundamental quantitative computations, and to draw logical data-driven conclusions.

5321. Domestic and International Legal Structures

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Introduction to rules of contract formation and contract performance, and remedies if contract promises are not fulfilled. Students examine issues of business negligence and compliance to standards, and assess how firms can effectively comply with domestic and global intellectual property rules and defend intellectual assets. Legal and regulatory issues related to internet commerce, data protection, and business development are explored.

5332. Capital Budgeting and Corporate Financial Policy

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students apply the tools and techniques of the time value of money framework to capital budgeting issues and corporate financial policy. They focus on corporate capital budgeting and valuation, investment decisions under uncertainty, market efficiency, and corporate financial policy including financing and dividend decisions. Students evaluate capital investments with a focus on how companies analyze the risk associated with future cash flows and how that risk is incorporated in the required rates of return, as well as how financing choices (stocks and bond issues) and

payout policy affect the cost of capital of large projects. Students apply two widely used models, the Capital Asset Pricing Model (CAPM) and the Weighted Average Cost of Capital (WACC) to capital budgeting problems.

5413. Financial Controls

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students take a macro perspective applying cost concepts to real-world managerial problems and make logical decisions. At a micro level, students come to understand the nature and behavior of cost and how cost is directly affected by resource (people, materials and capital) acquisition and allocation decisions. Students explore how management solves the interrelated problems of capacity, efficiency, productivity, sourcing, pricing, and profitability.

5462. Driving Market Demand

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Focus on developing a competitive value proposition and marketing strategies to drive organic growth, including attracting new customers, expanding the number and value of transactions that customers make, and retaining customers for longer periods of time. Students examine customer satisfaction and profitable growth, and use customer equity as a modeling framework in which to translate market analysis, customer insight and chosen targeting and positioning into financial projections for growth.

5471. Operational Analytics and Improvement

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

The management of the transformation of inputs, including labor, materials, and information, into the outputs of goods and services. Students use quantitative tools and qualitative knowledge to make decisions regarding capacity management, inventory management, planning of operations, and quality control.

5514. Performance Evaluation

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

How world-class companies excel at execution and how their control systems enable their employees to execute effective strategies. Students consider the environment and the processes that companies use to maintain control of enterprise performance, the use and effects of accounting related controls in relation to choices of responsibility structures, performance measures, standards, and the internal controls that help ensure measurement reliability.

5541. Domestic and Global Macroeconomics

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Domestic and global monetary policies, factors spurring economic growth and decline, trade balance and the macro level effects of trade imbalances in developed and emerging markets, as well as employment policies.

5582. Managing Teams and Organization Culture

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students explore how to foster a culture that enables maximum benefit from organizational teams. Specific topics include team creation and

dynamics, motivation, organization structure, conflict, empowerment, and politics. Emphasis is placed on the unique challenges presented by cross-cultural teams.

5602. Modeling Statistical and Qualitative Uncertainty

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Students will gain an understanding of how to leverage quantitative and qualitative data when making business decisions. Students will examine uncertainty inherent in future-oriented decisions based on traditional and Bayesian statistical analysis, as well as the behavioral tendencies of customers, suppliers, and employees. In addition, students will learn to recognize common decision biases and develop techniques for countering them.

5603. Global Business Issues

1-4.5 credits. Prerequisite: Open only to Business Administration Executive MBA students. May be repeated for a maximum of five credits.

Students become better versed in international business challenges, understand issues related to transnational and cross-cultural management, and examine global issues relative to their company. Students participate in an international trip to gain first-hand experience in the dynamics of international business management, engage with in-country business executives across multiple industries and functional areas, and execute a business challenge project in a foreign country.

5651. Managing Information Technology

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

IT-related issues internal to the organization, and analyze challenges inherent in managing a company's IT, including evaluating information technology investment decisions, designing business processes, selecting information technologies to support such processes, implementing technology solutions, managing information technology vendors, and securing information technologies.

5683. Managing Human Capital

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Examines how to manage human capital effectively in dynamic legal, social, and economic environments. Attention focuses on recruitment and selection, techniques for training and management development, performance appraisal, retention policies, and negotiation strategies and tactics.

5722. Employment Law

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Critical components of employment law and how management practices can generate a workplace regulatory environment that is not only compliant, but also a source of value for the firm. Regulatory issues related hiring, firing, and evaluating employees, illegal discrimination, and the rights of and obligations toward vulnerable populations. Additional emphasis is placed on interactions with administrative agencies, protecting firm knowledge from competition, developing employer-employee relationships, managing workplace safety, and resolving disputes.

5772. Supply Chain Management

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Integration of suppliers, manufacturers, and retailers, and consider supply chain responsiveness and costs in relation to adding value to the firm. Students evaluate the importance of good supply chain design, planning, and operation, and consider key drivers of supply chain performance, including the importance of technology.

5792. Strategic Fit and Coordination

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Focus on the needs of key organizational stakeholders and understanding the impact of decisions by individual functional areas on the entire organization. Students will draw upon knowledge from multiple academic disciplines to develop organizational strategies, designs, and resource allocations that can improve firm performance from a holistic perspective.

5842. Microeconomic Incentives

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

How key economic principles affect business decision making. Students consider how incentives play a role in the decisions. The effects of organizational and capital structure on decision making and employee efforts are examined.

5852. Leveraging Digital Technologies

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Assessing the strategic uses and implications of digital technologies, with a focus on harnessing and managing information technologies in inter-organizational and market-related contexts for competitive advantage.

5863. Managing Brand Value

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Focus on implementing the value proposition targeted to specific customers. Students use the marketing mix as a conceptual tool to structure thinking and make decisions around comprehensive strategy implementation related to product and service attributes and benefits, pricing, channels of distribution, and integrated communications platforms.

5901. Executive Project

1. Variable (5-3) credits. Prerequisite: Open only to Business Administration Executive MBA students. May be repeated for a maximum of three credits.

Students engage in a new business development opportunity. Students focus on idea inception, conduct a feasibility analysis using a comprehensive assessment framework, and develop implementation strategies.

5933. Alternative Investments and Risk Management

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

Concepts of risk management with specific attention to the structure of risk management, identifying risk types, assessing risk, mitigating risk, and capital adequacy. Students focus on the key investment strategies used in alternative investments markets, i.e., hedge funds and private equity, and assess derivatives (puts and calls), forward and futures contracts, and swaps. They

examine how these strategies can be used to speculate or hedge particular risks.

5993. Sustainable Competitive Strategy

1.5 credits. Prerequisite: Open only to Business Administration Executive MBA students.

How to defend businesses against competitive challenges and environmental change while maintaining high ethical standards. Students focus on game theory, sustainability, and temporal tradeoffs to understand the effects of managerial choices on competitors, internal stakeholders, society and the future performance of the firm.

Field Education (FED)

5301. Field Education Seminar I

Zero credits. Corequisite: BASC 5390, 5391, and FED 5351; open to M.S.W. students.

This seminar helps students prepare for and make optimum use of their field education experience. Topics include the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar is used to identify issues that arise in the field and ways to deal with them. Required course for students in the M.S.W. program.

5302. Field Seminar II

One credit. Corequisite: FED 5352 and ADMN 5301 or CSWK 5301 or GRWK 5301 or CORG 5301 or POPR 5301. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This seminar helps students prepare for and make optimum use of their field education experience. Areas of seminar content include such topics as the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar identifies issues that arise in the field and ways to deal with them. Required course for students in the M.S.W. program.

5310. Field Education Seminar III

Zero credits. Prerequisite: Open only to M.S.W. students. Corequisite: POPR 5353 or CORG 5353 or ADMN 5353 or GRWK 5353 or CSWK 5353.

This seminar helps students prepare for and make optimum use of their field education experience. Topics include the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar is used to identify issues that arise in the field and ways to deal with them. Required course for students in the M.S.W. Program.

5311. Field Education Seminar IV

One credit. Prerequisite: ADMN 5353 or CSWK 5353 or GRWK 5353 or CORG 5353 or POPR 5353 and FED 5310; open only to students in the M.S.W. program. Corequisite: ADMN 5354 or CSWK 5354 or GRWK 5354 or CORG 5354 or POPR 5354. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This seminar helps students prepare for and make optimum use of their field education experience. Areas of seminar content include such topics as the roles and responsibilities of

the student, field instructor and faculty advisor, exploration and development of the learning contract, and the educational assessment of self as a learner in the profession. Required course for students in the M.S.W. program.

5340. Field Practicum Extension

Variable (1-5) credits. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Field practicum extension of hours.

5350. Field Education Seminar V

One credit. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students; department consent required. Corequisite: CSWK 5355 or GRWK 5355 or ADMN 5355 or CORG 5355 or POPR 5355. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This seminar helps students prepare for and make optimum use of their field education experience. Topics include the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar is used to identify issues that arise in the field and ways to deal with them. Required course for students in the M.S.W. program completing a Block Field Placement.

5351. Field Education Foundation I

Four credits. Prerequisite: Open only to M.S.W. students. Corequisite: BASC 5390 or BASC 5391 or FED 5301. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Teaches students basic skills in social work practice with systems of all sizes including individuals, groups, organizations, and communities. This field experience course provides the foundation for the development of advanced skills in specific social work methods in advanced field experiences. Required course for students in the M.S.W. program.

5352. Field Education Foundation II

Four credits. Prerequisite: Open only to M.S.W. students. Corequisite: FED 5302 and CSWK 5301 or GRWK 5301 or ADMN 5301 or CORG 5301 or POPR 5301. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Continues to develop basic skills in social work practice with systems of all sizes, while adding increased emphasis on the students' development of skills in the students' major method. Required course for students in the M.S.W. program.

Finance (FNCE)

5101. Financial Management

Three credits. Prerequisite: Open only to MBA students. Not open to students who have passed FNCE 5812.

Overview of techniques for effectively studying financial decisions and their impact on the company. Covers the basic concepts and tools necessary to understand the financial decision-making process. The fundamental issues of timing and uncertainty are integrated into the problem of asset valuation. Financial analysis models for determining appropriate sources of capital and effective use of long term and short-term assets are discussed.

5151. Introduction to Economic Markets

Three credits. Prerequisite: Open only to MBA students. Not open to students who have passed BADM 5170.

Provides a foundation in the economics of markets, with particular application to financial markets and the role of information. Specific topics include the following: (1) the basic principles of supply, demand, profit maximization, price determination, international trade, and exchange rates; (2) the basic structure of modern, global financial markets, as an application of the basic economic principles; (3) the use of information and information technology in financial markets, including use of the internet, Bloomberg, Dow Jones and other computerized sources of information; and (4) a review of the "efficient market hypothesis.

5181. Fundamentals of Financial Management

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Students gain tools and frameworks to analyze financial decisions based on principles of modern financial theory. Covers concepts such as discounted cash flow techniques, and its applications to valuation of common stock and bonds and lease vs. buy decisions. The time value of money is examined for both personal financial planning and business applications, and is used to value financial instruments, including common stock and bonds.

5182. Capital Budgeting and Corporate Financial Policy

1.5 credits. Corequisite: FNCE 5181.

Applying the tools and techniques of the time value of money framework to capital budgeting issues and corporate financial policy. They focus on corporate capital budgeting and valuation, investment decisions under uncertainty, market efficiency, and corporate financial policy including financing and dividend decisions. Students evaluate capital investments with a focus on how companies analyze the risk associated with future cash flows and how that risk is incorporated in the required rates of return, as well as how financing choices (stocks and bond issues) and payout policy affect the cost of capital of large projects. Students apply two widely used models, the Capital Asset Pricing Model (CAPM) and the Weighted Average Cost of Capital (WACC) to capital budgeting problems.

5202. Investment and Security Analysis

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

A rigorous foundation in risk/return analysis, asset valuation, the use of derivatives, and financial engineering techniques in risk management and overall portfolio management. Information technology is applied, including computerized financial modeling and asset management software.

5205. Global Financial Management

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

An exploration of global finance topics such as 1) international trade, 2) balance of payments, 3) exchange rate determination, 4) currency exposure, and 5) the cost of capital in global financial markets. Information technology is applied.

5206. Financial Institutions: Management and Capital Markets

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Investigation of the structure financial services companies (banks, insurance companies, securities firms, and so forth). Emphasis is on the tools used by these firms to compete to provide basic financial services like pooling resources, managing risk, transferring economic resources, pricing information and clearing and settling payments. Financial services product development and the role of information technology in financial services, including software and data.

5209. Corporate Finance

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

A markets-oriented approach to corporate finance issues, especially capital structure and dividend policy. Modern concepts of agency theory and asymmetric information are integrated.

5311. Financial Markets and Instruments

Two credits. Prerequisite: Department consent.

Fixed income securities, futures and forwards, swaps and options contracts and the structure of financial markets, including equity and bond markets, money markets, foreign exchange, and commodities.

5312. Financial Institutions - A Risk Management Approach

Three credits. Prerequisite: Department consent.

Sources of risk and management of risk through diversification, hedging and gearing. Value at Risk (VAR), Risk Management System and Basel II Accord, as well as the measurement of market risk, interest rate risk, credit risk, and other risks are addressed in this course.

5313. Financial Risk Modeling I

Three credits. Prerequisite: Department consent.

The mathematical foundation for modeling financial risk as well as key concepts in algebra, statistics, calculus, time series and econometrics principles with applications to modeling risk management as a dynamic process over time.

5321. Financial Risk Modeling II

Three credits. Prerequisite: Department consent.

A background in building advanced financial models, including lattice models, numerical methods, and Monte Carlo simulation; programming techniques to value complex derivatives and portfolios; and analyses of financial risk problems with Excel, VBA, and higher level programming languages.

5322. Financial Risk Management I - Equity Markets

Three credits. Prerequisite: Department consent.

Strategies for security selection and asset allocation and evidence on returns and volatility, trade-to-trade equity price behavior, trading volume and patterns, financial risks and optimal allocation of funds. Students will use pricing and equity derivatives in risk management as well as exotic options in equity-linked and interest rate-linked products and strategies.

5323. Strategies and Risk Management in Alternative Investments I

Three credits. Prerequisite: Department consent.

The alternative investment tools, the performance of hedge funds and other alternative investments such as venture funds and private

equity, an in-depth analysis of the main hedge fund investment strategies, and behavioral issues and human factor in risk management. The recent financial crises have exposed how risk models can fail as a result of human errors, and lack of communication. The instructors will include business professionals and rely mostly on cases which apply the concepts developed in the previous classes. This class will devote a significant amount of time on how to address the human factor in modeling risk.

5331. Financial Risk Modeling III

Three credits. Prerequisite: Department consent.

The application of advanced estimation and forecasting techniques including multivariate and time series models (ARIMA) and maximum likelihood estimation to risk management, and advanced VAR topics, including computing and implementing VAR management systems, extensions and limitations of VAR (IVAR, DVAR), and stress testing.

5332. Financial Risk Management II - Fixed Income Markets

Three credits. Prerequisite: Department consent.

Bond fundamentals and risk, models of term structure, the use of interest rate derivative in hedging interest rate risk, the use of mortgage-backed and other asset-backed securities (MBS, CMBS), and other debt instruments (CDOs, CLOs etc.) to manage credit and cash flow risks, in addition to valuation and trading strategies of pooled assets and derivative bonds using Monte Carlo and option pricing techniques.

5333. Strategies and Risk Management in Alternative Investments II

Three credits. Prerequisite: Department consent.

Alternative investment tools, performance of hedge funds and other alternative investments such as venture funds and private equity, in-depth analysis of the main hedge fund investment strategies, behavioral issues and human factor in risk management. The recent financial crises have exposed how risk models can fail as a result of human errors, and lack of communication. The instructors will include business professionals and rely mostly on cases which apply the concepts developed in the previous classes. This class will devote a significant amount of time on how to address the human factor in modeling risk.

5341. Financial Risk Management III - Advanced Topics

Three credits. Prerequisite: Department consent.

Pricing, measurement, and management of credit risk; credit risk modeling; use of credit derivatives to manage and control credit risk; building and managing portfolios, including long/short, and market neutral strategies; measurement of credit risk, including Actuarial, Merton, and Copula function; and portfolio construction, performance evaluation, asset allocation, and portfolio risk management (VAR, Hedging, Portfolio insurance).

5342. Internal Control Risk - Valuation and Analysis Issues

Three credits. Prerequisite: Department consent.

Accounting requirements associated with asset valuation and income recognition of complex portfolios that utilize advanced hedging techniques. Analyzing an organization's control environment and processes within COSO and SOX frameworks and the control practices that organizations use to help ensure the integrity of information provided

by its accounting systems. Tax related issues and Basel II are also discussed.

5343. Legal and Ethical Issues in Financial Risk Management

Three credits. Prerequisite: Department consent.

An introduction to the federal laws regulating financial products and the internal controls necessary to comply with those laws. The federal regulation of securities and derivatives and the market participants engaged in those businesses. Participants study safety and soundness regulation of other major financial institutions, including commercial banks, bank holding companies, and insurance underwriters. Examination of the compliance activities and internal controls that financial firms need to maintain to comply with federal law particularly the Sarbanes-Oxley Act. Includes an overview of new developments in financial regulation and compliance.

5351. Excel Visual Basic Applications in Financial Risk Management

Three credits.

The advanced knowledge of financial risk management to build risk measurement and management tools by using Excel VBA. Course assumes prior knowledge of the VBA language. It provides an advanced learning forum for students to develop specific applications on their own. These deliverable risk management applications are graded.

5352. Financial Programming and Modeling

Three credits.

The use of MATLAB, R, and SAS for financial programming and modeling. Students pick up materials such as programming basics, SQL, database operations, file operations, graphical user interface design, object-oriented programming, XML, Component Object Model (COM) client and server, and application programming interface (API). Fundamental concepts are reviewed. Students learn modeling techniques such as Monte-Carlo simulation, binomial and trinomial trees, Black-Scholes, finite difference methods, constrained and unconstrained optimization, linear and non-linear programming, heuristic optimization, mean-variance, Value at Risk, data envelopment analysis (DEA), and data mining techniques applied in risk management, and apply these in financial contexts. Construction of various applications, for example portfolio optimization with live data from the internet using various methods, option pricing using Monte-Carlo, binomial trees, Black-Scholes, asset pricing models, capital budgeting, efficiency evaluation, finding betas of stocks, risk evaluation using data mining techniques, etc., across several programming languages.

5353. Enterprise Risk Management (ERM)

Three credits.

A real world approach for students and real-world professionals to use in determining how business risk can affect top priority business strategies and how to develop action plans for addressing those risks through ERM. The steps necessary to achieve an effective ERM process through a unique methodology for identifying and prioritizing risks across business functions. An initial set of specific risks many functions may currently face. Includes tools, sample reports and case studies providing a practical guide for implementing ERM. Links ERM to the corporate

strategy which is well illustrated through case studies. There will be a detailed discussion of the value of ERM to the enterprise and its various stakeholders.

5408. Valuation of Financial Assets

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Developing models for asset allocation, and security selection to construct a diversified portfolio. Analysis of industry segments, and valuation of common stocks and bonds. Topics include analysis of business models, measurement of risk and cost of capital, valuation of common stocks, and valuation and measurement of risk of bonds and bond funds. Preparation of analysts' reports is an integral part of the course.

5409. Advanced Valuation and Portfolio Management

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Starts with performance measurement, and then discusses various trading and risk management strategies, and concludes with a discussion of the impact of Accounting process, and Corporate Governance on valuation. Technical analysis is briefly discussed at the end. Delivered primarily through discussion of cases.

5410. Fund Management I

Variable (1-3) credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students; instructor consent. Corequisite: FNCE 5202.

First part of a two-part Fund Management course. Develops the objectives and goals, the process, and the procedure for execution for management of funds in conformity with the SMF Prospectus. Trains students in the art of asset allocation, security selection, portfolio construction, risk management, preparing analysts' reports for trade recommendations, monitoring of positions, and preparing reports for presentation to the IAB.

5411. Fund Management II

Variable (1-3) credits. Prerequisite: FNCE 5101 or FNCE 5182 and FNCE 5202; open only to MBA students; instructor consent.

This course is the second part of a two-part Fund Management course. In addition to all the activities in the first part during Fall, this course focuses on portfolio management, performance evaluation, attribution analysis, development of various trading and risk management strategies, and technical analysis. Students prepare the final annual report for presentation to the UConn Foundation.

5504. Options and Futures

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Analysis and valuation of speculative securities including options and futures with emphasis on their use for hedging and speculative motives. Major valuation models are discussed and applications of contingent claim valuation framework to corporate finance problems are also explored.

5507. Working Capital Management

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Working capital management is critical in determining whether a firm is competitive and profitable. Each component of working capital cash, marketable securities, receivables, inventories, and payables is studied and is related to

the firm's operations. Concentrates on applications and includes lectures by working capital managers from major corporations.

5508. Asset Allocation and Capital Market Theory

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Provides an integrative overview of issues in financial theory. Contemporary theoretical developments in corporate finance and financial markets are addressed. Major topics include agency theory, option theory, term structure theory, CAPM, APT, market efficiency, capital structure, and dividend policies under full and asymmetric information.

5512. Fixed Income Instruments and Markets

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Examines contemporary portfolio management of fixed income institutional investors, issuers, and broker-dealers. Assesses current practice and presents a theoretical framework for anticipating change. Coverage includes pricing, assessment of return and risk, and the development of overall strategies, for these markets: government, corporate, municipal, and international bonds; mortgage-related and other asset-backed securities; and derivative securities including futures, options, swaps, and other interest rate contracts.

5513. Advanced Corporate Finance: Capital Investment Finance

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Dynamic capital budgeting; applies corporate finance theory to the real-world problems that financial analysts face every day, integrating theory and practice, facilitated through the use of simulation analysis. These tools include both an understanding of the theoretical underpinnings of sound capital budgeting techniques and a mastery of the technology necessary to practically implement this knowledge in a real-world setting.

5521. Risk and Insurance

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

A study of the recognition, analysis, and treatment of pure risk from the viewpoint of the enterprise. This course considers various methods of risk management but emphasizes the role of insurance.

5532. Real Estate Investment and Portfolio Management

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Overview of real estate investment decision-making. Topics include: risk-return analysis of alternative types of real estate investments; leases, operating costs, and tax consequences; valuation techniques, including discounted cash flow and option pricing; real estate portfolio management; and alternative forms of equity securitization such as real estate investment trusts.

5533. Real Estate Capital Markets

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Structure and operation of the mortgage market. Topics include the identification, measurement and management of risk from the perspective of borrower, lender, and investor. Stresses the integration of the real estate debt markets with

the global capital market, and considers the role and impact of mortgage-backed securities for residential and commercial real estate lending.

5534. The Internet and Information Systems Applied to Real Estate

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Specialized information technology is now available for all segments of the real estate industry. For example, investment firms are particularly interested in information technology that helps them monitor, understand, and manage risks associated with mortgage-backed securities. Database management systems and geographic information systems (GIS) give the decision-maker unprecedented power to manage data and analyze risks. The Internet opens up vast new sources of timely information. This course stresses the use of GIS and of the Internet. Students will gain hands-on experience with these tools through projects that are organized around business problems.

5610. Personal Financial Planning

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

For the professional working in the area of financial services as well as for one's personal planning. It is the application of finance theory to the individual and family. This integrated approach covers lifetime cash flows, asset accumulation and allocation, debt management, retirement planning, and risk management.

5611. Financial Modeling

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

A hands-on use of computerized decision aids to analyze a variety of financial problems. Applications will be drawn from corporate financial planning, modern portfolio theory, options pricing, dynamic trading, and so forth. No computer experience is required; this course will help students develop the necessary programming skills to build fairly sophisticated models.

5630. Real Estate: A Personal Investment Perspective

Three credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent.

Real estate is a major component of household wealth. Important household real estate decisions include, for example, where to buy a house; renting versus owning a home; choosing between alternative mortgage instruments; understanding the house purchase transaction; and the risks and returns of real estate investing. This course surveys the fundamentals of real estate from a personal investment perspective.

5894. Seminar

Variable (1-3) credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent. May be repeated for a maximum of 12 credits.

Investigation and discussion of special topics in finance, risk and insurance and/or real estate and urban economic studies.

5895. Special Topics in Finance

Variable (1-3) credits. Prerequisite: FNCE 5101 or 5182; open only to MBA students, others with consent. May be repeated for a maximum of 12 credits.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of

finance, risk and insurance, and/or real estate and urban economic studies. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

6200. Investigation of Special Topics

Variable (1-2) credits. Prerequisite: FNCE 5508. May be repeated for a maximum of 12 credits.

6201. Introduction to Finance Theory and Evidence

Three credits. Prerequisite: Instructor consent.

Efficient market hypothesis, utility theory, portfolio theory, CAPM, arbitrage pricing theory, option pricing, capital structure, tax theory, capital budgeting under uncertainty, and current empirical studies.

6202. Corporate and Institutional Finance

Three credits. Prerequisite: FNCE 5508; instructor consent.

Topics include information asymmetry, agency, internal capital markets, governance, market microstructure, moral hazard / adverse selection. Concepts are applied in both corporate and financial institution settings.

6203. Theory of Financial Markets and Valuation

Three credits. Prerequisite: Instructor consent.

Fundamental pricing theorems, state preference theory, martingale pricing, dominance, spanning and arbitrage restrictions, consumption models, and continuous-time approaches to asset pricing, interest rate models, and derivatives pricing.

6204. Empirical Methods in Finance Research

Three credits. Prerequisite: FNCE 5508; instructor consent.

Topics include predictability of asset prices, time series models of market microstructure, event study methodology, tests of asset pricing models and derivative pricing models, market efficiency, volatility of asset returns, and term structure interest rates.

French (FREN)

5306. The Later French Enlightenment

Three credits.

5307. Problems in French Literature or Philology

Variable (1-3) credits. May be repeated for a maximum of 12 credits.

5309. Provençal Language and Literature

Three credits.

5311. Aesthetic Trends in Twentieth-Century French Literature

Three credits. May be repeated for a maximum of 12 credits.

5353. Old French Literature

Three credits.

5357. The French Novel in the Eighteenth Century

Three credits.

5361. French Poetry in the Second Half of the Nineteenth Century

Three credits.

5362. French Contemporary Poetry

Three credits.

5369. The French Novel in the First Half of the Nineteenth Century

Three credits.

Stendhal, Balzac, and the romantic novelists.

5370. The French Novel in the Second Half of the Nineteenth Century

Three credits.

Flaubert, Zola, and their contemporaries.

5373. The French Contemporary Novel

Three credits.

5376. The Prose of the French Renaissance

Three credits.

5377. The Poetry of the French Renaissance

Three credits.

5380. Seminar in Francophone Literature

Three credits. May be repeated for credit with change of topic.

The study of the literature from the French-speaking world outside of France (Quebec, the Antilles, West Africa, the Maghreb) against the background of colonial and post-colonial history.

5401. Seminar on Villon

Three credits. Prerequisite: FREN 5353.

Geography (GEOG)

5000. Research Design

Three credits.

A survey of research methods in geography. Topics include spatial sampling, hypothesis construction and testing and geographic modelling.

5010. Geography Proseminar

One credit. Prerequisite: Open only to Geography graduate students.

Presentation by geography faculty of current research topics.

5100. Location Analysis

Three credits.

Issues and approaches in location analysis. Topics include location theory and models; representation issues; use of geographic information systems (GIS) for data preparation, analysis and display; evaluation of service areas; land use allocation; accessibility and locational conflict; and implications for planning and public policy.

5110. Regional Development and Policy

Three credits. Prerequisite: Instructor consent.

A study of theory and practice in regional development and planning. Emphasis on evaluation of regional problems and public policies designed to resolve them, with a primary focus on the United States.

5130. GIS in Transportation

Three credits. Prerequisite: Open only to Geography graduate students.

Discussion of the uses of Geographic Information Systems (GIS) for transportation rate establishment, for visualizing the results of transportation models for predicting flows, for exploring the impact of transportation on the location of economic activities, and for the planning of transportation facilities in cities.

5140. Geographical Analysis of Social Issues

Three credits. May be repeated for a maximum of six credits.

Focus on geographical perspectives toward research on selected social issues, with an emphasis on methods of behavioral analysis and relevant social geographical concepts such as social space,

activity spaces and time-space budgets, and diffusion.

5150. Visualization in Geographic Information Systems

Three credits.

Design of spatial data displays and computer generated maps.

5220. Geography of Sustainable Development

Three credits.

Conceptualizing international development; understanding theories, strategies and ideologies of development; and use of case studies to understand development in practice. Emphasis placed on the concept of sustainable development and sustainability, grassroots-driven approaches to development, the role of women, and geographic explanations as to how and why uneven development has occurred.

5230. Advanced GIS for Remote Sensing for Geoscience Applications

(Also offered as GSCI 5230.) Three credits. Not open to students who have passed GEOG 4520.

Research methods for using Geographic Information Systems, remote sensing, and image interpretation to investigate problems in geoscience. Includes research techniques for data acquisition, processing and analysis of Digital Elevation Models and satellite imagery. Geologic materials, processes, landforms and landscapes.

5290. Advanced Urban Geography

Three credits. May be repeated for a maximum of six credits.

Analysis of social and economic patterns within urban areas, with emphasis on individualized research. The implications for planning are stressed.

5310. Advanced Fluvial Geomorphology

Three credits. Not open for credit to students who have passed GEOG 3310.

Research methods for analyzing fluvial forms and processes. Theoretical discussion of factors controlling open-channel flow, sediment transport, channel morphology, adjustments of rivers to environmental changes and human impacts. River management and restoration strategies. Requires one weekend field trip.

5390. Advanced Physical Geography

Three credits. May be repeated for a total of 6 credits.

Problems involving the application of physical processes in our changing environment.

5500. Fundamentals of Geographic Information Science

Three credits.

An introduction to the theory and methods for representing, acquiring, storing, manipulating, displaying, and analyzing geographic features in relation to the surface of the earth.

5505. Remote Sensing of Marine Geography

Three credits.

Introduction to remote sensing applications in oceans and seas. Applications include image analysis of sea surface temperature, winds, altimetry, sea ice, chlorophyll, primary productivity, and bathymetry. Graduate section includes individualized projects.

5510. Application Issues in Geographic Information Systems

Three credits. Recommended preparation: GEOG 5500.

Operational and management issues in geographic information systems (GIS). Implementation of traditional planning and management theories and techniques in GIS. Topics include problems of data exchange standards, implementation of GIS in an institutional setting including benchmarking a GIS, applications of GIS in various fields, social impacts and legal aspects of GIS. Practical work includes analytical exercises using GIS culminating in an application project.

5515. Web GIS

Three credits. Prerequisite: Instructor consent.

Introduction to Internet GIS. The basics of system architecture, geospatial web services, mashups, key elements of mobile GIS solutions, the functionality of geoportals and web technologies, web mapping interoperability using universal data standards such as OGC (Open Geospatial Consortium) web services, and the current state of e-business and e-government web mapping interests.

5520. GIS Modeling of the Urban Environment

Three credits. Prerequisite: Instructor consent.

Survey of GIS methods and spatial analysis for studying spatial patterns of land use and human activity in an urban environment.

5530. GIS Applications in Health Research

Three credits.

Survey of GIS methods for health research, health care policy making, and planning.

5560. GIS and Environmental Geography

Three credits. Recommended preparation: GEOG 5500.

Applicability of Geographic Information Systems to solve environmental problems. Case studies address environmental assessment and monitoring, analysis and modeling, planning and management.

5600. Spatial Data Analysis

Three credits. Prerequisite: Instructor consent.

Univariate statistics focused on the use of spatial statistics, including geostatistics in geographical research. Problems specific to spatial data analysis are addressed.

5610. Spatial Statistics and Modeling

Three credits. Prerequisite: GEOG 5600.

Advanced study in the methods and practice of multidimensional statistics and spatial modeling.

5620. Computer Applications in Spatial Analysis

Three credits.

Advanced seminar in the design of Geographic Information Systems software for solving problems in spatial analysis.

5700. Contemporary Europe: A Geography

Three credits.

An introduction to the peoples, countries, and landscapes of Europe (excluding the republics of the former U.S.S.R.). Emphasis on the economic, political, and social forces both maintaining national identities and shaping a united Europe.

5810. Special Problems in Geography

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

5890. Internship in Geography

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

A fieldwork internship program under the direction and supervision of the geography staff. Students will be placed in agencies or industries where their academic training will be applied. One 8-hour work day per week (or its equivalent) for the host agency during the course of the semester will be necessary for three academic credits. A written report will be required.

6000. Themes in Geographic Thought

Three credits.

Examination of the historical development of geography since the early nineteenth century. Emphasis on the last century of intellectual developments that have led to the emergence of contemporary geography as a research discipline.

6800. Practicum in College Teaching in Geography

One credit. Prerequisite: Open only to Geography graduate students; instructor consent. May be repeated for a maximum of three credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Guided development of college-level instruction. Drafting of course objectives, selection of texts, development of course and lecture outlines, selection of grading mechanisms, and incorporating feedback for improvement of instruction.

6810. Advanced Topics in Spatial Analysis

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6820. Advanced Topics in Regional Analysis

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6830. Advanced Topics in Population Geography

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6840. Advanced Topics in Urban Geography

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6850. Advanced Topics in Geography of Public Policy

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6860. Advanced Topics in Economic Geography

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6870. Advanced Topics in Physical Geography

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

6880. Advanced Topics in Environmental Geography

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

Geoscience (GSCI)

5000. Geoscience Core Course

Three credits. May be repeated for a maximum of six credits.

Exposes students to a solid background in a variety of topics related to integrative geosciences, emphasizing interdisciplinarity. Development of

speaking skills through oral presentations, and writing skills through preparation and defense of large, interdisciplinary grant proposals. Required of all first year graduate students in Geosciences.

5050. Special Problems in Geology

Variable (1-6) credits. Prerequisite: Department consent. May be repeated for credit up to six times with a change of content.

Advanced study and research in geology.

5110. Sediment Transport

Three credits.

The mechanics of sediment transport with particular emphasis on the processes governing transport in coastal and estuarine areas. Initiation of motion for cohesive and noncohesive materials, bed and suspended load transport, bed forms, sediment-flow interactions modeling considerations.

5210. Glacial Processes and Materials

Three credits.

Reconstruction of former glaciers and the interactive processes leading to the character and distribution of unconsolidated surface materials in glaciated regions. Techniques for interpreting subsurface unconsolidated materials.

5230. Advanced GIS for Remote Sensing for Geoscience Applications

(Also offered as GEOG 5230.) Three credits. Not open to students who have passed GEOG 4520.

Research methods for using Geographic Information Systems, remote sensing, and image interpretation to investigate problems in geoscience. Includes research techniques for data acquisition, processing and analysis of Digital Elevation Models and satellite imagery. Geologic materials, processes, landforms and landscapes.

5310. Advanced Structural Geology

Three credits.

Application of finite and incremental strain analyses using advanced geometric techniques. This course integrates field studies of deformed rocks with theoretical understanding and quantitative analysis.

5320. Advanced Plate Tectonics

Three credits.

Introduces students to techniques used in analyzing plate motions on a sphere, including poles of rotation and instantaneous and finite motions. The course integrates geologic data and analytical techniques with a rigorous understanding of plate motions and provides students with a global understanding and appreciation of the Earth.

5410. Igneous Petrology

Four credits.

Introduction to igneous rocks, physical and chemical principles governing their formation. Fluid mechanics of magmas, heat transfer, thermodynamics, phase equilibria, isotope geochemistry, and the relation of magmatism to plate tectonics. Optical microscopy, x-ray fluorescence, and electron microprobe analysis. Prepare a paper suitable for publication in a scientific journal.

5420. Metamorphic Petrology

Three credits.

Interpretation of mineralogical, chemical, and textural features of metamorphic rocks in terms of the physical conditions and dynamic processes operating in the Earth's crust. Thermodynamic description of phase equilibria in fluid-rock

systems. Kinetics, mass and energy transport in metamorphic processes. Petrographic and x-ray analytical techniques.

5510. Applied Geophysics for Geologists and Engineers

Three credits.

Introductory survey of surface and borehole geophysical methods and their application to hydrogeologic, environmental monitoring, and geotechnical engineering studies. Laboratory involves geophysical field measurement, data reduction and geologic interpretation.

5520. Exploring and Engineering Seismology

Three credits.

Theory of elasticity applied to wave propagation: equations of motion; reflection and refraction of elastic waves; velocity analysis and fundamental petrophysics; and principles of detecting subsurface interfaces and structures.

5530. Applied and Environmental Geophysics

Three credits. Prerequisite: Instructor consent.

Potential theory (gravity, static electricity and magnetic fields), electromagnetic coupling, Maxwell's equations; electromagnetic wave propagation; principles of detection of subsurface interface and structures by geophysical methods.

5550. Physics of the Earth

Three credits.

The composition, structure, and dynamics of the earth's core, mantle, and crust inferred from observations of seismology, geomagnetism, and heat flow.

5560. Fundamentals of Planetary Science

Three credits.

Evolution of the solar system, celestial mechanics, tidal friction, internal composition of planets, black-body radiation, planetary atmospheres.

5680. Applied Geologic Mapping

Six credits. Prerequisite: Instructor consent.

Advanced surveying and techniques of 3D mapping using electronic total stations, GPS and Geodetic-grade GPS instrumentation. Environmental field geophysics; GPR, resistivity, seismic, magnetic and microgravity surveys. Petrologic, geochemical and geophysical core logging for geotechnical and exploration applications. Field sampling for assay and environmental geochemistry. Detailed geological outcrop mapping. Mine and subsurface geologic mapping.

5710. Advanced Hydrogeology

Three credits.

Transport processes in groundwater systems. Mathematical methods in groundwater hydrology. Water quality and resource evaluation.

5720. Groundwater Modeling

Three credits.

Numerical techniques for modeling flow and contaminant transport in groundwater systems. Model design, calibration, visualization, verification and sensitivity analysis. Application to field sites.

5790. Field Methods in Hydrogeology

Variable (1-6) credits. May be repeated for a maximum of six credits.

Field methods associated with ground water and contamination assessments.

6130. Seminar in Paleontology

Variable (1-6) credits. Prerequisite: Department consent. May be repeated for a maximum of six credits with change of content.

Readings and discussions on recent advances in paleontology and paleobiology.

6330. Seminar in Structural Geology

Three credits.

Readings and discussion of recent advances in structural geology.

6340. Seminar in Tectonics

Three credits.

Readings and discussions of recent advances in tectonics.

6510. Fundamentals of Seismology

Three credits.

Theory of elasticity applied to wave propagation; equations of motion; reflection and refraction of elastic waves; wave propagation in homogeneous media; surface waves.

6520. Advanced Seismology

Three credits. Prerequisite: MATH 5410; MATH 5411, which may be taken concurrently.

Elastic wave propagation in plane layered media; seismogram synthesis by ray parameter integration, ray approximations, and mode summation; earthquake source representations.

6530. Geophysical Inverse Theory

Three credits.

Fitting geophysical model parameters to data. Topics include model uniqueness, resolution, and error estimation.

6540. Seminar in Geophysics

Variable (1-6) credits. Prerequisite: Instructor consent.

Readings and discussions of recent advances in geophysics.

6550. Special Topics in Geophysics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

German (GERM)

5305. Studies in Germanic Philology and Linguistics

Three credits. May be repeated for a maximum of 12 credits.

Study of a coherent body of material related to older Germanic languages; to diachronic or synchronic phonology, morphology, syntax, and lexicology of Germanic languages; or to other areas of theoretical or applied linguistics.

5314. German Studies

Three credits. May be repeated for a maximum of 12 credits.

Exploration of the field of German Studies as an "interdiscipline"; analysis of a coherent body of material drawn from the social sciences, humanities, natural sciences, or other fields that helps to illuminate the German-speaking world.

5315. Topics in German Studies

One credit. May be repeated for a maximum of four credits.

Focus on a particular theme (e.g. revolution, or family and society), approach (e.g. critical theory, or feminist interpretations), genre (e.g. lyric, or autobiographical essay), skill (e.g. research methodology) or other aspect of German studies.

5332. Studies in German Literature II

Three credits. May be repeated for a maximum of 12 credits.

Study of a coherent body of texts drawn from the period from approximately 1700 to 1890.

5345. Studies in German Literature III

Three credits. May be repeated for a maximum of 12 credits.

Study of a coherent body of texts drawn from the period from approximately 1890 to the present.

5365. German Film Studies

Three credits. May be repeated for a maximum of 12 credits.

Study of a coherent body of films and related materials (e.g. fiction, theory, reviews) organized to illuminate particular themes (e.g. representations of postwar Germany), relationships (e.g. between films and literature or film and social context), cinematic styles (e.g. Expressionism), etc.

5376. Rhetoric and Writing

Three credits. May be repeated for a maximum of 12 credits.

In-depth introduction to the rhetorical resources of the German language; extensive analysis of spoken and written language; application of knowledge in students' own writing and speaking.

5377. Topics in Rhetoric and Writing

One credit. May be repeated for a maximum of four credits.

5378. Preparation for Certification of Proficiency in German

Zero credits.

Development of students' proficiency in speaking, listening, reading and writing German in preparation for either the Mittelstufenprüfung or Oberstufenprüfung.

5380. German Language Methodology

Three credits. May be repeated for a maximum of 12 credits.

Exploration and analysis of a range of theories, issues, and problems in German instruction. Focus on the nature of language acquisition, methods, and implications for practice.

5385. German Literary Criticism and Theory

Three credits. May be repeated for a maximum of 12 credits.

Systematic study of literary criticism, including such topics as the contributions of particular critical approaches to the understanding of significant German-language literary works; the philosophies, implicit or explicit, underlying various critical approaches; and the German contribution to international critical discourse.

5390. Independent Study

Variable (1-6) credits. May be repeated for credit.

6420. Seminar in Medieval Literature

Three credits. May be repeated for a maximum of 12 credits.

6450. Seminar in Nineteenth-Century Literature

Three credits. May be repeated for a maximum of 12 credits.

6460. Seminar in Twentieth-Century Literature

Three credits. May be repeated for a maximum of 12 credits.

6480. Investigation of Special Topics

Variable (1-6) credits. May be repeated for a maximum of 12 credits.

Graduate Program in Professional Studies (GPPS)

5300. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent.

Independent study in a topic related to the graduate program in Professional Studies as designated and approved by the instructor assigned to oversee and grade the project.

5301. Special Topics in Professional Studies

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits with a change of content.

The instructor assigned will designate the special topics related to the graduate program in Professional Studies and oversee and grade students' work in the course.

5325. Issues in Economic Development

Three credits.

Economic, social, and demographic change in those countries comprising the less wealthy regions of the South. It examines development from linear (neoclassical), structuralist (political economy), and other perspectives, and emphasizes relationships between "advanced" and "developing" countries within the context of the global economy. In addition to theoretical grounding, the course provides practice in preparing development profiles of individual countries.

5347. Program Evaluation

Three credits.

Application of the methods of science to the assessment of social programs. Here a social program refers to organized, goal-directed activities designed to address a social problem. The goal of this course is to provide you, the student, with enough skill that you are able to design and implement evaluations of programs. The extent to which you are able to do this without assistance reflects largely your familiarity with scientific methods. Some of the more technical forms of impact studies may require additional study, or assistance from consultants.

5352. Systemic Analysis

Three credits. Prerequisite: Instructor consent.

Provides students with a foundational understanding of the complex and dynamic relations between issues and the systems that cause them. Systemic analysis trains students to understand in the operational dynamics of the social and structural dimensions of a society or group.

5357. Quantitative Analysis

Three credits.

Develop skills necessary to understand and utilize research based on quantitative methods while building fundamental skills in quantitative analysis. Includes basic univariate statistics, bivariate statistics and basic multivariate statistics including basic analysis of variance and basic multiple regression analysis. Stresses the use of Microsoft Excel for performing statistical analysis.

5361. Strategic Staffing and Talent Management

Three credits.

This course presents the theoretical frameworks and practical tactics for the acquisition, deployment, and retention of the talent necessary

to achieve the strategic and tactical objectives of the business. Topics will include strategic staffing, human resource planning, recruitment, assessment, selection decision-making strategies, succession planning and retention strategies. The importance of linking staffing and talent management to business strategies, objectives, and competitive challenges will be emphasized.

5389. MPS Internship

Three credits. Prerequisite: Open only to students enrolled in the Master of Professional Studies degree program; instructor consent.

The internship will provide professional experience in the student's field of study in a private or public organization. Students will select the organization and specific internship position with the approval of the major advisor. Students will be expected to perform professional duties for a minimum of 160 hours during the semester. Prior to the beginning of the internship, student will develop a set of professional objectives for the internship experience. Students will maintain a log of experiences and activities during the internship. At the conclusion of the internship, students will write a paper evaluating the experience gained in light of the stated objectives.

5395. MPS Residency Program

Zero credits. Prerequisite or corequisite: GPPS 5397; instructor consent.

The Master of Professional Studies (MPS) program requires students to complete a professional residency. The residency is a milestone towards the completion of the MPS degree. Consistent with the criteria for the MPS Capstone Project, each residency will be subject to the approval of the student's advisory committee. Appropriate residencies are those designed to: (a) provide students with an opportunity to develop a sense of affiliation and identification with the program and the university; (b) provide students with an opportunity for scholarly dialogue related to their capstone project; or (c) provide students with an opportunity for professional socialization by developing relationships with peers, faculty, and practitioners in the field. Examples of appropriate residencies include but are not limited to sessions at the Storrs campus, attendance and participation in approved regional national or international professional conferences.

5397. MPS Capstone Project

Variable (3-6) credits. Prerequisite: Open only to students enrolled in the Master of Professional Studies degree program; instructor consent. May be repeated for a maximum of six credits.

Towards the end of the M.P.S. program, students will select, with faculty approval, a topic for a major project that demonstrates the student's ability to define, analyze, synthesize, evaluate, and recommend actions or solutions to deal with a major issue, problem, or opportunity within the field of study. Capstone Projects may include job-related field projects, integrative analyses of professional literature, and comprehensive project proposals for adoption by third parties. In all cases, the Capstone Project is intended to demonstrate an extensive understanding of the topic area selected, the ability to develop and integrative and systemic analysis of a problem, and the ability to identify appropriate solutions and recommendations. A written report documenting all aspects of the project will be presented for faculty approval.

Graduate School (GRAD)

5900. Special Topics in Graduate Education

Variable (1-3) credits. Prerequisite: Instructor consent.

Special topics in Graduate Education.

5910. Responsible Conduct in Research

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The core principles pertaining to responsible conduct in research are covered through extensive use of case studies, along with readings and classroom instruction. Different sections of the course utilize case studies that emphasize discipline-specific issues. Satisfactory completion is based on participation in the discussions and completion of a case study presentation.

5915. Summer Institute in College Instruction

Three credits. Prerequisite: Instructor consent.

Required core course of the Graduate Certificate Program in College Instruction, intended for doctoral students in the early stages of their graduate careers. Course objectives include competencies in instruction, classroom management, use of technology, assessment and evaluation, and other pedagogical best-practices. The course is offered in residential format over a two week period in May.

5930. Full-Time Directed Studies (Master's Level)

Three credits. Prerequisite: Open only to M.S.W. students, not doctoral students; Graduate School consent required. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course denotes that the student is participating in a full-time internship, field work experience, or other course of off-campus study required as part of the student's Master's program. No other courses may be taken concurrently.

5940. Exchange Studies

Variable (1-9) credits. Prerequisite: Department consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course denotes that the student is participating in a full-time Graduate Exchange. No other courses may be taken concurrently.

5950. Master's Thesis Research

Variable (1-9) credits. Prerequisite: Open only to graduate students enrolled in a Plan A Master's Degree Program. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Associated with the research efforts of students pursuing a Plan A master's degree, and may be used to meet the nine-credit Master's research requirement.

5960. Full-Time Master's Research

Three credits. Prerequisite: Open only to graduate students enrolled in a Plan A Master's Degree Program; Graduate School consent required. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

For students who have completed all courses on the plan of study and who are performing master's level research on a full-time basis. It may

contribute to meeting the nine credit Master's research requirement. No other courses may be taken concurrently. In the summer, this is a 12-week (Summer 4) course. Since this course denotes a full time commitment, students may not hold graduate assistantships while taking this course.

5997. Special Readings (Certificate)

Zero credits.

This is a non-credit course for which certificate students must register in cases where their regular program of course work for credit has been interrupted and they are not otherwise registered.

5998. Special Readings (Master's)

Zero credits. To be used by master's students who are not enrolled in a thesis (Plan A) track. May be repeated.

This is a non-credit course for which master's degree students must register in cases where their regular program of course work for credit has been interrupted and they are not otherwise registered.

5999. Thesis Preparation

Zero credits. Prerequisite: Open only to graduate students enrolled in a Plan A Master's Degree Program. May be repeated.

This is a non-credit course to be used to maintain registered status by Plan A master's students who have completed their coursework and who are not registered for any other credit-bearing course.

6000. Seminars in College Instruction

One credit. May be repeated for a maximum of three credits.

Explores teaching skills that promote learning within a diverse student body in higher education. Hybrid sessions each address a specific topic in educational theory and practice. Students must complete five seminars of their choosing to fulfill the course requirement. Students will be self-directed in the completion of the course and are encouraged to select seminars that meet their professional interests, needs, and professional goals.

6001. Fundamentals Teaching and Learning

Two credits.

Introduction to instructional practices in higher education in general and undergraduate education in particular. Topics include instructional design and methods, evaluation and assessment, learning theory, pedagogical resources, and trends in higher education. This course is required for the Graduate Certificate in College Instruction.

6002. Reflections on Teaching Practice

Three credits.

Students in this seminar examine and discuss various issues of curriculum and teaching practice related to university level courses. Through a systematic process of problem-posing, reflection, and group feedback, students formulate practical solutions to problems occurring during curriculum development, instruction, materials use, teacher-student interactions, course management, and program administration.

6003. Advanced Issues Teaching and Learning

Three credits.

This is a self-directed course providing graduate students interested in college teaching with the opportunity to design their own teaching portfolios and investigate and critique the syllabi and curriculum of other college teachers in order to reflect on their own pedagogical practices.

6004. Practicum in College Instruction
One credit.

The implementation and application of theory in college instruction. This 1-credit course is required for the Graduate Certificate in College Instruction for students who do not have any practical teaching experience in higher education. The practicum involves observation, mentoring, participation in classroom teaching, and planning/teaching in a higher education setting. Students and their coach will develop contracts that identify individualized learning outcomes of the practicum and assessment.

6930. Full-Time Directed Studies (Doctoral Level)

Three credits. Prerequisite: Open only to doctoral students; Graduate School consent required. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Denotes that the student is participating in a full-time internship, field work experience, or other course of off-campus study required as part of the student's doctoral program. No other courses may be taken concurrently.

6932. Directed Studies for MD/PhD

One credit. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

For use of MD/PhD students at UConn Health to provide them with a credit benefit for their dual degree program. MD/PhD enrolling students may hold a graduate assistantship and take additional graduate courses, which allows continued integration of the graduate and medical school curricula in the first four semesters of the program. This 15-credit benefit is approved for UConn dual degree programs and is an important aspect of the MD/PhD program. Gives MD/PhD students the same 15-credit benefit as DMD/PhD students.

6940. Exchange Studies

Variable (1-9) credits. Prerequisite: Department consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course denotes that the student is participating in a full-time Graduate Exchange. No other courses may be taken concurrently.

6950. Doctoral Dissertation Research

Variable (1-9) credits. Prerequisite: Open only to doctoral students. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Associated with the research efforts of students pursuing a doctoral degree, and may be used to meet the fifteen-credit doctoral research requirement.

6960. Full-Time Doctoral Research

Three credits. Prerequisite: Open only to doctoral students; Graduate School consent required. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

To be used by those students who have completed all courses on the plan of study and who are performing doctoral level research on a full-time basis. It may contribute to meeting the 15-credit doctoral research requirement. No other courses may be taken concurrently. In the summer, this is a 12-week (Summer 4) course. Since this course denotes a full time commitment, students

may not hold graduate assistantships while taking this course.

6998. Special Readings (Doctoral)

Zero credits. Prerequisite: Open only to doctoral students. May be repeated.

A non-credit course for which doctoral students must register in cases where their regular program of course work for credit has been interrupted and they are not otherwise registered.

6999. Dissertation Preparation

Zero credits. Prerequisite: Open only to doctoral students. May be repeated.

A non-credit course to be used to maintain registered status by doctoral students who have reached candidacy for the doctoral degree and who are not registered for any other credit-bearing course.

Group Work (GRWK)

5301. Essentials of Social Group Work Practice

Three credits.

Provides knowledge, theories, and practice principles common to social group work. Focuses on knowledge and practice methods that are used to identify and understand procedures and processes essential to planning, developing and working with small groups in various agency-based settings, dealing with a range of issues and diverse peoples. Social and behavioral sciences and group work literature, empirical data and practice wisdom serve as the foundation for organizing course content and activities. Required course for students in the Group Work concentration.

5302. Differential Group Work: Populations and Settings

Three credits. Prerequisite: GRWK 5301, FED 5352, and FED 5302; open only to M.S.W. students in the Group Work concentration. Corequisite: GRWK 5353 and FED 5310.

Designed to increase the depth of understanding of the content of GRWK 5301. Focuses on the application of group work processes, properties and group work skills to group work practice with groups that are established for different purposes and with populations that differ according to age, culture and need for group work services. Also examines the impact of different settings as the context for group work practice. Required course for students in the Group Work concentration.

5303. Advanced Group Work Practice Methods and Techniques

Three credits. Prerequisite: GRWK 5302 and 5353, and FED 5310; open only to M.S.W. students in the Group Work concentration. Corequisite: GRWK 5354 and FED 5311.

The overall emphasis of this course will be on a critical analysis and sound examination of the social group work method B - its underlying theories, knowledge, research-supported practices, ideological commitments, and basic tenets and principles. The primary focus is on the development of advanced practice methods and techniques. Required course for students in the Group Work concentration.

5311. Group Processes

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Helps students develop a conceptual frame of reference for understanding small group processes. The focus of study is mainly on establishing a

theoretical and conceptual appreciation of how small groups function. Students will develop an increasingly wide range of conceptual tools to identify and assess group processes. Students will gain a better understanding of small group interaction as it impacts individuals, interpersonal relationships and interactions with others beyond the group. Experiential as well as didactic study methods will be used. Required course for students in the Group Work concentration.

5340. Skills Laboratory in Social Group Work Practice

One credit.

Primary focus is to offer students an opportunity to demonstrate how to apply (i.e., simulate practice experiences) some of the knowledge and theory presented in GRWK 5301 - Essentials of Social Group Work Practice in practice situations. Students will participate in exercises and use procedures to enhance and assess current practice skill levels. Exercises and other instructional aids will center on particular elements pertinent to basic competencies in social group work practice including group formation, entering an established group, work within the group's process and achieving group goals. As well, attention is focused on group work within the context of the agency setting and its philosophical stance toward this method of practice. Required course for students in the Advanced Standing Option in the Group Work Concentration and must be taken in the summer prior to the beginning of full time study for the M.S.W. degree.

5342. Group Work Practice in Therapeutic Settings

Three credits. Prerequisite: GRWK 5301 or CSWK 5301; open only to M.S.W. students in the Casework and Group Work concentrations.

Provides a theoretical base and group work practice skills for working with populations who have been diagnosed with a clinical condition(s). Focuses on understanding how to use a strength-based, recovery oriented therapeutic group to foster the social and emotional growth that will promote optimal functioning and prevent relapse in persons with clinical conditions. Biological, behavioral, cognitive-behavioral and psychodynamic theories will be used to understand factors that contribute to clinical conditions and to develop the type of therapeutic group that responds to the social and emotional needs of the members of the group. Focus will be on diverse settings (in-patient, out-patient, prison, residential half-ways houses) where clients with clinical conditions are served in open-ended and closed groups. DSM V will be used to develop diagnostic skills and understanding.

5353. Field Education in Group Work III

Four credits. Prerequisite: FED 5302 and FED 5352; open only to M.S.W. students in the Group Work concentration. Corequisite: GRWK 5302 and FED 5310. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Group Work concentration.

5354. Field Education in Group Work IV

Four credits. Prerequisite: GRWK 5353 and FED 5310; open only to M.S.W. students in the Group Work concentration. Corequisite: GRWK 5303

and FED 5311. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Group Work concentration.

5355. Block Placement in Group Work

Eight credits. Prerequisite: FED 5352 and FED 5302; open only to M.S.W. students in the Group Work concentration. Corequisite: GRWK 5302 and 5303 and FED 5350; instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Field Education in Group Work for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course. Required course for students in the M.S.W. program completing a Block Field Placement.

Healthcare Management and Insurance Studies (HCMI)

5221. Risk Management and Insurance

Three credits.

Provides a basic understanding of various ways to deal with different types of risk. Fundamentals relating to life, property and casualty, and health insurance are discussed in that context. Enterprise risk management for corporations, financial risk management, and strategic policies to mitigate risk are also covered.

5240. Health Care Organization and Management

Three credits. Prerequisite: Open only to MBA students, others with consent.

Examines the nation's healthcare delivery system with overviews provided for each major sector of the health economy. The basic tools of economics and finance are employed to gain critical insights into the structure, conduct and performance of each of these sectors. Designed to accommodate both health care professionals and individuals from other business areas interested in learning more about the health care industry.

5243. Health Care Economics

Three credits. Prerequisite: HCMI 5240.

Demonstrates how various economic theories can be used to think about health care issues and takes a macro or industry perspective of various health care problems and policy questions. Students are provided with a set of economic tools to evaluate a theoretical or empirical argument relating to health or medical care. Culminates with an in-depth analysis of the structure, conduct, and performance of the markets for medical insurance, physician services, hospital services, pharmaceutical products, and long-term care. Health care reform is also discussed.

5549. Management of Long-Term Health Care Organizations

Three credits. Not open to MBA students.

Examines administrative processes within the long-term health care facility including issues related to organizational effectiveness, financial management, the regulatory structure, operational procedures, policies and practices.

5632. Internship in Health Care Management

Variable (1-9) credits. Not open to MBA students. May be repeated for a maximum of nine credits.

Under the guidance of a qualified preceptor, the student participates in the administrative process in the long-term health care organizational structure. A project is required.

5686. Health Insurance and Risk Management

Three credits. Prerequisite: HCMI 5240.

A detailed overview of the purpose, structure, operation, and performance of the health insurance industry from the perspective of various stakeholders including insurance company owners, employers, individual consumers of health insurance services, and society. Emphasis is placed on individual and group health insurance products with respect to administration, selling and marketing, underwriting, pricing, and claims administration. Managed-care techniques, benefit-package design, and cost-sharing mechanisms are also evaluated and discussed.

5687. Global Healthcare Systems

Three credits. Prerequisite: HCMI 5240.

The examination and evaluation of diverse healthcare systems across the world. As part of this process, students will review the rationale that shapes the unique characteristics and attributes of different systems throughout the world and their associated strengths and weakness. From an organizational perspective, introduces models used for the provision of health care services within the framework of business management practices. May be used to satisfy the MBA Program at Hartford.

5688. Risk Management and Quality across Borders

Three credits. Prerequisite: HCMI 5240.

Examines the management of risk and quality within health care organizations and within different international settings. Within this framework, students are exposed to a number of different quality modes and study the relationship between risk management and quality.

5891. Health Care Internship

Variable (1-3) credits. Prerequisite: Instructor consent.

Under the guidance of a qualified preceptor, students are provided opportunities to study and analyze an organization's characteristics, functions, goals, strategies, and decision-making processes. Managerial skill is developed through the performance of administrative tasks and through participation in problem-solving processes. A research paper is required.

5894. Seminar

Variable (1-3) credits. Prerequisite: Open only to MBA students. Not open to students who have passed BLAW 5182. May be repeated for a maximum of 12 credits.

Investigation and discussion of special topics in health care management.

5895. Special Topics in Health Care Management

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of health care management. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

Hebrew and Judaic Studies (HEJS)

5303. Religion of Ancient Israel

Three credits.

Significant aspects of the religion of ancient Israel: The God-human relationship, the origins of good and evil, law and covenant, kingship, prophecy, ritual and morality, repentance and redemption. Taught in English.

5316. Jewish Martyrdom in the Middle Ages

Three credits.

Open to graduate students in Judaic Studies, Medieval Studies, Religion, English, Comparative Literature; others with consent of instructor. Jewish martyrdom from Late Antiquity through the Middle Ages, in text and practice. From rabbinic legends to medieval resistance.

5325. Seminar on the Holocaust: Philosophical and Historical Issues

Three credits. Prerequisite: At least six credits of Hebrew and Judaic Studies graduate courses.

Study of philosophical and historical issues related to the occurrence and analysis of the Holocaust.

5326. Translating Scripture

Three credits.

Open to graduate students in Judaic Studies, Comparative Literature and Cultural Studies, Medieval Studies, Classical and Mediterranean Studies, English, and Medieval Studies, others with permission; The history of Bible translations, from the ancient Aramaic and Greek versions of the Hebrew Scriptures to modern English translations.

5351. Seminar on Modern Jewish Philosophy

Three credits. Prerequisite: at least six credits of Hebrew and Judaic Studies graduate courses.

Study of the principal issues and figures in Jewish philosophy from the Enlightenment to the present. Topics considered include the nature (and possibility) of Jewish philosophy, the concepts of God, nature, and the world, the status of religious knowledge, law and practice, the concept of election in relation to the people and land of Israel. Thinkers to be considered and read include Moses Mendelssohn, Solomon Maimon, S.R. Hirsch, Hermann Cohen, Franz Rosenzweig, Ahad Ha'am, Martin Buber, Emanuel Levinas, A.J. Heschel, and Joseph Soloveitchik.

5353. Modern European Jewish History

Three credits. Prerequisite: Instructor consent.

Selected topics in Modern European Jewish History between the Enlightenment and the establishment of the State of Israel.

5371. Jews, Turks, and Moors, in Early Modern Europe

Three credits. Prerequisite: Open to graduate students in Judaic Studies; Literatures, Cultures, and Languages; English; History; and Medieval Studies; others by consent.

Examination of the varied representations of Jews, Muslims, and Africans in early modern culture through a study of travel narratives, poetry, religious texts, and dramatic literature.

5390. Independent Study

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

5397. Special Topics in Judaic Studies

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

History (HIST)

5101. Introduction to Historical Research

Three credits. Prerequisite: Instructor consent.

Introduction to the sources and methods of professional historians. Finding primary sources (qualitative and quantitative), evaluating them for accuracy and usefulness, organizing data, and writing exercises based on the sources. Students must produce a proposal (fully annotated) for a major research paper to be written in the subsequent semester.

5102. Historical Research and Writing

Three credits. Prerequisite: Open to History M.A. and Ph.D. students; instructor consent. May be repeated for a maximum of nine credits.

A research seminar for students in the M.A. and Ph.D. programs in history.

5103. Teaching History

Three credits. Prerequisite: Department consent.

A survey of the pedagogy and practice of history teaching, designed to prepare advanced graduate students for careers in colleges and universities, museums, and other educational settings. Seminar will explore the contemporary landscape of higher education; debates over the liberal arts and the place of history in the curriculum; diversity in the classroom; and challenges of designing syllabi, preparing and delivering lectures, leading discussions, advising and evaluating.

5140. Introduction to Historical Museum Work I

Three credits. Prerequisite: Instructor consent.

A study of historical agencies and museums. Laboratory work and field trips are included.

5141. Introduction to Historical Museum Work II

Three credits. Prerequisite: Instructor consent.

A study of historical agencies and museums. Laboratory work and field trips are included.

5142. Administration of Archives and Manuscripts

Three credits.

An overview of the history and development of the American archival profession, including basic archival theory and methodology. Emphasizes principles of collection, organization, and reference service for historical manuscripts and archives.

5195. Special Topics in History

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

5199. Independent Study in History

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

5201. Theories of History

Three credits. Prerequisite: Instructor consent.

The principles and problems underlying the study of history; and a survey of the history of historical writing and of various schools of historical interpretation.

5218. Historical Conceptions of Race and Science

Three credits. Prerequisite: Instructor consent.

Historical examination of the interplay between concepts of race and scientific naturalism as they emerged in the eighteenth, nineteenth, and twentieth centuries. Attention also paid to political and social contexts.

5235. The Making of the African Diaspora

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

Theory and practice of African Diaspora history. Recent theoretical debates and cases of African Diaspora studies and history including: politics, culture, resistance; community formation; slavery; pan-Africanism; transnationalism; black internationalism; African and black consciousness; Diaspora theory; gender, race, and class analyses.

5276. War and Revolution in the Twentieth Century

Three credits. Prerequisite: Instructor consent.

5316. Topics in Medieval History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5370. Western Europe in the Fifteenth and Sixteenth Centuries

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5373. Europe in the Seventeenth Century

Three credits. Prerequisite: Instructor consent.

5374. Europe in the Eighteenth Century

Three credits. Prerequisite: Instructor consent.

5410. The French Revolution

Three credits. Prerequisite: Instructor consent.

An intensive study of the intellectual, social, economic, political, and military events of the period and of their impact upon the world, as well as upon French history.

5412. Nineteenth Century France

Three credits. May be repeated for a maximum of nine credits.

5423. State and Society in Europe since 1800

Three credits. Relationship between social change and state formation in Western Europe from c. 1800 to the mid-20th century; industrialization, class, social identities, nationalism, and imperialism.

5424. Europe in the Nineteenth and Twentieth Centuries

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5456. Germany in the Nineteenth and Twentieth Centuries

Three credits. Prerequisite: Instructor consent.

5462. Topics in Modern British History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5470. Topics in Italian History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5475. Histories of the Body: European Perspectives since 1500

Three credits. Prerequisite: Instructor consent.

Historical and interdisciplinary approaches to the study of the body and the European imagination since 1500. Topics include representations of health and illness; the body as a site of law and sovereign power; sexed bodies; the body in social and political theory; the government of life and death; race and ethnicity.

5505. Gender in the Early Modern West

Three credits.

Discussion of key works on gender, women, and sexuality, spanning the 1400s-1700s with a geographical focus mostly on Britain, continental Europe, and the Americas.

5505. Gender in the Early Modern West

Three credits.

Discussion of key works on gender, women, and sexuality, spanning the 1400's-1700's with a geographical focus mostly on Britain, continental Europe, and the Americas.

5510. Topics in Colonial American History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5515. The American Revolution

Three credits. Prerequisite: Instructor consent.

5520. United States in the Early National Period and the Age of Jackson, 1787-1840

Three credits. Prerequisite: Instructor consent.

5525. Society and Culture in the Civil War Era, 1830-1880

Three credits. Prerequisite: Instructor consent.

The social, economic, political and cultural forces, including gender, race, and class, that shaped the Civil War and its aftermath.

5530. United States in the Age of Reform, 1877-1924

Three credits. Prerequisite: Instructor consent.

5540. Topics in American Social and Cultural History, 1600-1876

Three credits. Prerequisite: Instructor consent.

Major themes in the recent scholarship of social and cultural history: community and communication; family and gender; race, class, and industrialization; religion; and slavery.

5543. Social Change in 19th Century America

Three credits. Prerequisite: Instructor consent.

Major sources of social change in 19th-century United States, including legacy of the American Revolution; fate of Native America; rural society; slavery; industrialization; immigration; class formation; race; the impact of Civil War and Reconstruction.

5544. American Land and Society

Three credits. Prerequisite: Instructor consent.

Examines the historical literature on American ideas about landholding and agriculture from the 18th to the 20th century and their impact on society, culture, and the environment.

5545. Topics in New England History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5550. Topics in American Family History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5555. Topics in the History of American Women

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5560. Topics in the History of American Foreign Relations

Three credits. Prerequisite: Instructor consent.

5565. Topics in the History of Urban America

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5570. Topics in Black History

Three credits. Prerequisite: Instructor consent.

5575. American Maritime History

Three credits. Prerequisite: Instructor consent.

A study of the development of American mercantile enterprise from colonial times and its relationship to American political, economic, and cultural history. The course includes lectures,

readings, and extensive use of the facilities at Mystic Seaport. It is offered at Mystic Seaport under the joint auspices of the University of Connecticut and the Frank C. Munson Institute of American Maritime Studies.

5576. Seminar in American Maritime Studies

Three credits. Prerequisite: Instructor consent.

A seminar involving reading and research on selected topics in American maritime studies. Open only to students who have previously taken History 5575 or to advanced students who are concurrently enrolled in History 5575. This course is given at Mystic Seaport under joint auspices of the University of Connecticut and the Frank C. Munson Institute of American Maritime History.

5610. Comparative Transnational Latina/o American History

Three credits. Prerequisite: Instructor consent.

Critical issues in diverse U.S. Latina/o histories and forces that contributed to the arrival of people of Latin American and Caribbean heritage to the United States. Topics include the epistemological origins and historiographical traditions of the field; U.S. empire; labor, migration, and diaspora; border formations; constructions of gender and sexuality; and comparative racialization.

5621. Topics in Latin American History

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5622. The Historical Literature of Latin America

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5630. The Historical Development of the Caribbean

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

Theories and case studies of Caribbean history. Recent theoretical debates and cases of Caribbean history including economy, politics, culture, community formation; political mobilization; slavery and emancipation; nation and state formation; law; immigration and emigration; intellectual traditions; gender, race, and class analyses.

5836. Topics in Twentieth-Century China

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of nine credits.

5837. East Asian History

Three credits. Prerequisite: Instructor consent.

Topics in modern Chinese and Japanese history with emphasis on Chinese thought and politics.

6000. American Studies: Methods and Major Texts

(Also offered as AMST 6000 and ENGL 6800.) Three credits. Prerequisite: Open only to English, History, and Political Science graduate students.

Introduction to the methodologies and topics of American Studies through a survey of major texts in the field, past and present. Course also provides a history of the field.

6500. American Studies: Special Topics

(Also offered as AMST 6500 and ENGL 6850.) Three credits. Prerequisite: Open only to English, History, and Political Science graduate students. May be repeated once for credit with a change in topic.

Detailed study of a specific topic in American cultural studies with an emphasis on developing

skills in interdisciplinary research. Topics vary from semester to semester.

Homeland Security Leadership (HSL)

5312. Intelligence for Homeland Security: Organizational and Policy Challenges

Three credits.

Examines contemporaneous issues facing the intelligence community and its role in homeland security. Emphasis on critical thinking of issues related to policy development, implementation, and intelligence support to senior decision makers in the homeland security community. Students will have the opportunity to address policy, organizational and substantive issues pertaining to homeland security and intelligence; interact with each other, and author well researched papers.

5315. Contemporary Issues in Homeland Security Leadership

Three credits.

Supports the overarching goals of the Homeland Security Leadership program by providing an intellectual framework for engaging in ongoing self-directed learning within the Homeland Security domain; developing a cadre of leaders across the Homeland Security continuum who share substantive skills in analysis, interpretation, policy development, and administration of approved policy; and to complement other more operationally oriented training programs.

Human Behavior Elective (HBEL)

5300. Substance Abuse: I: Intro to Alcohol and Other Drugs

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Examines the special issues and problems in dealing with alcohol and drug abuse. Focuses on: developing a conceptual framework of drug abuse and addiction; major classifications of drugs; examining high risk populations with an emphasis on their unique problems and needs; integrating knowledge with practice by giving careful consideration to treatment issues such as identification, assessment, referral, therapeutic strategies, treatment modalities and settings; providing information on the role of federal, state, and voluntary organizations which impact on prevention, education and treatment programs. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

5301. Substance Abuse II: Prevention and Treatment of Alcohol and Other Drug Abuse

Three credits. Prerequisite: HBEL 5300; open only to students in the M.S.W. or STEP program.

Builds upon HBEL 5300, an overview of the various classes of drugs and the acute and chronic effects of drugs on human behavior and the body. Focuses on traditional and new intervention techniques that could be applied to social work practice. Provides knowledge of clinical applications and the empirical validation of effectiveness of major intervention strategies used in treatment of addictions. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

5327. Ethnic Minorities and the Social Work Profession: Black Experience

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Considers the Black Experience from historical, social, political, and economic perspectives. Addresses the evolution of male/female roles and relationships, the genesis of Black family patterns, and the consequences for social work practice. Examines the impact of poverty and discrimination in a context of international and national cultural factors. Required course for Substantive Area: Focused Area of Study on Black Studies for Social Work Practice; Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work .

5328. Ethnic Minorities and the Social Work Profession: The Puerto Rican/Latino/a Experience

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Considers the Puerto Rican experience in the United States from the historical, social, political, economic, and cultural perspectives. Examines the impact of poverty, migration, and discrimination on individuals, families and communities. Required course for Substantive Area: Focused Area of Study on Puerto Rican/Latino/a Studies Social Work; Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work; Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work.

5344. Aging and Mental Health

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Uses ecological theory as a framework for understanding the psychological processes of adaptation and the mental health needs of the elderly. Analyzes various service arrangements in terms of their usefulness in rehabilitation and prevention. Elective course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

5352. Death and Dying

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Focuses on dying as experienced by persons of all ages (not only the elderly) and on its psychological concomitants, such as rage and grief, bereavement and mourning; suicide and suicide prevention; dying as a career with identifiable states, as well as the concept of death as a social phenomenon. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice. Elective course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

5357. Social Gerontology

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Considers the societal aspects of aging, including the social psychological concomitants of adjustments, changing roles, and systems of social relationships. Includes an overview of the economic aspects of aging and the service delivery system. Required course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

5367. Culture and Health/Mental Health Disparities: Micro and Macro Perspectives

Three credits. Prerequisite: FED 5301.

This course will examine health/mental health disparities as it relates to contemporary micro and macro practice with diverse populations. The objective of the course is the examination and analysis of the inter-relations among differential diagnosis, culture, and varying treatment strategies. The content will cover important aspects of health such as factors influencing wellness and disease, contemporary socio-political factors, and agendas that shape how health care services are delivered and accessed. We will explore current domestic and international health epidemics, discuss their implications for populations that are at risk, and the professional communities' responses to them.

5370. The LGBTQ Experience: Sexual and Gender Diversities

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Examines the problems of America's homosexual minority. Presents homophobia (fear of homosexuals or homosexuality) as a prejudice held by all people, gay and straight, in a society which holds that heterosexuality is the "normal" and "acceptable" behavior and attitude. Intended to expand the students' awareness of how homophobic attitudes affect them and their relationships with other people in both professional and non-professional settings.

5373. Leadership Development in Anti-Violence Work: The Susan Schechter Social Action Seminar

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Collaboratively sponsored by Futures Without Violence, The Susan Schechter Leadership Development Fellowship and University of Connecticut School of Social Work, this interdisciplinary seminar will give students a structure for developing their analytic and social action abilities in the area of violence against women, children and in families. Study of the movement to end violence against these populations and its connections to other social change movements, such as civil rights and GLBT rights will be examined. The leadership approach demonstrated in the course is based on the work of Susan Schechter, an academic, activist, practitioner and writer.

5376. Puerto Rican and Latina Women and Their Reality

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Emphasizes the double oppression that the Puerto Rican woman faces. Analyzes the double burden that she confronts when seeking to maintain her identity as a Puerto Rican and as a woman in a society which discriminates against both groups. Equal emphasis is placed on issues of racism, classism, and heterosexuality since these issues create an even stronger burden on Puerto Rican women. Special consideration is given to Puerto Rican cultural aspects of the socialization process of males and females with a focus on rigid adherence to sex roles (e.g., machismo - marianismo). Elective course for Substantive Area: Focused Area of Study on Puerto Rican/Latino/a Studies Social Work; Elective course for Substantive

Area: Focused Area of Study on Social Work with Women and Children in Families; Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

5381. Child Maltreatment: History, Theory, Prevention and Intervention

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Primarily for students with some practice experience in family and children's services, examines the phenomena of child abuse and neglect and societal and professional responses aimed at their prevention and treatment. As with other courses in the Substantive Area in Family and Children's Services, it is presented in the context of ecologically oriented, family-centered child welfare policy and practice. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

5393. Emerging Issues in Mental Health and Substance Abuse

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program. May be repeated once for credit.

This course is designed to introduce students to current issues confronting providers of mental health and addiction services and consumers of these services as we enter the 21st Century. Philosophies about people with mental health, addiction and co-occurring disorders are changing in response to the developing knowledge base and the rise of consumer movements. Specific emphasis on the growing need for broad based multicultural service systems for consumers will be fostered. Issues of poverty and the "severely and predominantly mentally ill" will be discussed. Required course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

Human Development and Family Studies (HDFS)

5000. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Advanced study for qualified students who present suitable projects for intensive, independent investigation in human development and family studies.

5001. Seminar

One credit. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Seminar in professional orientation to the field of human development and family relations.

5002. Special Topics in Human Development and Family Studies

Variable (1-3) credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent. With a change of topic, students may enroll up to four times for a maximum of 12 credits.

In-depth investigation of a recent issue of human development and family studies.

5003. Research Methods in Human Development and Family Studies I

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Family and human development procedures, research experience related to analyzing interpersonal interaction and developmental processes.

5004. Research Methods in Human Development and Family Studies II

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Advanced family and human development research methods; research design and underlying methodological issues in analyzing interpersonal interaction and developmental processes.

5005. Qualitative Research Methods in HDFS

Three credits. Prerequisite: HDFS 5003; open only to Human Development and Family Studies graduate students; instructor consent.

Philosophical bases of qualitative research in the social sciences; developing qualitative strategies; including: existential-phenomenological, intensive interviews, participant observation, and textual analysis.

5007. Current Issues in Human Development and Family Studies

Variable (1-2) credits. Prerequisite: Open to graduate students in Human Development and Family Studies with instructor consent; others by permission. May be repeated for a maximum of 12 credits with a change of topic.

Focused presentation and discussion of an aspect of theory or methods related to advancing the field of human development and family studies.

5010. Practicum in University Teaching of Human Development and Family Studies

Three credits. Prerequisite: Instructor consent.

Supervised teaching of undergraduate courses in Human Development and Family Studies.

5020. Culture, Health and Human Development

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

Introduction to current interdisciplinary approaches to the study of human development and health in the context of culture. An overview of theoretical approaches; presentations of current research by invited speakers, focusing on how to combine disciplinary perspectives and methods in order to build a new integrative science of health and development across and within cultures.

5021. Culture, Health and Human Development

One credit. Prerequisite: Open to graduate students in Human Development and Family Studies with instructor consent; others with permission. May be repeated for a maximum of six credits.

Introduction to current interdisciplinary approaches to the study of human development and health in the context of culture. An overview of theoretical approaches; presentations of current research by invited speakers, focusing on how to combine disciplinary perspectives and methods in order to build a new integrative science of health and development across and within cultures.

5030. Research Practicum

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Supervised research in Family Studies.

5031. Culture, Health and Human Development Project

Three credits. Prerequisite: Department consent. May be repeated for a maximum of six credits.

Group discussion and guidance through planning, implementation, and write-up of a publishable research project in fulfillment of a core requirement for the Graduate Certificate in Culture, Health, and Human Development.

5032. Research Seminar in Qualitative Methods
Three credits. Prerequisite: Instructor consent. Recommended preparation: HDFS 5005.

Discussion and application of qualitative methods as applied to students' individual ongoing research projects. Participants must be currently conducting research using qualitative methods.

5088. Supervised Field Work in Family Development

Variable (1-6) credits. Prerequisite: Open only to Human Development and Family Studies graduate students; instructor consent. May be repeated for credit.

Work in a community agency related to the field of family development.

5101. Infant and Toddler Development

Three credits. Prerequisite: Instructor consent.

Contemporary theories and research on infant and toddler development; evaluation of prevention and intervention programs designed to address contemporary social issues facing infants/toddlers and their families.

5102. Early and Middle Childhood Development

Three credits. Prerequisite: Open to graduate students in Human Development and Family Studies; others by permission.

Theory and research related to early and middle childhood as a developmental period. Focus will be on topics such as executive functioning and cognitive development, language and literacy development, peer relations, gender roles, aggression, and prosocial behaviors, as well as on prevention and intervention programs designed to address contemporary social issues facing children and their families.

5103. Adolescent Development

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Adolescent development; understanding the various forces related to adolescent behavior.

5110. Families, Communities, and Positive Behavior Supports

Three credits. Prerequisite: Instructor consent.

Analysis of theory, research, systems, and curricula in Positive Behavior Supports (PBS) with emphasis on family and community partnerships. Interventions for problem behavior are examined across context and perspective. Open to graduate students in Human Development and Family Studies and related fields, and (with permission) to upper level undergraduates and those enrolled in the Honors Program.

5150. Human Attachment across the Lifespan

Three credits.

Theory and research on attachment, separation, trauma, and loss; lifespan approach to studying continuity or discontinuity from infant-parent attachment to peer-peer interactions to adult relationships.

5215. Models and Concepts of Lifespan Human Development

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Overview of approaches to understanding human development across the lifespan. Emphasis on models that cross-disciplinary boundaries to explore development in social and cultural contexts.

5232. Research Seminar in Adult Development and Aging

Three credits. May be repeated for a maximum of nine credits.

Research models and approaches specific to studying development in the latter half of the lifespan. Development of an individual research project.

5240. Aging: Personality and Social Interaction

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Patterns of adjustment to aging; continuity versus change in personality, role changes, and family relations of the elderly.

5248. Adaptation and Development in Adulthood

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Young adulthood through middle age with particular attention on transition episodes; stability and change in adult personality with attention to familial and other social relationships.

5250. Close Relationships

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Formation, maintenance, and dissolution of close relationships across the life span; relationships like courtship, marriage, parent-child, and friendships.

5255. Living with Chronic or Life-threatening Illness

Three credits. Prerequisite: Instructor consent.

Chronic and/or life-threatening illness from diagnosis through long-term management. Psychological, interpersonal, family, and ethical aspects of the chronic illness experience across the life span, in contexts for culture and health policy.

5277. Human Sexuality

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Human sexual behavior and attitudes.

5310. Patterns and Dynamics of Family Interaction

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Readings and research concerning the family, stressing interpersonal processes and communication.

5311. Theories of Family Development

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Concepts and theories in the area of family development.

5312. Diverse Families: Adaptations across the Lifespan

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

An interdisciplinary examination of the issues and experiences of diverse families within sociological and psychological contexts and how factors such as race, ethnicity, and culture shape contemporary family life across the lifespan.

5320. Special Issues in Family Development

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Theory, research and practice applied to special issues in human development and family relations over the life span.

5321. Seminar on Parent-Child Relations in Cross-Cultural Perspective

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Research and theory regarding the antecedents and effects of major dimensions of parental behavior on child development in the U.S.A. and cross-culturally, parental warmth, control, punishment, and their interactions.

5340. Prevention, Intervention, and Public Policy

Three credits.

Survey course of the theory, practice and science of primary prevention of human problems. Prevention concepts and case studies are presented. Students give analysis and critique of course content and develop personal and professional perspectives on prevention practice and possible social policy initiatives.

5342. Parent Education

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Planning, implementation, and evaluation of parent education programs for individuals and groups. Development and use of materials for such programs.

5442. Latina/o Health Disparities

Three credits.

Overview of health and health care issues among Latina/os in the United States with particular focus on health disparities.

5550. Social Policy, Law, and Child Welfare

Three credits.

Application of theory and research on child development, family relations, and intervention/prevention practices to legal, policy and child welfare contexts.

5751. Foundations of Marriage and Family Therapy

Three credits. Prerequisite: Open only to Human Development and Family Studies graduate students, others with consent.

Theoretical foundations of marriage and family therapy; basic principles of therapy, interactional patterns of marital dyads and families under stress; professional and ethical issues relevant to the practice of marriage and family therapy.

5752. Building Cultural, Contextual, and Integrative Competencies in Marriage and Family Therapy I

Two credits. Corequisite: HDFS 5751; instructor consent.

Conceptual and applied learning and community immersion experiences that address the cultural, contextual, and integrative competencies considered necessary to serve effectively as marriage and family-therapy scientist/practitioners in today's intercultural society.

5754. Marriage Therapy

Three credits. Prerequisite or corequisite: HDFS 5751; open only to Human Development and Family Studies graduate students, others with consent.

Marital interaction and therapy. Theory and technique of contemporary therapeutic approaches.

5756. Family Therapy

Three credits. Prerequisite or corequisite: HDFS 5751; open only to Human Development and Family Studies graduate students, others with consent.

Contemporary clinical conceptualizations of family interaction, major contributions to the development of family therapy as a unique discipline. Issues and problems commonly confronted in conducting family therapy.

5757. Building Cultural, Contextual, and Integrative Competencies in Marriage and Family Therapy II

Two credits. Prerequisite: instructor consent. Corequisite: HDFS 5756.

Conceptual and applied learning and community immersion experiences that address the cultural, contextual, and integrative competencies considered necessary to serve effectively as marriage and family-therapy scientist/practitioners in today's intercultural society.

5759. Case Seminar in Marriage and Family Therapy

Three credits. Prerequisite: HDFS 5751, and HDFS 5754 or 5756; instructor consent. Corequisite: HDFS 5762.

Specialized professional issues and professional problems in the practice of marriage and family therapy. Case material.

5761. Introduction to Clinical Practice and Professional Issues

Three credits. Prerequisite or corequisite: HDFS 5751; open only to Human Development and Family Studies graduate students.

Clinical practice in the Center for Marital and Family Therapy and in approved clinical training centers. Classwork and supervised clinical practice required. Professionalism, ethics, confidentiality, therapeutic techniques, and procedures required for clinical practice.

5763. Individual Supervision in Marriage and Family Therapy

Variable (1-6) credits. Prerequisite: HDFS 5761, and HDFS 5754 or 5756; open only to Human Development and Family Studies graduate students; instructor consent. May be repeated for a maximum of 24 credits.

5764. Clinical Assessment and Practice

Three credits. Prerequisite: Instructor consent.

Diagnosis and treatment of dysfunctional marital and family relationship patterns, nervous and

mental disorders; major family therapy assessment methods and instruments.

5782. Master's Practicum I in Marriage and Family Therapy

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

Supervised group experience in marriage and family therapy related to clinical practice in the Humphrey Clinic for Individual, Couple, and Family Therapy or other approved clinical training centers.

5790. Theories and World Views Informing Marriage and Family Therapy

Three credits. Prerequisite: Instructor consent.

Underlying theories and conceptualizations informing marriage and family therapy.

5792. Master's Practicum II in Marriage and Family Therapy

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of six credits.

Supervised group experience in marriage and family therapy related to clinical practice in the Humphrey Clinic for Individual, Couple, and Family Therapy or other approved clinical training centers.

6710. Family Therapy Research

Three credits. Prerequisite: HDFS 5003; open only to Human Development and Family Studies graduate students, others with consent.

Family therapy research methods; research design and methodological issues in analyzing treatment interventions, family interaction processes, and change.

6720. Family Therapy Supervision

Three credits. Prerequisite: Instructor consent.

Major models and methods of marriage and family therapy supervision; ethical and legal responsibilities faced by marital and family therapy supervisors. Development of perceptual, conceptual, and executive skills needed to supervise and train practitioners in the field of marriage and family therapy.

6730. Advanced Family Therapy

Three credits. Prerequisite: HDFS 5751 and 5756; instructor consent.

Current trends and issues in the field of family therapy; integration of clinical theory, research, and practice.

6792. Doctoral Practicum in Marriage and Family Therapy

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Supervised group experience in marriage and family therapy related to clinical practice in the Humphrey Clinic for Individual, Couple and Family Therapy or other approved clinical training centers.

6895. Internship in Marital and Family Therapy

Variable (1-6) credits. Prerequisite: Open only to Human Development and Family Studies graduate students; instructor consent. May be repeated for credit.

Nine to 12-month period of full-time clinical experience in a cooperating institution. Open only with consent of instructor to students of advanced standing in marital and family therapy. Offered at approved clinical training centers. The student assumes a full range of professional responsibilities associated with practice of marital and family

therapy. Minimum of 500 hours of direct client contact and receipt of 100 hours of supervision.

Human Rights (HRTS)

5005. Special Topics in Human Rights

Three credits. Prerequisite: Instructor consent. May be repeated for up to nine credits with change in content.

In-depth investigation of an issue in human rights research.

5095. Special Topics

Variable (1-3) credits. Prerequisite: Instructor consent.

5254. Managing the Future of Social Enterprise

Three credits. Not open for credit to students who have passed or are taking BADM/BLAW 5254.

Developing and managing market-based approaches to global human rights and social issues. Strategizing how companies create value both for society and business, including role of for-profit businesses as agents for positive social impact in changing legal, regulatory, policy, and market environments. Regulatory and business strategies that serve markets and promote long-term economic viability, sustainability, and human rights. Managerial perspectives on social innovation, statutory benefit corporations, corporate social certifications, social investment, shared value, strategic philanthropy and business opportunities serving emerging markets.

5301. Contemporary Debates in Human Rights

Three credits. Prerequisite: Instructor consent.

Key debates in Human Rights will introduce students to the main modern debates in the academic field of human rights. It is interdisciplinary in scope, including recent intellectual contributions from philosophy, law, political science, sociology, anthropology, literature and history. It will address a number of central issues and questions, including the normative philosophical foundations of human rights, whether human rights are universal or relative, whether human rights can be held collectively, and the justifications for women's rights and cultural rights.

5390. Economic Rights

Three credits. Prerequisite: Instructor consent.

Economic rights include the right to an adequate standard of living, the right to work, and the right to basic income guarantees for those unable to work. These rights are grounded in international law - particularly in the Universal Declaration of Human Rights and the International Covenant on Economic, Social, and Cultural Rights. This class will explore the conceptual bases, measurement, and policy applications of economic rights. Specific topics will include child labor, the right to development, non-governmental initiatives, and the institutionalization of economic rights (e.g., constitutionalization versus statutory implementation versus discretionary policies).

5899. Seminar in Human Rights

Three credits. May be repeated for up to nine credits with change in content.

Variable topics in the study of human rights.

Humanitarian Services Administration (HSA)

5300. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent.

Independent study in various topics related to the HSA certificate program as designated and approved by the instructor assigned to oversee and grade the project.

5312. Issues in Humanitarian Studies

Three credits. Prerequisite: Instructor consent.

Examines current issues of Global Human Development from the perspective of non-governmental organizations (NGOs), private voluntary organizations, international organizations (IOs), multi-governmental aid and humanitarian assistance agencies, the U.S. military and government sponsored aid organizations. Students gain a comprehensive, multidisciplinary understanding of issues facing these organizations and stresses that are currently forcing many to reevaluate their current policies and procedures.

5325. Advocacy and Grassroots Development

Three credits.

Addresses the importance of advocacy in the sustainable development process. Introduces the concept of advocacy, its role and functions in sustainable development and empowerment. Students will be given the opportunity to explore ways and means to develop effective advocacy programs.

5332. International Human Rights

Three credits. Prerequisite: Department consent.

Addresses the evolution of international human rights and of the legal instruments designed for their promotion and protection. It will study the theoretical foundations of the idea of human rights in various civilizations and cultures, evaluate its legacy within the western and non-western traditions, and examine its meaning and relevance in the contemporary world.

5377. Environmental Compliance and Regulations

Three credits.

Compliance and knowledge of a whole new generation of environmental regulations is required of all managers. This course begins with general compliance obligations, common law, trespass, nuisance and negligence. The major federal environmental laws affecting companies and agencies are reviewed along with even more stringent state and local regulations. Also presented is a view of the severe civil and criminal penalties liabilities attached to environmental regulations, and a discussion of the sharply increasing punishments for non-compliance. The final section of the course will outline strategies for compliance with specific comments on proactive environmental management as a method for reducing legal exposure from environmental issues. This is required of managers and it empowers private citizens.

Independent Study (IS)

5394. Independent Study

Variable (1-9) credits. Prerequisite: Open only to M.S.W. students; instructor consent. May be repeated for a maximum of nine credits.

Special social work topics not included in the curriculum may be the subject of an Independent Study. A proposal to do an independent study must be presented no later than the second session of the semester in which the course is to be completed and be approved by the Director of Student Services. A maximum of three independent study courses or nine credits may be applied toward degree requirements.

Individuals, Groups and Families (IGFP)

5301. Practice with Individuals, Groups and Families

Three credits. Prerequisite: Must be taken concurrently with the second semester of the first year of field placement.

In-depth exploration of the skills of working with individuals, groups, and families. Social work practice with individuals, emphasizes the interdependence between assessment and intervention, the transactional nature of helping, and monitoring and evaluation of practice. Social work practice with groups, focuses on types of groups, leadership, forming and beginning the group, the role of mutual aid and use of program activities. Practice with families give emphasis to the family as a functional unit and the diversity of life style and structure and its capacity to respond to the needs of its members and changing environmental factors.

5302. Advanced Practice with Individuals, Groups and Families: Theoretical Approaches

Three credits. Prerequisite: IGFP 5301; must be taken concurrently with first semester of second year of field placement.

Overview of theoretical approaches to working with individuals, groups and families. Helps students to think critically about the use of theory in practice, evidence based practice, and ways of learning and knowing, including use of supervision. Introduction to psychodynamic, attachment, cognitive, and behavioral, as well as solution-focused approaches and motivational interviewing. The stages of group development, group dynamics and other content related to social work practice with groups. Theoretical frameworks such as systems, multisystemic and attachment on which family practice approaches are based.

5303. Advanced Practice with Individuals, Groups and Families, Across Settings and Populations

Three credits. Prerequisite: IGFP 5302; must be taken concurrently with second semester of second year of field placement.

Builds upon content in previous IGFP courses about practice with individuals, groups and families within the context of oppression and privilege, while integrating core concepts related to trauma, strengths, resilience, and empowerment. Primary focus on the differential knowledge and skills needed to work effectively in various fields of practice (e.g., health care, schools, and the criminal justice, child protection, substance abuse and mental health systems). Systems of care, interdisciplinary teams, and policies impacting social work within each field of practice, as well as common clinical approaches and other interventions with the populations served in these settings.

5311. Group Processes

Three credits.

Helps students develop a conceptual frame of reference for understanding small group processes. Focus on establishing a theoretical and conceptual appreciation of how small groups function. Students will develop an increasingly wide range of conceptual tools to identify and assess group processes. Students will gain a better understanding of small group interaction as it impacts individuals, interpersonal relationships and interactions with others beyond the group. Experiential as well as didactic study methods will be used.

5342. Group Work Practice in Therapeutic Settings

Three credits. Prerequisite: IGFP 5301; open only to M.S.W. students with consent of instructor.

Provides a theoretical base and group work practice skills for working with populations who have been diagnosed with a clinical condition(s). Focus on understanding how to use a strength-based, recovery oriented therapeutic group to foster the social and emotional growth that will promote optimal functioning and prevent relapse in persons with clinical conditions. Biological, behavioral, cognitive-behavioral and psychodynamic theories will be used to understand factors that contribute to clinical conditions and to develop the type of therapeutic group that responds to the social and emotional needs of the members of the group. Focus will be on diverse settings (inpatient, outpatient, prison, residential halfway houses) where clients with clinical conditions are served in open-ended and closed groups. DSM V will be used to develop diagnostic skills and understanding.

5345. Clinical Conditions with Children and Adolescents

Three credits. Prerequisite: FED 5301 and 5351; must be taken concurrently with field placement.

Practice course paying equal attention to the values, skills, and knowledge required for social work practice with children, adolescents, and their families. These youth have a range of bio-psychosocial problems related to mental disorders. Students will learn a range of assessment and intervention skills and will become familiar with current psychiatric classification systems, such as the Diagnostic and Statistical Manual (DSM) and the International Classification of Diseases (ICD). Students will demonstrate the ability to access the most recent empirical and practice knowledge, and to develop skills related to work in a variety of mental health settings. Mental disorders will be learned within the context of larger bio-psychosocial systems. Attention is paid to differences based upon such variables as age, gender, ethnicity, race, religion, sexual orientation, and physical ability.

5346. Clinical Conditions with Adults and Older Adults

Three credits. Prerequisite: FED 5301 and 5351; must be taken concurrently with field placement.

Practice course paying equal attention to the values, skills, and knowledge required for social work practice with adults and older adults who have a range of bio-psychosocial problems related to mental disorders. Students will learn a range of assessment and intervention skills and become familiarized with current psychiatric classification systems, such as the Diagnostic and Statistical Manual (DSM) and the International Classification

of Diseases (ICD). Students will demonstrate the ability to access the most recent empirical and practice knowledge and to develop skills related to work in a variety of mental health settings. Mental disorders will be learned within the context of the larger bio-psychosocial system and attention is paid to differences based upon such variables as age, gender, ethnicity, religion, sexual orientation, and physical ability.

5365. Family Therapy: Theory and Practice

Three credits. Prerequisite: Students should currently be in field practice or employed in a casework-oriented agency. Approval must be granted by instructor, advisor, and Office of Student and Academic Services.

Provides knowledge of significant theories, theorists, practice skills and techniques for family therapy, as well as the growing professional self-awareness of the practitioner. Provides: a) opportunities to study the use of family practice with particular problem situations; b) critical analysis of changes in current theories, emerging theories and integration of theories; c) analysis of research in family practice; and d) an ongoing seminar for discussion of cases.

Information Science and Knowledge Management (ISKM)

5013. Information Security

Three credits.

A survey of security in the creation, storage, and distribution of information. Topics include networks, threats, vulnerabilities, risk assessment methodologies, physical protection and emergency response teams (CERT). The organization of the Internet in terms of management and operations will be presented in depth, including domain names, registrars, ICANN and related policy.

International Studies (INTS)

5000. Seminar in International Studies

Three credits. Prerequisite: Instructor consent.

Combines the various disciplines that constitute International Studies. Includes Social Sciences, Humanities, and Development Studies (development economics and administration). Area Studies faculty from relevant departments will conduct the individual seminar sessions. Introduces concepts and theoretical issues of the fields, including research approaches and the formulation of research questions. Develops analytical thinking and writing skills in an interdisciplinary context. Utilizes a combination of reading, discussion, short papers, presentations, and research exercises. Library research and on-line resources are also covered.

5110. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit with a change of content.

Italian Literary and Cultural Studies (ILCS)

5315. Introduction to Contemporary Literary Studies

Three credits.

Contemporary methods and fields of literary analysis. Paradigms of literary studies and overview

of Marxist, Freudian, Feminist, Historicist, and Culturalist criticism.

5330. The Literature of the Origins

Three credits.

Poets and poetical schools of the Duecento from the Franciscans to the Sicilians and the "Dolce stil nuovo."

5333. Seminar on Boccaccio

Three credits.

The Italian lyrics and narrative poems, the Decameron and its seminal importance for prose fiction, the scholarly Italian and Latin works.

5335. Baroque Literature

Three credits.

The beginnings of baroque literary style and its ramifications in the seventeenth century.

5337. Theories and Methods of Modern Criticism I

Three credits.

Aesthetic problems from Vico to the present day.

5339. Seminar on Modern Literature

Three credits. May be repeated for a maximum of nine credits.

One leading writer from the last two centuries.

5340. Divina Commedia

Three credits.

5345. Studies in Italian Literature or Philology

Variable (1-6) credits. May be repeated for credit.

5347. Italian Chivalric Poetry

Three credits.

5352. Modern Italian Poetry I

Three credits.

Post-romantic masters through the twentieth century experiments: e.g., the Crepuscolari, Futurists, Hermeticists.

5354. Masters of Twentieth-Century Fiction

Three credits.

Pirandello, Svevo, Moravia, Pavese, Vittorini.

5375. Topics in Early Modern Italian Studies

Three credits. Prerequisite: Open only to graduate students in Italian. May be repeated once for credit with a change in topic.

A variable topics course focusing on early modern Italian culture.

5376. Topics in Modern and Contemporary Italian Studies

Three credits. Prerequisite: Open only to graduate students in Italian. May be repeated once for credit with a change in topic.

A variable topics course focusing on modern and contemporary Italian culture.

5377. Topics in Transnational Italy

Three credits. Prerequisite: Open only to graduate students in Italian. With a change in topic, may be repeated for a maximum of six credits.

Variable topics course focusing on cultural, historical and political intersections between Italy and other nations.

Kinesiology (KINS)

5094. Seminar

Three credits. May be repeated for a maximum of 12 credits.

Issues and research in the biological and social science fields.

5099. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

5100. Musculoskeletal Examination and Acute Treatment I

Four credits.

Introduces the common types of orthopedic injuries and/or dysfunctions that occur to the upper extremity during physical activity and/or athletics. Injuries will be discussed from the following viewpoints: etiology and mechanism of injury; pathology; recognition and evaluation techniques; protocols; and prevention. Students will also learn to apply the techniques of orthopedic injury assessment and evaluation as well as the immediate care of those injuries.

5109. General Medical Aspects in Athletic Training

Four credits.

Prepares the athletic training student to recognize, evaluate, and manage common general medical conditions that may affect physically active individuals. Conditions that affect all of the major body systems will be discussed. Information regarding the relationship between nutrition and physical fitness for the purpose of developing individualized nutrition plans for physical fitness and general well-being will be provided.

5110. Leadership, Administration, and Professional Development in Athletic Training

Three credits.

Concepts for students majoring in athletic training regarding professional development and healthcare administration and organization. Topics related to personnel management, leadership, daily operations, finance, facility design, information management, workshop development, interviewing skills, ethics and ethical decision-making, organizational structure, work-place culture, among other topics that pertain to the profession of athletic training will be discussed.

5111. Practical Applications of Injury Assessment and Care

Two credits.

Provides students an opportunity to solidify, improve upon and refine assessment skills, treatment plans and rehabilitation prescription. Students' ability to provide proper documentation utilizing a written SOAP note, including differential diagnoses as well as immediate treatment and short and long-term rehabilitation plans will be assessed throughout the semester.

5112. Counseling Strategies and Psychology of Athletic Injury

Three credits.

Prepares students to recognize clients/patients exhibiting abnormal social, emotional, and mental behaviors. Coupled with recognition is the ability to intervene and refer these individuals as necessary. Students learn to appreciate the role of mental health in injury and recovery and use interventions to optimize the connection between mental health and restoration of participation.

5113. Principles of Neuromuscular Conditioning and Sport Performance

Three credits.

Prepares the entry-level athletic trainer to be versed in strength and conditioning principles and exercise as a means to help prevent and rehabilitate musculoskeletal injuries. The physiology behind

muscle and bone development related to exercise and strength training and designing targeted strength training programs to treat abnormalities after injury and to optimize performance will be discussed.

5200. Athletic Training Clinical Rotation I

Two credits.

Students work directly with a certified athletic trainer serving as the clinical preceptor and are assigned to a specific athletic training practice setting. This experience involves providing day-to-day care for the participants, as well as administering treatments and rehabilitation under the supervision of the clinical preceptor. Students will be expected to be immersed daily into the role of the athletic trainer.

5203. Athletic Training Clinical Experience IV

Four credits.

Students work directly with a certified athletic trainer and are assigned to a specific athletic training practice setting. Involves providing day-to-day care for the participants, as well as administering treatments and rehabilitation under supervision of the certified trainer. Students will be expected to be immersed daily into the role of the athletic trainer.

5204. Athletic Training Clinical Experience V

Three credits.

Students work directly with a certified athletic trainer and are assigned to a specific athletic training practice setting. Involves providing day-to-day care for the participants, as well as administering treatments and rehabilitation under supervision of the preceptor. Students will be expected to be immersed daily into the role of the athletic trainer.

5205. Culminating Athletic Training Clinical Experience

Six credits.

Students work directly with a certified athletic trainer and are assigned to a specific athletic training practice setting. Involves providing day-to-day care for the participants, as well as administering treatments and rehabilitation under supervision of the preceptor. Students will be expected to be immersed daily into the role of the athletic trainer.

5320. Psychological Aspects of Sport

Three credits.

The behavioral variables that affect an individual's performance in sport.

5330. Analysis of Amateur Sport

Three credits. Prerequisite: Instructor consent.

Acknowledges the complexity and scope of the sport industry while addressing all segments of amateur sport including, intercollegiate athletics, youth sport, and community sport and recreation.

5335. Analysis of Professional Sport

Three credits. Prerequisite: Instructor consent.

This course will acknowledge the complexity and scope of the sport industry while specifically addressing professional sport.

5345. Theory and Methods of Research

Three credits.

Theoretical and empirical foundations of quantitative and qualitative research in sport and leisure science including research design, implementation and statistical analysis.

5488. Theory of Clinical Analysis

Three credits. Prerequisite: Instructor consent.

Provides an introduction to the principles and procedures of various tests performed in clinical chemistry. Presents the physiological basis, principle and procedures and the clinical significance of test results, including quality control and reference values. Emphasizes basic chemical laboratory technique, electrolytes, acid-base balance, proteins, carbohydrates, lipids, enzymes, endocrine function, TDM, toxicology, hematology, and coagulation.

5500. Research Techniques and Experimental Designs in Exercise Science

Three credits.

Gives an understanding of research designs and methods in exercise science when examining different research topics related to human, animal and cell culture models.

5507. Fundamentals of Exercise Prescription

Three credits. Prerequisite: instructor consent. Recommended preparation: An undergraduate course in exercise prescription and/or exercise science/kinesiology.

An examination and application of the principles of exercise prescription in primary disease prevention. Students will advance their knowledge in the exercise pre-participation health screening and pre-exercise evaluation processes. Students will develop exercise prescriptions for healthy adults and adults with multiple cardiovascular disease risk factors and/or special considerations. Student will learn how to adjust an exercise prescription for clients taking common medications that affect the exercise response and learn behavioral strategies to improve exercise adherence.

5508. Exercise Prescription for Individuals with Chronic Diseases and Health Conditions

Three credits. Prerequisite: KINS 5507.

Taught online. An in-depth examination and application of the principles of exercise prescription for individuals living with chronic diseases and health conditions. Students will advance their knowledge in prescribing exercise for special populations that include groups with cancer, cardiovascular, pulmonary, metabolic, neuromuscular, and musculoskeletal diseases and conditions across the lifespan, among others.

5510. Exercise Metabolism

Three credits.

Influence of aerobic and anaerobic exercise on energy metabolism and the utilization of nutrients, as viewed from the perspectives of physiology, a variety of sports, heredity, maturation, and disease.

5512. Preventing Sudden Death in Sport

Three credits. Prerequisite: Instructor consent.

Provides an in-depth examination of the causes of sudden death in the athletic/exercise environment. The most current evidence-based guidelines pertaining to the prevention, recognition, and treatment of these conditions will be explored and discussed.

5514. Legal Considerations of Sudden Death in Sport--Issues for Medical Staff and Athletic Administrators

Three credits.

A seminar for Kinesiology graduate students using formal instruction regarding legal aspects of sudden death in sport. Covers sport law concepts drawing upon the case law of recent incidents of sudden death in sport to explore the various criminal and civil legal ramifications that arise

when preventable deaths occur in domain of organized sport and physical activity.

5515. Scientific Presentations

Three credits.

Skills required for writing scientific articles and abstracts, reviewing manuscripts, and presenting results at scientific meetings.

5520. Scientific Instrumentation

Three credits.

Scientific instruments in the Human Performance Laboratory. Development of skills necessary to perform analyses on these instruments.

5525. Laboratory Analytical Techniques

Three credits. Prerequisite: Open only to Kinesiology graduate students.

Analytical methods utilized in exercise science laboratories.

5530. Physiology of Stressful Environments

Three credits.

Exercising and resting responses/adaptations/illnesses to high altitude, cold, hyperbaric, polluted, and zero gravity environments. The acute and chronic effects of electromagnetic radiation fields and sleep deprivation will also be studied.

5533. Current Research and Issues in Athletic Training

Three credits. Prerequisite: Instructor consent.

Acquaints students of athletic training with the recent research in the field, the components of conducting and publishing research in this field, and preparation for research endeavors at the graduate level. Covers relevant issues, policies, and laws related to athletic training that are currently being regionally or nationally debated, discussed, and/or implemented.

5534. Advanced Clinical Care in Sports Medicine

Three credits.

A discussion/lecture-based class designed to explore advanced topics for graduate students in athletic training. Furthers students' knowledge and skills regarding "hot" topics within the athletic training profession.

5535. Biomechanical Analysis of Sport Performance

Three credits.

Quantitative research in sport motion, two-dimensional and three-dimensional analysis, kinematic and kinetic analysis, instrumentation (videography, computer systems).

5550. Children and Physical Activity

Three credits.

Overview of systems physiology for pediatric individuals. The impact of physical activity and chronic training will be evaluated.

5595. Special Topics in Exercise Prescription

Three credits. Prerequisite: KINS 5507.

Taught online. An in-depth examination and application of the principles of exercise prescription for healthy populations with special considerations, and unique circumstances under which people exercise related to both athletic and clinical populations. Students will advance their knowledge in prescribing exercise for healthy populations with special populations such as children and older adults, populations with unique considerations such as the spinal cord injured and amputee athletes, and unique exercise circumstances such

as environmental considerations and wearable technologies, among others.

6094. Seminar

Variable (1-6) credits. May be repeated for a maximum of 12 credits.

Cooperative study of developments and problems in the student's area of specialization.

6100. Data Analysis and Reporting in Kinesiology

Three credits.

Analyzes data and critically appraises research literature using a broad variety of methods applicable to laboratory and clinical research. Students will gain experience using software to analyze data germane to exercise kinesiology and report results in a manner consistent with leading journals in the field. Knowledge of basic statistical principles is assumed.

6102. Concepts and Principles of Clinical and Classroom Teaching in Athletic Training

Three credits.

Lecture and discussion-based course provides the athletic trainer with formal instruction regarding clinical supervision and teaching. Covers both effective strategies and techniques for success in the classroom as well as in the clinical education setting.

6103. Employment Concepts and Issues in Athletic Training

Three credits. Prerequisite: Instructor consent.

Lectures and discussions to cover topics related to workplace structure, organizational culture, professional socialization and professional development.

6106. Qualitative Research Methods

Three credits. Prerequisite: Instructor consent.

The role of qualitative research in healthcare and exercise science. Examines major approaches used in conducting qualitative research and the application of these methods to problems and phenomena in healthcare and athletic training. Emphasizes the developmental process prior to collection, collection, management, analysis, and interpretation of qualitative data. Exploration and application of topics such as sampling, interviewing and observation techniques, data analysis methods, and reporting of qualitative research. Examines evaluation and critique of research studies utilizing qualitative methods.

6320. Advanced Sport Sociology

Three credits.

Advanced topics in sport sociology and sport psychology with special emphasis on those models and theoretical perspectives that are associated with generating significant research in the area.

6425. Special Topics in Health and Wellness Across the Lifespan

Three credits. Prerequisite: Instructor consent.

An in-depth examination of health issues across the lifespan. Perspectives from social and behavioral health science, occupational and environmental health science, and/or public health policy.

6450. Exercise Endocrinology

Three credits.

Overview of cellular endocrinology with a focus on the impact of acute and chronic exercise on these systems.

6500. Exertional Heat Stroke

Three credits. Prerequisite: Instructor consent.

An in-depth examination of pathophysiology, prevention, recognition, treatment, and return to play considerations for exertional heat stroke, with a secondary emphasis on all exertional heat illnesses.

6505. Teaching Strategies to Enhance Learning for Health Fitness and Sport Professionals

Three credits. Prerequisite: Instructor consent.

A "hands-on" approach to the translation of learning theories and styles and the principles of curriculum development, design and assessment into the practice of activities that enhance learning for health fitness and sport professionals.

6510. Physiology of Human Performance

Three credits.

Selected physiological principles related to exercise stress, including related laboratory experience.

6512. Advanced Resistance Training Physiology

Three credits.

Provides students with an in-depth overview of the physiological mechanisms mediating the different exercise prescriptions in resistance training.

6520. Thermal Physiology

Three credits.

Detrimental effects which exercise in the heat and dehydration have on: cardiovascular function, strength, endurance, fluid-electrolyte balance, disposition, and heat tolerance.

6525. Muscle Physiology in Exercise and Sport

Three credits.

Structural, morphological and biochemical changes in muscle with exercise and training.

6530. Repair of Musculoskeletal Tissue

Three credits.

Fundamental processes necessary for the understanding of our physiologic response to injury stress, healing and recovery. Intended for graduate students in the Department of Kinesiology. The scope of physiologic discussion will span from cell to organism. Discussion will center on systemic and tissue specific responses to injury. Some prior exposure to organ level physiology, endocrinology, and cell biology is recommended.

6535. Neuromuscular Function and Effects of Injury

Three credits.

The structural and neural properties of skeletal muscle and the response to injury will be examined.

6550. Body Weight Regulation and Exercise

Three credits.

Factors impacting body weight, including neuroendocrine control of metabolism and body weight. The role of physical activity in the maintenance of body weight is also considered.

Latino and Latin American Studies (LLAS)

5000. Seminar in Latin American Studies

Three credits.

Interdisciplinary introduction to graduate level study of Latin America.

5100. Comparative Transnational Latin(o) American History

(Also offered as HIST 5610.) Three credits. Prerequisite: Instructor consent.

Critical issues in diverse U.S. Latina/o histories and forces that contributed to the arrival of people of Latin American and Caribbean heritage to the United States. Topics include the epistemological origins and historiographical traditions of the field; U.S. empire; labor, migration, and diaspora; border formations; constructions of gender and sexuality; and comparative racialization.

5105. Special Topics

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

5110. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit with change in content.

5300. Special Topics in Puerto Rican and Latin American Studies

Three credits. May be repeated for a maximum of six credits.

Intensive study of specialized topics not ordinarily covered in the graduate curriculum, taught by visiting scholars or joint appointment faculty.

5360. Latinos and U.S. Education

Three credits.

Latinos and U.S. education.

5390. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent.

Independent study.

5890. Latin American Studies Project

Three credits. Prerequisite: Instructor consent.

Independent, interdisciplinary research project culminating in a written paper, developed by the student under the supervision of a committee consisting of a first and second reader. The first reader will be the major advisor on the project. Capstone course for the master's degree, to be taken after all other course requirements are completed.

Linguistics (LING)

5110. The Acquisition of Syntax

Three credits.

Relationship between the syntax of children's language and linguistic theory.

5120. Readings and Research in Acquisition

Three credits. Prerequisite: LING 5110. May be repeated for a maximum of 12 credits.

Lectures and discussion of classic and current articles in first language acquisition; presentation of ongoing student research.

5310. Phonology I

Three credits. Prerequisite: Open only to Linguistics graduate students, others with consent.

The analysis of sound patterns in languages within a generative framework: distinctive features, segmental and prosodic analysis, word formation, the theory of markedness.

5320. Phonology II

Three credits. Prerequisite: LING 5310.

The analysis of sound patterns in languages within a generative framework: distinctive features, segmental and prosodic analysis, word formation, the theory of markedness.

5410. Semantics I

Three credits. Prerequisite: Open only to Linguistics graduate students, others with consent.

The bases of formal models of syntax and semantics. Compositionality; quantification; Logical Form.

5420. Semantics II

Three credits. Prerequisite: LING 5410.

Theories of meaning and reference. Formal treatment of meaning in a generative grammar.

5000. Introduction to Computational Linguistics

Three credits. Prerequisite: Open only to Linguistics graduate students, others with consent. Recommended preparation: At least one course in Linguistics or Computer Science.

Computational methods in linguistic analysis and natural language processing. Topics include the use of text corpora and other sources of linguistic data; morphological analysis, parsing and language modeling; applications in areas such as information retrieval and machine translation.

5010. Research Seminar in Language and Psychology

(Also offered as PSYC 5500.) One credit. Prerequisite: Open only to Linguistics graduate students. May be repeated for a maximum of three credits.

5510. Syntax I

Three credits. Prerequisite: Open only to Linguistics graduate students, others with consent.

Transformational analysis within a Chomskyan framework; deep structure, surface structure, universal conditions on the form and application of transformational rules.

5520. Syntax II

Three credits. Prerequisite: LING 5510.

Transformational analysis within a Chomskyan framework; deep structure, surface structure, universal conditions on the form and application of transformational rules.

5500. Advanced Introduction to Syntax

Three credits. May be repeated for a maximum of six credits.

Concepts and tools of current syntactic theory. Syntactic features, lexical and functional categories, representation of phrase structure, argument structure, case, movement, locality.

5799. Directed Reading in Linguistics

Variable (1-6) credits. May be repeated for a maximum of 12 credits.

6010. General Exam Workshop

Variable (1-3) credits. Prerequisite: Open only to Linguistics graduate students, others with consent. Recommended preparation: Previous completion of three semesters of full-time course work in Linguistics. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Weekly forum for second- and third-year doctoral students to present and receive feedback on their research for General Examination papers. Regular presentations and participation in discussions required.

6020. Professional Methods

One credit. Prerequisite: Open to graduate students in Linguistics, others with permission. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Practice in writing abstracts for academic conferences. Preparation for academic job market: C.V.s, letters of application, interviews, job talks. Previous completion of three semesters of full-time graduate course work in Linguistics recommended.

6040. Structure of a Selected Language

Three credits. Prerequisite: LING 5310 and 5510. May be repeated for a maximum of 12 credits.

Phonological and syntactic problems of a given language.

6050. Field Methods in Linguistics

Three credits. Prerequisite: LING 5310 and 5510. May be repeated for a maximum of 12 credits.

Collection and analysis of linguistic data from native consultants.

6060. Historical Linguistics

Three credits. Prerequisite: LING 5320 and 5520. May be repeated for a maximum of 12 credits.

Introduction to the theories and techniques of studying linguistic change. The comparative method of reconstructing languages. Internal reconstruction. Rule change.

6110. Methods in Acquisition

Three credits. Prerequisite: LING 5110.

Experimental methods for first language acquisition research.

6120. Topics in Acquisition

Three credits. Prerequisite: LING 5110. May be repeated for a maximum of 12 credits.

Current topics in first language acquisition research.

6160. Second Language Acquisition

Three credits.

Current research on theories of second language acquisition. Differences between first and second language development, including views on the availability of universal grammar. Linguistic input and the effect of age of immersion in a second language. Research methodologies and their validity will be discussed. Pedagogical implications derivable from this research will be addressed. Student research component.

6210. Morphology

Three credits. Prerequisite: LING 5310 or 5510; instructor consent.

Introduction to morphological analysis and to the methods of linguistic segmentation. The Lexicon. The relationships between Phonology and Morphology and between Syntax and Morphology. The nature of clitics.

6310. Problems in Phonology

Three credits. Prerequisite: LING 5320. May be repeated for a maximum of 12 credits.

Advanced work in phonology.

6410. Semantics Seminar

Three credits. Prerequisite: LING 5420. May be repeated for a maximum of 12 credits.

Classical and recent literature and current research in semantics.

6420. Topics in Semantics

Three credits. Prerequisite: LING 5420. May be repeated for a maximum of 12 credits.

Current topics in semantic research.

6510. Readings and Research in Syntax

Three credits. Prerequisite: LING 5520. May be repeated for a maximum of 12 credits.

Examination and discussion of classic articles in syntactic theory; presentation of ongoing student research.

6520. Problems in Syntax

Three credits. Prerequisite: LING 5520. May be repeated for a maximum of 12 credits.

Advanced work in syntax.

6530. Comparative Syntax

Three credits. Prerequisite: LING 5520. May be repeated for a maximum of 12 credits.

Cross-linguistic study of syntactic structure; implications for linguistic theory.

6610. Methods in Experimental Syntax

Three credits.

An introduction to the design and analysis of experiments in syntax.

6798. Special Topics in Linguistics

Three credits. Prerequisite: LING 5310 and 5510. May be repeated for a maximum of 12 credits.

Topics in general linguistics at an advanced level.

6799. Independent Study in Linguistics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit with change in content.

6899. Directed Research in Linguistics

Variable (1-6) credits. May be repeated for a maximum of nine credits.

Independent study.

Literatures, Cultures, and Languages (LCL)

5010. Film Theory and History

Three credits.

Advanced study of world cinema through film history and theory in an interdisciplinary context. Discussion on all national cinemas, for example: French Cinema, German Cinema; and film genres: for example: Film Noir, The Western, Political Film, Documentary, among others.

5020. Digital Humanities, Media Studies, and the Multimodal Scholar

Three credits.

An introduction to digital methods and media theory in the humanities. Research, debate and practice of multimodal forms of scholarship in literary studies.

5030. Methods and Approaches to Second Language Acquisition

Three credits. Prerequisite: Open only to Literatures, Cultures and Languages graduate students, others with consent.

Approaches to Foreign Language teaching and learning. Focus on the nature of language learning and methods and approaches to teaching.

6010. Fields and Research in Language, Culture and Literature Studies

One credit. Prerequisite: Open only to Literatures, Cultures and Languages graduate students, others with consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Theory and practice of research methods in the fields of literature, language and culture.

6020. Advanced Theory for the Study of Literatures, Cultures and Languages

Three credits. Prerequisite: Open only to Literatures, Cultures and Languages graduate students, others with consent.

Historical interdisciplinary and contemporary theoretical parameters and models in literary, visual and cultural studies at the advanced level.

6030. Scholarship and the Profession

Three credits. Prerequisite: Open only to Literatures, Cultures and Languages graduate students, others with consent.

Critical reflection on the academy and a variety of professional careers, as well as practical instruction in source gathering, grant writing, conference presentation, publication, networking, and employment.

6040. Interdisciplinary Seminar

Three credits. Prerequisite: Open only to Literatures, Cultures and Languages graduate students, others with consent. May be repeated for a maximum of nine credits.

An interdisciplinary LCL seminar team-taught by at least two faculty with different areas of specialization within LCL. Variable topics, depending on the interests of the faculty. Offered once a year (fall or spring) with change of topic. Although the course will be taught in English in order to facilitate working across different languages, students will be expected to do research and and/or write seminar papers in the language(s) of their specialization, as appropriate. Candidates for the Ph.D. in Literatures, Cultures and Languages will be required to complete at least one such interdisciplinary seminar before advancing to candidacy.

Management (MGMT)

5138. Managing Organizations

Three credits. Prerequisite: Open only to MBA students, others with consent. Not open for credit to students who have passed MGMT 5183.

Today's business climate demands that organizations and their managers be innovative, flexible, adaptive, and capable of maximizing the contributions of all their members. In addition, effective managers must possess the leadership and team skills necessary to manage an increasingly diverse work force. This course examines topics such as leadership, motivation, team dynamics, organization structure, design and culture, conflict, power and politics.

5181. Value Creation and Competition

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open for credit to students who have passed BLAW 5182.

Analysis of the challenges inherent in navigating competitive markets with the objective of adopting strategies to achieve value creation, and assess the fit between internal capabilities and the competitive landscape to identify and plan for potential threats and opportunities from environmental change.

5182. Motivating Individuals and Teams

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Development and improvement of "people skills" as they relate to managing individuals and teams in organizations. Prepares students to understand how to best organize and motivate the

human capital of the firm, how to solve problems effectively, influence the actions of individuals and lead successful teams. Topics include personality, perceptions and perceptual distortions, decision making, developing a motivational climate and effective incentive systems, creative problem solving, managing conflict and negotiations, designing and managing diverse teams and team processes. Through the use of experiential exercises and role-playing, participants are given a "hands-on" opportunity to practice and refine their management skills as well as to gain significant insight into their own strengths and weaknesses as a manager.

5183. Organizational Behavior in Context

1.5 credits. Prerequisite: MGMT 5182.

Builds upon the individual and team managerial skills developed in MGMT 5182 by focusing on "people skills" as they relate to managing oneself and others within an organizational context. Prepares students to navigate and succeed in a complex organizational environment. Topics include organizational design, culture, managing diversity, understanding and managing social networks, power, politics, and organizational communications. Through the use of cases, experiential exercises and role playing, participants are given a "hands-on" opportunity to practice and gain insight into their managerial skills as they pertain to the larger organizational context.

5184. Strategic Fit and Coordination

1.5 credits. Prerequisite: MGMT 5181.

Focus on the needs of key organizational stakeholders and the understanding the impact of decisions by individual functional areas on the entire organization. Students will draw upon knowledge from multiple academic disciplines to develop organizational strategies, designs, and resource allocations that can improve firm performance from a holistic perspective.

5222. Management Consulting

Three credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182

Introduces students to the roles individual consultants and consulting firms play in enhancing the effectiveness of their clients. Draws on a wide range of management theory and practice to help students develop the interpersonal, analytical, and technical skills required in consulting interventions. Overview of the consulting industry and address such topics as relationship and client management, intervention frameworks and their application, project management, ethical issues in consulting, and implementation issues.

5223. Managing Innovation and Change

Three credits. Prerequisite: MGMT 5138 or 5183; open only to MBA students, others with consent, others with consent.

Students will learn both the theory and practice underlying successful organizational change, providing them with the understanding necessary to become effective change agents. Addresses such topics as assessing organizational effectiveness and performance, fundamental organizational development techniques, change methodologies, individual, group, and organizational change processes, applied research methods for analysis of change problems, process interventions, the power and politics of change, and strategic change.

5224. Venture Consulting Practicum

Three credits. Prerequisite: Open only to MBA students; instructor consent. Not open to students who have passed BLAW 5182

The primary goal of the venture consulting practicum is to give students the opportunity to work directly with clients (in teams, with faculty mentors) in real-time and gain additional hands-on experience. Students will be required to prepare a consulting proposal for the client (scope of work, timeline, etc.), negotiate an end product with the client, perform the proposed intervention, and prepare a final report and present findings with recommendations to the client for evaluation and critique. (Student participation in a project at the Innovation Accelerator can be substituted for this course.)

5250. Consultative Management for Business Function Professionals

Three credits.

Introduces students to the consultative style of management required for functional professionals to be effective with their internal clients. Draws on a wide range of management theory and practice to help students develop the interpersonal, analytical, and technical skills required for consultative contributions. Addresses such topics as relationship and internal client management, intervention frameworks and their application, project management, ethical issues in consulting, and implementation issues.

5260. Management of Technology and Innovation

Three credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182

In today's dynamic organizations, management of research, technology and change are generic processes which constitute irresistible and critical elements of the overall environment of business. Awareness of these processes can be a powerful force for an organization's management of its future. This course introduces the student to the management of innovation in several contexts, dealing with products and services, tangible and intangible outputs.

5335. Venture Planning, Management, and Growth

Three credits. Prerequisite: MGMT 5183 or 5138; open only to MBA students; instructor consent.

Presents students with an opportunity to put all of their business skills to the test as they prepare and pitch their business plans, while also exposing them to multiple facets of starting and managing new ventures in a very hands-on fashion. The business plans will concentrate on the fundamentals of building a great business, including the business proposition, the business model, the customer, the product, the competition, the market, the industry, the channels of distribution, the selling cycle, and funding requirements, etc. Through a business simulation, students are concurrently placed into a very realistic business setting where they start-up and run a company. Students are given full control of the simulated business and must manage its operations through several decision cycles, challenged with business fundamentals and the interplay between marketing, manufacturing, finance, accounting, etc., as they manage and grow the business.

5377. Human Resource Metrics and Talent Analytics

Three credits.

Creating and managing appropriate metrics is vital to enabling the development of high-achieving people in organizations and maintaining an effective human resource function. Introduces techniques for developing effective metrics and identifies connections between human resource metrics and other performance measurement systems commonly used in organizations. Introduces students to talent analytics, the tools and techniques managers use to mine organizational data in pursuit of actionable knowledge. Students learn how to structure research questions, communicate data needs to technical specialists, and interpret data to yield organizational insights and support effective decisions.

5401. Managing Risk in the Workplace

Three credits.

Successful professionals evaluate business issues with proper consideration of organizational risk. Risk is defined as the likelihood of unfavorable outcomes with respect to the organization's process, financial, reputational, competitive market, and people outcomes. The class examines risk-related challenges linked to workplace activities and issues including employee separation, hiring, promotion, employment laws, regulations, interpersonal conflicts, employee privacy, workplace safety, intellectual property and data security.

5420. Employee and Labor Relations

Three credits.

Examines the broad range of concepts and practices that arise out of the relationship between an organization and its employees. Covers the core topics of labor relations, including organizing, collective bargaining, and the grievance process. Examines trends in unionization and the impact of these trends on employees and organizations. Also examines broader employee relations issues such as managing diversity, arbitration/mediation, downsizing, performance appraisal, implied contracts, and statutory rights.

5615. Leadership

Three credits. Prerequisite: MGMT 5183 or 5138; open only to MBA students, others with consent.

Exposes students to current thinking and research on leadership, to help students develop new ways of viewing the leadership process, and to examine characteristics of effective and ineffective leadership.

5620. Project Leadership and Communication

Three credits. Not open to MBA students.

Comprehensive and in-depth coverage of project leadership and communication designed to increase the student's ability to be a successful project manager. It covers critical competencies for leadership, critical components of communication, key roles involved in taking charge of an organization, building and using networks, motivation and influence, and authority and non-authority bases for power. Students will identify ways to further develop their own leadership potential and their own communication style. Not open to MBA students.

5621. Business and Managerial Ethics

Three credits.

Recent observers of the business scene have questioned whether today's modern executive has

lost his/her "moral compass." Clearly all businesses and their managers must be held accountable to ethical standards. At issue then is what is ethical behavior and what problems are created in trying to exercise such behavior. This course examines in detail the processes of policy formulation and implementation as they relate to ethical problems. Alternative responses to expressed and anticipated social needs, expectations and demands that arise in the daily conduct of business are considered.

5629. Formal Corporate Planning Systems

Three credits.

Planning is a corporate, group, and business function whose character has changed markedly and whose importance is universally recognized. Special attention is given to particular topics: environmental forecasting, corporate vs. business planning, staff vs. line functions, cycling/rolling systems, planning's impact on results, and others. Emphasizes the essential nature of creating a managerial system which is efficient and effective through tailoring it to the specific requirements of the organizational setting, the work of the course centers on case analyses, but it employs also, as appropriate, lectures, discussions, and field projects and reports.

5634. Opportunity Generation, Assessment, and Promotion

Three credits. Prerequisite: MGMT 5183 or 5138; open only to MBA students; instructor consent.

Hands-on experience in opportunity development, exposing students to three distinct modules. The first, creativity and innovation, stimulates the flow of ideas. The second, feasibility analysis, runs these ideas through a comprehensive assessment framework. The third module, getting the first customer, focuses on the initial sales and marketing process needed to get the idea off the ground. At the end of the course, students will be able to identify, evaluate, and shape new business opportunities; effectively present and sell their ideas to critical constituencies; manage the resource constraints associated with launching new ventures.

5637. Organization Behavior

Three credits. Prerequisite: Open only to MBA and MPS students.

Divided into two major components: micro and macro organization behavior. The first component focuses on individual and group-level problems and the second focuses on organizational-level problems, as they relate to improving organizational performance. This course introduces some of the central topics in management theory, research, and practice and provides the basis for understanding and evaluating organizations and their management.

5639. Diversity and Inclusion

Three credits.

The globalization of product, labor, and capital markets has led to significant changes in the demographic composition of the international labor force. This course chronicles and examines the transition that is taking place in the global workforce due to the increased diversity in employees on the basis of personal characteristics such as sex, race/ethnicity, and national origin. Examines how employers respond to these new workforce realities and how workforce inclusion strategies can contribute to positive outcomes for

employers, employees and their families, and other stakeholders.

5640. International Business

Three credits. Prerequisite: MGMT 5138 or 5183; open only to MBA students, others with consent.

The growing impact of a rapidly changing international business environment on organizations today means that few managers can afford to remain indifferent to the issues of international business. It is important to understand the changing patterns of international business, the dynamics of international competition, government-business interactions in other countries, and the organizational challenges of managing strategically across borders. This course addresses these issues through an applied approach in the discussion of cases.

5650. Interpersonal Relations, Influence, and Ethical Leadership

Three credits. Prerequisite: MGMT 5138 or 5183; open only to MBA students, others with consent.

Communication challenges and difficult conversations faced by business professionals. Emphasizes core values associated with ethical leadership in the professional world with a particular focus on the connections between applied ethics and management issues. Topics include conflict resolution styles and models, negotiation, organizational politics, influencing processes, the language of leadership, and models for examination and resolution of ethical workplace dilemmas.

5672. Leading Yourself

Three credits. Prerequisite: MGMT 5138 or 5183; open only to MBA students, others with consent.

Human resources professionals and managers who understand their own management skills and style are more effective in achieving their personal and professional goals. To help build student self-awareness, the class introduces and employs assessment instruments commonly utilized by business leaders. Students learn to give and receive feedback, build skills inventories and develop personal growth and career development plans, goals and strategies.

5673. Organizational Renewal Development

Variable (1-3) credits.

Organizational renewal must be a regular part of the job of every manager. This course focuses on the management skills needed to diagnose, change and develop an organization. Participants learn not only the latest concepts but also are required to engage in organizational development (OD) exercises. Topics to be covered include methods of diagnosing organizations, planning and OD effort, deciding on a change strategy, fitting the intervention to the client's needs, managing an intervention and obtaining evaluative feedback. Through the use of exercises, presentations and hands-on-training, participants have the opportunity to practice their OD skills.

5674. Negotiation Strategies

Three credits. Prerequisite: MGMT 5138 or 5183; open only to MBA students, others with consent.

Effective negotiations skills are essential for successful managers in complex contemporary organizations characterized by changing structures, temporary task forces, multiple demands on resources, and the increased importance of interdepartmental cooperation. Critical negotiation

situations with other organizations range from those dealing with labor unions, purchasing, mergers, acquisitions, and joint ventures. During this course, participants plan and conduct negotiations simulations and receive feedback on their performance.

5675. Business Acumen and Strategic Human Resource Management

Variable (1-3) credits. May be repeated for a maximum of three credits.

Business acumen involves understanding and managing a business situation in a manner that is likely to lead to a good outcome. Human resources managers need the capability to evaluate multiple dimensions of complex business issues and to understand their implications for a range of stakeholders. In pursuit of these objectives, the course examines the role of HRM activities in organizational strategy design and execution. Specific topics include identification of human capital as a firm resource, understanding employee value propositions and the role of human resources in creating value for customers and other stakeholders.

5676. Human Capital and Workforce Capability Development

Three credits.

Students in this course will learn how to assess and develop an organization's human assets. The class explores organizational learning and focuses on specific ways in which learning is achieved through training and development activities. Students study human resources trends such as increasing competition, globalization, technological complexities, regulation, and dynamic labor markets, and how these issues interact with increasing demands on workforce productivity. Topics include learning strategy development, training needs assessment, training program design, training techniques, evaluation strategies, and career development practices.

5678. Total Rewards and Performance Management

Three credits.

Explores the concept of total rewards, its fundamental elements, and strategic prevalence in attracting, motivating and retaining valued employees, and its integration with performance management. Topics include job evaluation, pay surveys, compensation plans and structure, individual and group incentives, and employee benefit principles and concepts. Covers the design of incentive plans, including merit pay, bonuses, equity awards, gain sharing, profit sharing, piece rate, tipping, and commission systems. Students will participate in strategic goal and program development, examining how total rewards, compensation, and benefit design impact performance and contribute to defining organization culture.

5680. Talent Management Through the Employee Lifecycle

Three credits.

One of the primary responsibilities of human resources is managing talent throughout the employee lifecycle. Talent management spans recruiting, hiring, retention, and separation and requires a keen awareness of individual and organizational issues and strategies. Topics covered include recruitment, selection, on-boarding, career planning, job/competency analysis, benefits

administration, retention, retirement, voluntary and involuntary separation, and downsizing.

5800. Strategy, Policy, and Planning

Three credits. Prerequisite: MGMT 5138; open only to MBA students who have completed at least 42 credits with a GPA of 3.0 or better in graduate-level courses. Not open to students who have passed MGMT 5184.

Capstone course dealing with the two major aspects of strategy: formulation and implementation. Strategy formulation examines such issues as environmental threats and opportunities, the values and priorities of management and societal stakeholders, and the strengths of company resources and competencies relative to principal competitors. Strategy implementation covers such topics as strategic leadership, organizational structure, resource allocation, and building a strategy-supportive culture. Uses cases and readings to develop the knowledge and skills necessary to prepare students to deal with strategic issues. The student must have completed basic courses in the functional areas of business in order to be ready to assume the holistic perspective required of those who address this important topic.

5801. Advanced Strategy, Policy, and Planning

Three credits.

This advanced strategy course offers practical tools to evaluate sources of a firm's competitive advantage. A supplement to the capstone course, this course offers an in-depth look at special strategic problems such as the implementation of strategy, corporate renewal, strategy formulation in decline contexts, and/or political elements of strategy.

5805. Human Resource Management Capstone

Three credits. Prerequisite: Open only to Human Resource Management MPS students.

Hands-on experience in the development of an HR related initiative within students' work organization. Students will diagnose a problem or opportunity that needs to be addressed, identify specific cause and effect relationships driving current unsatisfactory outcomes, and build evidence in support of their causal theories. Students create guidelines to steer their change plans including identifying clear objectives, determining boundaries of the challenge, and explaining how changes can lead to desired outcomes. In the final stage of the project, students develop a coherent set of change actions expected to lead the organization from its current performance to its desired future outcomes. This course should be taken at the conclusion of the students' HRM program.

5893. Management Internship

Three credits. Prerequisite: Instructor consent.

The application and implementation in a work situation of theories and practices related to the student's area of specialization, facilitated by the student, sponsoring organization, and faculty advisor. Among other course assessments to be determined by the faculty advisor, a comprehensive project is required.

5894. Seminar

Variable (1-3) credits. Prerequisite: MGMT 5138 or 5183; open only to MBA students; instructor consent. May be repeated for a maximum of 12 credits.

Investigation and discussion of special topics in management.

5895. Special Topics in Management

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of management. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

6200. Directed Readings in Special Topics

Variable (1-6) credits. Prerequisite: Open only to Business Administration Ph.D. students. May be repeated for a maximum of 12 credits.

6201. Seminar in Organizational Behavior

Three credits.

A survey of research in organizational behavior and theory. Topics include learning and cognition in organization, attribution theory, satisfaction and performance, leadership, motivation and group dynamics.

6202. Research Methods in Strategic Management

Three credits.

An in-depth review of the content of policy research. Covers several "streams" of research currently popular in the strategic management literature. Also the major findings within each stream.

6203. Contemporary Research in Organizational Behavior

Three credits.

Focus is on several of the contemporary research themes popular in Organization Behavior. Students critique the methodology and future potential of each theme.

6204. Seminar in Strategic Management

Three credits.

Reviews the research of strategic management that emphasizes macro explanatory models. Students review recent dissertations and critique the content and methodology of each.

6206. Applied Research in Management

Three credits.

Students, individually or in groups, formulate, conduct and prepare a written report in publishable format on a research project pertaining to the area of management. Meetings will be devoted to discussion of issues which arise in the conduct of student projects and to presentation of projects.

6405. Research Design

Three credits.

Examination of research methods utilized in management research. Topics include the laboratory-field distinction, randomized experiments in field settings, content analysis and interrater reliability, log-linear analysis, instrument design and reliability analysis, survey design and sampling techniques, meta-analysis, quasi-experimental design, nonequivalent group design, interrupted time-series design and correlational analysis.

6408. Seminar in Strategic Entrepreneurship, Innovation, and New Ventures

Three credits. Prerequisite: Instructor consent.

Major theoretical and empirical issues in the area of strategic entrepreneurship, innovation, and new ventures. The construction and testing

of theory regarding the generation, identification, assessment, and capture of opportunities that support the expansion of existing ventures or formation of new businesses. Includes an overview of the field; generation and identification of entrepreneurial opportunities; entrepreneurial thinking and the associated decisions to explore and exploit; and influences on and processes associated with innovation management and venture creation.

Marine Sciences (MARN)

5010. Biological Oceanography

Three credits. Not open for credit to students who have passed MARN 4010.

Structure and function of marine food webs, from primary producers to top trophic levels; interaction of marine organisms with the environment; energy and mass flow in food webs; elemental cycling; coupling between pelagic and benthic environments.

5011. Biogenic Fluxes in the Oceans

Three credits. Prerequisite: MARN 5010; instructor consent.

Processes regulating the export of organic matter from the surface of the ocean to the seabed. New and export production; role of the biotic and abiotic processes in downward transport of particulate and dissolved organic matter; current topics of research on the biological pump.

5012. Marine Invertebrate Biology

Three credits. Prerequisite: Instructor consent.

Comparative examination of major adaptations and functional responses of marine invertebrates to biotic and abiotic factors in the marine environment. Field trips required.

5014. Marine Phytoplankton Ecology and Physiology

Three credits.

The physiology of marine phytoplankton, environmental factors affecting their growth and photosynthesis in the ocean, the oceanographic processes responsible for the temporal and spatial distributions of phytoplankton biomass and production, and current topics in phytoplankton research.

5015. Molecular Approach to Biological Oceanography

Three credits.

Principles and technology in nucleic acid purification and manipulation, DNA fingerprinting, gene cloning and sequencing, phylogenetic analysis, and detection of gene expression (mRNA and protein). Application examples in marine ecological studies.

5016. Marine Zooplankton

Three credits. Prerequisite: EEB 2244 or 2245, or MARN 5010; instructor consent.

Bioenergetics, life history, population and community ecology of zooplankton, and role of zooplankton in aquatic biogeochemical cycles.

5017. Plankton Ecology

Three credits. Prerequisite: Instructor consent. Recommended preparation: The equivalent of one year of biology, chemistry and physics courses.

Ecology of planktonic organisms (bacteria, protista and metazoa). The evolutionary ecology concept, methods of research, special features of aquatic habitats; adaptations to aquatic environments; population biology; predation,

competition, life histories, community structure, and role of plankton in ecosystem metabolism.

5018. Ecology of Fishes

Three credits.

General concepts in fish ecology such as distribution, feeding, bioenergetics, growth, larval fish ecology, biotic interactions, life history evolution and other contemporary research topics.

5030. Chemical Oceanography

Three credits.

Composition, origin and solution chemistry of seawater and the marine biogeochemical cycles of salts, elements and gases. Distributions and transfer in the marine environment through chemical equilibria, rates, redox, partitioning, ocean circulation, biological cycles and crustal exchanges.

5031. Aqueous Geochemistry

Three credits.

Application of chemical theory (thermodynamic equilibrium approaches and kinetics) to understanding the geochemistry of the Earth's aqueous systems, with a focus on the ocean and coastal ecosystems.

5032. Coastal Pollution and Bioremediation

Three credits.

Overview of processes and compounds leading to pollution in the nearshore marine environment. The impact of pollution on the marine food web and its response is emphasized. Alleviation of pollution through metabolism of organisms, including bacteria, seagrasses and salt marshes.

5033. Marine and Atmospheric Processes of Global Change

Three credits.

Fundamentals of marine and atmospheric processes in global biogeochemistry. Evaluation of atmospheric, biological and chemical processes that contribute to global change.

5036. Advanced Chemical Oceanography

Three credits.

Major global biogeochemical cycles of the major elements, nutrients, gases, organic matter, and trace elements and the impact of climate change and ocean acidification. Biogeochemical cycling of toxic trace metals, and transfer of substances at the air and sediment interfaces.

5050. Geological Oceanography

Three credits.

Concepts in geological oceanography, including the role of plate tectonics in the control of the Earth and ocean system, fundamentals of biosphere-geosphere interaction over geologic timescales, and the reconstruction of past climates using marine sediment archives.

5051. Radiotracer Applications in Natural Systems

Three credits. Prerequisite: Instructor consent.

Applications of radiotracers in the environment for environmental engineers, environmental scientists, geologists, hydrologists and oceanographers. Use of radionuclides in the interpretation and quantification of aqueous transport processes. The interaction of geochemistry, mass transport and flux balances in Earth, ocean and environmental systems.

5060. Dynamic Physical Oceanography

Three credits.

Global energy balance. General circulation in the oceans and atmosphere. Thermodynamics and stability. Fundamental fluid mechanics. Surface gravity waves. Geophysical fluid mechanics. Tides and other long waves. Theories of global circulation.

5061. Advanced Dynamical Oceanography

Three credits. Prerequisite: MARN 5060; instructor consent.

Ocean thermodynamics; dynamics of rotating; homogeneous fluids; ocean circulation; western boundary currents; the thermocline, oceanic fronts.

5062. Sediment Transport

Three credits.

The mechanics of sediment transport with particular emphasis on the processes governing transport in coastal and estuarine areas. Initiation of motion for cohesive and noncohesive materials, bed and suspended load transport, bed forms, sediment-flow interactions, modeling considerations.

5063. Estuarine Circulation

Three credits. Prerequisite: MARN 5060.

The physical characteristics of estuaries, river and tidal interactions, turbulence and mixing, salt balance, circulation dynamics, mass transport and flushing, modeling considerations.

5064. Air-Sea Interaction

Three credits. Prerequisite: MARN 5060.

Processes controlling the exchange of momentum, heat and mass across the air-sea interface. Topics include atmospheric and oceanic stratification, wind-wave-current interaction, wave breaking, bubble generation, heat budgets, flux parameterizations and instrumentation.

5065. Physical Oceanography

Three credits.

Overview of physical properties and dynamics influencing the oceans and coastal waters. Descriptions of global water property distributions, surface mixed layer, pycnocline, surface heat fluxes, and major ocean currents. Introduction to dynamics of ocean circulation, waves, tides, and coastal circulation.

5066. River Influences on the Marine Environment

Three credits. Recommended preparation: calculus and general physics.

Influences of rivers on estuaries, coastal and open ocean water properties, energy budgets and ecosystems including inputs of buoyant waters, sediments and pollutants and variability from storms, seasons, human alterations and climate change. Recommended preparation: calculus and general physics.

5067. Synoptic Meteorology

Three credits.

Fundamental processes of atmospheric synoptic meteorology, including the governing equations of motion, atmospheric stability, quasi-geostrophic theory, extratropical cyclogenesis, and frontogenesis.

5200. Oceanographic Data Analysis

Three credits.

Programming, data input/output, and graphing with advanced scientific analysis software. Analysis of temporal and spatial patterns in oceanographic datasets using multivariate regression, harmonic analysis, Fourier and wavelet

transforms, empirical orthogonal functions, and three-dimensional mapping.

5500. Professional Development in Marine Sciences

Three credits.

Survey of practical skills required for professional integration into the scientific community, including proposal writing, scientific and public presentations, manuscript preparation and publication, scientific peer review, resume building, and interview skills.

5501. Marine Sciences Seminar

Two credits. May be repeated for a maximum of six credits.

Intensive reading, evaluation and critical discussion of current interdisciplinary topics presented at weekly departmental research seminars.

5830. Seminar in Oceanography

Two credits. Prerequisite: Instructor consent. May be repeated for a maximum of eight credits.

Readings and discussions of current literature in oceanography. Topics vary each semester: Biological, Chemical, Physical, Geological.

5893. Research

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Field and laboratory research covering selected topics of marine sciences.

5895. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent.

A reading course for pursuing specialized work in marine sciences. Open to undergraduate students with permission. Designate the field of special interest by use of the appropriate section symbol.

5899. Independent Study

Variable (1-6) credits. May be repeated for credit with change in content or instructor.

Independent study under the direction of a faculty member.

5995. Special Topics

Variable (1-6) credits. May be repeated for credit with change in content.

6001. Mathematical Models in Marine Sciences

Two credits. Prerequisite: at least nine credits of Marine Sciences graduate courses.

Examples of the formulation of quantitative models of marine systems with a review of some particularly useful mathematical methods (differential equations, operational methods, numerical solution techniques), emphasizing the computation of predictions.

6002. Mathematical Models in Marine Sciences: Practicum

Two credits. May be repeated for a maximum of eight credits.

Individual term projects relating to mathematical modeling in the marine sciences.

6010. Advanced Biological Oceanography -- Pelagic Processes

Three credits.

Pelagic communities, ecosystem structure and function, bioenergetic constraints, population dynamics, consequences of global climate and environmental change, and advances in the field driven by technological innovation.

6088. Variable Topics

Variable (1-6) credits. May be repeated for credit with change in content.

Marketing (MKTG)

5115. Marketing Management

Three credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

A strategic and analytical approach to marketing decisions. Students will develop basic proficiency with key marketing concepts and skills including: identifying opportunities and threats in the market environment; forecasting market growth; evaluating customers and competitors; segmenting, targeting, and positioning; determining product, price, place and promotion components of marketing strategies; and assessing marketing performance.

5181. Customer Insights and Marketing Opportunity

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

A strategic and analytical approach to marketing decisions. Students will develop basic proficiency with key marketing concepts and skills including: identifying opportunities and threats in the market environment; forecasting market growth; evaluating customers and competitors; and segmenting, targeting, and positioning.

5182. Managing and Delivering Customer Value

1.5 credits. Corequisite: MKTG 5181.

Builds on the strategic perspective developed in MKTG 5181. Students will learn how to determine product, price, place and promotion components of marketing strategies and how to assess marketing performance.

5230. New Product and Service Innovation Management

Three credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182.

Framework and analytical tools for managing innovation based on best practices and research evidence. Students will learn how to enhance opportunities for innovation, how to identify ideas to pursue, how to integrate marketing and R&D in new product/service development, how to forecast sales, how to accelerate the new product process from design to commercialization, and how to make product investment decisions in both mature and emerging technologies under conditions of uncertainty. Directed at students preparing for positions in product management, product development and innovation, and consulting.

5625. Marketing for Global Competitiveness

Three credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182.

A dynamic approach to competitive marketing strategy in domestic and global markets. Students will learn how to analyze customers and competitors and how to conduct country and product portfolio analysis to develop effective strategies over the product life cycle and in different global markets. Strategies for market pioneers, late entrants, mature, and declining markets, as well as perspectives on the effects of cultural, political, economic, and institutional factors, are covered. Directed at students preparing for positions in

global marketing strategy, consulting, and product and brand management.

5220. Big Data and Strategic Marketing

Three credits. Prerequisite: MKTG 5115; or MKTG 5181, 5182, and OPIM 5103; or BADM 5180 and 5181.

Offers students the tools to analyze "big" data, to identify patterns that have actionable marketing value. Students will gain hands-on exposure to advanced analytical tools such as neural networks, market basket analysis, sequence detection, text mining, and use of state-of-the-art business modeling software to apply course concepts. Applications include financial services, retail, advertising, insurance, health care and human resources. Directed at students preparing for positions in digital analytics, digital marketing, marketing research, and consulting.

5250. Marketing Research and Intelligence

Three credits. Prerequisite: MKTG 5115; or MKTG 5181, 5182, and OPIM 5103; or BADM 5180 and 5181.

Introduction to methods and techniques used to gain customer and market insights through marketing research. Students will learn how to identify the most appropriate research techniques to answer particular marketing questions, how to design studies for maximum insight, and how to analyze and critically read results. Qualitative and quantitative approaches will be covered. Directed at students preparing for positions in marketing research, digital analytics, consulting, product and brand management, and product development and innovation.

5251. Marketing and Digital Analytics

Three credits. Prerequisite: MKTG 5115; or MKTG 5181, 5182, and OPIM 5103; or BADM 5180 and 5181.

Provides a framework for using website and social media analytics tools to support marketing decisions. Students will gain hands-on experience using basic and advanced analytical tools to analyze markets, gain insights from social media and respond in real time to online consumer behavior, forecast sales, profile and target customers, and develop pricing and promotion strategies. Directed at students preparing for positions in digital analytics, digital marketing, consulting, product and brand management, customer management, and integrated marketing communications.

5640. Integrated Marketing Communications in the Digital Age

Three credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182.

A strategic approach to the design, coordination, integration, and management of marketing communications. Students will develop an integrated marketing communications campaign using traditional, social, and mobile media with an emphasis on the competitive and strategic value of communications in the marketplace. Directed at students preparing for positions in integrated marketing communications, digital marketing, product and brand management, and customer management.

5650. Strategic Brand Management

Three credits. Prerequisite: MKTG 5115; or MKTG 5181, 5182, and OPIM 5103; or BADM 5180 and 5181.

Provides an advanced understanding of customer behavior to build, leverage, and enhance brand equity. Students will learn how to strategically position brands; build and leverage brand communities; measure brand assets and brand performance; and manage domestic and global brands and brand extensions. Directed at students preparing for positions in product and brand management, integrated marketing communications, digital marketing, and consulting.

5655. Pricing and Revenue Management

Three credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182.

The strategy and tactics of pricing, with an emphasis on revenue management. Students will learn how to develop dynamic pricing strategies that account for changing customer demand, differences across customer segments and markets, competitive pricing strategies, and the role of pricing in loyalty programs, managing product inventory, and price-quality relationships. Students use analytic tools to apply course concepts to revenue management. Directed at students preparing for positions in product and brand management, digital analytics, and consulting.

5660. Customer Insights

Three credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182.

A systematic framework for understanding consumer and business buying behavior to inform marketing decisions. Students will examine internal and external influences on behavior including information search, choice processes and biases, product usage, satisfaction, loyalty, and word-of-mouth. Directed at students preparing for positions in product and brand management, digital marketing, integrated marketing communications, and marketing research.

5665. Digital Marketing

Three credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182.

A framework for developing marketing strategies in digital environments. Students will learn how to develop integrated digital marketing management strategies in pursuit of long-term marketing objectives. Directed at students preparing for positions in digital marketing, digital analytics, brand and customer management, integrated marketing communications, and consulting.

5894. Seminar

Variable (1-6) credits. Prerequisite: MKTG 5115, or MKTG 5181 and 5182. May be repeated for credit.

Investigation and discussion of special topics in marketing.

5895. Special Topics in Marketing

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of marketing. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

6200. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Open only to students in the Marketing doctoral program. May be repeated for credit.

6202. Introduction to Consumer Behavior

Three credits. Prerequisite: Instructor consent.

Major research topics in consumer behavior, such as theory development and testing, judgment and decision-making, information search, memory, attitude theory, learning, group and interpersonal influence.

6203. Introduction to Quantitative Applications in Marketing

Three credits. Prerequisite: Instructor consent.

Techniques and concepts of quantitative marketing modeling. Topics would typically cover: empirical models such as brand choice models, purchase quantity models, purchase timing models, related estimation issues such as heterogeneity and endogeneity, basic microeconomic and industrial organization models, and the use of such models in marketing applications such as pricing, channel strategies, customer word-of-mouth and retail competition.

6209. Introduction to Research in Marketing

Three credits. Prerequisite: Instructor consent.

Introduces the contents and nature of academic marketing research. Topics typically include: an introduction to the area of marketing, theory development in marketing, research and the research process in marketing, a typology of research areas in marketing, a survey of research techniques in marketing (including qualitative, experimental, survey based, econometric, and analytical), and a survey of the base disciplines upon which marketing draws for theory (psychology, economics, and sociology).

6210. Strategic Applications in Marketing

Three credits. Prerequisite: Instructor consent.

This survey course acquaints students with the state of the art in strategic marketing. Topics are subject to change at the discretion of the instructor, but would typically cover strategic issues related to products, firms, customers and competition.

6211. Multivariate Analysis in Marketing

Three credits.

An overview of various multivariate statistical methods. Topics are subject to change at the discretion of the instructor, but would typically cover: discriminant, canonical, cluster, and factor analysis; multidimensional scaling; and conjoint, logit, probit and tobit analysis. Hands on experience in use of these methods will be provided; the primary focus will be on marketing applications.

6212. Socio-cultural Aspects of Consumer Behavior

Three credits. Prerequisite: Instructor consent.

The socio-cultural aspects of consumer behavior, such as consumer identity, consumption signs and symbols, cross-cultural consumption, class, culture and consumption, consumption practices, transformative consumer research, and historical and ethnographic perspectives on consumer behavior.

6213. Advanced Quantitative Applications in Marketing

Three credits. Prerequisite: MKTG 6203 or the equivalent as determined by the instructor.

Advanced topics and recent developments in quantitative marketing. Current topics may include dynamic structural models, numerical dynamic programming, learning models, entry and exit, and multi-category models. Students use these

models and methods with empirical data to address marketing problems.

6296. Special Topics: Progress toward Qualifying Paper

Three credits. Prerequisite: Open only to students in the Marketing doctoral program.

Independent study under faculty supervision in area chosen for doctoral student's qualifying paper. Satisfactory progress on qualifying paper (including literature review and research conceptualization) is required. Student can also develop research design, conduct pilot studies, refine questionnaires and measures, or develop a framework for model specification and model estimation. A written report is required.

Materials Science and Engineering (MSE)

5001. Principles of Materials Engineering

Three credits.

Accelerated Introduction to Materials Science and Engineering Concepts, including: structures and defects; phase diagrams; mechanical properties; electronic properties; magnetic properties; optical properties; thermal properties; functional materials; metals and alloys; ceramics; polymers; and composites.

5095. Independent Study

Variable (1-3) credits.

5301. Thermodynamics of Materials

Three credits.

Classical thermodynamics with emphasis on solutions and phase equilibria. Applications to unary and multicomponent, reacting and nonreacting, homogeneous and heterogeneous systems, including development of phase diagrams.

5305. Phase Transformations in Solids

Three credits.

Thermodynamics, kinetics and crystallography of phase transformations. Nucleation and growth kinetics. Order-disorder, ferroelectric, and ferromagnetic transformations.

5307. Solidification of Metals and Alloys

Three credits. Prerequisite: MSE 5301.

Thermodynamic and kinetic principles of solidification. Control of structure and properties of pure and multicomponent materials through casting and solidification processes. Application of solidification principles to shaped casting, continuous casting, crystal growth and particulate processes.

5309. Transport Phenomena in Materials Science and Engineering

Three credits.

Mechanisms and quantitative treatment of mass, energy, and momentum transfer will be discussed in the context of materials science and engineering applications. Increasingly complex and open-ended applications will be used to illustrate principles of fluid flow; heat conduction, radiation, and diffusion.

5310. Materials Modeling from First Principles

Three credits. Prerequisite: Instructor consent.

An overview of the theory and practices underlying modern electronic structure materials computations, primarily density functional theory (DFT). Students involved primarily/partially in materials computations, as well as those focused on

experimental materials research wishing to learn about DFT techniques will benefit from this course.

5311. Mechanical Properties of Materials

Three credits.

Mechanics of deformation and fracture; dislocation theory; strength of ductile and brittle materials; toughness; strengthening mechanisms; toughening mechanisms; creep mechanisms; fatigue crack initiation and propagation; reliability and lifetime prediction.

5317. Electronic and Magnetic Properties of Materials

Three credits.

Crystal structures and interatomic forces, lattice vibrations, thermal, acoustic, and optical properties. Semiconductors, dielectric properties, magnetism, and magnetic properties, superconductivity. Device applications.

5320. Investigation of Special Topics

Three credits. May be repeated for a maximum of nine credits.

Special courses or individual readings.

5322. Materials Characterization

Three credits.

A review of the principal experimental methods used to reveal the microstructure and chemistry of materials. Diffraction techniques: x-ray, electron, neutron and proton scattering. Photon probes: photon microscopies, x-ray topography and XPS. Electron probes: SEM, TEM, EDX, EELS, AES. Atom and ion probes: RBS, SIMS, FIM, PIXE. Scanned probe microscopies.

5323. Transmission Electron Microscopy

Three credits. Prerequisite: MSE 5322 or instructor consent.

Electron beam-specimen interactions. Basics of electron microscopes. Diffraction: theory, types of patterns and interpretation. Imaging: diffraction contrast, phase contrast and other techniques. Spectrometry: x-ray microanalysis and electron energy-loss spectrometry.

5330. Classical Atomic-level Simulations in Materials Science and Engineering

Three credits.

Introduction to several classical atomic-level simulation techniques (molecular dynamics, Monte Carlo methods) with an emphasis on learning the art of designing simulations and analyzing data generated. The capabilities of the methods to investigate properties and response of materials and the current limitations of materials at the atomic scales will be covered.

5334. Structure and Defects in Materials

Three credits.

Structure of amorphous and vitreous materials. Crystallography: translation symmetry and lattices, point and space groups, use of the International Tables for Crystallography, examples of simple crystal structures. Defects in materials: point defects, line defects, planar defects, homophase and heterophase interfaces. Distributions of structure and defects: an introduction to microstructure.

5335. High Temperature Materials

Three credits.

Strength-determining factors in advanced alloys, ceramics and composites. Role of material chemistry and microstructure. High temperature creep and crack growth. Oxidation. Thermomechanical behavior.

5336. Material Selection in Mechanical Design

Three credits. Prerequisite: MSE 2101; instructor consent.

Study of materials and how they are chosen for various mechanical designs. A wide range of materials will be discussed (metal, ceramic, polymer, etc.) and their key properties (modulus, strength, density, etc.) in design will be reviewed. Guidelines for material selection will be shown. Design trades will also be discussed.

5343. Corrosion

Three credits.

Mechanisms, characteristics and types of corrosion. Test methods and evaluation of corrosion resistance. Suitability of metals, ceramics, and organic materials in corrosive environments. Oxidation and other high temperature gas-metal reactions.

5364. Advanced Composites

Three credits.

Mechanical properties, analysis and modeling of composite materials. The properties treated include stiffness, strength, fracture toughness, fatigue strength and creep resistance as they relate to fiber, whisker, particulate, and laminated composites.

5366. Alloy Casting Processes

Three credits.

Principles and practices of alloy solidification and casting processes are discussed and applied in the context of sand, investment, permanent mold and die-casting; continuous and direct chill casting; electroslag and vacuum arc remelting; crystal growth; rapid solidification; and laser coating.

5370. Ceramics

Three credits. Prerequisites: a knowledge of Materials Science at the undergraduate level, or MSE 5001.

A graduate-level treatment of the science and engineering of Ceramic Materials. Concepts to be studied include the structure of both crystalline and non-crystalline material, and defects (including point defects, dislocations and interfaces) in these materials. A broad range of special (for ceramics) methods for the preparation, processing and characterization of these materials will run throughout the course. An important component of the course is consideration of how the crystal structure determines or influences mechanical, electronic, magnetic, and thermal properties. Special topics may include functional ceramics, 2D ceramics, and connections between ceramics, economics and global affairs.

5700. Biomaterials and Tissue Engineering

(Also offered as BME 5700.) Three credits. Prerequisite: instructor consent. Not open for credit to students who have passed BME 4710.

A broad introduction to the field of biomaterials and tissue engineering. Presents basic principles of biological, medical, and material science as applied to implantable medical devices, drug delivery systems and artificial organs.

6401. Graduate Seminars in Materials Science and Engineering

One credit. May be repeated for credit.

Presentations by invited guest speakers on topics of current interest in various areas of Materials Science and Engineering.

Mathematics (MATH)

5000. Mathematical Pedagogy

One credit. Prerequisite: Open to graduate students in Mathematics, others with instructor consent.

The theory and practice of teaching mathematics at the college level. Basic skills, grading methods, cooperative learning, active learning, use of technology, classroom problems, history of learning theory, reflective practice. May not be used to satisfy degree requirements in mathematics.

5010. Topics in Analysis I

Three credits. Prerequisite: Instructor consent. May be repeated for credit with change in content.

Advanced topics in analysis.

5011. Topics in Analysis II

Three credits. Prerequisite: MATH 5010; instructor consent. With a change of content, may be repeated for credit.

Advanced topics in analysis.

5016. Topics in Probability

Three credits. May be repeated for a maximum of 12 credits with change in content.

Advanced topics in probability theory, theory of random processes, mathematical statistics, and related fields.

5020. Topics in Algebra

Three credits. Prerequisite: MATH 5211. May be repeated for credit.

Advanced topics chosen from group theory, ring theory, number theory, Lie theory, combinatorics, commutative algebra, algebraic geometry, homological algebra, and representation theory.

5026. Topics in Mathematical Logic

Three credits. Prerequisite: MATH 5260; instructor consent. May be repeated for credit.

Topics include, but are not restricted to, Computability Theory, Model Theory, and Set Theory.

5030. Topics in Geometry and Topology I

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits with change in content.

Advanced topics in Geometry and Topology.

5031. Topics in Geometry and Topology II

Three credits. Prerequisite: MATH 5030; instructor consent. With a change of content, may be repeated for credit.

Advanced topics in Geometry and Topology.

5131. Functional Analysis I

Three credits. Prerequisite: MATH 5111. With a change of content, may be repeated for a maximum of six credits.

Normed linear spaces and algebras, the theory of linear operators, spectral analysis.

5040. Topics in Applied Analysis I

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Advanced topics from the theory of ordinary or partial differential equations. Other possible topics: integral equations, optimization theory, the calculus of variations, advanced approximation theory.

5041. Topics in Applied Analysis II

Three credits. Prerequisite: Instructor consent. May be repeated for a maximum of 12 credits.

Advanced topics from the theory of ordinary or partial differential equations. Other possible topics:

integral equations, optimization theory, the calculus of variations, advanced approximation theory.

5046. Introduction to Complex Variables

Three credits. Not open for credit to students who have passed MATH 3146.

Functions of a complex variable, integration in the complex plane, conformal mapping. Open for master's credit but not doctoral credit toward degree in Mathematics.

5050. Analysis

Three credits. Not open for credit to students who have passed MATH 3150.

Introduction to the theory of functions of a real variable. Open for master's credit but not doctoral credit toward degree in Mathematics.

5070. Topics in Scientific Computation

Three credits. May be repeated for a total of 12 credits.

5110. Introduction to Modern Analysis

Three credits.

Metric spaces, sequences and series, continuity, differentiation, the Riemann-Stieltjes integral, functions of several variables.

5111. Measure and Integration

Three credits. Prerequisite: MATH 5110.

General theory of measure and Lebesgue integration, L^p -spaces.

5120. Complex Function Theory I

Three credits. Prerequisite: MATH 5110.

An introduction to the theory of analytic functions, with emphasis on modern points of view.

5121. Topics in Complex Function Theory

Three credits. Prerequisite: MATH 5120. May be repeated for credit with a change in content and consent of the instructor.

Advanced topics of contemporary interest. These include Riemann surfaces, Kleinian groups, entire functions, conformal mapping, several complex variables, and automorphic functions, among others.

5130. Functional Analysis I

Three credits. Prerequisite: MATH 5111.

Normed linear spaces and algebras, the theory of linear operators, spectral analysis.

5140. Fourier Analysis

Three credits. Prerequisite: MATH 5111.

Foundations of harmonic analysis developed through the study of Fourier series and Fourier transforms.

5141. Fourier Analysis on Groups

Three credits. Prerequisite: MATH 5111.

5160. Probability Theory and Stochastic Processes I

Three credits. Prerequisite: MATH 5111.

Convergence of random variables and their probability laws, maximal inequalities, series of independent random variables and laws of large numbers, central limit theorems, martingales, Brownian motion.

5161. Probability Theory and Stochastic Processes II

Three credits. Prerequisite: MATH 5160. May be repeated for a maximum of 12 credits.

Contemporary theory of stochastic processes, including stopping times, stochastic integration, stochastic differential equations and Markov processes, Gaussian processes, and empirical and

related processes with applications in asymptotic statistics.

5210. Abstract Algebra I

Three credits.

Group theory, ring theory and modules, and universal mapping properties.

5211. Abstract Algebra II

Three credits. Prerequisite: MATH 5210.

Linear and multilinear algebra, Galois theory, category theory, and commutative algebra.

5220. Introduction to Representation Theory

Three credits. Prerequisite: MATH 5210.

Semi-simple rings, Jacobson radical, density theory, Wedderburn's Theorem, representations and characters of groups, orthogonality relations, Burnside's theorem.

5230. Algebraic Number Theory

Three credits. Prerequisite: MATH 5211.

Algebraic integers, ideal class group, ramification, Frobenius elements in Galois groups, Dirichlet's unit theorem, localization, and completion. Further topics (zeta-functions, function fields, non-maximal orders) as time permits.

5250. Modern Matrix Theory and Linear Algebra

Three credits.

The LU, QR, symmetric, polar, and singular value matrix decompositions. Schur and Jordan normal forms. Symmetric, positive-definite, normal and unitary matrices. Perron-Frobenius theory and graph criteria in the theory of non-negative matrices.

5260. Mathematical Logic I

Three credits. Prerequisite: MATH 5210.

Predicate calculus, completeness, compactness, Lowenheim-Skolem theorems, formal theories with applications to algebra, Godel's incompleteness theorem. Further topics chosen from: axiomatic set theory, model theory, recursion theory, computational complexity, automata theory and formal languages.

5310. Introduction to Geometry and Topology I

Three credits. Prerequisite or corequisite: MATH 5110.

Topological spaces, maps, induced topologies, separation axioms, compactness, connectedness, classification of surfaces, the fundamental group and its applications, covering spaces.

5311. Introduction to Geometry and Topology II

Three credits. Prerequisite: MATH 5310. With a change in content, may be repeated for a maximum of 12 credits.

Smooth manifolds, vector fields, differential forms, de Rham cohomology, homology theory, singular (co)homology, Poincaré duality.

5320. Algebraic Geometry I

Three credits. Prerequisite: MATH 5211; and MATH 5310, which may be taken concurrently.

This course is an introduction to algebraic varieties: affine and projective varieties, dimension of varieties and subvarieties, algebraic curves, singular points, divisors and line bundles, differentials, intersections.

5321. Algebraic Geometry II

Three credits. Prerequisite: MATH 5320.

This course introduces further concepts and methods of modern algebraic geometry, including schemes and cohomology.

5360. Differential Geometry

Three credits.

This course is an introduction to the study of differentiable manifolds on which various differential and integral calculi are developed. The topics include covariant derivatives and connections, geodesics and exponential map, Riemannian metrics, curvature tensor, Ricci and scalar curvature.

5410. Introduction to Applied Mathematics I

Three credits.

Banach spaces, linear operator theory and application to differential equations, nonlinear operators, compact sets on Banach spaces, the adjoint operator on Hilbert space, linear compact operators, Fredholm alternative, fixed point theorems and application to differential equations, spectral theory, distributions.

5411. Introduction to Applied Mathematics II

Three credits.

Banach spaces, linear operator theory and application to differential equations, nonlinear operators, compact sets on Banach spaces, the adjoint operator on Hilbert space, linear compact operators, Fredholm alternative, fixed point theorems and application to differential equations, spectral theory, distributions.

5420. Ordinary Differential Equations

Three credits. Prerequisite: MATH 5111.

Existence and uniqueness of solutions, stability and asymptotic behavior. If time permits: eigenvalue problems, dynamical systems, existence and stability of periodic solutions.

5430. Applied Analysis

Three credits. Not open for credit to students who have passed MATH 3430. May not be used for credit for Mathematics graduate degrees.

Convergence of Fourier Series, Legendre and Hermite polynomials, existence and uniqueness theorems, two-point boundary value problems and Green's functions.

5435. Introduction to Partial Differential Equations

Three credits.

Solution of first and second order partial differential equations with applications to engineering and science. Not open to students who have passed MATH 3435. Not open for graduate credit toward degrees in Mathematics.

5440. Partial Differential Equations

Three credits. Prerequisite or corequisite: MATH 5120.

Cauchy Kowalewsky Theorem, classification of second-order equations, systems of hyperbolic equations, the wave equation, the potential equation, the heat equation in \mathbb{R}^n .

5510. Numerical Analysis and Approximation Theory I

Three credits. Prerequisite or corequisite: MATH 5110.

The study of convergence, numerical stability, roundoff error, and discretization error arising from the approximation of differential and integral operators.

5511. Numerical Analysis and Approximation Theory II

Three credits. Prerequisite: MATH 5510.

The study of convergence, numerical stability, roundoff error, and discretization error arising

from the approximation of differential and integral operators.

5520. Finite Element Solution Methods I

Three credits.

Numerical solution of elliptic, parabolic and hyperbolic partial differential equations by finite element solution methods. Applications.

5521. Finite Element Solution Methods II

Three credits. Prerequisite: MATH 5520.

Numerical solution of elliptic, parabolic and hyperbolic partial differential equations by finite element solution methods. Applications.

5580. Optimization

Three credits.

Theory of linear programming: convexity, bases, simplex method, dual and integer programming, assignment, transportation, and flow problems. Theory of nonlinear programming: unconstrained local optimization, Lagrange multipliers, Kuhn-Tucker conditions, computational algorithms. Concrete applications.

5600. Fundamentals of Financial Mathematics

Three credits.

The risk-neutral model for pricing and hedging derivative financial instruments within the context of binomial and trinomial models of the stock price process.

5620. Financial Mathematics I

Three credits. Not open for credit to students who have passed MATH 2620.

The mathematics of measurement of interest, accumulation and discount, present value, annuities, loans, bonds, and other securities.

5630. Actuarial Mathematics I

Four credits. Prerequisite or corequisite: MATH 2620 or MATH 5620. Not open for credit to students who have passed MATH 3630.

Survival distributions, claim frequency and severity distributions, life tables, life insurance, life annuities, net premiums, net premium reserves, multiple life functions, and multiple decrement models.

5631. Actuarial Mathematics II

Four credits. Prerequisite: MATH 5630. Not open for credit to students who have passed MATH 3631.

Survival distributions, claim frequency and severity distributions, life tables, life insurance, life annuities, net premiums, net premium reserves, multiple life functions, and multiple decrement models.

5637. Risk Theory

Three credits.

Individual risk theory, distribution theory, ruin theory, stoploss, reinsurance and Monte Carlo methods. Emphasis is on problems in insurance.

5640. Advanced Topics in Actuarial Mathematics I

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Survival models, mathematical graduation, or demography.

5641. Advanced Topics in Actuarial Mathematics II

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Credibility theory or advanced theory of interest.

5650. Financial Mathematics II

(Formerly offered as MATH 5621.) Four credits. Not open for credit to students who have passed MATH 3650.

The continuation of MATH 5620, focusing on the mathematics of finance: measurement of financial risk and the opportunity cost of capital, the mathematics of capital budgeting and securities valuation, mathematical analysis of financial decisions and capital structure, and option pricing theory. Provides VEE credit in the Corporate Finance subject area for Society of Actuaries and Casualty Actuarial Society requirements.

5660. Advanced Financial Mathematics

Three credits.

An introduction to the standard models of modern financial mathematics including martingales, the binomial asset pricing model, Brownian motion, stochastic integrals, stochastic differential equations, continuous time financial models, completeness of the financial market, the Black-Scholes formula, the fundamental theorem of finance, American options, and term structure models.

5661. Yield Curve Models

Three credits.

The theory and practice of stochastic models to analyze and value interest rate derivatives, and practical issues in the markets where they are traded.

5670. Financial Programming and Modeling

Three credits.

Optimization; linear and non-linear programming; data mining and machine learning in a financial context.

5671. Financial Data Mining and Big Data Analytics

Three credits.

Data structures and algorithms; regression; classification; clustering; recommender systems; anomaly detection; Big Data tools; databases

5800. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 36 credits.

Students who have well defined mathematical problems worthy of investigation and advanced reading should submit to the department a semester work plan.

5850. Graduate Field Study Internship

Variable (1-3) credits. Prerequisite: Instructor consent.

Participation in internship and paper describing experiences.

6000. Seminar in Current Mathematical Literature

Variable (1-6) credits. May be repeated for a total of 12 credits.

Participation and presentation of mathematical papers in joint student faculty seminars. Variable topics.

6010. Seminar in Analysis

Variable (1-6) credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6020. Seminar in Algebra

Variable (1-6) credits. Prerequisite: MATH 5211. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6026. Seminar in Mathematical Logic

Variable (1-6) credits. Prerequisite: MATH 5260. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6027. Seminar in Set Theory

Variable (1-6) credits. Prerequisite: MATH 5310. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6030. Seminar in Topology

Variable (1-6) credits. Prerequisite: MATH 5321. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6036. Seminar in Geometry

Variable (1-6) credits. Prerequisite: MATH 5360. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6040. Seminar in Applied Mathematics

Variable (1-6) credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Mechanical Engineering (ME)

5105. Basic Concepts of Continuum Mechanics

Three credits.

An introductory course in the theory of continuum mechanics. Development of physical principles using cartesian tensors. Concepts of stress, strain and motion. Basic field equation for the Newtonian fluid and the elastic solid.

5110. Advanced Thermodynamics

Three credits.

Microscopic view of thermodynamics: probability and statistics of independent events, thermodynamic probabilities and most probable thermodynamic distributions, molecular structure and partition function, Ensemble of microstates describing macroscopic behavior, with ideal gas as an example, Macroscopic descriptions of thermodynamic equilibrium and equilibrium states, Reversible processes, Heat and Work interactions, Mixtures of pure substances and chemical equilibrium, Stability and phase transitions, Irreversible thermodynamics, Onsager reciprocity relations and thermo-electric effects, Kinetic theory of gases.

5120. Advanced Thermo-Fluids I

Three credits.

Fluid as a continuum, Kinematics and decomposition of fluid motion, Conservation of mass and momentum, Navier-Stokes equations, Conservation of energy, Exact solutions to governing equations, Potential flows, Vorticity dynamics and low Reynolds number flows, Laminar boundary layers including heat transfer, Laminar free shear flows including heat transfer, Flow instabilities and transition.

5130. Advanced Heat and Mass Transfer

Three credits.

Review of thermophysical properties of matter including nanoscale effects. Exact and computational solutions of heat conduction equation. Dimensionless conduction rate approach for steady-state and transient conduction. Species diffusion equations with emphasis on stationary media and partitioning effects. Navier-Stokes equations and exact solutions for special cases. Correlation approach for treatment of single phase laminar, turbulent and two-phase flow. Radiative

properties and treatment of surface radiation with spectral and directional effects. Emphasis on multimode heat transfer with applications in manufacturing, nanotechnology, information technology and biotechnology.

5140. Heat and Mass Transfer in Multiphase Systems

Three credits.

Presentation of basic principles for analysis of transport phenomena in multi-phase systems and how they can be applied to a wide variety of applications. The scope is limited to thermodynamics and heat and mass transfer fundamentals in solid <-> liquid, liquid <-> vapor and solid <-> vapor with emphasis in condensation, evaporation, sublimation, vapor deposition, boiling, two phase flow, melting and solidification.

5150. Analytical and Applied Kinematics

Three credits.

Analytical methods of coordinate transformation and two and three dimensional motion, analysis of relative motion and relative freedom through kinematics connections, study of finite and instantaneous properties of motion, study of the geometry of single and multi-parameter engineering curves, surfaces and motions. Application in the analysis and design of linkages and mechanisms.

5155. Geometric Modeling

Three credits.

This course deals with the mathematical modeling, computer representations and algorithms for manipulating geometry on a computer. It focuses on the basic concepts of solid and geometric modeling from geometry and topology, and uses these concepts to develop computational techniques for creating, editing, rendering, analyzing and computing with models of physical objects, mechanical parts, assembly and processes.

5160. Theory and Design of Automatic Control Systems

Three credits.

Design features of a closed loop control system. Laplace domain analysis of electromechanical, pneumatic, hydraulic, thermal, and mechanical systems. Computer simulation of dynamic responses using software tools. Stability issues, Routh analysis, root locus, Bode and Nyquist analyses are addressed. An open-ended, hands-on design project from a current research topic is assigned.

5180. Dynamics

Three credits.

Three-dimensional particle and rigid-body mechanics. Particle kinematics. Newton's laws, energy and momentum principles. Systems of particles. Rigid body kinematics, coordinate transformations. Rigid body dynamics, Euler's equations. Gyroscopic motion. Lagrange's equations.

5190. Advanced Solid Mechanics

Three credits.

This course covers the fundamental idealizations used in linear solid mechanics and the fundamental principles of the subject. Idealizations covered include beams, circular torsion, struts and thick cylinders. Basic principles include principle of minimum potential energy, principle of minimum complementary energy, virtual work, equations of

static equilibrium and direct and potential methods of solving equilibrium equations. Example applications vary but may include, bounding of elastic properties of composites, derivation of finite elements, solution of plate problems by Green's functions and others.

5210. Intelligent Material Systems and Structures

Three credits.

Overview of piezoelectric materials and electrostrictive materials, shape memory alloys, magnetostrictive materials, and ER/MR fluids. Development of adaptive structure integrated with piezoelectric material, actuation and sensing, simultaneous optimal design/control of electromechanical integrated system, nonlinear and robust control. Design of shape memory alloy system for position control. Development of semi-active control using ER/MR fluids. Structural health monitoring and system identification research.

5220. Principles of Machining and Machine Tools

Three credits.

Theories and applications of machining. Fundamentals of machine tools and machining automation. Physics and mechanics in machining, machining forces and stresses, shear angle theories. Basic phenomena pertinent to process characteristics, such as tribology and tool life, machinability, surface integrity, and economics. Mechanisms of machining and machine tool errors. Machining error compensation with feedback sensors. Machining chatter and vibration analyses. Case studies.

5301. Macroscopic Equilibrium Thermodynamics I

Three credits.

Review of zeroth, first and second laws of thermodynamics, development of equilibrium thermodynamics from a postulatory viewpoint, examination of thermodynamic potentials and equilibrium states, stability of thermodynamic systems including implications on phase and chemical equilibrium. Thermodynamic availability analysis.

5311. Computational Methods of Viscous Fluid Dynamics

Three credits. Prerequisite: Instructor consent.

An advanced course on integral and finite-difference methods of solution of the parabolic and elliptic equations of viscous fluid flow. Method of weighted residuals; Crank-Nicolson; Dufort-Frankel; Peaceman-Rachford alternating direction method; truncation error analysis; stability. Applications to boundary layer and heat transfer problems. A background of FORTRAN programming and numerical analysis is necessary.

5320. Flow of Compressible Fluids I

Three credits.

Equations of motion of a compressible fluid. Quasi-one-dimensional flow including effects of friction, heat addition, and normal shocks. Two and three-dimensional flows. Velocity potential and stream function. Small perturbation theory. Subsonic pressure correction formulas. Kelvin and Crocco Theorems. Method of characteristics for steady and unsteady, rotational and irrotational flows. Curved and oblique shock waves. Shock tube theory.

5321. Flow of Compressible Fluids II

Three credits. Prerequisite: ME 5320.

Equations of motion of a compressible fluid. Quasi-one-dimensional flow including effects of friction, heat addition, and normal shocks. Two and three-dimensional flows. Velocity potential and stream function. Small perturbation theory. Subsonic pressure correction formulas. Kelvin and Crocco Theorems. Method of characteristics for steady and unsteady, rotational and irrotational flows. Curved and oblique shock waves. Shock tube theory.

5340. Conduction Heat Transfer

Three credits.

Mathematical development of the fundamental equations of heat conduction in the steady and unsteady state, with or without internal heat generation or absorption. Study of exact and approximate methods used in the solution of heat conduction boundary value problems. Analytical, graphical, numerical and experimental evaluation of the temperature field in conducting media.

5341. Radiation Heat Transfer

Three credits. Prerequisite: ME 5507.

Fundamentals of radiative emission (black body behavior and Planck's law), surface properties (emissivity, absorptivity, reflectivity, and transmissivity), electromagnetic theory for prediction of radiative properties, development of the methods of solution for radiant energy interchange between surfaces and in enclosures with and without absorbing, emitting, and scattering media present.

5410. Theory of Elasticity

Three credits. Prerequisite: ME 5105.

The mathematical theory of linear elasticity. The theory of torsion of prismatic members. Two-dimensional elasticity problems. Thermal stress. Variational methods.

5412. Wave Propagation in Continuous Media

Three credits. Prerequisite: ME 5105.

General dynamical equations for linear elastic media including both solids and fluids. Wave propagation in elastic rods, plates, cylinders, and semi-infinite and infinite solids. Rayleigh and Love waves; Layered media; reflection and refraction.

5415. Advanced Dynamics

Three credits. Prerequisite: ME 5180.

Variational principles of mechanics: Lagrange's equations, Hamilton's principle. Hamilton-Jacobi theory, canonical transformations, integrability. Introduction to special relativity, applications to orbital problems. Current topics in analytical dynamics.

5420. Mechanical Vibrations I

Three credits.

Variational principles, Lagrange's equation. Equations of motion for multi-degree of freedom systems. Free vibration eigenvalue problem: modal analysis. Forced solutions: general solutions, resonance, effect of damping, and superposition. Vibrations of continuous systems: vibration frequencies and mode shapes for strings, bars, membranes, beams, and plates. Experimental methods and techniques.

5421. Mechanical Vibrations II

Three credits. Prerequisite: ME 5420.

Variational mechanics, Hamilton's principle, and energy formulations for linearly inelastic

bodies. Eigenvalue and boundary-value problems. Non-self adjoint systems. Approximate methods: Ritz and Galerkin. Gyroscopic systems. Nonconservative systems. Perturbation theory for the eigenvalue problem. Dynamics of constrained systems.

5422. Advanced Analysis of Composite Materials and Structures

Three credits.

The purpose of this course is to equip students with the fundamental theories and computational skills to perform advanced analysis of composite materials and structures. The focus is on the damage and failure modeling of composites across multiple length scales. Various composite failure criteria and modeling techniques are reviewed, including the virtual crack closure technique, cohesive zone model and crack band model. Virtual simulations of composite manufacturing processes are introduced, with emphasis on the prediction of manufacturing-induced defects. Methods to evaluate the deformation response of 2D and 3D textile composites are also covered in this course.

5425. Principles of Machine Tool Design

Three credits.

The basic principles and philosophies in the design of precision machine tools. Mathematical theory and precision machine tools. Mathematical theory and physics of errors. The building up of error budget and the mapping of geometric and thermal errors. Design case study of a precision machine tool. Discussion of various types of sensors and actuators, bearings, and transmissions. System design considerations.

5430. Mechanics of Composite Materials

Three credits. Prerequisite: ME 5410 or CE 5124.

Provides students with the fundamental knowledge to perform stress analysis of fiber-reinforced composite materials. Focus on the use of mechanics to study the stresses due to applied deformations, loads, and temperature changes. Begins with an introduction to composite materials, including their constituent properties, applications, advantages and limitations, and manufacturing techniques. Elasticity theory of anisotropic solids is also reviewed. Next, the determination of composite macroscopic constitutive relations through micromechanics is discussed, followed by the development of Classical Lamination Theory (CLT) for composite structural members, and applications to buckling and free vibration analyses. Concludes with a discussion on the use of CLT for failure analysis of composite structures subjected to mechanical and thermal loads.

5431. Fatigue in Mechanical Design

Three credits. Not open for credit to students who have passed ME 3228.

Design calculation methods for the fatigue life of engineering components, fundamentals of fracture mechanics. Crack initiation and crack propagation fatigue lives. Neuber analysis, multiaxial stress, cyclic stress-strain behavior, mean and residual stress effects. Selected current research topics, advanced research and design projects.

5432. Tribology

Three credits.

The theory of fluid film lubrication, including hydrodynamic, externally pressurized and squeeze film mechanisms of load support in bearings. Fixed and pivot pad thrust bearings; air bearings;

journal bearings. Elasto-hydrodynamic lubrication; boundary lubrication; liquid and solid lubricants. Direct solid contact and rolling element contact bearings. Theories of wear. Design considerations in lubrication and wear.

5440. Computer Integrated Manufacturing Systems

Three credits. Prerequisite: instructor consent. Not open for credit to students who have passed ME 3221.

Topics in Computer Integrated Manufacturing (CIM) including the fundamentals of automated manufacturing systems; production economics; Just-In-Time (JIT) and Shop Floor Control (SFC) techniques; Computer Numerical Control (CNC) and off-line programming; Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), and release and control of the engineering and manufacturing of new products. Advanced design and research projects.

5441. Design and Engineering Production Systems

Three credits. Prerequisite: instructor consent. Not open for credit to students who have passed ME 3222.

Design and engineering functions of production systems. Decision-Making Process, Economic Analysis, Demand Forecasting, Product and Process Design, Optimization and Linear Programming, Integrated Production and Inventory Control, Production Scheduling, Critical Path Methods (CPM), Program Evaluation and Review Technique (PERT), and Statistical Quality Control. Advanced design and research projects.

5442. Composites Design

Three credits.

The goal of this course is to provide students with the fundamental principles and best practices for designing structural parts made from composite materials. Students will apply the knowledge and skills obtained throughout the course towards solving a practical design problem. Students will learn and use engineering software for predicting laminated composite properties, designing composite parts, and predicting the part performance under specified loads. At the end of the course, students will have created a complete definition of their design that may be manufactured and tested in subsequent courses.

5433. Theory of Plasticity

Three credits. Prerequisite: ME 5410.

Introduces the physical basis for inelastic behavior and various mathematical descriptions for non-linear deformation. Provides an overview of plastic deformation in metals, including the role of dislocation behavior in strain hardening and strengthening. Detailed topics include yield surfaces, flow rules, hardening rules and introduction to viscoplastic modeling; emphasis is on finite element computer-based implementation of the concepts and their use in predicting the behavior of structures.

5443. Composites Manufacturing

Three credits.

This course will provide an overview of multiple manufacturing methods for a select group of material types. Manufacturing methods will focus on production and process qualification for Aerospace Components. Students will have the opportunity to survey multiple materials, methods,

and processes for part fabrication. Part evaluation methods will also be covered (destructive and non-destructive). There will be entry level exposure to manufacturing risk analysis through the use of industry standard tools (Manufacturing Flow, PFMEA, Control Plan, and PPAP).

5507. Engineering Analysis I

Three credits.

Matrix algebra, indicial notation and coordinate transformations. Cartesian and general vectors and tensors, vector and tensor calculus. Partial differential equations: Fourier series, solution procedures to boundary value problems in various domains. Application to the mechanics of continuous media.

5511. Principles of Optimum Design

Three credits.

Engineering modeling and optimization for graduate students in all areas of engineering. Problem formulation, mathematical modeling, constrained and unconstrained optimization, interior and boundary optima constraint interaction, feasibility and boundedness, model reduction, sensitivity analysis, linear programming, geometric programming, nonlinear programming, and numerical methods in optimization.

5513. Modern Computational Mechanics

Three credits.

An advanced course in Computational Mechanics with emphasis on modeling problems using Finite Differences and Finite Element techniques. Projects include initial value problems, ordinary differential equations and partial differential equations. Course evaluation is made by the successful completion of several assigned projects.

5520. Finite Element Methods in Applied Mechanics I

Three credits.

Formulation of finite elements methods for linear static analysis. Development of two and three dimensional continuum elements, axisymmetric elements, plate and shell elements, and heat transfer elements. Evaluation of basic modeling principles including convergence and element distortion. Applications using commercial finite element programs.

5521. Finite Element Methods in Applied Mechanics II

(Also offered as CE 367.) Three credits.

Formulation of finite elements methods for modal and transient analysis. Development of implicit and explicit transient algorithms. Stability and accuracy analysis. Formulation of finite element methods for material and geometric nonlinearities. Development of nonlinear solution algorithms. Applications using commercial finite element code.

5895. Special Topics in Mechanical Engineering

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Classroom and/or laboratory courses in special topics as announced in advance for each semester. The field of study or investigation is to be approved by the Head of the Department before announcement of the course.

6110. Statistical Thermodynamics

Three credits.

A microscopic development of thermodynamics including statistical ensembles, quantum statistical

mechanics, and a comparison of various molecular models.

6130. Advanced Thermo-Fluids II

Three credits.

Review of governing flow equations, instability and transition, Reynolds averaging and closure approximations, Algebraic turbulence models, Two-equation turbulence models, Large eddy simulations, Turbulence statistics: probability density function and power spectral densities, Energy cascade and intermittency, Turbulent boundary layers including heat transfer, Turbulent free shear flows, Turbulent internal flows (pipes and channels) including heat transfer, Natural convection.

6140. Convection Heat Transfer

Three credits.

A study of heat transfer to laminar and turbulent boundary layers for both compressible and incompressible fluids. Free convection heat transfer is also investigated.

6160. Turbines and Centrifugal Machinery

Three credits. Prerequisite: ME 5320.

Theory, design and performance of centrifugal and axial flow machinery including turbines, blowers, fans, compressors, superchargers, pumps, fluid couplings and torque converters. A detailed study of the mechanics of the transfer of energy between a fluid and a rotor.

6170. Combustion and Air Pollution Engineering

Three credits.

Review of thermodynamics and chemical equilibrium. Introduction to chemical kinetics. Studies of combustion processes, including diffusion and premixed flames. Combustion of gases, liquid, and solid phases, with emphasis on pollution minimization from stationary and mobile systems. Air pollution measurement and instrumentation.

6171. Reaction Engines

Three credits. Prerequisite: ME 5320.

Dynamics of gas flow, including heat addition of friction. Thermodynamic analysis of ramjets, gas turbines, and rockets and their components. Principles of propulsion systems. Nuclear, thermoelectric, ionic, and high-energy propulsion devices.

6172. Advanced Internal Combustion Engines

Three credits. Prerequisite: ME 3251 or 5301.

An analytical study of the factors influencing the operation and performance of the internal combustion engine. Spark-ignition and compression ignition engine theory. Emphasis on the latest analytical and experimental developments.

6173. Advanced Combustion

Three credits. Prerequisite: ME 6170, or ME 2234 and 3250.

Review of thermodynamic properties, transport properties, conservation equations of multicomponent reacting gas. Introduction to chemical kinetics. Classification of combustion waves. Deflagrations, detonations and diffusion flames. Ignition phenomena, droplet and spray combustion and some aspects of turbulent combustion.

6174. Seminar in Combustion Generated Pollution

Three credits. Prerequisite: ME 6173 or ENVE 6210.

A study of the mechanism of production of pollutants such as nitrogen oxides, carbon monoxide, sulphur dioxide, soot and unburned hydrocarbons from power plants such as stationary gas turbines, internal combustion engines, and jet engines. Emphasis will be placed on current research problems and recent advances in combustor designs.

6175. Physical Acoustics

Three credits. Prerequisite: Instructor consent.

The basic principles of the generation and propagation of sound. Mathematical theory of vibration and sound, including single and multi-dimensional waves in stationary and moving media. Physical properties of sound waves; propagation of sound in confined and free space; refraction, reflection, and scattering from strong and weak inhomogeneities.

6176. Hypersonic Aerodynamics

Three credits. Prerequisite: ME 5320.

Hypersonic small disturbance theory; similarity laws. Newtonian, shock-expansion and blast-wave theories of hypersonic flow. Aerodynamic shapes for minimum hypersonic drag. Physical properties of real gases; shock waves in real gas flow.

6177. Aerothermal Analysis

Three credits. Prerequisite: ME 5320; instructor consent.

High-speed, viscous compressible flow. Equations of motion. Thermodynamic and transport properties of high temperature gases. Blunt body heating. Boundary layer equations and transformations. Hypersonic boundary layers with heat and mass transfer. Reference enthalpy methods.

6178. Applied Solar Energy

Three credits. Prerequisite: ME 5340 and 3242.

Study of the technology and economics of solar energy conversion to useful forms. Review of heat transfer and energy storage. Collector design and performance analysis. System design of water heaters and space heating/cooling systems. Review of wind power, wave power, ocean thermal energy conversion and satellite solar power systems.

6179. Underwater Sound

Three credits. Prerequisite: Instructor consent.

The propagation of sound in sea-water, including effects of temperature and salinity gradients. Transducers. Flow noise.

6222. Non-Linear Vibrations

Three credits.

Vibrations of non-linear single-degree-of-freedom systems. Singular points. Liapunoff function. Approximation techniques. Stability. Self-excited vibrations. Vibrations of non-linear multi-degree-of-freedom systems.

6223. Random Vibrations

Three credits. Prerequisite: ME 5421 and MATH 3160.

Introduction to theory of sets. Statistical preliminaries. Fourier transforms. Random vibrations of single-degree-of-freedom and two-degree-of-freedom systems. Random vibrations of systems with distributed mass. Theories of failure.

6250. Advanced Analysis and Design of Mechanisms

Three credits. Prerequisite: ME 3224 or ME 5150.

Kinematic analysis and synthesis of planar and spatial linkages with lower pairs. Type and number synthesis. Finite position and higher order design. Unified treatment of position, path-angle and function generation problems. Approximation synthesis and optimization. Defect elimination and performance evaluation, introduction to commercial software.

6251. Robotic Manipulators

Three credits. Prerequisite: ME 5160 or ME 3224.

Modeling of 3-D industrial robots; kinematic and dynamic analysis of manipulators. Manipulation techniques. Design workspace and performance criteria. Review of control techniques. Hardware requirements. On-line and off-line optimal trajectory planning.

6255. Computer Graphics for Design

Three credits. Prerequisite: Instructor consent.

A practical study of interactive computer graphics as applied to engineering design. Graphics hardware, interactive techniques, transformations, remote graphic systems, and stand-alone minicomputer based systems are discussed emphasizing their application in engineering design. Practical experience is gained through assignments involving various graphics systems.

6260. Advances in Control Systems Design

Three credits. Prerequisite: ME 5160 or 5507.

Review of the state space design concepts for control systems. Mathematical modeling of dynamic systems. Lagrange's and Newton's representations. Decentralized or linearized control. Variable structure systems. Sliding mode control of nonlinear systems and discussions of constraint control cases. Time-delayed systems. Stability-based analysis and synthesis. Engineering applications. Open-ended control system design projects.

6300. Independent Study in Mechanical Engineering

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Individual exploration of special topics as arranged by student and instructor.

6301. Macroscopic Equilibrium Thermodynamics II

Three credits. Prerequisite: ME 5301.

Review of zeroth, first and second laws of thermodynamics, development of equilibrium thermodynamics from a postulatory viewpoint, examination of thermodynamic potentials and equilibrium states, stability of thermodynamic systems including implications on phase and chemical equilibrium. Thermodynamic availability analysis.

6303. Macroscopic Non-equilibrium Thermodynamics I

Three credits. Prerequisite: ME 6301; instructor consent.

A study of the laws and equations applicable to non-equilibrium processes of a very general nature; this will include the conservation laws, entropy law and entropy balance, the phenomenological equations. Onsager's relations and the fluctuation dissipation theorem. Selected application of the foundations will include heat conduction, diffusion

and cross effects, viscous flow and relaxation phenomena, and discontinuous system processes.

6304. Macroscopic Non-equilibrium Thermodynamics II

Three credits. Prerequisite: ME 6303; instructor consent.

A study of the laws and equations applicable to non-equilibrium processes of a very general nature; this will include the conservation laws, entropy law and entropy balance, the phenomenological equations, Onsager's relations and the fluctuation dissipation theorem. Selected application of the foundations will include heat conduction, diffusion and cross effects, viscous flow and relaxation phenomena, and discontinuous system processes.

6320. Environmental Engineering

Three credits. Prerequisite: ME 3250 or 5301.

Design and arrangement of heating, air conditioning and refrigeration equipment and controls to meet comfort and industrial process requirements.

6330. Advanced Measurement Techniques

Variable (1-3) credits. Prerequisite: Instructor consent.

A critical examination of measurement techniques. Principles of operation of various instruments. Estimates of accuracy, precision, and resolution of measurements. Intended primarily for students contemplating experimental theses. When possible, specific topics covered will be structured to the needs of the class.

6340. Graduate Seminar

Zero credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Presentations by invited guest speakers on topics of current interest in various Mechanical Engineering and allied fields.

6508. Engineering Analysis II

Three credits. Prerequisite: Instructor consent.

Calculus of variations including transversality conditions, constraints, Lagrange multipliers, Rayleigh-Ritz and Galerkin methods. Integral transform techniques including Laplace, Fourier, Hankel, and Mellin transforms, Integral equations.

6511. Advanced Optimum Design

Three credits. Prerequisite: MATH 3410 or ME 5511.

Advanced techniques in engineering design and process modeling optimization for graduate students in all areas of engineering. Review of theories of multi-variable constrained and unconstrained optimization, and computational techniques in nonlinear programming, structured programming, including integer programming, quadratic programming, genetic algorithms, theories of multivariable optimization from calculus of variations, computational techniques in functional optimization.

Medical Science (MEDS)

5306. Physiological Digital Imaging

Three credits. Prerequisite: instructor consent.

A combination lecture/seminar/project course in "Foundations of Imaging Science." It covers the principal mechanisms of physiological imaging in digital applications and focuses on critical analysis of the performance of modern imaging sensors, modeling and measuring of visual perception

parameters for image information and optimizing of digital imaging for the life sciences, pathology and radiology, including teleradiology. The course is intended for anyone who works with or will use digital images.

5307. Critical Analysis of the Biological Literature

Two credits.

Develops and improves each student's capacity for critical analysis of research articles, with special emphasis on the logic used to frame hypotheses and justify conclusions. An understanding of experimental methods will also be emphasized. Each week one or two papers, across a wide spectrum of modern biomedical research, will be discussed in depth in a small group format.

5308. The Nature of Evidence in Scientific Research

Two credits.

Aspects of the scientific process that are common to all levels of biomedical investigations: from biophysics in cell-free systems to molecular biology in cells, to physiology in whole organisms, to epidemiology and clinical investigation in humans. These features begin with enunciation of the question to be asked, and include (1) Identification of a system to address the question, (2) Specification of the systems and their manipulation, (3) Assessment of outcomes, and (4) Drawing inferences on the basis of results. Discussion of seminal, published works on the topics. Two to three key papers will be distributed to participants at least one week before the scheduled discussions. There will be no examination for the course. Students are expected to actively participate in critical evaluation and discussion during each of the weekly two-hour sessions. Evaluation of performances will be based solely on such participation.

5309. Molecular Basis of Disease

Two credits.

Seminar and discussion based course that reviews the molecular understanding of human disease.

5310. Responsible Conduct in Research

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Introduction to ethical and legal issues associated with the practice and reporting of science. Uses a case study approach and requires in-class student participation.

5313. Biomaterials and Tissue Engineering

(Also offered as BME 5700.) Three credits. Prerequisite: instructor consent.

A broad introduction to the field of biomaterials and tissue engineering. Presents basic principles of biological, medical, and material science as applied to implantable medical devices, drug delivery systems and artificial organs.

5322. Developmental Biology

Two credits.

History, concepts, and experimental strategies in both classical and modern developmental biology. Topics ranging from early fertilization, to early embryonic development, to the formation of adult structures are considered and compared in a range of model organisms. One hour of lecture by instructors and one hour of literature analysis and discussion by students each week. Course grade

will combine results of class participation and a final exam.

5323. Genetics and Developmental Biology Journal Club

One credit. May be repeated for a total of 10 credits.

Reading and discussion of current research in the fields of genetics and developmental biology with emphasis on molecular aspects. Periodic presentation of research papers and active discussion will be expected of all participants.

5325. Computational Genomics Practicum

Two credits. Prerequisite: instructor consent.

A practical introduction to computational genomics focusing on methods for processing/analyzing Next Generation Sequencing (NGS) data. 1. Programming: Introduction to the Linux command line, elements of Python and R programming. 2. Genomics software tools for performing sequence read-alignments, transcript-expression profiling, and robust procedures for gauging differential gene expression. 3. Methods for genome assembly, genome variation detection, motif finding, and data-visualization. 4. Statistical topics include probability distributions, central limit theorem, hypothesis testing, linear models, and dimensionality reduction.

5327. The Logic of Modern Biology

Four credits.

Fundamental biochemical and genetic principles that underlie all areas of modern biology. The biochemistry and genetics of both prokaryotes and eukaryotes are addressed. Reading and discussion of papers in the literature are important elements of the course.

5329. Immunobiology I

Two credits.

An overview of basic concepts in immunology including antibody structure, function and production, molecular genetics of the immune system and cellular regulation of immunity.

5330. Immunobiology II

Two credits. Prerequisite or corequisite: MEDS 5329.

This continuation of MEDS 5329 considers effect or mechanisms of the immune system in inflammation, hypersensitivity, transplantation and autoimmunity as well as regulation of the immune system by cells, cellular products and chemical or physical agents.

5333. Immunobiology of Transplantation

Two credits. Prerequisite: instructor consent.

Immunogenetics of transplantation, alloantigen reaction lymphocytes, afferent recognition phase of transplantation immunity, cellular effector mechanisms and antibody participation in transplant immunity.

5335. Advanced Molecular and Cellular Immunology I.

Four credits. Prerequisite: instructor consent.

Major areas covered include: (1) Development of the immune system with respect to lymphoid organs and lymphocyte subsets; (2) Mechanisms of antigen processing and presentation; (3) Lymphocyte activation including the role of costimulatory molecules and (4) Regulation of the immune response including tolerance induction, cytokine interactions and signal transduction.

5336. Advanced Molecular and Cellular Immunology II

Four credits. Prerequisite: MEDS 5329 and 5330; instructor consent.

Major areas covered include: (1) Immunoglobulin genetics and structure; (2) T cell receptor genetics and structure; (3) Molecular nature of antigen recognition by T cell receptor; (4) Structure, function and molecular genetics of lymphocyte accessory molecules; (5) Mechanisms of cytotoxicity and (6) Complement and complement receptors.

5337. Immunopathology

Three credits.

The immediate-type hypersensitivities will be considered, with special emphasis on anaphylactic-type responses, pathologic responses, pathologic responses to immunologic complexes, immunohematologic diseases and models such as virus immunopathology, and rheumatoid arthritis and systemic lupus erythematosus.

5338. Techniques in Structural Biology

Two credits. Prerequisite: instructor consent.

Introduces graduate students and selected undergraduates to modern techniques in structural biology. Each course offering covers a specific technique: NMR, computational and graphical analysis of biomolecules, X-ray crystallography, analytical ultracentrifugation, spectroscopy, calorimetry, and others.

5341. Molecular Neurobiology of Excitable Membranes

Three credits. Prerequisite: instructor consent.

Emphasizes the relation between structure and function of biological interfaces that comprise electrically excitable and chemically excitable (synaptic) membranes. Models of electrically and chemically induced regulation of ion movement via channels and transporters are examined. Genetic manipulation of channel composition is evaluated with attention to altered function and inferences about their structure.

5349. Principles of Pharmacology

Variable (1-3) credits.

An introductory course covering the basic principles of Pharmacology. Introduces the student to the concept that drugs and chemicals act on the body by binding to receptors. The physico-chemical properties of ligand binding to macromolecules is examined, followed by an examination of the nature of receptors and the mechanisms whereby they exert their physiological responses to pharmacological agents. The uptake and fate of xenobiotics (compounds foreign to the body) in the body is discussed. The responses to chemicals, as therapeutic agents, i.e., the desired correction of diseased conditions, as well as toxins, carcinogens and teratogens. The mechanisms governing these different responses are examined in detail.

5350. Biochemistry I

Four credits.

Introductory biochemistry of protein structure, function and synthesis, enzymology, structure and replication of nucleic acids, membrane structure and function.

5351. Biochemistry II

Three credits.

Fundamentals of biomolecular interactions and protein structure. Structure/function of select proteins and enzymes essential to the following:

metabolic pathways, DNA/RNA transactions, gene expression, cell cycle and signal transduction, and the cytoskeleton.

5365. Genetics

Three credits.

Introduction to the principles and practices of molecular genetics of prokaryotes and eukaryotes. Topics include gene structure and function; gene transfer and recombination; gene regulation; molecular genetics of eukaryotic viruses, yeast, *Drosophila*, somatic cells and humans.

5367. Introduction to Molecular Biology and Biochemistry

One credit. Prerequisite: Open only to Biomedical Science doctoral students; instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Reading and discussing classic papers in Molecular Biology and Biochemistry in order to introduce first year students to the field and to develop critical skills. Topics will vary from year to year but may include nature of the gene, basic principles of transcription, translation, DNA replication, and membrane structure.

5368. Topics in Biochemistry and Molecular Biology

One credit. May be repeated for a total of three credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

To be offered every semester by a different faculty member on a rotating basis. Topic to be determined by individual faculty member. The purpose of the course will be to discuss and critically evaluate relevant literature in each topic. The topics will include viral replication strategies, membrane molecular biology, growth factors and second messengers, molecular biology of microbial development, membrane receptors, extracellular matrix-cell interactions, and peptide hormones.

5369. Advanced Genetics and Molecular Biology

Three credits.

An advanced course emphasizing approaches to the genetic analysis of eukaryotic systems including yeast, fungi, *Drosophila*, mice, and humans. Topics include genome organization, DNA replication, regulation of gene expression, development, and differentiation.

5370. Introductory Neuroscience

One credit. Prerequisite: Instructor consent.

Introduction to neuroscience as a discipline and the important concepts and problems that make the nervous system unique. The nervous system consists of the brain, spinal cord, and peripheral nervous structures. Our scientific understanding of sensation, movement, emotional behavior, homeostatic systems, and cognition each require knowledge and understanding of the nervous system. Introduction to the neurobiological bases of these behaviors and the experimental approaches that underlie modern neurobiological research. Introduction to the unique cell and molecular biology of the nervous system. Neuroscience, as a discipline, incorporates data from many other scientific fields to address fundamental problems. Therefore, one goal of the course is to show how our understanding of the nervous system requires the integration of data from disciplines like endocrinology, genetics, computation biology,

engineering, and biophysics. Introduction to common diseases of the nervous system. Diseases are instructional since dysfunction may help explain normal function. More important is that the cure of diseases, such as stroke, Alzheimer's disease, and multiple sclerosis, provide a strong motivation for research in the nervous system.

5371. Systems Neuroscience

Three credits. Prerequisite: instructor consent.

Part of the core series in the Neuroscience graduate program. Functional organization of neural systems underlying sensation, movement, language, learning/plasticity, and emotion/arousal. Sensory systems will include the somatosensory, auditory, visual, vestibular, and chemosensory systems. Motor systems will include the spinal cord, brain stem, cerebellum, vestibular system, oculomotor system, basal ganglia and cerebral cortex.

5372. Neuroscience: Cellular and Molecular Neuroscience

Three credits. Prerequisite: instructor consent.

Part of a core series in the Neuroscience Program, this course provides an introduction to basic concepts in the study of cell biology, neuroanatomy, neurophysiology, neurochemistry, and molecular biology of the nervous system.

5374. Neuroscience: Structure, Function, and Development of the Nervous System

Variable (1-6) credits. Prerequisite: MEDS 5372; instructor consent.

Provides systematic coverage of neuroanatomy, neurophysiology, neuropathology, neurochemistry and developmental neurobiology (including embryology and neural plasticity). Introduction to neuroendocrinology, degeneration and regeneration, communicative sciences (speech, hearing, chemical senses, and psychophysics), and research methods.

5375. Neuroscience: Current Research Topics/ Methods

One credit. Prerequisite: Instructor consent. May be repeated for a total of four credits.

Familiarizes students early in their education (first or second year) with various key methodologies to which they will be exposed in courses, journal club presentations, and seminars. After a brief overview of basic concepts, applications, controls, and permutations of the method in the classroom, students will observe and participate in a demonstration of important technical aspects of the method in the laboratory setting. Targeted toward students with an interest in neuroscience or neuroimmunology.

5376. Developmental Neurobiology

Two credits.

Emphasis on the cellular and molecular mechanisms that underlie the development of the nervous system. Reading and discussion of research papers in the literature is stressed.

5377. Neurobiology of Hearing

Three credits. Prerequisite: instructor consent.

Provides in-depth analysis (using the Auditory System as a model system) with application of interdisciplinary approaches of cell and molecular biology, developmental neurobiology, neuroanatomy, neurophysiology/biophysics, neurochemistry, neural modeling, psychophysics, and plasticity, with state-of-the-art methods used in neuroscience research today. The team of faculty

members contribute a variety of complementary fields of study.

5378. Computational Neuroscience

Three credits. Prerequisite: instructor consent.

Students study the function of single neurons and neural systems by the use of simulations on a computer. Combines lectures and classroom discussions with conducting computer simulations. The simulations will include exercises and a term project. Each student will complete a term project of neural simulation to be developed during the second half of the semester. The topic of the term project should be approved by the instructors by the middle of the semester. The grade will be based on the exercises and the term project. Course includes: analysis of electrical circuits modeling neuronal cell membrane and the related differential equations; the Hodgkin-Huxley model of voltage- and time-dependent sodium and potassium conductances in the squid axon; voltage-clamp and current-clamp; the relationship between two rate constants versus the steady-state value and time constant underlying each conductance; neuronal response properties that are related to voltage-dependent and calcium-dependent ion channels; single- and multi-compartment models with ionic conductances simulating specific neuronal response properties described in the literature; excitatory and inhibitory postsynaptic currents and underlying ligand-gated ion channels; dendritic electrotonus and synaptic integration; temporal and spatial interactions of synaptic inputs to the dendritic tree and the cell body; action potential propagation in axons; neural circuits.

5380. Cell Biology

Four credits.

Basic eukaryotic cell biology. Major topics include Methods in Cell Biology; Cell Growth and Proliferation; Cytoskeleton; Transport; Hormone Response; Cytoplasmic Organelles and Membrane Structure, Function, Biogenesis, Transport and Sorting; Cell Motility; Chromatin Structure and Organization; and Extracellular Matrix and Cell Adhesion.

5381. Cell Biology and Physiology II

Four credits. Prerequisite: MEDS 5380.

Part I: Lecture format on membrane biophysics (membrane structure and permeability, electrical properties and gated channels, concentration gradients, volume and shape control, energy transduction, membrane dynamics). Part II: Lecture/Seminar format. Topics in receptors and channels, cell biology of the senses, cell junctions in the nervous system, growth factors and cell activation, cell cytoskeleton and matrix. Emphasis on in-depth discussions of specific cell systems through current literature. Final paper required in the form of research proposal.

5382. Practical Microscopy and Modeling for Cell Biologists

Two credits.

Introduction to the students the most recent achievements in the field of intracellular signaling and regulation. Each of the participating faculty members will give an introductory lecture to provide an overview of signaling events in their field of expertise and discuss the most important recent papers.

5383. Neurobiology of Disease

Three credits.

Discussion and lecture run by clinician and basic scientist, on diseases of the nervous system.

5384. Brain Microcircuits

Two credits. Prerequisite: instructor consent.

Brain microcircuitry is an upper level course.

5385. Molecular Mechanisms of Neurobiological Disorders

Three credits.

Discussion of current papers relevant to molecular analyses of neurobiological diseases.

5388. Principles and Techniques of Biological Electron Microscopy

Variable (1-4) credits. Prerequisite: instructor consent.

A lecture/laboratory course on the theory and practice of transmission and scanning electron microscopy as applied in the biological sciences. Topics include instrument design and operation, electron optics, specimen preparation, photography, microscopic image interpretation and special techniques. Laboratory students learn and carry out commonly used preparative techniques, observe and photograph specimens in the electron microscope, and complete an independent project.

5391. Enzymes of Xenobiotic Biotransformation

Two credits. Prerequisite: instructor consent.

Lectures and student presentations of journal articles relevant to the lectures plus one laboratory. Topics include an overview of metabolic routes of drugs and chemicals in the body with an emphasis on the hepatic cytochrome P450 monooxygenases. Other topics include conjugative xenobiotic metabolizing enzymes.

5395. Independent Study

Variable (1-6) credits.

5415. Craniofacial and Oral Biology

Two credits. May be repeated for a total of four credits.

Combination lecture and literature discussion course with a focus on the on the underlying biochemical, molecular and genetic mechanisms involved in the pathogenesis of craniofacial and oral disorders, the identification of unsolved questions, and consideration of possible approaches to investigate these questions.

5418. Stem Cells and Regenerative Biology

Three credits. Prerequisite: MEDS 5322 or 5327 or 5380.

A literature-based course on the fundamental aspects of stem cells; their nature, origin, self-renewal and differentiation during embryogenesis and tissue regeneration. Taught by a team of experts. Grade based on mid-term tests, class participation and presentation.

6372. The Neurobiology of Glia

Two credits.

Detailed introduction and advanced, in-depth discussion on specific topics related to the cellular biology and pathobiology of glia. First part of the course will be didactic lectures covering each of the types of glia in the central and peripheral nervous systems. Second part of the course will provide focused paper discussions on the specific roles of glia in particular diseases of the nervous system that may change with time to stay current with recent publications and innovations in the field.

6400. Human Biology

Variable (1-9) credits.

Introduces the histology of the major types of tissues and cellular ultrastructure. Following this introductory material, the students will dissect the limbs, and study epithelia, connective tissue, and skin including the extracellular matrix and body fluid compartments. Muscle, bone, peripheral nerves, the neuromuscular junction, blood vessels, and other elements essential to understanding the function of the limbs. For all tissues considered, there will be an integrated presentation of structure, biochemistry, and physiology. Also, presents the general principles of biochemistry and molecular biology. Fundamental processes involved in cellular growth and division are included as well as an overview of metabolism and energy production. This is followed by consideration of cellular differentiation. Finally, there will be a survey of the general principles of immunology and the lymphoid tissues including the function of blood cells and coagulation.

6401. Organ Systems I

Variable (1-9) credits. Prerequisite: instructor consent.

Presents, in an integrated fashion, the anatomy, histology, biochemistry, and physiology of the central nervous system. Concurrently, the students dissect the head and the neck.

6402. Organ Systems II

Variable (1-9) credits. Prerequisite: instructor consent.

Presents, in an integrated fashion, the anatomy, histology, biochemistry, and physiology of the cardiovascular, respiratory and renal-urinary systems. The emphasis is placed on how these organ systems interact and work together to maintain homeostasis. Concurrently, the students dissect the thorax. Introductory biostatistics and epidemiology are also presented at this time.

6403. Organ Systems III

Variable (1-9) credits. Prerequisite: instructor consent.

Presents, in an integrated fashion, the anatomy, histology, biochemistry and physiology of the gastrointestinal, endocrine and reproductive systems. Also presented is material related to principles of human genetics. At the same time, students dissect the abdomen and pelvis.

6404. Correlated Medical Problem Solving - Part A

Two credits. Prerequisite: instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course serves to expand upon and integrate basic science concepts introduced in the Human Systems.

6405. Correlated Medical Problem Solving - Part B

Two credits. Prerequisite: instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Expands upon and integrates basic science concepts introduced in the Human Systems course.

6406. Human Development and Health

Variable (1-2) credits. May be repeated for a total of two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The HDH course has been taken by combined MD/PhD students for graduate school credit in the 2nd year of study. The School of Medicine has now

divided the course so that parts are taken in the 1st and 2nd years. In fall 2013, current second year students will enroll for 2 credits while current first year students and all subsequent classes will enroll for 1 credit in each of the first two years.

6407. Mechanisms of Disease: Part A

Four credits. Prerequisite: instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

A 30-week, yearlong medical school course covering the pathology and pathophysiology of organ systems and basic principles of therapeutics. The instruction format includes about 50% lecture, 15% laboratory, 30% small group conference and 5% clinical-pathological correlations. The course covers General Pathology, Pharmacological Principles, and Infectious Disease; Diseases of Homeostasis; Oncology and Diseases of Metabolism; and Diseases of the Nervous System, Diseases of the Reproductive System and Immune and Non-immune Mediated Diseases.

6408. Mechanisms of Disease: Part B

Six credits. Prerequisite: instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

A 30-week, yearlong medical school course covering the pathology and pathophysiology of organ systems and basic principles of therapeutics. The instruction format includes about 50% lecture, 15% laboratory, 30% small group conference and 5% clinical-pathological correlations. The course covers General Pathology, Pharmacological Principles, and Infectious Disease; Diseases of Homeostasis; Oncology and Diseases of Metabolism; and Diseases of the Nervous System, Diseases of the Reproductive System and Immune and Non-immune Mediated Diseases.

6409. Mechanisms of Disease: Part C

Variable (1-9) credits. Prerequisite: instructor consent.

Medicine. Oncology, metabolism, endocrinology, and the nervous system.

6410. Mechanisms of Disease: Part D

Variable (1-9) credits. Prerequisite: instructor consent.

Reproduction, immunology, and connective tissue.

6411. Clinical Practicum

12 credits. Prerequisite: instructor consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical experience in the major disciplines including: Medicine, Surgery, Obstetrics and Gynecology, Psychiatry, Family Medicine, and Pediatrics.

6412. Advanced Clinical Practicum

11 credits. Prerequisite: instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Advanced clinical work with opportunities in the major clinical disciplines.

6413. Cancer Biology

Two credits.

This is a survey course to explore the genetics and pathobiology of cancer by focusing on a variety of current research topics. Understanding the disease process requires studying normal mechanisms of growth control. Emphasis will be

on topics such as differentiation, apoptosis, growth factors, oncogenes, tumor suppressor genes, viruses and signal transduction.

6414. Advanced Correlated Medical Problem Solving - Part A

Two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Expands upon and integrates basic science concepts introduced in Human Development and Health and Mechanisms of Disease.

6417. Advanced Correlated Medical Problem Solving - Part B

Two credits. Prerequisite: instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Expands upon and integrates basic science concepts introduced in Human Development and Health and Mechanisms of Disease.

6418. Classic Papers in Molecular Biology and Biochemistry

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Students are required to read and critically analyze one or two papers selected by the instructor each week.

6419. Classic Papers in Neuroscience and Immunology

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Students are required to read and critically analyze one or two papers selected by the instructor each week.

6421. Classic Papers in Cell Biology and Developmental Biology

Variable (1-6) credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Students are required to read and critically analyze one or two papers selected by the instructor each week.

6422. Classic Papers in Cellular and Molecular Pharmacology

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Students are required to read and critically analyze one or two papers selected by the instructor each week.

6423. Cellular and Molecular Biology of the Vascular System

Two credits.

Systematic survey of classic and current literature in vascular biology, emphasizing the molecular and cellular basis of the development, function, and malfunction of the vascular system.

6424. Neuropharmacology

Two credits.

Highlights the different neurotransmitter and neuromodulator systems and the pharmacological agents that affect them. Emphasis is placed on the mechanisms of drug action in the treatment of nervous system and mental disease, serving to complement other courses in neuroscience, pharmacology, immunology, and pharmaceutical science.

6425. Neuroimmune Interactions

Two credits.

Addresses the chemical and physical relationships between the immune system and the nervous system and emphasizes the coordinate operations of the two systems.

6430. Molecular and Medical Parasitology

Two credits.

Provides students with an in-depth knowledge of classical and modern parasitology. The course will focus on the molecular and cellular bases of parasite development, differentiation, parthenogenesis and host-pathogen interactions. The course also will address the most recent advances in genomics, proteomics, bioinformatics and large-scale functional analyses and their contributions to treatment and prophylaxis of parasitic infections.

6444. Medical Microbiology

Four credits.

Provides first and second year graduate students with a broad understanding of the molecular and medical aspects viruses and bacteria. For viruses, topics include entry, genome replication and gene expression, assembly, viral transformation, pathogenesis, host immune responses, clinical presentations viral immunology, treatment principles including vaccines and antiviral therapeutics, and emerging and re-emerging viruses that threaten human health. For bacteria, topics include development and differentiation, bacterial genetics and genomics, bacterial cell cycle (DNA replication, chromosome segregation and cell division), cell-cell communication, pathogenesis, host immune responses, clinical presentations and treatment principles. The course will include lecture, discussion of primary literature and student presentations. Grading will be based on class participation, student presentation and a short paper.

6445. Skeletal Biology

Two credits. Prerequisite: instructor consent.

A comprehensive survey of the cellular and molecular mechanisms that regulate the development, growth, differentiation, remodeling, and repair of the skeletal system.

6447. Tool Kit for Scientific Communication

One credit. Prerequisite: Instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Through a series of lectures and workshops, designed to improve the ability of students to present scientific data in written and oral format. These skills are essential, not only as a graduate student, but in future careers as scientist. The curriculum covers basic elements and logical order of presentations. Reviewer's perspectives, grant writing resources, workshops, and evaluation of recent seminars help students to design and evaluate research projects.

6448. Foundations of Biomedical Science I

Four credits.

Encompasses topics considered fundamental to any student pursuing a Ph.D. in any Area of Concentration in the Biomedical Science Graduate Program. Combines an introduction to fundamental concepts along with a more in-depth analysis of the research that underlies some of these ideas. A variety of topics will be examined in approximately one-week modules that will include a basic, introductory one hour lecture on

Mondays, a more in-depth discussion of one to two critical historical papers on an aspect of the topic on Wednesdays and then a small group discussion on a more modern paper related to the area on Fridays. Periodically, the course will include Consolidation weeks that discuss key methodologies in the context of new concepts or concepts previously discussed.

6449. Foundations of Biomedical Science II

Four credits.

Encompasses topics considered fundamental to any student pursuing a Ph.D. in any Area of Concentration in the Biomedical Science Graduate Program. Combines an introduction to fundamental concepts along with a more in-depth analysis of the research that underlies some of these ideas. A variety of topics will be examined in approximately one-week modules that will include a basic, introductory one hour lecture on Mondays, a more in-depth discussion of one to two critical historical papers on an aspect of the topic on Wednesdays and then a small group discussion on a more modern paper related to the area on Fridays. Periodically, the course will include Consolidation weeks that discuss key methodologies in the context of new concepts or concepts previously discussed.

6450. Optical Microscopy and Bio-imaging

(Also offered as BME 6450.) Three credits.

Presents the current state of the art of optical imaging techniques and their applications in biomedical research. Covers both traditional microscopies (DIC, fluorescence etc.) that have been an integrated part of biologists' toolbox, as well as more advance topics, such as single-molecule imaging and laser tweezers. Four lab sessions are incorporated in the classes to help students to gain some hand-on experiences. Strong emphasis on current research and experimental design.

6455. Introduction to Systems Biology

Three credits.

Guides students into a biology world as seen by engineers, physicists, mathematicians and computer scientists. Discussion of different kinds of predictive mathematical models and their dynamical behavior; stability, switching and stochasticity of a biological system; resources needed to start building a model; models exchange, simulation and visualization; public databases and software tools available for a modeler. Provides the necessary background to read modeling papers, choose Systems Biology resources that will help in biological projects, and be able to select a modeling technique appropriate for a given biological project.

6456. Human Systems A

Six credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

A 38-week long medical school course taken in the first year of the combined MD/PhD program. The course is divided into four sections: Human Biology, Organ Systems 1, Organ Systems 2 and Organ Systems 3. The course covers the basic elements of human anatomy, histology, biochemistry, physiology and genetics and an introduction to biostatistics and the principles of epidemiology. The instructional format includes about 50% didactic lectures, 30% laboratory and 20% small group sessions.

6457. Human Systems B

Six credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

A 38-week long medical school course taken in the first year of the combined MD/PhD program. The course is divided into four sections: Human Biology, Organ Systems 1, Organ Systems 2 and Organ Systems 3. The course covers the basic elements of human anatomy, histology, biochemistry, physiology and genetics and an introduction to biostatistics and the principles of epidemiology. The instructional format includes about 50% didactic lectures, 30% laboratory and 20% small group sessions.

6460. Advanced Optical Microscopy and Bio-imaging

(Also offered as BME 6460.) Three credits. Prerequisite: BME 6450 or MEDS 6450.

Covers several aspects of state of the art biological and biophysical imaging. Advanced techniques including nonlinear optical processes (multi-photon excitation, second harmonic generation, and stimulated Raman processes), as well as optical coherence tomography. Three lab projects will supplement the lectures, providing hands-on experience with nonlinear optical methods. Special emphasis will be given to current imaging literature and experimental design.

6461. Clinical Radiation Sciences: Physics and Biology (Part A)

Two credits. Prerequisite: instructor consent.

A continuous pair (i.e., MEDS 6461 and 6462) of semester lecture/seminar courses which examines the physical and biological principles underlying the uses of radiation and allied radiation sciences in clinical diagnosis and therapy. Characteristics of imaging systems, Nuclear Medicine, Radiation Therapy, biological effects of ionizing radiation, radiation measurement and dosimetry, and quality assurance will be covered through critical readings in texts and the literature. Available to individuals enrolled in residency programs of medical radiology, oral and maxillofacial radiology, and other specialties engaged in patient imaging. Some of these students will be enrolled in a concurrent degree program, either Master of Dental Science or PhD in Biomedical Sciences. Also available to individuals in Master's or PhD level graduate studies who desire an in-depth study of radiation sciences, and how they apply to patient care.

6462. Clinical Radiation Sciences: Physics and Biology (Part B)

Two credits. Prerequisite: instructor consent.

A continuous pair (i.e., MEDS 6461 and 6462) of semester lecture/seminar courses which examines the physical and biological principles underlying the uses of radiation and allied radiation sciences in clinical diagnosis and therapy. Characteristics of imaging systems, Nuclear Medicine, Radiation Therapy, biological effects of ionizing radiation, radiation measurement and dosimetry, and quality assurance will be covered through critical readings in texts and the literature. Available to individuals enrolled in residency programs of medical radiology, oral and maxillofacial radiology, and other specialties engaged in patient imaging. Some of these students will be enrolled in a concurrent degree program, either Master of Dental Science or PhD in Biomedical Sciences. Also available to individuals in Master's or PhD level graduate

studies who desire an in-depth study of radiation sciences, and how they apply to patient care.

6471. Physiological Systems I

(Also offered as BME 5000.) Three credits. Prerequisite: instructor consent.

Designed for engineers or other graduate students without a life sciences background. Contents: introduction to cell structure and function; the cardiovascular, respiratory, and renal/urinary systems; the basics of hematology, and the interactions between these organ systems to transport oxygen and eliminate wastes. Format: didactic session followed by group problem solving. Course grade will be determined by level of participation in the problem-solving session and by two take-home problem-solving exams. This course is available to all students involved in the BEACON (Biomedical Engineering Alliance for Central Connecticut) program.

6472. Physiological Systems II

(Also offered as BME 6020.) Three credits. Prerequisite: MEDS 6471 or BME 5000; instructor consent.

A problem-based learning course that focuses on in-depth coverage of four human organ systems with an engineering perspective. An extensive literature review is required for each topic, which culminates in a major report that highlights the engineering standpoint unified mathematically. Case studies are used to develop each topic. Format: didactic session followed by group problem solving.

6479. Chemistry and Biology of Drugs of Abuse

Five credits.

An in-depth interdisciplinary approach to the neurobiology of drug abuse, integrating basic and clinical sciences. Lectures, student presentations of original research reports, and laboratory exercises dealing with methods to measure neurotransmitter transport, ligand binding to receptors and transmitter action on ligand-activated channels.

6495. Independent Study

Variable (1-6) credits. May be repeated for credit.

A reading course for those wishing to pursue special topics in the biomedical sciences under faculty supervision.

6496. Laboratory Rotation

Variable (1-6) credits. May be repeated for credit.

6497. Graduate Seminar

Variable (1-6) credits. May be repeated for credit.

Reading and discussion of recent research developments in various areas of biomedical science.

6498. Special Topics in Biomedical Science

Variable (1-4) credits. May be repeated for credit.

Molecular and Cell Biology (MCB)

5001. Biochemistry

Five credits.

Metabolism of carbohydrates, lipids, amino acids, proteins, and nucleic acids, including regulation, and to the structure and function of biological macromolecules. Provides suitable preparation for advanced course work in biochemistry, biophysics, and other areas of molecular biology. Graduate students with considerable laboratory experience may arrange to take only the lecture portion of this course as Biology: MCB 5896 with consent of instructor.

5002. Biochemistry Laboratory

Three credits. Prerequisite: Instructor consent.

Theory and application of modern techniques for the separation and characterization of biological macromolecules, including several types of liquid chromatography, liquid scintillation spectrophotometry and SDS polyacrylamide gel electrophoresis. Each student will carry out individual projects using selected techniques.

5003. Biophysical Chemistry I

Three credits.

Thermodynamics, electrostatics of polar molecules and ionic solutions, dielectric constants, conductance, acid-base equilibria, molecular interactions.

5004. Biophysical Chemistry II

Three credits.

The physico-chemical behavior of biological macromolecules, their interactions, the forces involved, and the physical methods for studying such systems.

5007. Biophysical Techniques

Three credits. Prerequisite: Instructor consent.

Laboratory experience in the characterization of macromolecules in solution. Methods such as velocity- and equilibrium-sedimentation, density determination, refractometry and light scattering are covered.

5008. Techniques of Biophysical Chemistry

Three credits.

Theory and applications of biophysical methods for the analysis of the size, shape and interactions of proteins and nucleic acids. Topics include analytical ultracentrifugation, light scattering, X-ray scattering, calorimetry, surface plasmon resonance and single molecule approaches.

5010. Biological Optical Spectroscopy: Practical Applications

Two credits. If student has taken MCB 5038, this course may only be taken if the content is different.

Practical applications of spectroscopy in biochemistry and the biological sciences. Topics include fluorescence, circular dichroism and various spectroscopic techniques with particular emphasis on biological macromolecules. Analysis of raw data and interpretation of published results will be used to define the suitability and limits of these techniques.

5011. Enzyme Structure and Function

Three credits.

Information at the molecular level derived from protein chemistry, equilibria, kinetics and X-ray diffraction.

5012. Foundations of Structural Biochemistry

Three credits.

Comprehensive introduction to the molecular aspects and dynamics of structural biochemistry. Examination of nucleic acid, protein, and lipid structures including current topics in conformation and folding, enzyme kinetics, nucleic acid stability, ligand/receptor binding, and bioenergetics. Overviews of experimental strategies used to study macromolecular structure and interactions.

5013. Structure and Function of Biological Macromolecules

Three credits.

Fundamentals of protein structure, and the forces that stabilize structure. Recurrent structural motifs, molecular ancestry/homology, and insights

into proteins structure evolution. Protein folding and dynamics. Structure-function correlations, and structural basis of regulation. Techniques used to investigate structure: X-ray diffraction, NMR, TEM, AFM, structure prediction, computational simulations. Advanced topics: chaperones; structural genomics; role of misfolded proteins in disease.

5014. Structure and Dynamics of Macromolecular Machines

Three credits. Prerequisite: Open only to Molecular and Cell Biology graduate students, others with consent. Recommended preparation: a course in biochemistry or structural biology.

Biochemical and biophysical characteristics of macromolecular assemblies starting at the atomic level and proceeding to the cellular level. Topics include ribosomes, viruses, polymerases, membrane protein assemblies and ion transporters, which will be examined through lecture, discussion, and interactive computational modules.

5015. X-ray Structure Analysis

Three credits. Prerequisite: Instructor consent.

The determination of three-dimensional atomic-level structure by diffraction methods. Small-angle solution scattering. Protein crystallography.

5019. X-ray Diffraction Laboratory

Three credits. Prerequisite: Instructor consent.

Analysis of low- and high-angle X-ray data from both synthetic and biological macromolecules in amorphous and crystalline states.

5022. Human Disease and the Development of Therapeutic Agents

Three credits.

Molecular basis of human disease and strategies for developing therapeutic treatments. Applications of genetic, cellular, and biochemical information in treating different disease states. Especially appropriate for students interested in biomedical research and the health professions.

5025. Structure and Function of Biological Membranes

Three credits.

Overview of cell membrane structure and function based on a foundation of physical and biochemistry principles. Topics include lipid bilayers, vesicles and liposomes, cholesterol, membrane protein structure and function, transport, membrane fusion, receptors, drug/membrane interactions and membranes in cell regulation.

5034. Human Metabolism and Disease

Two credits.

A thorough analysis of the inter-relationships of metabolic pathways in connection with human health and disease, including inherited metabolic diseases and the role of hormones in metabolic pathways.

5035. Protein Folding

Three credits.

In-depth examination of protein folding in vitro and in vivo. Kinetics and thermodynamics of protein folding and assembly; chaperones in folding and misfolding; misfolding in human disease and biotechnology. Experimental methods used to study protein folding, including NMR, mutagenic and spectroscopic techniques.

5038. Techniques in Structural Biology

Two credits. Prerequisite: Instructor consent. May be repeated for a total of 8 credits.

A short course to introduce graduate students and selected undergraduates to modern techniques in structural biology. Each course offering covers a specific technique: NMR, computational and graphical analysis of biomolecules, X-ray crystallography, analytical ultracentrifugation, spectroscopy, calorimetry, and others. Also offered as MEDS 5338.

5076. Biomolecular Nuclear Magnetic Resonance Spectroscopy

Two credits.

Open to undergraduate students with consent of instructor. Advanced treatment of NMR spectroscopy as applied to problems in structural biology, particularly protein structure and dynamics. Recommended preparation: courses in biochemistry, organic chemistry, and physical chemistry.

5080. Frontiers in Microbiology

One credit. Prerequisite: Instructor consent. May be repeated for a total of 5 credits.

Current topics in microbiology including research advances, impact of microorganisms on the environment and society, their role in health and disease, and applications of microbiological research in academic, government and industrial settings.

5099. Graduate Seminar in Biochemistry

One credit. May be repeated for a total of 2 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

5200. Cell Biology of the Mammalian Secretory Apparatus

Three credits. Prerequisite: Instructor consent.

Critical reading of the primary literature focusing on how eukaryotic cells synthesize and traffic secretory and membrane proteins. Emphasis on effectiveness of data presentation in papers.

5210. Molecular Endocrinology

(Also offered as PNB 5270.) Three credits.

Molecular mechanism(s) of hormone action in vertebrates and invertebrates. Molecular and genetic characterization of hormones, receptors, and signal transduction, and hormone actions at the molecular, cellular, and organismal levels. Includes student presentations on selected papers.

5217. Biosynthesis of Nucleic Acids and Proteins

Three credits.

Mechanisms of protein and RNA synthesis in prokaryotes and eukaryotes. Topics such as RNA processing, gene splicing, and control of protein and RNA synthesis are discussed.

5219. Developmental and Regenerative Biology

Three credits. Prerequisite: instructor consent. Not open for credit to students who have passed MCB 3219 or 4219.

Principles of animal embryonic development and regeneration with emphasis on the cellular and molecular basis of pattern formation and cell differentiation in a variety of model organisms. Relevance to human development, disease and therapeutic applications will be emphasized.

5233. Plant Metabolism

Three credits.

Biochemistry and physiology of the principal metabolic systems of plants.

5240. Virology

Three credits.

Biological, biochemical, genetic, and physical characteristics of viruses, with an emphasis on molecular and quantitative aspects of virus-cell interactions.

5243. Molecular Analysis of Development

Three credits.

An analysis of the mechanisms of morphogenesis and differentiation with special emphasis on molecular aspects.

5250. Techniques in Cellular Analysis

Three credits. Prerequisite: Open only to Molecular and Cell Biology graduate students. Recommended preparation: a course in cell biology.

Examination of methodologies used to address cell biological questions: how they work, how they synergize, their advantages and disadvantages. Topics include detection and measurement of protein activities and interactions, molecular genetic manipulation of gene expression and protein function, determination of cellular localization and in vivo functional assays.

5253. Eukaryotic Molecular Biology

Two credits. Prerequisite: Instructor consent. May be repeated for a total of 8 credits.

Considerations of the molecular and cellular biology of eukaryotes with emphasis on current literature. Presentations by faculty and students.

5255. Cellular and Molecular Immunology

Two credits. Prerequisite: Instructor consent. May be repeated for a total of 8 credits.

Genetic, biochemical, and cellular control of the immune system, addressing such topics as antigen recognition, immune regulation, stress and immunity, apoptosis, and signal transduction.

5256. Animal Cell Culture Laboratory

Five credits. Prerequisite: Instructor consent.

Lecture and laboratory covering basic aspects of cell culture in vitro, including mammalian, avian, fish and insect cells. Laboratory procedures include: preparation of complex and synthetic media; mass and single cell culture; primary and established cell cultures; large scale growth of cells; culture contaminants; cell preservation; growth factors; measurement of cell growth and viability; cell cloning; cell synchrony; cell cycle analysis; karyotyping; mutant isolation; cell fusion/hybridomas; culture of specialized cells; virus propagation; production of specialized cell products; toxicity testing; cell transformation/immortalization; DNA transfection.

5280. Advanced Cell Biology

Three credits.

Integrative approach to the study of eukaryotic cell biology emphasizing structure, function, and dynamics of the cytoskeleton, membrane, and extracellular matrix.

5299. Current Topics in Cell Biology

Variable (1-2) credits. Prerequisite: Instructor consent. May be repeated for a total of 8 credits.

Discussion of papers from recent literature. Topics include cytoskeletal function, cell motility, gene expression, and signal transduction, with special focus on their relationship to development, the immune system, and cancer.

5426. Genetic Engineering and Functional Genomics

Three credits.

Methods and applications of genetic engineering, including gene manipulation and

transfer techniques in prokaryotes and eukaryotes. Emphasis on the application of recombinant DNA technology in the elucidation of gene function. Recent technological developments in molecular genetics and the societal issues related to these developments will also be addressed. Students will prepare a grant application or other written assignment.

5427. Laboratory Techniques in Functional Genomics

One credit. Prerequisite: Instructor consent. With a change of content, may be repeated for a total of seven credits.

Molecular biological techniques utilized in gene discovery and in the functional characterization of genes in animal development. Taught as a series of short modules, each focusing on a different set of techniques.

5428. Theory and Practice of Forensic Identification Methods

One credit. Prerequisite: Instructor consent. With change in content, may be repeated for credit.

Advanced consideration of the theory, practice, and analysis of various techniques used in forensic identification strategies. Taught as a series of stand-alone, "executive format" modules with each focused on a different methodology and consisting of hands-on laboratory combined with lectures and data analysis, problem solving, and/or case studies.

5429. Theory and Practice of High Throughput Sequence Analysis

Two credits. Prerequisite: Instructor consent. May be repeated for a total of 16 credits.

Advanced training in experimental design, sample preparation, quality control, high throughput sequence acquisition and analysis of data sets for a variety of genomics applications. Taught as a series of modules with each focused on a different aspect of the practice of next-generation genome analysis.

5430. Analysis of eukaryotic functional genomic data

Three credits. Prerequisite: Instructor consent.

Construction and implementation of computational pipelines that integrate available bioinformatics tools to perform processing, analysis and quality control of eukaryotic functional genomics datasets from ChIP-seq, RNA-seq and other high throughput sequencing approaches. No programming experience required.

5432. Molecular and Genetic Approaches to Developing Systems

Two credits.

Topics of current interest in developmental biology are presented with related developmental and genetic background information.

5445. Genome Dynamics and Epigenetics

Three credits.

An examination of the mechanisms of eukaryotic genome function and dynamics. Topics include, but are not limited to, chromatin organization, chromosome structure and function, and nuclear architecture.

5449. Molecular Genetics

Three credits.

A course of lectures on the molecular basis of heredity. The nature and properties of hereditary materials, including replication, mutation, recombination, and repair.

5452. Problems in Genetics of Eukaryotes

Three credits.

Consideration of such problems as chromosomal organization, mechanisms of meiotic drive, epigenetic inheritance, chromosome distribution, and transposable elements in model genetic organisms.

5454. Molecular Aspects of Genetics

Two credits. May be repeated for a total of 8 credits.

Integration of the biological effects, molecular structure, expression, and evolution of genes and genomes.

5459. Genetics of Higher Plants

Two credits.

Use of tools of molecular genetics to address problems in the biochemistry, cell biology, and physiology of higher plants. Topics covered include organ development, signal transduction, carbon partitioning, plant-microbe interactions, and plant genome projects.

5470. Current Advances in Epigenetics

(Also offered as ANSC 5623). One credit. Prerequisite: Instructor consent. May be repeated for a total of three credits.

Epigenetics is a field of modern biological research that is concerned with influences on gene expression, developmental biology, and disease that are mediated by mechanisms independent of DNA sequence. This course is a literature review course in which each student will present and critically analyze primary literature in epigenetics. All students will present and participate in detailed technical evaluations of selected papers, and develop a written proposal for future research based on the paper(s) that they present individually. Topics will include imprinting, X chromosome inactivation, chromatin dynamics, and cloning (nuclear transfer).

5471. Current Topics in Molecular Evolution and Systemics

One credit. May be repeated for a total of four credits.

Current concepts, ideas and techniques in the field of molecular evolution, and theoretical problems peculiar to the phylogenetic analysis of molecular data.

5472. Computer Methods in Molecular Evolution

Three credits.

Practical aspects of molecular data analyses. Databank searches, sequence alignments, statistical analyses of sequence data. Parsimony, distance matrix, and spectral analysis methods. Students compile and analyze a data set of their choice.

5480. Frontiers in Applied Genomics

One credit. Prerequisite: Instructor consent. May be repeated for a total of four credits.

Current topics in genomics research including ethics, impacts on society, and applications in academic and industrial settings.

5490. Industrial Insights

Variable (1-2) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Research and development, regulation, intellectual property protection, and production of commercial services and products from the vantage point of the genomics, biotechnology, and pharmaceutical industries. May be repeated with a change in topic.

5491. Professional Development Seminar

One credit. Prerequisite: Open only to Molecular and Cell Biology M.S. students. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Speakers from industry, government agencies, universities and non-profits provide advice about career paths, business models, hiring and employment opportunities.

5499. Current Topics in Genetics

Variable (1-2) credits. May be repeated for a total of four credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Intensive reading and discussion of current topics in genetics.

5616. Experiments in Bacterial Genetics

Three credits. Prerequisite: Instructor consent.

Experiments in bacterial genetics emphasizing genetic manipulations using modern techniques for mutant isolation, DNA characterization and cloning. These include the use of transposons, DNA isolation, restriction analysis, gel electrophoresis, PCR and DNA sequencing. Each student conducts an independent project.

5621. Molecular Biology and Genetics of Prokaryotes

Three credits. Prerequisite: Instructor consent.

Molecular genetics of bacteria, archaeobacteria, and their viruses. Transcription and replication of DNA, transformation, transduction, conjugation, genetic mapping, mutagenesis, regulation of gene expression, genome organization. Recommended preparation: a course in general microbiology.

5636. Industrial Microbiology

Three credits.

Biology of industrial microorganisms, including their physiology, selection, and biochemical and genetic manipulation. Primary and secondary metabolite biosynthesis and production. Pollution microbiology and biodegradation.

5650. Genetics of Microorganisms

Three credits.

Basic genetic processes in microorganisms including homologous and nonhomologous recombination, chromosome mechanics, and mutation; genome organization; transposable elements, their uses in genetic analyses and their role in microbial evolution.

5670. Theory and Practice of Laboratory Techniques in Microbiology

Variable (1-2) credits. Prerequisite: Instructor consent. With change in content, may be repeated for credit. Trains participants in techniques, experimental design, sample preparation, quality control, and analysis of data encountered in microbiology laboratories. Taught as a series of modules with each focused on a different technique.

5671. Advanced Theory and Practice of Laboratory Techniques in Microbiology

Variable (1-2) credits. Prerequisite: Instructor consent. With change in content, may be repeated for credit.

Advanced training in microbiology related technologies such as next-generation sequencing and other "omic" techniques including experimental design, sample preparation, library preparation, quality control, analysis of large data sets and processing of large number of samples

will be covered. The course is taught as a series of modules with each focused on a different technique.

5672. Applied Bioinformatics

Variable (1-2) credits. Prerequisite: Instructor consent.

Computational analysis of biological datasets. Lecture will cover background and theory. In the computer lab, sample data will be used to perform bioinformatics analysis. The course is taught as a series of modules with each focused on a different aspect.

5679. Microbial Physiology

Three credits. Prerequisite: Instructor consent.

Topics in microbial cell organization, growth, and intermediary metabolism with emphasis on specialized physiological adaptations.

5681. Mechanisms of Bacterial Pathogenicity

Three credits. Prerequisite: Instructor consent.

An in-depth examination of several host-parasite relationships as models of disease states.

5682. Physiological Genetics of Bacteria

Three credits. Prerequisite: Instructor consent.

The use of mutants in investigating metabolic pathways and homeostic mechanisms in bacteria, with extensive reference to *Escherichia coli* and its genetic map.

5683. Biotechnology Seminar

One credit. May be repeated for a total of eight credits.

Current topics in biotechnology.

5684. Fermentation and Separation Technology Laboratory

Three credits. Prerequisite: Instructor consent.

Introduction to techniques used for industrial mass culture of prokaryotic and eukaryotic cells and methods used to extract useful products from these cultures.

5699. Seminar in Microbiology

One credit. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Discussion of current topics in microbiology.

5801. Scientific Writing and Project Development for MCB Graduate Students

Two credits. Prerequisite: Open only to Molecular and Cell Biology Ph.D. students.

Instruction in the practice of scientific writing through group discussions and peer review during preparation of an application to the NSF Graduate Research Fellowship Program. Group discussions in related aspects of graduate student project development.

5893. Special Topics in Cellular and Molecular Biology

Variable (1-2) credits. May be repeated for a total of 2 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Selected topics in cellular and molecular biology presented by invited speakers. May be repeated for credit.

5895. Independent Study

One credit. Prerequisite: Instructor consent. May be repeated for a total of four credits.

A reading course for those wishing to pursue special work in biology. It may also be elected by undergraduate students preparing to be candidates for degrees with distinction.

5896. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 24 credits.

Advanced study in a field within Molecular and Cell Biology.

5899. Graduate Seminar

One credit. May be repeated for a total of three credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6000. Rotations in MCB Laboratories

One credit. Prerequisite: Open only to Molecular and Cell Biology graduate students. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Open only to students in MCB graduate programs with permission of the instructor. Provides entering graduate students with experience in three different laboratory settings during the first semester of graduate studies to assist with the selection of a research theme for their degree. Students are expected to participate in laboratory meetings, journal clubs, bench work, and other activities as defined by each of three host faculty members. Grading will be based on an aggregate of the performance in each of the host laboratories. Preference is given to students in the MCB doctoral program.

6897. Research

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 24 credits.

Conferences and laboratory work covering selected fields of Molecular and Cell Biology.

Music (MUSI)

5300. Investigation of Special Topics

Variable (1-3) credits. Prerequisite: Open only to Music graduate students; instructor consent. May be repeated for credit.

5301. Research Procedures in Music Education

Three credits.

Research methods and sources.

5302. Analytic Techniques

Three credits.

Structure and style in works from the 18th through the 20th Centuries.

5305. Graduate Performing Ensemble

One credit. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for credit.

Symphony Orchestra, Symphonic Wind Ensemble, Concert Band, Concert Choir, Chamber Singers, University Chorale, Voices of Freedom Gospel Choir, Jazz Ensemble, Jazz Lab Band.

5306. Seminar in Opera Literature

Three credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for credit.

Literature of the opera from the Early Baroque to the present. Course content can change from a general survey to a study of selected works by a composer, or works in a specific country or style period.

5309. Seminar in Woodwind Literature

Three credits. Prerequisite: Open only to Music graduate students, others with consent.

Historical development of the woodwind instruments; of representative solo and ensemble literature.

5315. Seminar in Suzuki String Pedagogy

Two credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for a maximum of eight credits.

Philosophy, repertoire and pedagogy of the Suzuki Method, including guided observation and supervised teaching.

5319. Notation and Performance Practice

Three credits. Prerequisite: Open only to Music graduate students, others with consent.

Notation, ornamentation, and instrumentation from the middle ages through the classic period.

5322. Experimental Research in Music

Three credits. Prerequisite: Open only to Music graduate students, others with consent.

Investigation of the problems and techniques employed in experimental studies of music.

5323. Applied Music

Variable (1-7) credits. Prerequisite: Open only to Music graduate students; Participation in an appropriate major ensemble, advanced standing in performance, recommendation by an instructor in this department, and consent of the department head are required. May be repeated for credit.

The Applied Music fee is charged all students receiving private instrumental, vocal, or conducting instruction.

5324. Graduate Chamber Ensemble

One credit. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for a maximum of eight credits.

Study and performance of chamber music for various ensembles.

5325. Opera Theater

One credit. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for credit.

Study and performance of roles in major opera productions and/or work in production technique.

5330. Advanced Instrumental Conducting

Two credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for a maximum of eight credits.

Score study, conducting, and rehearsal techniques of selected instrumental literature.

5331. Conducting Seminar

One credit. May be repeated for a total of six credits.

Special topics in instrumental and choral conducting.

5333. Foundations and Principles of Music Education

Three credits.

Historical, sociological and philosophical foundations of music education in American elementary and secondary schools.

5340. Musical Skills for Teachers

Two credits. Prerequisite: Open only to Music graduate students, others with consent.

Aural, sight-singing and keyboard skills for public school music teachers.

5345. Teaching Music at the College Level

Two credits.

Preparation for teaching music in higher education, in the studio, classroom, or rehearsal

hall—with attention to late-adolescent development; elements of effective teaching, including legal considerations; pedagogical approaches; institutional contexts; seeking, securing, and beginning work in a position; and procedures for attaining promotion and tenure. Open to students beyond first-year master's level.

5348. Schenkerian Theory and Analysis

Three credits. Prerequisite: MUSI 5302; open to Music graduate students, others with consent.

Readings and analytical projects based on the theories of Heinrich Schenker and his followers.

5353. Theory Seminar

Three credits. Prerequisite: MUSI 5302; open to Music graduate students, others with consent. With a change in content, may be repeated for a maximum of nine credits.

Analysis of specific styles and the work of particular theorists: variable topics.

5354. Advanced Analysis

Three credits. Prerequisite: MUSI 5302; open to Music graduate students, others with consent.

Methods and models of music analysis applied to selected works from the Middle Ages to the 20th Century.

5359. History of Music Theory

Three credits. Prerequisite: MUSI 5302.

Speculative pedagogical and analytical thought on the music in theoretical treatises from antiquity to the twentieth century.

5364. Advanced Choral Techniques

Two credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for a maximum of eight credits.

Score study, conducting, and rehearsal techniques of selected choral literature.

5365. Choral Literature to 1600

Two credits. Prerequisite: Open only to Music graduate students, others with consent.

Historical-analytical study of choral compositions: c. 1000 A.D. to 1600.

5366. Choral Literature from 1600 to 1800

Two credits. Prerequisite: Open only to Music graduate students, others with consent.

Historical-analytical study of choral compositions: 1600 to 1800.

5367. Choral Literature from 1800 to Present

Two credits. Prerequisite: Open only to Music graduate students, others with consent.

Historical-analytical study of 1800 to the present.

5372. Wind Band Literature

Three credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for a maximum of 12 credits.

Historical-analytical study of music for wind ensemble and symphony band.

5373. Orchestra Literature

Three credits. Prerequisite: Open only to Music graduate students, others with consent.

Historical-analytical study of orchestral literature.

5379. Atonal Theory and Analysis

Three credits.

Set theoretic concepts and operations in applied twentieth-century music.

5391. Procedures in Historical Research

Three credits.

A project-oriented approach to bibliographic tools and research methods applicable to the historical study of music.

5397. Recital

One credit. May be repeated for a total of four credits.

6400. Tutorial in Music

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Concentrated individualized study and research.

6411. Seminar: The Life and Works of Individual Composers

Three credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for credit.

6412. Seminar: Style Periods in Music History

Three credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for a maximum of 12 credits.

6413. Seminar: History of Musical Forms

Three credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for credit.

Sonata, concerto, madrigal, motet or other musical forms.

6491. Seminar: Advanced Research Procedures in Musicology

Three credits. Prerequisite: Open only to Music graduate students, others with consent.

Critical reading and original research in recent historical musicology.

6497. Topics in Music Education

Variable (1-3) credits. Prerequisite: Open only to Music graduate students, others with consent. May be repeated for credit.

Principles and advanced methods in the teaching of music.

Natural Resources and the Environment (NRE)

5105. Micrometeorology I

Three credits. Prerequisite: Instructor consent.

Study of basic processes of the atmospheric boundary layer including turbulent flow and the exchanges of heat, water vapor, and pollutants.

5110. Micrometeorology II

Three credits. Prerequisite: Instructor consent.

Study of current literature on processes in the atmospheric boundary layer

5115. Field Methods in Hydrogeology

Three credits. Not open for credit to students who have passed GEOL 5790.

Field methods associated with ground water and contamination assessments.

5125. Environmental Measurements and Instrumentation

Three credits.

Principles that govern the selection and use of both field sensors and recording data systems for field research and environmental monitoring.

5135. Water Transport in Soils

Three credits.

Application of the principles of transport of water in soil for various physical properties of soils and fluids, initial conditions and boundary conditions. The differential equations describing the movement of energy and mass for both

saturated and unsaturated flow conditions will be applied to soil evaporation and plant transpiration, infiltration and percolation of wetting fronts, and movement of tracers and chemical constituents of water. Both uniform flow and preferential flow will be examined.

5145. Environmental Biophysics

Three credits.

Gas laws and transport processes. Radiation environment. Momentum, heat, and mass transfer. Steady-state and transient energy balance. Microclimate of plants and animals. Physical and physiological interactions between plants/animals and their environment.

5155. Principles of Nonpoint Source Pollution

Three credits.

An advanced investigation of sources, impacts, modeling and management of nonpoint sources of water pollution.

5165. Advanced Ground Water Hydrology

Three credits. Not open for credit to students who have passed GSCI 5710.

Covers ground water resource assessment, management and protection, understanding the flow of ground water in fractured rock, application of tracer studies in evaluating flow conditions.

5175. Climate and Environmental Systems Modeling

Three credits. Prerequisite: Instructor consent. Recommended preparation: Undergraduate Calculus I, II.

How physical processes in climate and environmental systems - such as atmospheric motion, hydrological processes and transport of atmospheric constituents - are represented in numerical models. Topics include classification of numerical models, steps in climate and environmental (mathematical) modeling, conservation theories of mass and energy, mass balance equations, numerical techniques, and initial and boundary conditions.

5200. Sustainable Natural Resources Management

Three credits. Prerequisite: Instructor consent.

Explores social-ecological systems, including relationships between ecosystem services and human well-being and livelihoods; introduces systems theory for understanding disturbance, feedbacks, thresholds, directional change, adaptation and resilience in social-ecological systems; includes applied case studies in sustainable agriculture, fisheries, forestry, freshwater, marine, and wildlife.

5205. Decision Methods in Natural Resources

Three credits. Prerequisite: Instructor consent.

Aspects and methods of decision making for individuals, organizations, and institutions, including structured decision making, adaptive resource management, and organizational learning; concepts and techniques for managing risk and uncertainty, model-based and experience-based approaches to link alternative actions and consequences, tradeoff and optimization approaches, and monitoring and evaluation of resulting outcomes.

5210. Communications for Environmental Decision Makers

Three credits. Prerequisite: Instructor consent.

Methods and techniques for effective communication with diverse audiences using

written, spoken, and digital media; includes conflict resolution, crisis situations, persuasion, negotiation, marketing and advocacy.

5215. Geospatial Techniques for Environmental Management

Three credits.

Introduction to collecting, managing, displaying, and analyzing geospatial data. Modules include geographic information systems (GIS), relational database management systems (RDBMS), Global Positioning System (GPS), geospatial modeling, geoprocessing tools.

5220. Environmental Planning for Sustainable Communities and Regions

Three credits. Prerequisite: Instructor consent.

Principles of environmental planning with application to human health, natural areas, working landscapes, and built environments; basis and context for planning, including laws, regulations, zoning, compliance, uncertainty, and risk management.

5252. Physiology and Ecology of Trees

Three credits. Prerequisite: Instructor consent.

An examination of the interactions between trees and their environment at the molecular, individual and forest stand scales. Lectures and reviews of current research span at least two spatial scales of organization for each course topic. Course topics include tree carbon balance, water relations, mineral nutrition, morphology, genomics, phenology, climate change and modeling.

5325. Wildlife Management

Variable (1-6) credits.

The application of ecological principles as practiced by natural resource agencies throughout North America.

5335. Advanced Stream Ecology

Variable (2-3) credits. Prerequisite: Instructor consent.

Introduction to the current state of knowledge and research in rivers and streams. Topics include both basic structure and function of stream habitats and biotic assemblages as well as branch into the management and conservation applications of ecological information. Term project and paper is required. Students with previous stream ecology coursework (such as NRME 3205) may take the course for two credits and attend the single weekly meeting. Students lacking a basic introduction to stream ecology may take the course for three credits and will attend NRME 3205 lectures in addition to the weekly meeting.

5345. Advanced Fisheries Management

Three credits.

Principles, practices, and current trends in fisheries science and management.

5461. Landscape Ecology

Three credits.

Interdisciplinary focus on the effect of landscape pattern on environmental processes and conditions and the influence of disturbance and underlying geomorphology on landscape pattern. Consideration of landscape ecology principles in planning and management of pattern and processes in which conservation and production land uses are intermingled.

5555. GPS Surveying

Three credits.

Theory and practice of global positioning system (GPS) surveying. Includes network design, control, geodetic coordinate systems, field collection of measurements, data processing, and interpretation of results.

5575. Natural Resource Applications of Geographic Information Systems

Four credits. Prerequisite: instructor consent. Not open for credit to students who have passed NRE 4575.

The principles and applications of computer-assisted spatial data analysis in natural resources management will be covered. Both hypothetical and actual case studies of the use of geographic information systems (GIS) to solve natural resource problems will be discussed. Raster- and vector-oriented, microcomputer-based GIS software will serve as the hands-on tools for students.

5585. Geospatial Data Processing Techniques

Three credits.

Research approaches and techniques in geospatial analysis, enabling students to pursue integrated research in earth resources data geoprocessing applications. A variety of computer-based tools, including remote sensing, geographic information systems (GIS), and global positioning satellite (GPS), will be utilized in the acquisition, analysis, and presentation of digital earth resource data and information.

5605. Environmental Data Analysis

Three credits.

Topics on natural resources and environmental data analysis, including: random variables and probability distributions, parameter estimation and Monte Carlo simulation, hypothesis testing, simple regression and curve fitting, wavelet analysis, factor analysis; formulation and classification of optimization problems with and without constraints, linear programming; models for stationary and non-stationary time series; solution of ordinary differential equations with Laplace transforms and Euler integration; solution of partial differential equations with finite differences; basics of modeling.

5610. Technical Writing and LaTeX

Variable (2-3) credits.

Students learn how to write technical articles and theses using the LaTeX document preparation system. Subjects include grammar, punctuation, technical-writing style elements, citations and bibliographies, plagiarism, and LaTeX. Students are required to install LaTeX on a computer in order to complete assignments. English language learners may take the course for three units with permission of the instructor.

5694. Natural Resources Seminar

One credit. May be repeated for a total of four credits.

Active participation in weekly natural resources seminars given by invited speakers.

5695. Special Topics in Natural Resources

Variable (1-4) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Advanced topics in the field of natural resources. Topics and credits to be published prior to the registration period preceding the semester offerings.

5698. Natural Resources Colloquium

Variable (1-6) credits. May be repeated for a total of 6 credits.

Study and discussion of readings (journal articles, books, current research) on a selected topic in natural resources.

5699. Independent Study

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

5800. Graduate Seminar

One credit. May be repeated for a total of four credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The mechanism of presenting and moderating a professional presentation. Topics include presentation, organization, speaking skills, use of media technology, formulation of questions, and moderator activities.

6000. Research Methods in Natural Resources

Three credits.

General research techniques, writing scientific articles and grant proposals, problem solving approaches, experimental design and modeling concepts, and research ethics.

6135. Small Watershed Modeling

Three credits.

Mathematical modeling of hydrologic processes in small watersheds and aquatic systems. Solutions of mass balance and flow relationships. Investigation of dynamic relationships among variables. Examples include infiltration, overland flow, channel routing, chemical transport and transformations, surface-subsurface interactions and biotic growth and degradation.

6175. Ground Water Modeling Applications

Three credits. Not open for credit to students who have passed GSCI 5720.

Application of Modflow to ground water flow and contaminant problems. Well head protection modeling.

6325. Wildlife Ecology

Variable (1-6) credits.

A discussion of the principles upon which wildlife conservation is based.

6450. Teaching Practicum

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Doctoral students in the Natural Resources: Land, Water, and Air program take primary teaching responsibility for a course under the supervision of a faculty liaison.

6695. Special Topics in Natural Resources

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Advanced topics in the field of natural resources.

Nursing (NURS)

5000. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

5001. Holistic Nursing Part 1: Basic Concepts

Three credits. Prerequisite: Open only to Nursing graduate students; open to non-degree students who are nurses with consent.

The curriculum in this three-course certificate program is designed for nurses interested in integrating holistic principles and evidence-based modalities in their professional practice.

Students will learn about the state of the science in holistic care and the latest research on the efficacy and safety of a variety of complementary and alternative modalities (CAM). This course was developed around the five core values and scope and standards of holistic nursing and provides nurses with the educational foundation required to take the national board certification examination in holistic nursing. Teaching/learning interventions and CAM are selected as examples of nursing approaches to promote health and healing of patients. Every nurse who completes the three courses will receive a certificate.

5002. Holistic Nursing Part 2: Advanced Concepts

Three credits. Prerequisite: NURS 5001; open only to Nursing graduate students; open to non-degree students who are nurses with consent.

The curriculum in this three-course certificate program is designed for nurses interested in gaining a holistic perspective in nursing practice and everyday life and provides nurses with the educational foundation required to take the national board certification examination in holistic nursing. This course introduces students to advanced concepts in holistic nursing. Major concepts of health and wellness, body-mind healing, spirituality and health, selected complementary and alternative modalities (CAM), and evidenced-based practice are highlighted. Participants engage in experiential activities that explore and analyze a range of practices that are applicable for providing holistic care in a variety of health care settings. Every nurse who completes the three courses will receive a certificate.

5003. Holistic Nursing Practicum

Three credits. Prerequisite: NURS 5001; and NURS 5002, which may be taken concurrently.

Provides students with an opportunity to apply theory from holistic nursing to individuals, families, and community groups in a variety of health care settings. Focus is on relationship-centered holistic care and selected CAM modalities applied across the wellness-illness continuum in collaboration with other members of the health care team. Selected readings, clinical experiences, and practicum project are determined in collaboration with faculty.

5012. Nursing Science and Patterns of Knowing in Advanced Nursing Practice

Three credits. Prerequisite: Open only to Nursing graduate students, others with consent.

An historical, contemporary and futuristic exploration of the art and science of nursing praxis including patterns of knowing: empirical, ethical, aesthetic, existential and emancipatory. Theories and models derived from nursing and the social sciences are synthesized for their usefulness in advanced practice nursing care for individuals, families, and communities to promote health and manage a variety of problems such as health threats, acute and chronic illnesses, and transitions. Opportunities are provided for students to synthesize family health concepts for use in clinical practice, scholarship, and research.

5020. Statistical Methods in Health Sciences Research

(Also offered as CLTR 5020.) Three credits. Prerequisite: Open only to Nursing graduate students and students in the Certificate Entry into Nursing program; others with consent.

Quantitative procedures including descriptive and inferential statistics, non-parametric approaches to data, and parametric analyses. Selected research designs are explored. Analytic techniques are applied for use in selected research designs in health sciences research.

5030. Nursing Research for Evidence Based Practice

Three credits. Prerequisite: NURS 5020.

Examination of qualitative and quantitative methods of primary research employed to answer questions in nursing practice. Concepts include patient safety and quality principles, quality/process improvement, and evidence-based practice processes. Emphasis is on problem identification; design principles; and accessing, analyzing, disseminating and applying research for evidence-based practice.

5060. Advanced Pathophysiology: Concepts for Advanced Nursing Practice Across the Lifespan

Three credits.

Designed for nurses preparing for advanced nursing practice roles across varying population foci. Concepts will include advanced human physiology, pathophysiology, and common clinical manifestations. A body-systems framework will be used.

5062. Advanced Health Assessment across the Lifespan

Three credits. Prerequisite or corequisite: NURS 5060; open only to Nursing graduate students, others with consent.

Principles and techniques of advanced health assessment across the life span are examined and practiced. Lab fee of \$250 added to student's fee bill.

5070. Advanced Pharmacodynamics and Implications for Nursing Actions

Three credits. Prerequisite: NURS 5060.

Emphasis is placed on pharmacodynamics, on nursing measures that support desired drug responses or reduce side effects that must be tolerated, and on client teaching indicated by pharmacotherapy.

5089. Quality and Microsystems

Four credits. Prerequisite: NURS 5011 or 5012, and NURS 5060, 5070, 5030, 5020, 5062. Prerequisite or corequisite: NURS 5885 and 5865; instructor consent. May be repeated once for credit.

The didactic portion of the course introduces quality improvement methods used in microsystems; and the role of the Clinical Nurse Leader as a leader, educator, and advocate for safe, cost effective quality care. The clinical practicum (100 hours) focuses on completing a quality improvement assessment of a microsystem using the 5-Ps approach.

5095. Individualized Study

Variable (1-6) credits.

Description will vary depending on the needs/goals for each occurrence.

5098. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated credit.

5099. Clinical Nurse Leader Role, Quality and Clinical Immersion

Four credits. Prerequisite: NURS 5011 or 5012, and NURS 5060, 5070, 5030, 5020, 5062. Prerequisite

or corequisite: NURS 5885 and 5865; instructor consent.

Didactic (0.25 credit) and clinical (3.75 credit) course focusing on demonstration of CNL competencies for planning and implementing a quality improvement project using a theoretical framework, culminating in a 300-400 hour clinical immersion experience which includes the management of the quality project as identified in NURS 5089

5101. Fundamental Mechanisms of Acute and Chronic Pain

Three credits. Prerequisite: instructor consent. Recommended preparation: Background in nursing or other health or allied health training.

An exploration of physiological processes involved in pain transmission as well as the psychological, emotional, and cognitive processes that modulate pain experience based on the current literature using both animal and human pain models.

5102. Basic and Clinical Pain Research

Three credits. Prerequisite: NURS 5101; instructor consent.

Exploration of the methods and models (both basic and clinical) used to study pain.

5103. Pharmacology of Pain and Analgesia

Three credits. Prerequisite: instructor consent. Recommended preparation: Background in nursing or other health or allied health training.

The pharmacological processes underlying normal and pathological pain states, and will build upon this knowledge to gain an understanding of the pharmacotherapies currently utilized for the treatment of pain and their shortcomings. Particular emphasis will also be placed on the concept of individualized care and developing technologies within this realm.

5104. Pain Assessment and Management

Three credits. Prerequisite: NURS 5101 and 5102; instructor consent.

This seminar-based course comprised of seminars by clinicians and pain scientists will evaluate, integrate and translate findings from primary literature into evidence-based practice.

5150. Common and Chronic Health Problems in APN Practice II

Three credits. Prerequisite within six months or corequisite: NURS 5400 and 5409.

Grounded in theory and evidence, this didactic clinical course focuses on application of critical thinking skills necessary to achieve advanced practice nursing core competencies and domains. The emphasis is on health promotion and maintenance, and assessment, diagnosis and management of common and chronic health problems while considering context for populations, including individuals, families, and communities, specific to the adult-gerontology acute care, adult-gerontology primary care, and family nurse practitioner.

5160. Common and Comorbid Health Problems in AGNP Acute Care Practice III

Three credits. Prerequisite: NURS 5400 and 5409; NURS 5150 within six months. Prerequisite or corequisite: NURS 5030 and 5870. Corequisite: NURS 5169.

Incorporating theory and evidence, this didactic clinical course focuses on integration of critical thinking skills necessary to achieve advanced

practice nursing core competencies and domains. The emphasis is on risk reduction and acute care assessment, diagnosis and management of common and co-morbid acute health conditions while considering context among populations, including individuals, families, and communities, specific to the adult-gerontology acute care nurse practitioner. Taken by all students in the adult-gerontology acute care track.

5169. AGNP Acute Care Clinical Practicum II

Three credits. Prerequisite: NURS 5400, 5409, and 5150, all within six months. Corequisite: NURS 5160. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical Practicum and seminar course that focuses on integration of critical thinking and psychomotor skills necessary to achieve advanced practice nursing core competencies and domains in the acute care clinical setting. Integrates content and clinical experiences from all previous acute care didactic and practicum courses with an emphasis on considering context while providing risk reduction and assessment, diagnosis and management of common and co-morbid health problems among populations, including individuals, families, and communities, specific to the adult-gerontology acute care nurse practitioner. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in the adult-gerontology acute care nurse practitioner track. A grade of B (83%) or higher in this course is required to progress to the next level.

5170. Complex and Comorbid Health Problems in AGNP Acute Care Practice IV

Three credits. Prerequisite: NURS 5160 and 5169 within six months. Prerequisite or corequisite: NURS 5811. Corequisite: NURS 5179.

Grounded in theory and evidence, this didactic clinical course focuses on synthesis of critical thinking skills necessary to achieve advanced practice nursing core competencies and domains. The emphasis is on risk reduction and acute care assessment, diagnosis and management of more complex and co-morbid acute health conditions while considering context among populations, including individuals, families, and communities, specific to the adult-gerontology acute care nurse practitioner. Taken by all students in the adult-gerontology acute care track.

5179. AGNP Acute Care Clinical Practicum III

Three credits. Prerequisite: NURS 5160 and 5169 within six months. Corequisite: NURS 5170. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical practicum and seminar course that focuses on synthesizing critical thinking and psychomotor skills necessary to achieve advanced practice nursing core competencies and domains in the acute care clinical setting. Synthesizes content and clinical experiences from all previous acute care didactic and practicum courses with an emphasis on considering context while providing risk reduction and assessment, diagnosis and management of more complex acute health problems among populations, including individuals, families, and communities, specific to the adult-gerontology acute care nurse practitioner. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in the adult-gerontology acute care practitioner track.

5365. Advanced Neonatal Nursing Theory I

Three credits. Prerequisite: NURS 5011 or NURS 5012 and NURS 5350.

The purpose of this first clinical course is to introduce the role of the neonatal nurse practitioner clinician in the management of normal and high-risk families and infants. The focus of the course is to develop skills in the physical and psychosocial assessment of high-risk childbearing families during all phases of the childbearing process: antenatal, intrapartum, postpartum, and the neonatal period. Special emphasis will be placed on events during the antenatal, intrapartum, and postpartum periods that impact the neonate.

5350. Advanced Neonatal Embryology/Physiology

Three credits.

Examines fetal, transitional, and neonatal physiology. Embryology is also discussed, as the basis for neonatal development.

5362. Advanced Health Assessment across the Lifespan: Neonatal Section

Three credits.

Enable students to put into practice the principles and skills needed for advanced health assessment of the neonate.

5369. Advanced Neonatal Practicum I

Two credits. Prerequisite: Instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focus of this practicum is the assessment and management of moderately ill infants and their families.

5370. Advanced Pharmacodynamics and Implications for Nursing Actions: Neonatal Section

Three credits. Prerequisite: NURS 5350 or 5060.

Emphasis is placed on neonatal pharmacodynamics, on nursing measures that support desired drug responses or reduce side effects that must be tolerated.

5375. Advanced Neonatal Nursing Theory II

Three credits. Prerequisite: NURS 5365.

Focuses on the acquisition and application of in-depth physiological and psychological knowledge to the nursing care of high-risk neonates and their families. Emphasis is placed on the role of the advanced practice nursing management of high-risk neonatal populations.

5379. Advanced Neonatal Practicum II

Three credits. Prerequisite: NURS 5365 and 5369. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The focus of this practicum is the assessment and management of high-risk neonates and families.

5385. Advanced Neonatal Nursing III

Three credits. Prerequisite: NURS 5375.

Focuses on the components essential for preparation of students for advanced practice in neonatal nursing.

5389. Advanced Neonatal Practicum III

Three credits. Prerequisite: NURS 5379 Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Assessment and management of critically ill high-risk neonates and their families.

5400. Health Promotion, Prevention, and Common Health Problems in APN Practice I

Three credits. Prerequisite: NURS 5011 or 5012; NURS 5020 and 5060; and NURS 5062 within six months; instructor consent. Prerequisite or corequisite: NURS 5070.

Grounded in theory and evidence, this initial didactic clinical course focuses on development of critical thinking necessary to achieve advanced practice nursing core competencies and domains. The emphasis is on health promotion, disease prevention, risk reduction, and assessment, diagnosis and management of common health problems while considering context for populations, including individuals, families, and communities, specific to the adult-gerontology acute care, adult-gerontology primary care, and family nurse practitioner. Taken by all students in adult-gerontology acute care, adult-gerontology primary care, and family nurse practitioner tracks. A fee is added to the fee bill for clinical tracking online. A grade of B (83%) or higher in this course is required to progress to the next level.

5409. APN Clinical Practicum I

Three credits. Prerequisite: NURS 5011 or 5012, NURS 5060, and within six month of NURS 5062. Corequisite: NURS 5400. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Initial clinical practicum and seminar focusing on developing critical thinking and psychomotor clinical skills necessary to cultivate advanced practice nursing core competencies and domains in a clinical practice setting. The emphasis is on considering context while providing health promotion, disease prevention, risk reduction, and clinical assessment, diagnosis and management of common health problems for populations, including individuals, families, and communities, specific to the adult-gerontology acute care, adult-gerontology primary care, and family nurse practitioner. The role of the nurse practitioner in the current healthcare system is examined. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in adult-gerontology acute care, adult-gerontology primary care, and family nurse practitioner tracks.

5410. Common and Comorbid Health Problems in APN Primary Care Practice III

Three credits. Prerequisite: NURS 5400, 5409, and 5150, all within six months.

Grounded in theory and evidence, this didactic clinical course focuses on integration of critical thinking skills necessary to achieve advanced practice nursing core competencies and domains. The emphasis is on health promotion and maintenance, and primary care assessment, diagnosis and management of common and co-morbid health conditions while considering context for populations, including individuals, families, and communities, specific to the adult-gerontology primary care and family nurse practitioner. Taken by all students in adult-gerontology primary care and family nurse practitioner tracks. A grade of B (83%) or higher in this course is required to progress to the next level.

5419. AGNP Primary Care Clinical Practicum II

Three credits. Corequisite: NURS 5410. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical Practicum and seminar course that focuses on integration of critical thinking and psychomotor skills necessary to achieve advanced practice nursing core competencies and domains in the primary care clinical setting. Integrates content and clinical experiences from all previous primary care didactic and practicum courses with an emphasis on considering context while providing health promotion and maintenance, and assessment, diagnosis and management of common and co-morbid health problems among populations, including individuals, families, and communities, specific to the adult-gerontology primary care nurse practitioner. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in the adult-gerontology primary care nurse practitioner track. A grade of B (83%) or higher in this course is required to progress to the next level.

5420. Complex and Comorbid Health Problems in APN Primary Care Practice IV

Three credits. Prerequisite: NURS 5410 within six months; NURS 5811, which may be taken concurrently.

Grounded in theory and evidence, this didactic clinical course focuses on synthesis of critical thinking skills necessary to achieve advanced practice nursing core competencies and domains. The emphasis is on health promotion and maintenance, and primary care assessment, diagnosis and management of more complex and co-morbid health conditions while considering context for populations, including individuals, families, and communities, specific to the adult-gerontology primary care and family nurse practitioner. Taken by all students in adult-gerontology primary care and family nurse practitioner tracks. A grade of B (83%) or higher in this course is required to graduate.

5429. AGNP Primary Care Clinical Practicum III

Three credits. Prerequisite: NURS 5410 and 5419. Corequisite: NURS 5420. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical practicum and seminar course that focuses on synthesizing critical thinking and psychomotor skills necessary to achieve advanced practice nursing core competencies and domains in the primary care clinical setting. Synthesizes content and clinical experiences from all previous primary care didactic and practicum courses with an emphasis on considering context while providing health promotion and maintenance, and assessment, diagnosis and management of more complex and co-morbid health problems among populations, including individuals, families, and communities, specific to the adult-gerontology primary care nurse practitioner. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in the adult-gerontology primary care and family nurse practitioner tracks. A grade of B (83%) or higher in this course is required to progress to the next level.

5430. Management of Childbearing Women and Children

Three credits. Prerequisite: Open only to Nursing graduate students, others with consent.

The focus of this course on health promotion/disease prevention and clinical diagnosis and management of management of childbearing

women and children. In addition, common acute and chronic health problems will be addressed.

5439. FNP Primary Care Practicum II

Three credits. Corequisite: NURS 5410. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical Practicum and seminar course that focuses on integration of critical thinking and psychomotor skills necessary to achieve advanced practice nursing core competencies and domains in the primary care clinical setting. Integrates content and clinical experiences from all previous primary care didactic and practicum courses with an emphasis on considering context while providing health promotion and maintenance, and assessment, diagnosis and management of common and co-morbid health problems among populations, including individuals, families, and communities, specific to the family nurse practitioner. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in the family nurse practitioner track. A grade of B (83%) or higher in this course is required to progress to the next level.

5440. Advanced Practice Nursing Abroad

2.5 credits. Prerequisite: NURS 5400, 5409, and 5150; instructor consent.

Focus is on health promotion/disease prevention and the clinical diagnosis and management of individuals/families experiencing chronic health problems in varied clinical settings providing care for diverse cultural groups. The role of the nurse practitioner is examined with a focus on cultural competency and sensitivity. Includes seminar and clinical hours.

5449. FNP Primary Care Practicum III

Three credits. Prerequisite: NURS 5410 and 5439, both within six months. Corequisite: NURS 5420. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Clinical practicum and seminar course that focuses on synthesizing critical thinking and psychomotor skills necessary to achieve advanced practice nursing core competencies and domains in the primary care clinical setting. Synthesizes content and clinical experiences from all previous primary care didactic and practicum courses with an emphasis on considering context while providing health promotion and maintenance, and assessment, diagnosis and management of more complex and co-morbid health problems among populations, including individuals, families, and communities, specific to the family nurse practitioner. Credits include seminar and 16 hours of clinical per week (240hr/semester). Taken by all students in the family nurse practitioner track. A grade of B (83%) or higher in this course is required to progress to the next level.

5700. Health Professions Education: Evaluation

Three credits. Introduction to important principles of evaluation science, with a particular emphasis on formative and summative evaluations. Will help students apply these principles to the practice of evaluating educational activities for health care professionals in various stages of education and training.

5710. Health Professions Education: Planning

Three credits. Prerequisite: NURS 5700; open only to Nursing graduate students, others with consent.

Introduction to important principles of educational planning, reflecting the literatures of adult learning, curriculum and instruction, diffusion of innovations research, and health professions education. The course will help students apply these principles to the practice of planning educational activities for health care professionals in various stages of education and training.

5720. Health Professions Education: Implementation

Three credits. Prerequisite: Instructor consent.

Introduction to important principles of implementation reflecting the literatures of adult learning, curriculum and instruction, and health professions education. The course will help students apply these principles to the practice of implementing educational activities for health care professionals in various stages of education and training.

5811. Application of Genetics to Healthcare

Three credits. Prerequisite: Open only to Nursing graduate students.

The role of the Human Genome Project in genetic diagnostics, health promotion, disease prevention, therapeutic interventions and counseling, as well as the mechanisms of genetic inheritance and the genetic contribution to common and complex disorders, will be analyzed using a multidisciplinary context. Students will evaluate the ethical, financial, cultural, moral and legal issues that arise using case study discussion and analysis to augment didactic knowledge.

5845. Health Services Statistics and Research Methods for the Scholarship of Application

Three credits. May be repeated for a total of six credits.

Encompasses elements of needs assessment, statistics, research methods/design, and epidemiology/populations health serving as the foundation for subsequent development of clinical scholarship.

5850. Scientific and Theoretical Underpinnings for the Scholarship of Application

Three credits.

Exploration of foundational theories applicable to the practice arena. Topics include Systems theory, organizational development theory, complexity theory, social world's theory, nursing mid-range theory and nursing models of evidence-based practice.

5855. Evidence-Based Practice for the Scholarship of Application

Three credits.

Development of skills in the translation, application, and evaluation of research, with an emphasis on evidenced-based practice. Skills in the integration of knowledge from diverse sources and disciplines and its application to solve clinical problems and improve health outcomes.

5860. Quality and Organizational/Systems Leadership for the Scholarship of Application

Three credits. Prerequisite: Open only to Nursing graduate students.

Assessment and diagnosis of organizations, facilitation of system-wide change, development of political skill for change, engagement in the process of quality and performance improvement

methodologies, and application of leadership theory within organizations.

5865. Information Systems for the Scholarship of Application

Three credits.

Evaluation and use of information systems/technology and patient care technology supportive of clinical and administrative decision-making relevant to patient care, care systems, and quality improvement.

5869. Doctor of Nursing Practice Residency Elective

Variable (1-6) credits. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course requires the student to complete a nursing practicum in the specialty area of their choice with hours as necessary for total of 1,000 post-BSN.

5870. Health Policy and Populations-based Advocacy for the Scholarship of Application

Three credits. Prerequisite: Open only to Nursing graduate students, others with consent.

The role of collaborative health care teams in health promotion and risk reduction and illness prevention for population health. Educational strategies necessary for transformation of clinical education to decrease preventable deaths will be incorporated.

5879. Doctor of Nursing Practice Residency I

Three credits. Prerequisite: NURS 5895. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The first of two clinical courses, requires the student to complete a nursing practicum in the specialty area of their choice. Students will select an area of specialization, develop individual objectives, and plan their project, which will be implemented during the subsequent clinical semester. The clinical practicum will serve as an immersion experience; concepts covered in didactic coursework will contribute to the students developing project ideas during the first clinical semester. The placement, preceptor, and the student's committee members will support the student during the process and time in which they develop, implement, and evaluate their projects over the course of two semesters.

5885. Leadership and Management for the Scholarship of Application

Three credits.

Encompasses elements of leadership development, advanced practice management issues, and financial planning including budgeting and business planning.

5895. Doctor of Nursing Practice Seminar Series for the DNP Project

Variable (1-9) credits. Prerequisite: Instructor consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Designed to assist students with the DNP Project.

5899. Doctor of Nursing Practice Residency II

Three credits. Prerequisite: NURS 5879. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The second of two clinical courses, requires the student to complete a nursing practicum in the specialty area of their choice. Students will select an area of specialization, develop individual objectives, and implement their project, which was designed in NURS 5879.

6100. Philosophy of Science in Nursing

Three credits.

A critical examination of the meanings, methods, and logical structure of science. Contemporary and historical views pertaining to the nature of truth, explanation, law, theory and methodology will be analyzed and compared. Examples drawn from nursing epistemology as well as that of other disciplines will be utilized to depict the presuppositions of modern science.

6101. Grantsmanship: The Pursuit of Scholarly Support

Variable (1-3) credits. Prerequisite or corequisite: NURS 6130, 6115, and 6145; instructor consent.

Introduction to the process of securing grants. Practical application is stressed to enhance the development of skills needed to secure funding for scholarly research endeavors.

6115. Experimental Design and Analysis in Nursing Research

Three credits. Prerequisite: NURS 6100; open only to Nursing doctoral students, others with consent.

Study and application of quantitative research methods from design through statistical analysis for experimental designs in nursing and healthcare. Options for the structures of experimental designs and techniques of data analysis appropriate to experimental studies of varying complexity, including emerging research methodologies, will be addressed. Students will conduct a pilot study using the most appropriate experimental design.

6122. Quantitative Methods for Design and Analysis in Nursing Research I

Three credits. Prerequisite: Master's level course in applied statistics equivalent to NURS 5020; open only to Nursing doctoral students.

First course in a three-semester sequence that focuses on the study and application of quantitative research methods from design through statistical analysis for experimental, quasi-experimental, and non-experimental designs in nursing and healthcare. Options for the structures of experimental designs appropriate to research in nursing and healthcare will be emphasized, including a study of theories and methods of instrument development to support such designs. An introduction to methods for multivariate statistical analysis will occur concurrently.

6123. Quantitative Methods for Design and Analysis in Nursing Research II

Three credits. Prerequisite: NURS 6122; open only to Nursing doctoral students, others with consent.

Second course in a three-semester sequence that focuses on the study and application of quantitative research methods from design through statistical analysis for experimental, quasi-experimental, and non-experimental designs in nursing and healthcare. Limitations to the justification/feasibility of applying an experimental approach to human subjects will be reviewed. Research methods for quasi and non-experimental designs in nursing and healthcare will be emphasized. Basic psychometric properties and statistical methods underlying instrument development will be presented.

6125. Quantitative Methods for Design and Analysis in Nursing Research III

Three credits. Prerequisite: NURS 6123; open only to Nursing doctoral students, others with consent.

Third course in a three-semester sequence that focuses on the study and application of quantitative research methods from design through statistical analysis for experimental, quasi-experimental, and non-experimental designs in nursing and healthcare. Techniques of data analysis appropriate to study designs of varying complexity will be explored as well as emerging innovations in research methods. The theory and methods of meta-analysis will be introduced.

6130. Introduction to Qualitative Methodology

Three credits.

Designed for students in nursing and other disciplines to achieve an introductory level of expertise in selected qualitative approaches. Expected course outcome is a completed qualitative project.

6135. Exploring the Nature of Nursing Knowledge

Three credits. Prerequisite: NURS 6100; open only to Nursing doctoral students, others with consent.

The course is a critical examination of the development of nursing's disciplinary knowledge as it relates to the nature of nursing and its epistemic, ontologic, and ethical claims. This examination will include historical analysis and evaluation of nursing's meta-paradigm (meta language), conceptual models, and theories both grand and middle range.

6145. Quasi and Non-Experimental Design and Analysis in Nursing Research

Three credits. Prerequisite: NURS 6115.

The application of quantitative research methods from design through statistical analysis for quasi and non-experimental designs in nursing and healthcare. Options for the structures of quasi and non-experimental designs and techniques of data analysis appropriate to studies of varying complexity, including emerging research method innovations, will be addressed. Limitations to the justification/feasibility of applying an experimental approach to human subjects will be included.

6150. Instrument Development in Nursing

Three credits.

Study of the theories and methods of instrument development as applied to nursing. The basic psychometric properties to be assessed and built into a useful measure for clinical or research applications are explored.

6160. Advanced Qualitative Methods

Three credits. Prerequisite: NURS 6130.

This seminar is designed for students in nursing and other disciplines to achieve an advanced level of expertise in selected qualitative approaches. Expected course outcome is a completed qualitative project.

6165. Mixed Methods in Nursing Research

Three credits. Prerequisite: NURS 6145 and 6160.

Presents mixed methods as a third paradigm that combines and complements the qualitative and quantitative approaches traditionally used in nursing research. Theoretical, paradigmatic, and programmatic issues, as well as practical application will be discussed.

6175. Advancing Nursing Knowledge Development

Three credits. Prerequisite: NURS 6135.

Critical application of nursing knowledge to nursing research. Each student will identify and justify the epistemology, theoretical perspective, methodology, and methods that will provide a scaffold for his/her dissertation topic.

Nutritional Sciences (NUSC)**5100. Concepts of Nutrition**

Two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

An introduction to the broad field of nutrition. Intended for entering graduate students, the course provides a conceptual framework for research and study in the nutritional sciences.

5200. Macronutrient Metabolism

Three credits. Prerequisite: MCB 5001.

The digestion, absorption/transport and metabolism of carbohydrates, protein/amino acids and lipids; their functions, metabolic pathways and interrelationships; mechanisms regulating their metabolism; methodologies for studying metabolism and assessing nutrient requirements in man and animals.

5300. Vitamins and Minerals

Three credits. Prerequisite: MCB 5001.

Comprehensive study of vitamins, trace elements, and selected macrominerals, including biochemical function(s), metabolic pathways, interactions, and toxicities.

5390. Field Work on Community Nutrition

Variable (1-6) credits.

Supervised field studies of community nutrition problems and visits with community agencies and families. Readings, conferences and reports required.

5394. Seminar

One credit. Prerequisite: NUSC 5100. May be repeated for a maximum of four credits.

Students develop the skills required for the analysis and presentation of current literature and research problems.

5398. Special Topics in Nutrition

Variable (1-6) credits. Prerequisite: Instructor consent.

Advanced study in a given area of nutritional science.

5399. Independent Study in Nutritional Science

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Research problems or critical review of literature in any area of nutrition.

6313. Nutrition and Gene Expression

Three credits. Prerequisite: MCB 5001.

Regulation of eukaryotic gene expression by specific nutrients, hormones, and metabolites. Transcriptional, post-transcriptional, and translational mechanisms.

6315. Lipid Metabolism in Health and Disease

Three credits.

Comprehensive study of lipid and lipoprotein metabolism. Influence of diet, drugs, exercise and obesity. Overview of relationship between genetics, lifestyle factors and chronic disease.

6317. Nutritional Epidemiology

Three credits. Prerequisite: Instructor consent.

Principles and applications of nutritional epidemiology with emphasis on research design.

6319. Research Design and Methods in Nutritional Sciences

Three credits. Prerequisite: NUSC 5200 and 5300.

Basic concepts and methodologies of research in public health and nutritional sciences, research proposal writing and in-class presentation.

Occupational Safety and Health (OSH)**5300. Independent Study**

Variable (1-3) credits. Prerequisite: Instructor consent.

Topics related to the Occupational Safety and Health Certificate program as designated and approved by the instructor assigned to oversee and grade the project.

5301. Special Topics in Occupational Safety and Health

Variable (1-3) credits. Prerequisite: Instructor consent.

The instructor assigned will designate the special topic(s) related to the Occupational Safety and Health Certificate program and oversee and grade students' work in the course.

5321. Seminar in Occupational Safety and Health Management

Three credits.

In-depth study of the impact of issues such as the changing demographics, and globalization of regulations, on promoting prevention of injuries and illness to workers, and protection of property and the environment in the workplace. Taught as a series of active seminars requiring students to research, write, and discuss papers.

5322. Industrial Pollution Management

Three credits.

Provides students with management and applied techniques to prevent and control pollution from industrial activities. It includes legal aspects of pollution prevention and control, setting up pollution prevention programs, performing pollution prevention assessments, performing economic evaluations and management principles in controlling industrial pollution.

5325. Systems Safety Analysis

Three credits.

Acquaints students with empirical methods and techniques for proactively identifying, assessing, and eliminating or controlling safety-related hazards to acceptable levels.

5326. Managing Environmental Systems

Three credits.

Provides guidance and detailed information on developing environmental management systems with special reference to ISO 14001; measuring corporate needs, advantages and disadvantages; liability issues; and internal and external auditing.

5376. Occupational Safety and Health

Three credits.

Provides the student with the rationale for providing an occupationally safe and healthy work environment for employees. These skills are needed to be able to work effectively in the area of human resources and employee development as well as industrial relations since workers have been

provided by law with specific safety and health rights.

5378. Advanced Industrial Hygiene

Three credits.

Directed at protecting workers' health through the recognition, evaluation and control of hazards in the work environment.

5380. Loss Control Methods

Three credits.

Detailed study of loss control research methods and application techniques with emphasis on the control of hazards using safety engineering methods in a variety of industrial settings.

5381. Advanced Loss Control and Management Theory

Three credits. Prerequisite: OSH 5380.

Provides students with opportunities to apply management and loss control techniques to analyze and address occupational safety and health issues. Topics include: epidemiology concepts in analyzing occupational safety and health injuries and illnesses; hazard analysis; prevention and control of hazards; tools of accident prevention; safety and health training; motivating safety and health; and communicating safety.

5382. Analysis of Occupational Safety and Health Law and Regulations

Three credits.

Provides the substance for understanding the Occupational Safety and Health laws and regulations, the regulatory process; and the research data and analyses required to promulgate or revise a law or regulations.

Operations and Information Management (OPIM)

5103. Managerial Statistics

Three credits. Prerequisite: Open only to graduate business students, others with consent. Not open for credit to students who have passed BADM 5181.

Covers some of the more familiar classical inference procedures and the basic statistical concepts that are often essential to the interpretation of business data. Methods of understanding variability, and detecting changes are explored using descriptive, exploratory, and inferential statistics found in widely available statistical packages. Topics include: discrete and continuous random variables, sampling, confidence intervals, hypothesis testing, and linear regression.

5110. Operations Management

Three credits. Prerequisite: OPIM 5103; open only to MBA and MSBAPM students, others with consent. Not open for credit to students who have passed OPIM 5184.

An operations manager is concerned with designing, operating and controlling a system for producing goods and services. Design decisions include selecting a process technology, organizing jobs, selecting vendors, and developing the location and layout of facilities. Operating the system involves planning and scheduling work and material flow, controlling quality, and managing inventories. General systems concepts and models are developed and applied. Topics include process flow analysis, inventory systems, waiting line analysis, quality design, capacity resource

planning, project management, and integrating operations with the firm's strategic plans.

5165. Management Information Systems

Three credits. Prerequisite: Open only to MBA and MSBAPM students, others with consent. Not open for credit to students who have passed OPIM 5182.

Emphasis on business applications and how to structure the development and use of information systems for maximum benefit to the organization. Topics include: decision support systems, impact of the computer upon individual and organizations, competitive implications, technology change, telecommunications, and control of information systems resources.

5181. Introduction to Data Analytics

1.5 credits. Prerequisite or corequisite: BADM 5180.

Introduction to key issues and concepts in data analytics. Begins by delineating the differences between standard statistical analysis, including model estimation and evaluation, and the data driven approach of data analytics. A good deal of emphasis is placed on critical issues underlying almost all data analytics projects, including data quality (accuracy, objectivity, and reliability), missing values, outliers, and data standardization. Introduction to basic analytics techniques and processes.

5182. Management Information Systems

1.5 credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Information technology (IT) has had a dramatic impact on how individuals and organizations work, and is an important force shaping entire industries and value creation by firms. Most business school graduates will have IT related responsibilities during their careers, no matter which functional area they are in, and will be involved in efforts to select, adopt, and exploit information technologies in support of business goals. The goal of this course is to prepare students to execute these responsibilities effectively, and to be able to do so even as the set of available technologies changes over time. The course presents students with frameworks that let them analyze business situations involving IT in a structured way. It will also help them develop sophisticated understanding of the links between IT, business strategy, and business process. They will also gain an appreciation of the organizational and management practices that complement IT investments.

5183. Introduction to Operations Management

1.5 credits. Corequisite: BADM 5181; open only to students in the full-time MBA program.

Overview and introduction to operations management. Focus on the process view of operations and develops a framework for process analysis and improvement with and without variability.

5184. Operations and Supply Chain Management

1.5 credits. Prerequisite: OPIM 5183.

Built on the previous module, covers critical and specific topics in operations management, including inventory, quality, lean operations, and operations across firms (supply chains). It introduces both qualitative strategies and quantitative models concerning these topics.

5270. Introduction to Project Management

Three credits. Prerequisite: OPIM 5165 or 5182; open only to MBA and MSBAPM students, others with consent.

Examines the project management process and the management of a portfolio of projects, with focus on techniques to overcome the pitfalls and obstacles that frequently occur during a typical project. Designed for business leaders responsible for implementing projects, as well as beginning and intermediate project managers.

5272. Business Process Modeling and Data Management

Three credits. Prerequisite: OPIM 5165 or 5182; open only to MBA and MSBAPM students; instructor consent.

Introduction to market-leading techniques that help to identify and manage key data from business processes. Provides the essential tools required for data mining and business process re-engineering. Combines lecture, class discussion and hands-on computer work in a business-oriented environment.

5500. Field Study Internship

Three credits. International students must have completed both a spring term and a fall term prior to taking this course. Instructor consent required. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Gives students real-world experiences in applications of analytics and/or project management through an internship or industry project undertaken individually with a company under the joint supervision of a faculty member and the student's field supervisor. Student performance will be evaluated on the basis of an appraisal by the field supervisor and a detailed written report submitted by the student.

5501. Visual Analytics

Three credits. Prerequisite: OPIM 5604.

Explores techniques and best practices in visualizing data. From simple cross tabs to more complex multi-dimensional analysis, explores why particular data visualizations can better illustrate patterns and correlations inherent in the data itself. Examines cognitive function and its role in data visualization designs; showing that data visualization can reveal answers and questions alike. Utilizing state of the art software, the use of parameters, filters, calculated variables, color, space and motion to visually articulate the data are surveyed. The use of dashboards to quickly reveal data-driven information that has daily relevance to executives, managers, supervisors and line personnel are investigated. Common pitfalls in visualization design and why less is often more are considered.

5502. Big Data Analytics with Hadoop

Three credits. Prerequisite: OPIM 5604 and 5272.

In-depth, hands-on exploration of various cutting-edge information technologies used for big data analytics. The first half focuses on using big data management techniques for ETL (extract-transform-load) operations. The second half focuses on using big data analytics tools for data mining algorithms including classification, clustering, and collaborative filtering. Extremely hands-on, requiring students to spend significant time working with large datasets. Students are expected to have taken at least one course in data modeling and one course in data mining (please see pre-requisites) or have significant related

work experience. Students should expect to become familiar with the Unix operating system, as well as with programming in Python. Students may be required to install some software on your computers on your own, with very little support, if any, from the instructor or anyone else. Students should be willing to troubleshoot any issues during installation, drawing help from Google searches.

5503. Data Analytics using R

Three credits. Prerequisite: OPIM 5604.

Helps students develop proficiency in data analytics using R for statistical inference, regression, predictive analytics, data mining, and Text mining: analyzing twitter and social network data. Combines lectures, hands-on exercises, business case discussions, and student presentations in a professional environment.

5504. Adaptive Business Intelligence

Three credits. Prerequisite: OPIM 5604, 5641, and 5272.

The use of techniques from statistics and optimization to implement ABI systems. Introduction to the fundamentals of decision support systems, genetic algorithms, ABI systems, and their applications to diverse management contexts. Students will learn how to use tools such as Excel VBA, Evolutionary Solver, and RExcel (R language for statistical analysis) to develop ABI applications.

5505. Analytical Consulting for Financial Services

Three credits. Prerequisite: OPIM 5641 or BADM 5181.

Exposes students to a wide array of real consulting situations in business analytics operations and financial services, and will teach students methods of addressing these problems using spreadsheets, simulation, and optimization methods. While consulting encompasses many specific tasks and requires broad functional knowledge, there is an increased need and appreciation of the usefulness of analytical consulting.

5506. Managing International Development Projects

Three credits. Prerequisite: OPIM 5270.

Application of project management knowledge, tools, and techniques to the planning, organization, and delivery of international development projects and programs. Funded by institutions (e.g., multilateral or regional development banks, United Nations associated agencies, bilateral government agencies, non-governmental organizations, global funds), these projects/programs cover a wide range of sectors and focus on poverty reduction/alleviation and improving living standards of people in developing and emerging countries, assistance to victims of natural or people caused disasters, capacity building and development of basic physical and social infrastructures, and on promoting environmentally sound development and basic human rights protection.

5507. Advanced Project Management Topics

Three credits. Prerequisite: OPIM 5270 and 5668.

Uses case studies to illustrate the variety of projects and the issues involved in managing them from resource concerns to the criticality for demand estimation; from conflicting objectives of stakeholders to social responsibility issues; from knowing the customer to project finance challenges. These cases inductively teach advanced

topics in the management of large projects, such as planning and scheduling issues, costing and budgeting, staffing and organizing, project finance structuring, sustainability and environmental issues, and the challenges in planning and execution of these complex projects. Agile project management methodologies for effectively and efficiently undertaking knowledge-based projects of today. Practical guidance and experience around the process of initiating, delivering, and evaluating analytics projects.

5601. Technical Communications in Business Analytics and Project Management

One credit. Prerequisite: OPIM 5272 or OPIM 5641. Prerequisite or corequisite: OPIM 5604 or OPIM 5270.

Reviews the foundational knowledge necessary for MSBAPM student to be a well-equipped analytics professional. Communication skills are essential to convey technical analytical content. Topics such as Public Speaking, Emotional Intelligence, Non-Verbal Communication, Requirements Gathering, and Etiquette via multiple modes of Communications (email, phone, in person, one to one, and one to group) and more will be discussed and practiced. Such skills are critical to professional success as the industry is changing to require technical depth and also the ability to connect it to the business. Topics covered include: Communication Skills - Bridging the Gap between the Technical and Business; Presentations Skills - Technical Content to the Business; Networking with Analytics Professionals

5602. Mathematical Analysis for Business

Three credits. Prerequisite: Open only to MBA students, others with consent. Not open to students who have passed BLAW 5182.

Review of algebra followed by introduction to functions, limits, differentiation, integration, vectors, matrices and linear programming. Examples and applications of mathematical topics to business problems.

5603. Statistics in Business Analytics

Three credits. Prerequisite: Open only to Business Analytics and Project Management M.S. students, others with consent.

Advanced level exploration of statistical techniques for data analysis. Students study the concepts of population and sample; discuss the difference between population parameters and sample statistics, and how to draw an inference from known sample statistics to usually unknown population parameters. Topics will focus on rigorous statistical estimation and testing. Prepares students with the skills needed to work with data using analytics software.

5604. Predictive Modeling

Three credits. Prerequisite: OPIM 5103 or BADM 5180 or enrollment in Business Analytics and Project Management M.S. program; instructor consent.

Introduces the techniques of predictive modeling in a data-rich business environment. Covers the process of formulating business objectives, data selection, preparation, and partition to successfully design, build, evaluate and implement predictive models for a variety of practical business applications. Predictive models such as neural networks, decision trees, Bayesian classification, and others will be studied. The course emphasizes the relationship of each step to a company's specific

business needs, goals and objectives. The focus on the business goal highlights how the process is both powerful and practical.

5620. Managing and Controlling Information Systems

Three credits. Prerequisite: OPIM 5165 or 5182; open only to MBA and MSBAPM students, others with consent.

Examines the management control problems and systems development processes from the dual perspective of (a) managers of the computer information system, and (b) the organization as a whole, including persons who interact extensively with the systems personnel or are administratively in a position to influence the information system.

5641. Business Decision Modeling

Three credits. Prerequisite: OPIM 5103 or BADM 5180; open only to MBA and MSBAPM students, others with consent.

Discusses business modeling and decision analysis. Covers topics such as optimization, simulation, and sensitivity analysis to model and solve complex business problems. As spreadsheets are often used as software tools for such problem solving, the course will emphasize developing high quality spreadsheets to ensure that the objectives of the model are clear, defining the calculations, good design practices, testing and presenting the results.

5668. Project Risk and Cost Management

Three credits. Prerequisite: OPIM 5270; open only to MBA and MSBAPM students, others with consent.

Introduces the art and science of project risk as well as continuity management and cost management. Risk management ensures a project is completed through both general and severe business disruptions on local, national and international levels. Managing the risk of a project as it relates to a three-part systematic process of identifying, analyzing, and responding is examined through actual case studies. In addition, this course will examine the process of cost management, early cost estimation, detailed cost estimation, cost control using the earned value method, issues related to project procurement management, and the different types of contracts for various scope scenarios.

5671. Data Mining and Business Intelligence

Three credits. Prerequisite: OPIM 5604; open only to MBA and MSBAPM students, others with consent.

Discusses data mining techniques that can be utilized to effectively sift through large volumes of operational data and extract actionable information and knowledge (meaningful patterns, trends, and anomalies) to help optimize businesses and significantly improve bottom lines. The course is practically oriented with a focus of applying various data analytical techniques in various business domains such as customer profiling and segmentation, database marketing, credit rating, fraud detection, click-stream Web mining, and component failure predictions.

5770. Advanced Business Analytics and Project Management

Three credits. Prerequisite: OPIM 5604 and 5272 and 5671 and 5668; open only to MSBAPM and MBA students.

Capstone course involving a live data analytics project, where students will need to integrate

their knowledge of data analytics and project management. Using the skill sets of predictive modeling, data management, process models, and data mining techniques, students will investigate a real problem through data analytics, and will use their project management skills to complete the project within time and budget constraints.

5771. Enterprise Security, Governance and Audit

Three credits. Prerequisite: Open only to MSBAPM and MBA students, others with consent.

Discusses the business risks arising from digital information processing and identifies ways to prevent, detect, and mitigate negative consequences of information security breaches. First, students will be introduced to the basic principles of information security, its role in reducing information risk exposure, and tools and solutions that can be used to prevent information loss or costly business interruptions. Second, students will explore the role of information technology governance in business organizations, discuss important relevant laws (for example, Sarbanes-Oxley Act of 2002), reporting requirements, and industry standards for IT Governance (for example, COBIT). Third, students will study the process of information systems audit, IT audit tools, and audit procedures to help in detection and prevention of fraud.

5894. Seminar

Variable (1-6) credits. May be repeated for credit.

Introduces many of the most exciting concepts emerging in the field of consumer oriented Internet working, including high-speed access [cable modem, satellites and digital subscriber lines (DSL)] and infrastructure developments such as gigabyte networking with asynchronous transfer mode (ATM). Evaluates the emerging directions in EC that are expected to shape both consumer and business applications in the coming decade. A "macro perspective" is used to examine the technical and managerial aspects of electronic commerce. Focus is on questions such as: What are or will be the key attributes of current and future digital products, payment systems, online retailing, and banking? How are these systems designed and implemented? What are the different mercantile processes and tradeoffs associated with these processes? What impact has global connectivity made on traditional supply-chain(s)?

5895. Special Topics in Information Management

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of operations management, operations research and/or information management. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

6200. Investigation of Special Topics

Variable (1-6) credits. Prerequisite: Open only to doctoral students; instructor consent. May be repeated for a maximum of nine credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

In-depth investigation in special topics in Operations and Information Management.

6201. Research Methods for Operations and Information Management

Three credits. May be repeated for a total of 12 credits.

Several advanced analytical methods that are relevant to students' areas of research will be studied in depth in this seminar. Topics may include special mathematical programming; complex decision making; linear models; advanced statistical analysis; and stochastic processes.

6202. Seminar in Operations Management

Three credits. May be repeated for a total of 12 credits.

Introduces doctoral students to the current research concerns in the field of Operations Management. Acquaint students with the variety of research tools used in the field, enabling them to critically evaluate the research of other scholars in the field as well as to develop research skills in identifying potential research problems to be analyzed.

6203. Seminar in Management Information Systems

Three credits. May be repeated for a total of 12 credits.

A topic on a significant applied or theoretical aspect of information systems will be chosen. Broadly, these aspects will encompass modeling, design, implementation, testing, and operation of computer information systems, and the implications of information technologies for the organization.

Pathobiology and Veterinary Science (PVS)

5094. Pathobiology Seminar

One credit. Prerequisite: Instructor consent. May be repeated for a total of 10 credits.

5099. Research and Independent Study in Animal Diseases

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

5201. Microbiology of Atypical Bacteria

Two credits.

An in-depth presentation of current information on medically significant atypical bacteria, with emphasis on molecular aspects of pathogenesis.

5202. Viral Pathogenesis

Three credits. Prerequisite: a course in virology or microbiology and one in biochemistry, with consent of the instructor. Recommended preparation: a course in immunology or pathology.

Review and discussion of recent advances regarding mechanisms involved in the development of viral disease at the virus, host, organ, tissue, cell, sub-cellular and molecular levels. Current advances in virus-host interactions will be discussed, including virulence factors, mechanisms of suppression and evasion of host responses, oncogenesis, persistence, immunopathology, neurotropism, neuroinvasion.

5203. Principles of Antibacterial Development

Three credits. Prerequisite: A course in general microbiology or bacteriology with consent of the instructor

Important concepts and pioneering strategies currently being used to develop novel antibacterials.

5300. Disc of Pathobiology and Veterinary Science Literature

One credit. Prerequisite: Instructor consent. May be repeated for a total of three credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Weekly discussion of current peer-reviewed literature related to pathobiological basis of disease.

5303. Veterinary Pathology Lecture Series

Variable (1-3) credits. May be repeated for a total of nine credits.

Lectures on veterinary and comparative anatomic pathology organized by animal species or disease classification utilizing lectures on electronic media in the context of a prescribed plan of study. May be repeated for credit with change in content

5331. Toxicological Pathology

Two credits. Prerequisite: Instructor consent.

Principles of toxicological pathology are covered, with special attention to chemical carcinogenesis and systemic toxicological pathology. For the different systems, the particularities of structure and function of the system are reviewed, along with the particular mechanisms of toxicity to that system, the specific responses of that system to injury, and the methods to test for toxicity. The discussion of related scientific journal articles supplement the textbook information reviewed in lectures.

5392. Practicum in Veterinary Anatomic Pathology

Three credits. Prerequisite: Open only to veterinarians accepted into the residency program in veterinary pathology; instructor consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Service-based learning of veterinary anatomic pathology through gross and histologic evaluation of necropsy and biopsy case material by direct review with faculty pathologists.

5394. Veterinary Pathology Seminar

Two credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Blinded examination of gross and histologic lesions with emphasis on lesion recognition, description and disease diagnosis, followed by group discussion of each case.

5401. Immunobiology

Four credits. Prerequisites: Open with consent of instructor to graduate students, upper-level Honors students, and senior undergraduate students with recommended preparation. Recommended preparation: Previous coursework in biochemistry, genetics, cell biology, and microbiology.

Principles of basic and clinical immunobiology; phylogeny and ontogeny of the immune response, characteristics of the immune response, cellular and humoral immunity; central and peripheral lymphoid tissues; mechanisms of immunologic injury and immunologic diseases; comparative and veterinary immunology; transplantation and tumor immunology.

5431. Avian Pathology

Two credits. Prerequisite: Instructor consent.

A comprehensive study of systemic avian pathology, stressing the correlation of pathological changes with clinical and microbiological findings.

5502. Evaluation of Diagnostic Test

Two credits. Prerequisite: Instructor consent.

Sampling criteria and size determination, diagnostic test selection, diagnostic strategies, test result evaluation and interpretation.

5503. Molecular Approaches to Disease Diagnosis and Prevention

Two credits. Prerequisite: Instructor consent.

Molecular aspects of disease, with emphasis on methodologies and strategies for diagnosis, analysis and prophylaxis.

5594. Current Veterinary Pathology Literature

One credit. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Detailed study of current veterinary pathology literature, with particular emphasis on lesions and mechanisms of disease.

5632. Vaccines: Mechanisms of Immune Protection

(Also offered as ANSC 5632.) Three credits. Prerequisite: Instructor consent.

Focuses on several different approaches to inducing prophylactic immunity in the host. Both traditional and modern molecular approaches to vaccine design are discussed. In addition, the mechanisms employed by pathogenic microbes to avoid hosts' immune responses will be examined in the context of vaccine design. The students will gain an appreciation for the transition from basic research to practical applications.

Pharmacy (PHAR)

5215. Pharmaceutical Biotechnology

Three credits. Prerequisite: Instructor consent.

A survey of medicinal chemistry and pharmaceuticals of pharmaceutical products derived from modern methods of molecular biology. Considers products in use or in clinical trials to emphasize the conceptual basis, design, and synthesis of biotech products in the context of current practical applications.

5216. Dosage Forms I

Three credits.

Introduces the student to the principles of thermodynamics, ionic equilibrium, chemical kinetics and diffusion. Application of these principles to formulation, stability and dissolution of a drug product, and release from the dosage form for optimum therapeutic outcome. Required of entering graduate students in Pharmaceutics who do not have a Pharmacy background as well as those who do not pass the qualifying examination within the first year of the program.

5217. Dosage Forms II

Three credits.

Covers the basic principles of the surface and colloid chemistry and rheology, as these relate to the performance of dispersed system dosage forms including colloids, suspensions, emulsions, suppositories, aerosols, ointments, and transdermals. Required of entering graduate students in Pharmaceutics who do not have a Pharmacy background, and those who do not pass the qualifying examination within the first year of the program.

5219. Biopharmaceutics and Pharmacokinetics

Three credits.

Basic principles of biopharmaceutics, bioavailability, and pharmacokinetics, including

their application to the rational design of both dosage forms and maximally effective dosing regimens. Intended for graduate students who may not have sufficient previous exposure to biopharmaceutics and pharmacokinetics.

5239. Current Literature in Pharmaceutics

One credit. May be repeated for a total of three credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Designed to familiarize students with current pharmaceutics literature and to educate students in critical peer review in the pharmaceutics literature.

5293. Seminar in Pharmaceutics

One credit. May be repeated for a total of two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Reports and discussions.

5295. Special Problems in Pharmaceutics

Variable (1-4) credits. Prerequisite: Instructor consent.

Individualized for students desiring research experience in any of the areas of pharmacy other than the area chosen by the student for thesis research.

5297. Special Topics in Pharmaceutics

Prerequisite: Instructor consent. May be repeated for credit.

Includes topics not presently covered in courses which are pertinent to current departmental research and areas of recent development in the literature.

5301. Macromolecules in Drug Design

Two credits. Prerequisite: Instructor consent.

A cooperative presentation of the fundamentals of medicinal chemistry.

5302. Chemical Biology and Drug Design

Two credits.

Introduction to the emerging field of chemical biology with a particular focus on the role it plays in understanding cellular signaling, drug design, and drug development.

5303. Small Molecule Structure and Function

Two credits.

Small organic molecules continue to be the preeminent form of therapeutic agents. The small molecules that constitute clinically used agents are developed through a highly interdisciplinary process involving chemists, biologists and healthcare workers in a process commonly referred to as drug discovery. The purpose of this course is to provide the student with a broad view of drug properties, drug function and the drug discovery process.

5308. Structure and Function of Biological Membranes

Three credits.

Overview of cell membrane structure and function based on a foundation of physical and biochemistry principles. Topics include lipid bilayers, vesicles and liposomes, cholesterol, membrane protein structure and function, transport, membrane fusion, receptors, drug/membrane interactions and membranes in cell regulation.

5393. Seminar in Medicinal Chemistry

One credit. May be repeated for a total of 10 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Reports and discussions.

5395. Special Problems in Medicinal Chemistry

Variable (1-4) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Individualized course for students desiring research experience in any of the areas of medicinal chemistry other than the area chosen by the student for thesis research.

5397. Special Topics in Medicinal Chemistry

Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Current developments in Medicinal Chemistry. For students who need exposure to topics not covered in other department offerings.

5403. Current Literature in Pharmaceutical Sciences

One credit. May be repeated for a total of two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Designed to familiarize students with current pharmaceutical sciences literature and to educate students in critical peer review of this literature.

5454. Principles of Safety Evaluation

One credit.

Introduction to toxicologic risk assessment. Fundamentals of dose-response relationships and risk characterization, and their application in the establishment of permissible exposure limits for drugs and other chemicals in the environment or workplace.

5471. Advanced Pharmacology I: Basic Principles

Three credits. Prerequisite: Instructor consent.

Molecular mechanisms of drug action including occupation and rate theories. Characterization of receptors in-situ and in-vitro.

5472. Advanced Pharmacology II: Drug Disposition

Two credits.

Drug absorption, distribution, excretion, metabolism, interaction, allergy, resistance, tolerance, idiosyncrasy and toxicity.

5475. Toxicology Scholars Colloquium

One credit. May be repeated for a total of five credits.

Reviews, discussions and seminars focused on the research of scientists who have made significant contributions to the science of toxicology.

5493. Seminar in Pharmacology and Toxicology

One credit. May be repeated for a total of two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Reports and discussions on journal and review articles and presentation of personal research results.

5494. Seminar in Immunology

One credit. May be repeated for a total of two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Reports and discussions.

5495. Special Problems in Pharmacology I

Variable (1-4) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Individualized for students desiring research experience in any of the areas of pharmacology.

5496. Special Problems in Toxicology

Variable (1-4) credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Individualized course for students desiring research experience in any of the areas of toxicology.

5497. Special Topics in Pharmacology

Prerequisite: Instructor consent. May be repeated for credit.

Includes topics not presently covered in courses, which are pertinent to current departmental research and areas of recent development in the literature.

5498. Special Topics in Toxicology

Prerequisite: Instructor consent. May be repeated for credit.

Basic principles of toxicology as emphasized by recent developments in the biochemical toxicology literature.

5746. Introduction to Managed Care Pharmacy

Three credits. Prerequisite: Instructor consent.

A study of managed care pharmacy within the United States health care system, with emphasis on managed care organization and control, pharmacy benefits design and management, outcomes measurement, pharmacoeconomics, health care provider and client education, benefits plan financing and marketing, and legal issues of managed care pharmacy.

5764. Advanced Pharmacy Administration

Three credits. Prerequisite: Instructor consent.

A study of modern management techniques applicable in terminal drug distribution. Special emphasis is placed upon quantitative methods and the utilization of electronic data processing.

5797. Special Topics in Pharmacy Administration

Prerequisite: Instructor consent. Prerequisite: Instructor consent.

Current developments in Pharmacy Administration. A course for students needing exposure to topics not covered in other Department of Pharmacy Practice offerings.

6234. Advanced Biopharmaceutics

Three credits.

Overview of physico-chemical, biopharmaceutic, and physiologic factors controlling the delivery of drug and their sites of action.

6241. Advanced Kinetics and Mechanisms of Drug Degradation

Two credits. Prerequisite: PHAR 6288; instructor consent.

An advanced treatment of the physical organic chemistry critical to the characterization and understanding of stability in pharmaceutical products.

6242. Freeze Drying of Pharmaceuticals

Two credits. Prerequisite: Instructor consent.

The science and technology of freeze drying, including fundamentals of heat and mass transfer gas systems, process design considerations, and formulation strategies with emphasis on stabilization of therapeutic proteins.

6285. Complex Equilibria

Three credits.

A study of the physico-chemical and mathematical treatment in pharmaceutical systems. Topics center on thermodynamics,

activity coefficients, acids and bases, solubility, complexation solubilization and protein binding.

6286. Transport Processes

Three credits. Prerequisite: Instructor consent.

Emphasis is on the application of the laws of diffusion to dissolution, membrane transport and release of drugs from dosage forms.

6288. Kinetics and Mechanisms of Drug Degradation and Stability

Three credits. Prerequisite: Instructor consent.

A study of the kinetics and mechanisms of drug degradation in the solid and liquid states and drug stabilization.

6289. Pharmacokinetics

Three credits. Prerequisite: Instructor consent.

A discussion of absorption, distribution, and clearance mechanisms, and their impact on concentration-time profiles and drug response.

6290. Colloid Chemistry and Interfacial Phenomena

Three credits. Prerequisite: Instructor consent.

Interfacial phenomena, colloid chemistry.

6452. Toxicology of the Respiratory System

Two credits. Prerequisite: PHAR 6455; instructor consent.

Anatomic and functional aspects of toxic injury to the respiratory tract with an emphasis on biochemical and physiologic mechanisms of toxic pulmonary injury. Lectures and student presentations.

6455. Advanced Toxicology

Four credits.

A study of the harmful effects of toxic chemicals on biological systems. Emphasis is on mechanisms of toxicant action and on practical applications of modern techniques to assess toxicity and hazard.

6459. Immunotoxicology

Two credits. Prerequisite: Instructor consent.

Demonstrates the detrimental effects on the immune system and/or inflammatory response, by a variety of physical and chemical xenobiotics. Emphasis is placed on the mechanisms of chemical and drug-induced immunosuppression, autoimmune response, and allergic response.

6475. Mechanistic Toxicology I

Two credits. Prerequisite: Departmental consent.

Mechanistic toxicology describes the processes of how chemicals exert their toxic effects in biological systems. Therefore, understanding of the underlying mechanisms of toxicity, together with exposure estimates, provides key information that links the toxic hazard of a chemical with the actual human health risk. This first course explores some fundamental cellular and molecular mechanisms of toxicity and integrates them into a larger picture; reactive intermediates, oxidative and nitrate stress, and mitochondria-mediated toxicity will be covered. The basic concepts will be illustrated with specific examples (drugs and environmental chemicals).

6484. Cutaneous Differentiation: Molecular Mechanisms and Cellular Processes

Two credits. Prerequisite: Instructor consent.

Examines mammalian skin structure, keratinocyte, immune and pigment cells, mechanisms of mesenchymal-epithelial induction, replication- and cytoskeletal-based diseases, stem cell identification and plasticity, and transcriptional

regulation of differentiation-dependent gene expression.

Philosophy (PHIL)**5300. Independent Study for Graduate Students**

Variable (1-6) credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for credit.

5301. Seminar in Contemporary Philosophy

Three credits. Prerequisite: Open only to Philosophy graduate students.

An introduction to contemporary philosophers such as Russell, Carnap, Ayer, Quine, Putnam, and Kripke.

5302. Introduction to Moral Philosophy

Three credits. Prerequisite: Open only to Philosophy graduate students.

Introduction to ethical theory. Readings in historical and contemporary moral philosophy.

5305. Seminar in Aesthetics

Three credits. Prerequisite: Open only to Philosophy graduate students.

A consideration of some of the basic problems in aesthetics.

5307. Logic

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of nine credits.

5311. Properties of Formal Systems

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated once for credit.

The development of formal deductive systems. The completeness and consistency of logical systems adequate for the expression of parts of mathematics. A consideration of aspects of the foundations of logic and mathematics.

5312. Seminar in the Philosophy of Science

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated once for credit.

A discussion of selected current, methodological issues in the philosophy of science. Topics may include scientific realism versus nonrealism; theories of scientific explanation; the nature of scientific revolutions; theories of the lawfulness of nature; and feminist theories of science.

5313. Seminar in the Philosophy of Physics

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of 12 credits.

Examination of philosophical issues associated with physical concepts of space, time, and matter. Topics may include relational versus absolute theories of space and time, and philosophical implications of quantum mechanics.

5314. Action Theory

Three credits. Prerequisite: Open only to Philosophy graduate students.

Examination and analysis of the concept of "action" and related concepts such as "agent" and "intention."

5315. Seminar in Moral Philosophy

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated once for credit.

A discussion and analysis of significant problems in ethical theory.

5316. Seminar in the Philosophy of Social Science

Three credits. Prerequisite: Open only to Philosophy graduate students.

5317. Seminar in the Philosophy of Psychology

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of 12 credits.

Philosophical examination of contemporary issues in the philosophy of psychology. Topics may include a philosophical analysis of the nature of behavior, consciousness, perception, cognition, and emotion; the nature of psychological explanation; comparison of the science of human psychology with ethology and other biological sciences, the physical sciences, and computer science.

5318. Seminar on Plato

Three credits. Prerequisite: Open only to Philosophy graduate students.

5319. Seminar on Aristotle

Three credits. Prerequisite: Open only to Philosophy graduate students.

5320. Seminar in the History of Philosophy

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of nine credits.

5321. Seminar on the British Empiricists

Three credits. Prerequisite: Open only to Philosophy graduate students.

5327. Seminar on Kant

Three credits. Prerequisite: Open only to Philosophy graduate students.

5330. Seminar on Theory of Knowledge

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of 12 credits.

Problems in the foundations and nature of knowledge. A critical study of recent treatments of the problem of mind. Issues such as the mind-body problem, our knowledge of the existence of other minds, the existence of private languages, will be dealt with in detail.

5331. Seminar in Philosophy of Mind

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated once for credit.

A critical study of recent treatments of the problem of mind. Issues such as the mind-body problem, our knowledge of the existence of other minds, the existence of private languages, will be dealt with in detail.

5333. Seminar on Nietzsche

Three credits. Prerequisite: Open only to Philosophy graduate students.

5340. Seminar on Metaphysics

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of nine credits.

5342. Seminar in Philosophy of Language

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated once for credit.

5344. Seminar in Philosophical Logic

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of nine credits.

Topics in the philosophies of logic and mathematics. May include completeness results

for non-classical logics, higher-order languages and logics, diagonalization, limitative theorems (Tarski, Godel), paradoxes, and formal theories of truth.

5350. Seminar in Recent Social and Political Philosophy

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated once for credit.

5352. Seminar in Feminist Theory

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for a maximum of 12 credits.

The focus of inquiry might be the history of feminist theory, a school of contemporary feminist theory, an issue or a selection of issues in feminist theory, or feminist approaches to major texts or themes in the history of philosophy.

5360. Seminar in Recent Continental Analytic Philosophy

Three credits. Prerequisite: Open only to Philosophy graduate students.

Critical reading of selected texts of recent European philosophers such as Derrida, Irigaray, Kristeva, Heidegger, and Foucault; along with related work of analytic philosophers such as Davidson, Quine, Rorty, and Kripke.

5397. Seminar

Three credits. Prerequisite: Open only to Philosophy graduate students. May be repeated for credit.

Physical Therapy (PT)

5410. Human Anatomy Trunk and Upper Extremity

Four credits. Prerequisite: Department consent.

Discussion of the conceptual and structural basis of osteology, myology, neurology, human development, and basic kinesiology and biomechanics. Selected anatomical and physiological dysfunctions of the trunk and upper extremity will also be discussed.

5412. Human Anatomy Pelvis and Lower Extremity

Four credits. Prerequisite: Department consent.

Discussion of the conceptual and structural bases of osteology, myology, neurology, human development, and basic kinesiology and biomechanics. Selected anatomical and physiological dysfunctions of the pelvis and lower extremity will also be discussed.

5414. Clinical Human Physiology

Three credits. Prerequisite: Department consent.

Discussion of the biochemical, nutritional, cellular and physiological principles necessary for the analysis of the normal and abnormal function and for the rehabilitation of the human musculoskeletal, cardiovascular and respiratory systems using patient cases.

5416. Clinical Neuroscience

Five credits. Prerequisite: Department consent.

Introduction to foundational concepts and vocabulary of neuroanatomy, neurophysiology, and the basic mechanisms of neuropathology, with emphasis on the specific pathologies they are likely to encounter in physical therapist practice. The course will provide an overview of the medical and surgical diagnosis and management of patients with neurologic pathology. Impact of neuromuscular

pathology across the lifespan and implications for physical therapy management are introduced.

5418. Clinical Pharmacology

Three credits. Prerequisite: Department consent.

Integrates and summarizes the essentials of medical pharmacology. The main molecular and cellular actions of drugs will be emphasized as well as the principles governing the use and actions of drugs in the treatment of disease.

5420. Foundation in Clinical Pathology

Three credits. Prerequisite: Department consent.

A comprehensive presentation of the general principles of disease with an emphasis on general pathology. Focus is on the mechanisms underlying disease and their management as a basis for therapeutic program planning in physical therapy.

5422. Cardiopulmonary Pathology

Two credits. Prerequisite: Department consent.

A comprehensive presentation of cardiopulmonary diseases. Focus is on the mechanisms underlying disease and their management as a basis for therapeutic program planning in physical therapy.

5424. Musculoskeletal Pathology

Four credits. Prerequisite: Department consent.

Mechanical properties of musculoskeletal tissues will be described. Growth and maintenance mechanisms of the different tissues will be detailed. Diseases and disorders of the musculoskeletal system will be covered. The underlying tissue pathology and clinical symptoms will be addressed from the orthopedic and physical therapy perspective. Therapeutic interventions will be presented.

5426. Neuromuscular Pathology

Three credits. Prerequisite: Department consent.

Introduction to basic mechanisms of neuropathology, the neurological examination and tests, and specific pathologies they are likely to encounter in physical therapist practice. Emphasizes the medical and surgical diagnosis and management of patients with neurologic pathology.

5430. Functional-Biomechanical Relationships

Three credits. Prerequisite: Department consent.

Students will receive detailed descriptions and analyses of structures of the musculoskeletal system in general as well as within individual functional regions. Students will also examine how structure affects function within each region. Lastly, they will also examine the forces sustained by the various regions during function, in normal and pathological conditions thus preparing them to apply knowledge of normal anatomical structure and function to therapeutic intervention.

5431. Prevention, Health Promotion, Fitness and Wellness

Two credits. Prerequisite: Department consent.

Prepares the student to provide culturally competent evidence based physical therapy services for prevention, health promotion, fitness and wellness to individuals, groups, and communities.

5432. Motor Control and its Clinical Application

Four credits. Prerequisite: Department consent.

Introduction to and discussion of contemporary theories of motor control, research evidence on normal, abnormal, developmental, and aging-related processes governing motor control will be provided. These ideas will be applied to understand

the various impairments of neurological populations and their treatment using the model of evidence based practice.

5433. Management for the Physical Therapist
Three credits. Prerequisite: Department consent.

Introduction to the student to the field of disability studies. Physical, cognitive, emotional, social, and cultural factors related to the presence of disability and chronic illness throughout the life span will be explored. Emphasis is placed on those aspects of disability that affect the practice of physical therapy assessment and treatment.

5434. Foundations for System Review

Two credits. Prerequisite: Department consent.

A foundations course for Physical Therapy Majors in Differential Diagnosis. The course scope covers a broad spectrum of clinical sciences and provides training in screening (i.e. history taking) of a culturally diverse patient/client population across the lifespan for appropriate healthcare management.

5437. Education and Communication for Physical Therapists

Three credits. Prerequisite: Department consent.

Fundamental aspects of education and communication as they relate to physical therapy as described in the Guide to Physical Therapist Introduction to learning theories and theories of change. Learner assessment and strategies for communication and instruction will be covered. Students generate written and oral communications and will plan and deliver an educational unit relating to physical therapy.

5438. Professionalism for the Physical Therapist

Two credits. Prerequisite: Department consent.

Through readings, lecture, personal investigation, and discussion of current issues, "hot topics" and problems in the profession of physical therapy, students will demonstrate an understanding of their environment of practice. Students learn selected laws, rules, regulations, guidelines and ethical codes governing the practice of physical therapy and will explore possible solutions to common professional problems. Emphasis is placed on the importance of ethical and legal practice.

5440. Evidence-Based Practice in Physical Therapy

Three credits. Prerequisite: Department consent.

A foundations course in research, statistical analyses, and evidence-based clinical-decision for Physical Therapy students. Students will develop skills for conducting literature searches, critically appraising clinical research and developing research questions. Applications will fall within the Physical Therapy Profession Patient/Client Management Model.

5446. Evidence-Based Practice Seminar

Two credits. Prerequisite: Department consent.

Focuses on clinical research related to diagnosis, and prevention / treatment outcomes with emphasis on musculoskeletal and neuromuscular physical therapy. Students will participate in meetings and discussions to facilitate their research projects.

5448. Capstone Scholarly Report Preparation

Two credits. Prerequisite: Department consent.

Students in the Doctor of Physical Therapy program are required to participate in a scholarly project (original research, systematic review or

clinical case report) with one or more faculty mentors and students. Course requirements are met by the preparation of a manuscript meeting professional standards for form and content, culminating in a document appropriate for submission to a refereed journal.

5450. Fundamentals of Physical Therapy Examination

Five credits. Prerequisite: Department consent.

Covers the fundamentals of physical therapist examination in the context of overall practice as described in the Guide to Physical Therapist Practice. Students will be introduced to basic tests and measures as well as to information relevant to their selection and interpretation. Students will apply the tests in laboratory and clinical settings and will learn to appropriately document their findings.

5451. Acute Care Management

Five credits. Prerequisite: Department consent.

An exploration of the practice of Physical Therapists in the acute care setting. Students will develop competency in clinical evaluation of impairments and functional limitations, identification of appropriate intervention options, and implementation of a plan of care to improve performance of functional activities for patients commonly encountered in acute care practice settings. This course encourages problem solving and critical thinking through the integration of knowledge and skills in the laboratory and clinic and through a written assignment and presentation.

5452. Therapeutic Interventions I

Two credits. Prerequisite: Department consent.

An exploration of interventions commonly used by physical therapists in both inpatient and outpatient settings. Students will develop competency in selection and implementation of therapeutic exercise as an intervention to improve performance of functional activities for patients commonly encountered in a variety of settings. Assessment of therapeutic effects and modification of the interventions is an integral component.

5453. Musculoskeletal Rehabilitation - The Spine

Three credits. Prerequisite: Department consent.

Management of musculoskeletal conditions affecting the spine. Elements of patient management consist of examination, evaluation, diagnosis, prognosis, and intervention with attention to outcomes, differential diagnosis, and screening strategies. Evidence-based practice is reinforced. Applications will consider client populations across the life span.

5454. Musculoskeletal Rehabilitation - The Extremities

Three credits. Prerequisite: Department consent.

Management of musculoskeletal conditions affecting the extremities. Elements of patient management consist of examination, evaluation, diagnosis, prognosis, and intervention with attention to outcomes, differential diagnosis, and screening strategies. Evidence-based practice is reinforced. Applications will consider client populations across the life span.

5455. Essentials of Rehabilitation Practice

Three credits. Prerequisite: Department consent.

An exploration of the practice of Physical Therapists in the area of orthotics prosthetics, Diabetes and Spinal Cord Injury. Students will

develop competency in clinical assessment of functional limitations, specifically in locomotion, identification of appropriate treatment options and implementation of interventions, through the use of orthotics and prosthetics, to improve performance of functional activities for patients with a variety of deficits.

5456. Neuromuscular Rehabilitation

Four credits. Prerequisite: Department consent.

Through comprehensive problem solving, students will learn to manage adult patients with neuromuscular dysfunction. Students will develop neurophysiologically sound examination and intervention skills integrating physical and psychological patient considerations. The skill set for examination and treatment will be consistent with foundational movement science under the evidenced based practice model.

5458. Pediatric Physical Therapy

Two credits. Prerequisite: Department consent.

Covers normal motor development, childhood conditions that are commonly served by pediatric physical therapists, and general examination and intervention methods used for pediatric populations.

5460. Introduction to Clinical Education

One credit. Prerequisite: Department consent.

Provides students with a foundation for clinical experiences and provide simulated hands-on practice in doing tests and measures used in physical therapy and in nursing. Concepts of expert practice, experiential learning, collaborative learning are explored. Interprofessional learning will be emphasized through work with nursing students. Students will develop an understanding of the importance of experiential learning, professional behaviors, self-evaluation and personal reflection. Students will work collaboratively with nursing students in a simulation lab while developing an understanding of interprofessional patient care.

5461. Clinical Education I

Eight credits. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Under close supervision by a licensed Physical Therapist, students will participate as a member of the health care team to provide patient care in an inpatient or outpatient setting for 10 weeks. Patient care settings may include but are not limited to Acute Care, Orthopedics, Neuro-Rehabilitation or specialties including but not limited to pediatrics, oncology, or women's health. The course is held off campus at individually assigned clinical facilities throughout the country. Each student is assigned one or two clinical instructors who are physically present and immediately available for direction and supervision.

5462. Integrated Clinical Experience, Musculoskeletal I

One credit. Prerequisite: Department consent.

Clinical experience that provides students the opportunity to integrate interventions learned in PT 5452 in an outpatient setting. Students will develop and administer plans of care that include therapeutic exercise and physical agents for outpatients with various musculoskeletal conditions.

5463. Integrated Clinical Experience, Musculoskeletal II

Two credits. Prerequisite: Department consent.

Clinical experience that provides students the opportunity to integrate interventions learned in PT 5453 and PT 5454 in an outpatient setting. Students will utilize examination and manual therapy skills in the development and implementation of plans of care for outpatients with various musculoskeletal conditions.

5464. Clinical Education II

Eight credits. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Under close supervision by a licensed Physical Therapist, students will participate as a member of the health care team to provide patient care in an inpatient or outpatient setting for 10 weeks. Patient care settings may include but are not limited to Acute Care, Orthopedics, Neuro-Rehabilitation or specialties including but not limited to pediatrics, oncology, or women's health. The course is held off campus at individually assigned clinical facilities throughout the country. Each student is assigned one or two clinical instructors who are physically present and immediately available for direction and supervision.

5465. Public Engagement in Prevention, Health Promotion, Fitness and Wellness

One credit. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Provides experiences for students in the development and delivery of service related to prevention, health promotion, fitness, and wellness in settings that support supervised interaction with the surrounding community.

5466. Integrated Clinical Experience, Neuromuscular

Two credits. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

A clinical experience that provides students the opportunity to integrate interventions learned in PT 5455 and PT 5456 in a clinical setting. Students will utilize examination and intervention skills in the development and implementation of plans of care for patients with various neuromuscular conditions.

5467. Clinical Education III

Eight credits. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Under close supervision by a licensed Physical Therapist, students will participate as a member of the health care team to provide patient care in an inpatient or outpatient setting for 12 weeks. Patient care settings may include but are not limited to Acute Care, Orthopedics, Neuro-Rehabilitation or specialties including but not limited to pediatrics, oncology, or women's health. The course is held off campus at individually assigned clinical facilities throughout the country. Each student is assigned one or two clinical instructors who are physically present and immediately available for direction and supervision.

5469. Integrated Acute Care Practicum

One credit. Prerequisite: Department consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

This course provides students with clinical experience at hospitals and sub-acute health care facilities. Students will observe and will assist as

appropriate with patient care under the supervision and direction of a licensed physical therapist. The course allows students to integrate and apply the didactic component of the curriculum in an acute or sub-acute environment. It is designed to foster the student's appreciation for the multidisciplinary nature of hospital care.

5471. Manual Therapy in the Management of Musculoskeletal Disorders

Three credits.

Focuses on the manual therapy examination and treatment of patients with musculoskeletal conditions. Instruction will be primarily case based and integrate various manual therapy approaches across body regions. Concepts introduced in the PT 5453 and 5454 courses will be explored in greater depth with a focus on improved proficiency in delivery of soft tissue and joint manipulation techniques including thrust. Evidence-based practice will be reinforced. Applications will consider diverse patient/client populations across the life span.

5472. Advanced Pediatric Physical Therapy

Three credits. Prerequisite: Department consent.

An elective for Doctorate of Physical Therapy students that covers the specialized practice of pediatric physical therapy. The course provides in depth information about pediatric conditions for which physical therapy services are typically provided. Specialized pediatric assessments and interventions are reviewed and clinical opportunities are provided to integrate and apply the academic information.

5480. Interaction for Health Care and Society

Three credits. Prerequisite: Open only to students in the D.P.T. program, others with consent.

Introduction to health care systems. Interactions between government agencies, institutions, communities and individuals addressed in relation to planning, funding, and delivering healthcare. Particular focus placed on societal issues relating to underrepresented groups including persons with disabilities (PWD), with an emphasis on those aspects that affect the practice of physical therapy assessment and treatment.

5481. Therapeutic Interventions II

Two credits. Prerequisite: PT 5452; open only to Physical Therapy students.

An exploration of interventions commonly used by physical therapists in both inpatient and outpatient settings. Students will develop competency in selection and implementation of therapeutic exercise and physical agents as interventions to improve performance of functional activities for patients commonly encountered in a variety of settings. The assessment of therapeutic effects and modification of the interventions is an integral component of this course.

Physics (PHYS)

5010. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated with a change of topic up to three times for a total of nine credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

A special reading course.

5020. Research in Physics

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated with a change of topic up to three times for a total of nine credits.

Experimental and theoretical research in selected topics in physics.

5050. Modern Physics for Teachers

Three credits.

New teaching materials and techniques as developed by the Physical Science Study Committee for secondary school teachers of physics.

5094. Physics Seminar

One credit. Prerequisite: Instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The treatment of special topics, primarily by individual readings and reports.

5101. Methods of Theoretical Physics I

Three credits.

Vector and tensor analysis, curvilinear coordinates, linear algebra, functions of complex variables, differential equations, special functions, elements of Green's functions.

5102. Methods of Theoretical Physics II

Three credits. Prerequisite: PHYS 5101.

Abstract vector spaces, Hilbert space, group theory. Fourier series and integral representations, Theory of Green's functions and integral equations. Complex function theory.

5105. Methods of Experimental Physics

Variable (1-6) credits. Experimental methods used in modern research are applied to experiments from various fields of physics, including: low temperature conductivity of metals, x-ray diffraction, acoustic attenuation, optical constants of metals, color centers in alkali halides, nuclear beta decay, Zeeman effects and others.

5201. Theoretical Mechanics I

Three credits.

Classical mechanics: Lagrange equations, central force motion, rigid body motions, small oscillations, Hamilton equations, canonical transformation.

5202. Theoretical Mechanics II

Three credits. Prerequisite: PHYS 5201.

Dynamics of continuous media, hydromechanics, elasticity, wave motion, wave interactions and scattering, non-linear processes.

5301. Electrodynamics I

Three credits. Prerequisite: PHYS 5101.

Differential formulations of electrostatics and magnetostatics, electromagnetic induction. Maxwell equations, electromagnetic waves, application to wave guides, cavities, and dispersive media. Foundations of special relativity.

5302. Electrodynamics II

Three credits. Prerequisite: PHYS 5201 and 5301.

Maxwell's equations with time dependent sources; radiation from relativistic charged particles; dynamical laws for charged particles; diffraction of electromagnetic waves.

5350. Computerized Modeling in Science

Four credits. Prerequisite: Instructor consent.

Development and computer-assisted analysis of mathematical models in chemistry, physics, and engineering. Typical topics include chemical equilibrium, reaction rates, particle scattering,

vibrating systems, least square analysis and quantum chemistry.

5401. Quantum Mechanics I

Three credits. Prerequisite: PHYS 5101 and 5201.

Mathematical formulation and interpretation of quantum mechanics. Illustrative examples. Hydrogen atom. Dirac ket and bra vectors, matrix methods. Scattering theory.

5402. Quantum Mechanics II

Three credits. Prerequisite: PHYS 5401.

Symmetry and angular momentum. Approximation methods for stationary and time-dependent problems, with applications. Relativistic theory of the electron.

5403. Quantum Mechanics III

Three credits. Prerequisite: PHYS 5402.

Occupation number representation, electron gas, Hartree-Fock approximation, correlation energy, superconductivity, perturbation theory, Green's functions, Feynman diagrams.

5500. Statistical Mechanics

Three credits. Prerequisite: PHYS 5401.

Ensembles, distribution function, partition function. Bose-Einstein and Fermi-Dirac distributions, fluctuations, applications to the properties of solids and liquids and to the kinetic theory of gases.

5600. Modern Physics

Three credits. Prerequisite: PHYS 5401.

Experimental and theoretical milestones in the development of contemporary physics. Atomic, molecular, and optical physics including quantum optics; condensed matter physics; nuclear and particle physics; and cosmology and astrophysics.

5621. Advanced Topics in Physics I

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Selected topics in theoretical and experimental physics.

5622. Advanced Topics in Physics II

Variable (1-3) credits. Prerequisite: PHYS 5621; instructor consent. May be repeated for a maximum of 12 credits.

Selected topics in theoretical and experimental physics.

6110. Atomic Physics

Three credits. Prerequisite: PHYS 5402.

Coupling of angular momenta. Hartree-Fock theory of many electron atoms, fine structure and hyperfine structure. Introduction to group theory.

6120. Molecular Physics

Three credits. Prerequisite: PHYS 6110.

Heitler-London and molecular orbital theories for diatomic molecules, semi-empirical methods of poly-atomic molecules.

6130. Quantum Optics

Three credits. Prerequisite: PHYS 5401.

Semiclassical theory of light-matter interactions. Quantum states of light. Generation, detection and interactions of nonclassical radiation.

6140. Principles of Lasers

Three credits.

The physics of lasers, including optical pumping and stimulated emission, laser rate equations, optical resonators, non-linear optics, the Kerr effect and Faraday rotation. Applications to gas, crystal, glass, liquid, dye, semiconductor, chemical and

ultraviolet lasers, Q-switching, mode-locking, and parametric devices.

6150. Semiconductor Optical Devices

Three credits. Prerequisite: PHYS 6201.

Semiconductor based optical devices such as lasers, amplifiers, modulators, and photodetectors, and their application to optical fiber transmission systems.

6201. Fundamentals of Solid State Physics I

Three credits.

Crystal structure, phonons, electronic band structure, metals, insulators and semiconductors.

6202. Fundamentals of Solid State Physics II

Three credits. Prerequisite: PHYS 6201.

Optical, magnetic and transport properties. Lattice defects. Non-crystalline solids.

6211. Condensed Matter Physics I

Three credits. Prerequisite: PHYS 5402.

Crystal structure; lattice vibrations; electronic band structure of solids; transport theory; basic properties of metals, semi-conductors and insulators; magnetism; super-conductivity.

6212. Condensed Matter Physics II

Three credits. Prerequisite: PHYS 6211.

Crystal structure; lattice vibrations; electronic band structure of solids; transport theory; basic properties of metals, semi-conductors and insulators; magnetism; super-conductivity.

6220. Advanced Solid State Physics

Three credits. Prerequisite: PHYS 6212 or 6342.

The many-body problem in solid state physics. The electron gas, normal metals, electron-phonon interactions, superconductivity, ferro- and antiferromagnetism and spin waves, polaron theory.

6234. Non-Equilibrium Properties of Solids

Three credits.

Electrical and thermal conduction, thermoelectricity. Electrons and phonons. Perturbation techniques to estimate interaction rates; electron-phonon, phonon-phonon and imperfection scattering processes. Ultrasonic generation and attenuation, spin-lattice interactions.

6236. Microwave Physics I

Three credits. Prerequisite: PHYS 5301.

The principles of microwave and radio frequency techniques applied to investigation of the properties of matter.

6244. The Electrical Properties of Polymers

Three credits.

Experimental and theoretical aspects of electrical phenomena in polymers: DC and AC conductivity, dielectric constant, electrical breakdown, photoconductivity, etc. Extended and localized electron wave functions; band and hopping conduction.

6246. Nuclear Magnetic Resonance I

Three credits. Prerequisite: PHYS 5401.

Basic theory and experimental methods of NMR with emphasis on resonance and relaxation in metals. Brief discussion of interpretation of NMR in non-metallic solids, liquids, and gases.

6247. Nuclear Magnetic Resonance II

Three credits. Prerequisite: PHYS 6246.

Basic theory and experimental methods of NMR with emphasis on resonance and relaxation in metals. Brief discussion of interpretation of NMR in non-metallic solids, liquids, and gases.

6254. Low Temperature Physics I

Three credits. Prerequisite: Instructor consent.

Lectures and seminars on selected topics in low temperature physics; superfluidity and superconductivity, solid state, nuclear alignment and polarization, transport properties in solids.

6256. X-Ray Physics I

Three credits.

Symmetry of crystals. Production and properties of x-rays. Application of x-rays in the study of crystalline and amorphous solids by diffraction and spectroscopic techniques, including synchrotron radiation for studying atomic and electronic structures in materials.

6264. Semiconductor Physics

Three credits. Prerequisite: PHYS 6201, and PHYS 5402, which may be taken concurrently.

Semiconductors and semiconductor devices. Band structure, phonon scattering, velocity-field relations, effects of doping and magnetic fields, optical and transport properties.

6300. Astrophysics and Modern Cosmology

Three credits. Prerequisite: Instructor consent.

Basic principles of contemporary astrophysics; applications to stars, galaxies, and modern cosmology.

6310. Relativity

Three credits.

Special relativity, tensor analysis, foundations of general relativity, Petrov classification of curved spacetimes, Schwarzschild and Kerr solutions, experimental tests and recent developments.

6320. Nuclei and Particles

Three credits.

Properties of nuclei and particles, conserved quantities, isospin, quark model, Fermi gas model, electroweak interaction, high energy scattering.

6331. Nuclear Physics I

Three credits. Prerequisite: PHYS 5402.

A quantum mechanical treatment of nuclear forces and nuclear structure, including the shell and collective models, and of reaction and radiation phenomena. The second semester is reserved for a discussion of selected topics on an advanced level.

6332. Nuclear Physics II

Three credits. Prerequisite: PHYS 6331.

A quantum mechanical treatment of nuclear forces and nuclear structure, including the shell and collective models, and of reaction and radiation phenomena. The second semester is reserved for a discussion of selected topics on an advanced level.

6341. Quantum Theory of Fields I

Three credits. Prerequisite: PHYS 5403.

Local gauge invariance, Lagrangian formulation, Noether currents, spontaneous breakdown of symmetry, Higgs mechanism and superconductivity, canonical quantization, Feynman diagrams, Green's functions.

6342. Quantum Theory of Fields II

Three credits. Prerequisite: PHYS 6341.

Topics chosen from the following: Path integral formalism, generating functionals, renormalization, abelian and non-abelian gauge theories (QED and QCD), electroweak theory, solitons, instantons.

Physiology and Neurobiology (PNB)

5101. Anatomy and Physiology for Intraoperative Neuromonitoring

Four credits. Recommended preparation: course background in biology. Instructor consent required.

Anatomy and physiology of the nervous and musculoskeletal systems.

5102. Fundamentals of Intraoperative Neuromonitoring

Three credits. Prerequisite: Instructor consent.

Overview of intraoperative neuromonitoring. Basics underlying recording of signals and discussion of main neuromonitoring modalities, common surgeries employing neuromonitoring, operating room protocols and procedures.

5103. Applied Intraoperative Neuromonitoring

Two credits. Prerequisite: Instructor consent.

Experience working with the intraoperative neuromonitoring recording machines. Practice writing protocols for different modalities, and use of simulator programs to observe examples of signal acquisition.

5104. Clinical Practicum in Intraoperative Neuromonitoring

Three credits. Prerequisite: PNB 5101, 5102, and 5103; with an average GPA of 3.0 or higher; instructor consent. May be repeated for credit.

Direct student involvement in intraoperative neuromonitoring of various surgical procedures, observing live signals obtained in a clinical setting, interaction with patients, surgeons and operating room staff, and review of operating room protocols and procedures.

5270. Molecular Endocrinology

(Also offered as MCB 5210.) Three credits.

Molecular mechanism(s) of hormone action in vertebrates and invertebrates. Molecular and genetic characterization of hormones, receptors, and signal transduction, and hormone actions at the molecular, cellular, and organismal levels. Includes student presentations on selected papers.

5302. Fundamentals of Physiology

Three credits.

Introduction to integrative biology. Associations of molecules, cells and tissues and their integrated functions across all organizational levels. Application of language and basic concepts of physiology to the development of problem-solving skills.

5347. Electron Microscopy

Variable (1-3) credits. Prerequisite: Instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Lectures and laboratory exercises on the principles and practice of biological electron microscopy.

5351. Projects in Electron Microscopy

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

Electron microscopy as a research method in biological sciences.

5390. Membrane Transport in Health and Disease

Three credits.

Fundamental mechanisms by which water and small molecules are transported across biological membranes. Biophysical and biochemical analysis

of transport by diffusion, osmosis, channels, carriers and pumps in health and disease.

5395. Independent Study

One credit. May be repeated for a total of 12 credits.

A reading course for those wishing to pursue special work in biology.

5396. Investigation of Special Topics

Variable (1-3) credits. May be repeated for a total of 24 credits.

Advanced study in a field within Physiology and Neurobiology.

5397. Research

Variable (1-6) credits. May be repeated for a total of 60 credits.

Conferences and laboratory work covering selected fields of Physiology and Neurobiology.

5700. Sensory Physiology

Three credits.

Cellular and molecular mechanisms supporting the detection of sensory stimuli in vertebrates, invertebrates and other organisms. Detection of chemicals, touch, temperature, pain, sound, light, heat, magnetic fields, and electricity

6400. Seminar in Neurobiology

One credit. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

An in-depth study of selected topics in the molecular, cellular, and central aspects of neurobiology.

6402. Seminar in Comparative Physiology

One credit. May be repeated for a total of 12 credits.

6403. Seminar in Endocrinology

One credit. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

6405. Seminar in Research and Journal Presentations in Physiology and Neurobiology

One credit. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Provides the opportunity for graduate students to present journal articles and their laboratory research in physiology and neurobiology to the department.

6417. Developmental Neurobiology

Three credits.

Molecular mechanisms of neurodevelopment. Neural induction, cell fate determination, neurogenesis, axon targeting, neuronal migration, synapse formation and activity-dependent synaptic remodeling.

6418. Integrative Neurobiology

Three credits.

Physiology of the central nervous system: information processing and central mechanisms in vertebrates and invertebrates; physiological aspects of behavior.

6420. Physiological Proteomics

Three credits.

Current experimental and computational techniques available to study the proteome and its role in cellular and organismal physiology

6423. Human Reproduction

Three credits.

The physiology of human reproduction.

6426. Molecular and Cellular Neurobiology

Three credits. Prerequisite: Open only to Physiology and Neurobiology graduate students; open to undergraduates in their senior year who have passed PNB 3251, 3275, and one of MCB 2000, 2210, or 3010; open to non-PNB graduate students by instructor consent.

Molecular and cellular aspects of modern neurobiology including the analysis of neuronal proteins and their post-translational modifications, the dynamics of cellular substructures, and various signaling mechanisms innervate cells including synaptic transmission. Molecular and cellular biology of selected neurological disorders.

Plant Science (PLSC)

5150. Design and Analysis of Agricultural Experiments

Four credits. Prerequisite: instructor consent. Recommended preparation: Introductory college-level statistics.

Design and analysis of experiments commonly conducted in agricultural field, greenhouse, and laboratory research. Emphasis on replicated treatment experiments based on completely random, randomized block, Latin square, split-plot, and split-block designs. Limited coverage of non-replicated treatment observational-type experiments. Statistical analyses performed primarily in SAS (Statistical Analysis System) software. Presentation of summarized data using computer generated graphics from various software packages.

5210. Molecular Laboratory Technology

Three credits. Prerequisite: instructor consent. Not open for credit to students who have passed PLSC or SPSS 3210.

Laboratory technologies for identification and characterization of molecules important for molecular biology research, genetic manipulation and disease diagnosis. Labs will provide hands-on experience performing basic molecular biology techniques, lectures will cover theoretical basis and application.

5240. Plant Biotechnology

Three credits.

Principles of recombinant DNA and plant gene transfer technologies. Applications of plant biotechnology in agriculture, horticulture, forestry, human/animal health care, and the pharmaceutical industry. Social and environmental impacts of plant biotechnology.

5245. Plant Breeding and Biotechnology

Three credits. Prerequisite: One of BIOL 1108, 1102, 1110; MCB 2410; SPSS 3210, 3230, 4210, or instructor consent. Not open for credit to students who have passed PLSC or SPSS 3240.

Principles and applications, economic, social and environmental impacts, advantages, potentials and limitations of major traditional and modern plant breeding technologies including crossing/hybridization, polyploidy, mutagenesis, genetic engineering and genome editing.

5250. Plant Gene Transfer Techniques

Three credits.

Techniques of plant gene delivery and transgenic plant production. Verification and analysis of transgenic plants.

5255. Modern and Traditional Plant Breeding Techniques

Three credits. Prerequisite: PLSC 5245. Not open for credits to students who have passed PLSC 5250 or SPSS 3250.

Hands-on experiments for traditional and modern plant breeding techniques, including artificial crossing/hybridization, polyploidy induction, plant tissue culture and transgenic plant production, and radiation- and genome editing-mediate mutagenesis. A fee of \$50 is charged for this course.

5260. Transdisciplinary Research and Participatory Design in Landscape Architecture

Three credits. Prerequisite: instructor consent.

Theory-based lecture course exploring how trans-disciplinary research and community based participatory research can help create a predictable and equitable environment for development decisions. Field trips required.

5270. Global Perspectives in Landscape Architecture

Three credits. Prerequisite: instructor consent.

Examination of the historic development and contemporary practice of landscape architecture across cultural and ecological international divides. Understanding of how the global age impacts landscape design, community planning, and sustainability frameworks.

5410. Soil Chemistry Components

Four credits. Not open to students who have passed SPSS 3420 or SOIL 3410.

Basic concepts of the physical chemistry of soil constituents. Topics include soil atmospheres, soil solutions, soil organic matter, soil mineralogy, and surface characteristics and analysis. Term paper required.

5420. Soil Chemistry Reactions and Equilibrium

Three credits.

Physical chemical characteristics of soil minerals and soil organic matter, and their reactivity with compounds present in the aqueous and vapor phase. Topics include: redox reactions, adsorption and desorption measurements, electrokinetics, adsorption modeling, and physicochemical principles of soil modification and remediation practices. Term paper required.

5460. Sustainable Site Design

Five credits. Prerequisite: instructor consent. Recommended preparation: environmental design coursework and familiarity with digital design programs.

Studio-based course covering environmental, cultural, social, economic dimensions of designing sustainable outdoor sites. Conceptual planning to detailed design and analysis of regenerative site systems over a range of contexts from urban to rural sites, using qualitative and quantitative methods. Applications on service-learning and engaged scholarship projects. Field trips required.

5470. Sustainable Coastal Land Use Planning

Five credits. Prerequisite: instructor consent. Recommended preparation: Environmental design coursework and familiarity with digital design programs.

Studio-based course exploring the relationship between sea level rise and the necessary adaptation of society's development patterns. The majority of

the course will focus on individual student planning projects. Service learning opportunities. Field trips required.

5620. Soil Fertility

Three credits.

Factors governing nutrient uptake by plants, fate of nutrients applied to soils, principles and practices in the use of fertilizers and amendments for crop production, laboratory and field studies of social and plant response to applied nutrients.

5897. Seminar

One credit. May be repeated for a total of two credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

5898. Topics in Plant Science

Variable (1-6) credits. Prerequisite: instructor consent. May be repeated for credit.

Topics and credits to be published prior to the registration period preceding the semester offerings.

5899. Independent Study

Variable (1-6) credits. Prerequisite: instructor consent. May be repeated for credit.

Policy Practice (POPR)

5300. Advanced Macro Practice

Three credits.

This initial course provides a contemporary and historical overview of how the macro practice methods independently and collectively can be leveraged for social change. It provides a foundation for addressing ethical obligations and challenges in macro practice, with particular focus on historically oppressed populations. In addition, students will gain an understanding of the role of leadership and use of power in community organizations and policy and practice.

5301. Policy Practice: Process and Finances

Three credits. Prerequisite: BASC 5350, which may be taken concurrently; and BASC 5390 and 5391; FED 5301 and 5351; open only to M.S.W. students in the Policy Practice concentration. Corequisite: FED 5302 and 5352.

The definition of policy practice, the phases of policy practice and the skills needed for policy practice especially advanced analytical and interactional skills, including the conscious use of self in practice, as well as persistence, creativity, and pragmatism and taking appropriate risks in the pursuit of policy practice goals. Other content includes the use of large data sets, data management systems, quantitative analysis, qualitative methods, especially focus groups. Emphasis is given to the use of policy practice to achieve distributive justice and implement and evaluate effective social service policies for populations at risk. Ethical requirements and dilemmas in policy practice are integrated throughout. Required course for students in the Policy Practice concentration.

5302. Policy Practice: Careers, Contexts, and Quantitative Analysis

Three credits. Prerequisite: POPR 5301 and 5353, and FED 5310; open only to M.S.W. students in the Policy Practice concentration. Corequisite: POPR 5354 and FED 5311.

Begins with content on career planning. Students will be helped to understand the complexity of social service funding, including the sources of

funds and the mechanisms for transferring funds to social service programs, including federal and state tax policies and implication for social service programs. Critical current issues such as the growth of faith-based and profit-making social service strategies will be debated. Other topics will include the use of the media and public relations expertise, cutting edge social theories, micro and macroeconomic theories, and global economic policies and how they impact social service policies. Students will be expected to demonstrate an ability to integrate and critically evaluate their practice skills as they prepare to leave the program. Emphasis will be given to the use of policy practice intervention strategies to achieve distributive justice and effective service policies for populations at risk. Ethical requirements and dilemmas in policy practice will be integrated throughout the course. Required course for students in the Policy Practice concentration.

5310. Program Planning, Development, and Evaluation

Three credits. Prerequisite: must be taken concurrently with field placement. Corequisite: ADMN 5353 or CORG 5353 or POPR 5353.

Covers a broad range of knowledge and skills needed to develop sound program proposals and to plan, manage, and evaluate social programs. These include assessing social and community needs; setting goals within the context of strategic plans; writing measurable objectives; designing program implementation and evaluation strategies, developing a program budget, and identifying funding sources. Addresses value and ethical issues in program development, as well as constraints and opportunities that support or constrain program planning. Required course for students in the Community Organization, Administration and Policy Practice concentrations. The pre and co-requisites for this course differ for each of these concentrations. Refer to the Student Handbook for pre and co-requisite details.

5312. Political Advocacy

Three credits. Prerequisite: FED 5351.

Builds on the concepts and interventions introduced in the Macro Foundation Practice course. Political decision-making groups, including executive, legislative, judicial and private agency decision-making. The ways macro practitioners use power and political analysis is discussed. Emphasis is on the design, implementation and evaluation of a political advocacy strategy to improve the life situations of populations at risk, such as lobbying, preparing and delivering testimony to a public policy making group and forming and maintaining coalitions. Ethical requirements and dilemmas in doing political advocacy are integrated throughout the course. Required course for students in both the Community Organization and the Policy Practice concentrations. The co-requisites for this course differ for each of these concentrations.

5340. Advanced Macro Practice Skills Laboratory

One credit.

Focuses on gaining knowledge and skills in the elements of program planning and proposal writing, and includes application of these through development of a program proposal for funding. The skills laboratory will provide an additional opportunity for students to apply knowledge and skills through a proposal review and evaluation

exercise. The exercise will be conducted on the last day of the course after the students' final projects have been submitted. The instructor will choose one final project for the purposes of the review exercise with the student's name removed. (Note: more than one proposal can be selected offering an opportunity for ranking them in the exercise.) Required course for students in the Advanced Standing Option in the Administration, Community Organization, and Policy Practice Concentrations and must be taken in the summer prior to the beginning of full time study for the M.S.W. degree.

5353. Field Education in Policy Practice III

Four credits. Prerequisite: FED 5302 and 5352. Corequisite: POPR 5310 and FED 5310. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Policy Practice concentration.

5354. Field Education in Policy Practice IV

Four credits. Prerequisite: POPR 5353 and FED 5310; open only to M.S.W. students in the Policy Practice concentration. Corequisite: POPR 5302 and FED 5311. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Policy Practice concentration.

5355. Block Placement in Policy Practice

Eight credits. Prerequisite: FED 5302 and 5352; open only to M.S.W. students in the Policy Practice concentration. Corequisite: POPR 5310 and FED 5350; instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Field Education in Policy Practice for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course. Required course for students in the M.S.W. program completing a Block Field Placement.

Political Science (POLS)

5000. Independent Study in Political Science

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 24 credits.

5010. Investigation of Special Topics in Political Science

Variable (1-3) credits. May be repeated for a total of 24 credits.

5100. Proseminar in Political Theory

Three credits.

Historical survey and analysis of fundamental concepts in political theory.

5105. Political Theory

Three credits. May be repeated for a total of 12 credits.

Historical and conceptual analysis of selected political ideas such as justice, liberty, rights, political obligation, or the state; including an examination of one or more major schools or bodies of political thought from ancient to contemporary times.

5115. Theories of Human Rights

Three credits.

Debates about the meaning of human rights and their importance.

5200. Proseminar in Comparative Government

Three credits.

Political institutions and processes compared. Derivation of generalizations.

5215. Comparative Political Development

Three credits.

Development of political systems in relation to socio-economic level and other conditioning factors. Political stability and change.

5235. Comparative Democratization

Three credits.

Democratization and major approaches to regime change away from authoritarianism.

5240. Research Seminar in Comparative Politics

Three credits. May be repeated for credit.

5250. Comparative Voting Behavior

Three credits.

The effect of economic, social, and political contexts on voters, decision-making processes.

5260. Democratic Institutions

Three credits.

Rules that structure access to power and policy-making process across countries; changes over time; and major political effects. Topics include the electoral system, presidentialism, government formation, legislative committees, federalism, and the courts.

5300. Proseminar in International Relations

Three credits.

Current theories of and methodological approaches to international relations.

5305. Foreign Policy Analysis

Three credits.

Analysis of foreign policy processes from a comparative, theoretical perspective.

5315. International Security

Three credits.

Political and military issues as they intersect at the international level, such as war, terrorism, alliances, and intervention.

5322. Human Security

Three credits.

Examination of emerging conceptions of human security, important elements of which include good governance, food, water, political, economic, and environmental security. Definition, measurement, and politics of human security. Relationship to domestic and international policy-making and advocacy.

5325. International Political Economy

Three credits.

Major problem areas in which politics, economics, and business intersect at the international level -- trade, foreign investment, and monetary relations. The politics and mechanisms of U.S. foreign economic policy.

5330. International Organization and Law

Three credits.

International cooperation to resolve economic, social, and political transnational problems.

5335. U.S. Foreign Policy in the Middle East

Three credits.

Examination of U.S. political, economic and strategic interests and aims in the Middle East.

5340. Politics and Security in the Middle East

Three credits.

Examination of security issues in the Middle East and the responses of regional actors and external powers.

5400. Proseminar in American Politics

Three credits.

Theory and practice of American government and politics, with an emphasis on various theoretical and methodological perspectives.

5406. Special Topics in American Politics

Three credits.

Advanced study of selected topics. Intensive examination of research literature dealing with particular aspects of American politics.

5407. American Political Institutions and Policy

Three credits.

The institutions and policy-making process of American government.

5408. American Political Behavior

Three credits.

The political behavior of the American public, including public opinion, voting behavior, and other forms of participation.

5409. American Race, Gender and Ethnic Politics

Three credits.

The politics of American race, gender and ethnicity, with a focus on disadvantaged groups and their influence on the political process.

5410. Black Feminist Theory and Politics

Three credits.

Major debates at the core of black feminist theory, emphasizing the ways in which interlocking systems of oppression uphold and sustain each other in contemporary U.S. politics.

5420. Public Opinion and American Democracy

Three credits.

Theories of democracy and what they imply about the public's capabilities and role; empirical research on the American public and public opinion in the context of democratic theory.

5425. American Political Parties

Three credits.

The development, organization, and role of political parties in the United States, with implications for public policy.

5455. Public Opinion and Public Policy

Three credits.

Theoretical and empirical study of public opinion and its role in policy formation.

5460. Social Policy

Three credits.

5505. Seminar in Public Law

Three credits.

Selected topics in public law, the administration of justice, and jurisprudence.

5510. Judicial Decision-Making

Three credits.

The judicial decision-making process in terms of methods and models developed in the framework of the behavioral sciences.

5515. Constitutional Interpretation

Three credits.

An exploration of the theories and process of constitutional interpretation in the United States,

with an emphasis on the role the Supreme Court plays in defending and enforcing civil liberties.

5600. Nature of Political Inquiry

Three credits.

The scope of political science, modes of inquiry, the role of concepts and theory. Graduate students are urged to take the course in their first semester.

5605. Seminar in Quantitative Methods of Political Science

Three credits.

Introduction to the data analysis techniques most often used by political scientists. Requires no previous background in statistics.

5610. Research Design in Political Science

Three credits.

Introduction to quantitative and non-quantitative empirical research design in political science.

5615. Seminar in Qualitative Methods of Political Science

Three credits. Prerequisite: POLS 5600, 5605, and 5610; department consent required. May be repeated once for credit.

A survey of qualitative research methods. Training in use of case studies, comparative historical approach, interviewing and focus groups, ethnography and interpretive methods.

6400. Research Seminars in American Politics

Three credits.

6500. Research Seminar in Judicial Process

Three credits.

6610. Research Seminar in Quantitative Methods

Variable (1-6) credits. Prerequisite: POLS 5605. May be repeated for a maximum of six credits.

Research in quantitative applications to political data.

Polymer Science (POLY)

5351. Polymer Physics

Three credits.

Modern concepts relating to glassy, rubbery and organized states of bulk polymers. Considers rubber elasticity, glass-to-rubber transitions, networks, elements of crystallization, blends and interfacial phenomena.

5352. Polymer Properties

(Also offered as CHEG 5352.) Three credits.

Interrelationships between solid state structure, dynamics and mechanical properties of non-crystalline and semi-crystalline polymers. Considers polymer viscoelasticity, diffusion, failure mechanisms, and elementary polymer rheology.

5367. Polymer Rheology

(Also offered as CHEM 5367.) Three credits.

Analysis of the deformation and flow of polymeric materials. Topics include non-Newtonian flow, viscoelastic behavior and melt fracture with application to polymer processing.

5380. Polymer Synthesis

(Also offered as CHEM 5380.) Three credits.

Chemistry of the formation of high polymers, including kinetics, mechanisms, and stereochemistry of step growth and addition polymerization. Recent advances in polymer synthesis.

5381. Polymer Physical Chemistry

(Also offered as CHEM 5381.) Three credits.

A molecular description of the fundamental physico-chemical aspects of polymer solutions and solids. Considers thermodynamics, chain statistics, dynamics, and structure of polymer molecules.

5382. Polymer Characterization I

(Also offered as CHEM 5382.) Three credits.

Experimental techniques for characterizing polymers on a molecular level, with emphasis on the provision of a working knowledge of instrumental analysis. Experiments include dilute solution viscosity, vapor pressure osmometry, gel permeation chromatography, chemical and spectroscopic analysis.

5384. Polymer Characterization II

(Also offered as CHEM 5384.) Three credits.

Experimental techniques for characterizing polymers, with emphasis on provision of a working knowledge of instrumental analysis. Experiments include calorimetry, IR and fluorescence spectroscopy and X-ray structure determination.

5395. Biopolymers

(Also offered as CHEG 5395.) Three credits.

Thermodynamics and kinetics of biopolymers (carbohydrates, proteins, DNA/RNA, lipids/biomembranes). Properties, applications, and connections to current research.

5396. Polymer Processing

Three credits.

Various polymer processing techniques: extrusion; injection molding; film and sheet processing; blow molding; thermoforming; fiber spinning; processing of thermosets and special polymers. Also offered as CHEG 5395 Special Topics

5397. Nanostructural Characterization

(Also offered as CHEG 5395.) Three credits.

Various types of scattering techniques (diffraction, small angle scattering, reflectometry) to investigate global structure of polymeric or other soft materials ranging from Å to submicron using different probes (X-ray, neutron, light).

6001. Seminar in Polymer Science and Engineering

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Presentations by invited guest speakers on topics of current interest in various areas of Polymer Science and Engineering).

Psychological Sciences (PSYC)

5100. History of Psychology

Three credits. Prerequisite: Open only to Psychological Sciences graduate students, others with consent.

Intellectual antecedents to contemporary clinical, developmental, experimental, and social psychology.

5101. Motivation

(Also offered as COMM 5101.) Three credits. Prerequisite: Instructor consent.

Theories of motivation considered in relation to their supporting data.

5104. Foundations of Research in the Psychological Sciences I

Three credits. Prerequisite: Open only to Psychological Sciences graduate students, others with consent.

Introduction to the logic of experimental design and data analysis in the psychological sciences. Analysis of group designs, especially analysis of variance, and introduction to hypothesis testing.

5105. Foundations of Research in the Psychological Sciences II

Three credits. Prerequisite: PSYC 5104; open only to Psychological Sciences graduate students, others with consent.

Expands on material covered in PSYC 5104, including the development and application of correlational methods specific to conducting and understanding research in the psychological sciences.

5120. Health Psychology

Three credits. Prerequisite: Instructor consent.

Interaction of biological, psychological, and social factors in health. Topics include disease prevention and health promotion, psychosocial factors in treatment of illness, and stress and coping processes.

5121. Research Methods in Health Psychology

Three credits. Prerequisite: STAT 3115Q and 5105 or equivalent statistics course; instructor consent.

Research designs, methods, and data analysis strategies used in health promotion and disease prevention research (e.g., case control studies, randomized clinical trials).

5123. Occupational Health Psychology

Three credits. Prerequisite: STAT 5105 or NURS 5020 or PUBH 5434; instructor consent.

Introduction to research in occupational health and the field of occupational health psychology in a proseminar format. Topics include work stress, worker participation in hazard management, epidemiology of occupational exposures, workplace incivility, and design of safe work environments.

5131. Meta Analysis: Theory and Practice

Three credits. Prerequisite: STAT 5105; instructor consent.

Methods of research synthesis, including the literature review and the place of quantitative methods in drawing conclusions from existing empirical research. Introduces the statistical techniques of meta-analysis, which integrates the results of independent studies addressing the same hypothesis.

5140. Foundations in Neuropsychology

Three credits.

An introduction to neuropsychology, including functional neuroanatomy, neurochemistry, neuropharmacology and cognitive/emotional function and dysfunction.

5141. Neuropsychological Assessment

Three credits. Prerequisite: PSYC 5140; instructor consent.

An introduction to clinical neuropsychological assessment, including review of neuroanatomy and neuropsychological functions, common syndromes of neuropsychological dysfunction, specific tests to measure neuropsychological functions and professional issues for the neuropsychologist.

5150. Neurodevelopment and Plasticity

(Also offered as COGS 5130.) Three credits. Prerequisite: Open only to graduate students in Psychological Sciences; Speech, Language and Hearing Sciences; and Physiology and Neurobiology; instructor consent.

Overview of brain development including embryonic neurogenetics; evolution and evo-devo; how emergent behavioral capabilities reflect neural growth in neurobehavioral development; and how disruptions of neurodevelopment cause developmental disabilities. Offered alternating years in spring semester.

5170. Current Topics in Psychology

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Selected topics in psychology are studied with particular attention to recent developments in the field.

5200. Behavioral Neuroscience Research Seminar

Two credits. Prerequisite: Instructor consent. May be repeated for a total of eight credits.

Seminar on current research, with intra- and extra-mural colloquium speakers.

5228. Neuropsychopharmacology

Three credits. Prerequisite: Instructor consent.

Review of the anatomy and physiology of the CNS and then discuss the effects of pharmacological agents on it. Topics include general anesthetics, hypnotics and sedatives, anticonvulsants, alcohol, muscle relaxants, tranquilizers, hallucinogens, and narcotics. Student presentations will treat topics relating the CNS and behavioral pharmacology.

5251. Neural Foundations of Learning and Memory

Three credits. Prerequisite: Instructor consent.

Examination of the processes involved in habituation, conditioning, learning, and memory through a study of the neural elements and systems involved in their production and maintenance.

5257. Physiological Psychology Laboratory

Three credits. Prerequisite: Instructor consent.

Techniques used in the study of physiological psychology, including ablation, electrical and chemical stimulation, and electrophysiological recording of the nervous system.

5270. Current Topics in Behavioral Neuroscience

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Special problems or areas of research are studied with particular attention to recent developments in the field.

5271. Special Topics in Behavioral Neuroscience

Three credits. May be repeated for a total of 12 credits with a change in topic.

5285. Neurobiology of Aging: Changes in Cognitive Processes

Three credits. Prerequisite: Instructor consent.

Neural basis of age-related changes in learning and memory. Both the normal aging process and age-related pathologies examined. Encompasses both animal models and human data.

5300. Research Seminar in Clinical Psychology

One credit. Prerequisite: Open only to graduate students in the Clinical Psychology concentration. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Advanced seminar presentations by faculty, graduate students, and visiting speakers on current theoretical developments and empirical research in clinical psychology.

5301. Practicum in Interviewing and Cognitive Assessment

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

An introduction to psychological assessment with supervised practice in administering and interpreting clinical interviews and psychological tests.

5302. Adult Psychopathology

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

Theoretical and descriptive overviews of mental disorder that afflict adults, emphasizing etiology, diagnosis, and conceptualization.

5303. Developmental Psychopathology

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

An examination of diagnosis, etiology, and prognosis in child psychopathology.

5304. Practicum in Personality Assessment

Three credits.

Supervised practice in administration and interpretation of clinical tests and case history material, report writing and discussion of implications of diagnostic data for therapeutic procedures.

5305. Psychodynamics

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

Overview of theoretical and empirical literature about theories of personality development and models of behavior change processes.

5306. Professional Issues in Clinical Psychology

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

An examination of the relations among the law, ethical issues, and professional practices of clinical psychologists and of other providers of mental health services.

5307. Empirically Supported Therapy

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

Instruction in and supervised practice of empirically supported therapeutic techniques and treatments.

5322. Methods of Child and Family Therapy in Clinical Psychology

Three credits. Prerequisite: PSYC 5307; open only to Psychological Sciences graduate students in the Clinical Psychology concentration.

Overview of multiple intervention models for therapy with children and families.

5332. Research Design and Test Construction

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration.

Theoretical issues and practical problems in developing valid measures of personality variables and in designing experimental and quasi-experimental research.

5344. The History and Systems of Psychology

One credit. Prerequisite: PSYC 5307; open only to Psychological Sciences graduate students in the Clinical Psychology concentration.

An overview of the trends in philosophy and early psychology that shaped the present course of the discipline.

5370. Current Topics in Clinical Psychology

Three credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration; instructor consent. May be repeated for credit.

5371. Special Topics in Clinical Psychology

Three credits. May be repeated for a total of 12 credits with a change in topic.

5399. Clinical Psychology Research Group

One credit. Prerequisite: Open only to graduate students in the Clinical Psychology concentration; instructor consent. May be repeated for a maximum of 12 credits.

Discussion of ongoing research of faculty and graduate students

5400. Research Seminar in Developmental Psychology

One credit. Prerequisite: Open only to Psychological Sciences graduate students; instructor consent. May be repeated for a maximum of 12 credits.

Current research in developmental psychology, with intra- and extramural speakers and directed readings.

5410. Advanced Developmental Psychology

Three credits. Prerequisite: Instructor consent.

Undertakes, at an advanced level, a developmental treatment of child behavior on the basis of experimental findings and psychological theory.

5420. Cognitive Development

Three credits. Prerequisite: Instructor consent.

Current theory and research on children's conceptual development.

5424. Cognitive Neuroscience of Language across the Lifespan

(Also offered as COGS 5150.) Three credits. Prerequisite: Open only to Psychological Sciences, Linguistics, and Speech, Language and Hearing Sciences graduate students.

The cognitive neuroscience approach to the study of language across the lifespan. Recent advances in neuroimaging techniques such as MRI, ERP, TMS, and fNIRS are combined with classic lesion studies to address the neurobiological bases of typical and atypical language processing.

5425. Developmental Cognitive Neuroscience

Three credits. Survey of current research and methods in developmental cognitive neuroscience, an interdisciplinary scientific field at the boundaries of neuroscience, developmental psychology, and cognitive science.

5440. Development of Language and Related Processes

Three credits. Prerequisite: Open only to Psychological Sciences graduate students, others with consent.

Experimental and descriptive study of the child's language processes, with emphasis on acquisition, structure, meaning, thought, and the influence of verbal processes on nonverbal behavior.

5441. Language Modality, Neural Plasticity, and Development

Three credits. Prerequisite: Open only to Psychological Sciences, Linguistics, and Speech, Language and Hearing Sciences graduate students.

An integrative approach that reveals the contribution of sign language research to the understanding of human neural plasticity.

Diverse research programs and methodologies (e.g., emerging languages, neuroimaging) are combined with behavioral studies (e.g., cognitive psychology) to address the effects of variable language experiences on language development, cognitive development, and neural organization for language.

5445. Neurobiology of Language: Typical and Atypical Cognition and Language Development

(Also offered as COGS 5140.) Three credits. Prerequisite: Open only to Psychological Sciences, Linguistics, and Speech, Language and Hearing Sciences graduate students. Recommended preparation: one of COGS 5110, 5120, 5130, 5150; LING 5110; PSYC 5440; or SLHS 5348.

Survey of current research on language acquisition in developmentally delayed/pathological populations, including but not restricted to Autism, Williams Syndrome, Down Syndrome, and Specific Language Impairment. Examination of what the language delays and deficits reveal about each disorder, the processes of language acquisition, the representation and organization of language, and the biology/neuropsychology/genetics of language.

5450. Infancy and the Effects of Early Experience

Three credits. Prerequisite: Instructor consent.

Data and theory concerning the effects of early experience in infancy on behavioral and physiological development. Cross-species comparisons are emphasized.

5460. Social and Personality Development

Three credits. Prerequisite: Instructor consent.

Fundamental research and theory on social behavior, social cognition, and interpersonal relations in the preschool period (2-6 years) and in middle childhood (6-12 years). Early childhood precursors and consequences in adolescence. Both normative and atypical development.

5470. Current Topics in Developmental Psychology

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Selected topics in developmental psychology are studied with particular attention to current research and theoretical trends.

5471. Special Topics in Developmental Psychology

Three credits. May be repeated for a total of 12 credits with a change in topic.

5499. Research Team in Developmental Psychology

One credit. Prerequisite: Open only to Psychological Sciences graduate students; instructor consent. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Planning and execution of both individual and collaborative research projects in developmental psychology.

5500. Research Seminar in Language and Cognition

(Also offered as LING 5010.) One credit.

5513. Memory

Three credits. Prerequisite: Instructor consent.

Contrasts associationist, cognitive, connectionist, and cognitive neuroscience approaches to issues

involving short-term memory, long-term memory, and the representation of knowledge.

5515. Connectionist Models

Three credits. Prerequisite: Instructor consent.

Connectionist models in psychology and computational neuroscience. Topics include learning, memory, and language processes in both intact and damaged networks.

5553. Introduction to Nonlinear Dynamics

Three credits. Prerequisite: Instructor consent.

Basic concepts and methods of nonlinear dynamics systems theory applied to behavioral time-series data.

5554. Advanced Nonlinear Dynamics for the Behavioral Sciences

Three credits. Prerequisite: PSYC 5553; instructor consent.

Advanced concepts and methods of nonlinear dynamics systems theory applied to behavioral time-series data.

5564. Dynamics of Language and Cognition

Three credits.

Application of dynamical systems theory to language modeling.

5567. Cognition

Three credits.

An introduction to theories of human cognition.

5568. Psychology of Language

Three credits. Prerequisite: Instructor consent.

Psychological aspects of linguistic structure, with particular attention to phonology.

5570. Current Topics in Cognitive Science

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Special topics in cognitive systems theory are reviewed with particular emphasis on techniques for the intrinsic measurement of systems behavior including information processing capacities and goal achievements. Students are required to apply the techniques discussed to an ongoing research topic of their own choosing.

5572. Sensation and Perception II

Three credits. Prerequisite: PSYC 5571.

A continuation of PSYC 5571.

5574. Control and Coordination of Action

Three credits. Prerequisite: Instructor consent.

Covers the ecological approach; movement as the product of a representational/computational system; intentionality; physical principles of self-organization and cooperativity; task dynamics. Problems in the physiology of activity, prosthetics and robotics are addressed.

5583. Sentence and Discourse Processing

Three credits.

How psychological theories of perception and learning provide insight into language processing at the level of sentence structure and discourse structure.

5600. Research and Practice of Industrial/Organizational Psychology

One credit. Prerequisite: Instructor consent. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Current research and practice in industrial/organizational psychology, with intra- and extramural speakers.

5611. Work Motivation

Three credits. Prerequisite: PSYC 5613; instructor consent.

Major theoretical approaches to work motivation and their implications for the design of work settings and the treatment of workers.

5612. Leadership in the Workplace

Three credits. Prerequisite: PSYC 5613; instructor consent.

Theoretical and research issues associated with leadership in the workplace. Classical and current theories of leadership, research in leadership development, and evaluation of various leadership models.

5613. Organizational Psychology

Three credits. Prerequisite: Open only to doctoral students in the Industrial and Organizational Psychology concentration, others with consent.

Major research lines in organizational behavior (work motivation, leadership, work attitudes, job design, turnover, absenteeism), with attention to emerging areas (e.g., women in management). Emphasis on research methods and analytic strategies.

5614. Personnel Psychology

Three credits. Prerequisite: Open only to doctoral students in the Industrial and Organizational Psychology concentration, others with consent.

Techniques of personnel psychology: recruitment, selection, placement, evaluation, training, development, and related areas.

5615. Human Factors

Three credits. Prerequisite: Open only to doctoral students in the Industrial and Organizational Psychology concentration, others with consent.

Theories of design and analysis of man-machine systems in an industrial/organizational context. Special emphasis on the human as an information-processing sub-system operating with other people and machines in complex systems. Application of psychological principles to design of industrial workplaces, military systems, and consumer products; and to the design of simulation systems for training.

5616. Human Judgment and Decision Process

Three credits. Prerequisite: Open only to doctoral students in the Industrial and Organizational Psychology concentration, others with consent.

Examination of social judgment methodology, judgmental heuristics and biases, process tracing, bootstrapping, behavioral decision theory, and multi-attribute utility measurement.

5617. Occupational Health and Safety

Three credits. Prerequisite: PSYC 5615; instructor consent.

Research methods, theories and findings related to the impact of work duties and environmental conditions on occupational safety and health.

5618. Selection and Placement

Three credits. Prerequisite: PSYC 5614; instructor consent.

Theory and research on employee selection and placement. Selection models, employee testing, statistical methods in selection and placement, equal opportunity and EEOC guidelines and related ethical issues.

5619. Performance Appraisal

Three credits. Prerequisite: PSYC 5614.

Methods and issues in performance rating in organizations. Classic studies and current models of performance evaluation are used to explore factors that enhance or hinder the accurate gathering, evaluation, and communication of employee performance information.

5620. Design and Analysis of Human-Machine Systems

Three credits. Prerequisite: PSYC 5615; instructor consent.

The basis, in theories of perception and learning, for design of complex human-machine systems.

5670. Current Topics in Industrial/Organizational Psychology

Three credits. Prerequisite: Instructor consent. May be repeated for credit.

Selected topics in industrial/organizational psychology are studied with particular attention to current research and theoretical trends. Topics vary by semester.

5671. Special Topics in Industrial/Organizational Psychology

Three credits. May be repeated for a total of 12 credits with a change of topic.

5699. Research Team in Industrial/Organizational Psychology

Variable (1-3) credits. Prerequisite: Open only to Psychological Sciences graduate students; instructor consent. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Planning and execution of both individual and collaborative research projects in industrial/organizational psychology.

5700. Proseminar in Social Psychology

One credit. Prerequisite: Open only to graduate students in the Social Psychology concentration; instructor consent. May be repeated for a maximum of 10 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Presentations on current research in all areas of social psychology.

5701. Experimental Social Psychology

Three credits. Prerequisite: Instructor consent.

A critical overview of the various laboratory methods and techniques in social psychology.

5702. Field Research Methods

Three credits. Prerequisite: PSYC 5701.

An examination of various methods of field research, focusing on design, analysis, theory, and practical issues.

5703. Advanced Social Psychology

Three credits. Prerequisite: Open only to graduate students in the Social Psychology concentration, others with consent.

An overview of the field of social psychology organized around the major underlying theoretical orientations. Several positions are critically examined along with representative empirical work.

5770. Current Topics in Social Psychology

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 28 credits.

Topics vary by semester. Recent topics have included Professional Development, Health Psychology, Morality, Cross-cultural Psychology, Social Processes of AIDS, Ecological Social Psychology, Stereotypes and Prejudice.

5771. Special Topics in Social Psychology

Three credits. May be repeated for a total of 12 credits with a change of topic.

5799. Research Team in Social Psychology

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Planning and execution of both individual and collaborative research projects in social psychology.

5800. Research in Psychology

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

5801. Independent Study in Psychology

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

6136. Seminar in Quantitative Research Methods

Three credits. Prerequisite: Instructor consent.

Quantitative research culminating in a research methods paper. Intended as the capstone course for the Quantitative Research Methods graduate certificate following completion of other courses in the certificate program.

6141. Practicum in Neuropsychological Assessment

Three credits. Prerequisite: PSYC 5301, 5140, and 5141; instructor consent. May be repeated for credit.

Field placements in clinical neuropsychology. Students will be placed in area hospitals, rehabilitation centers, or on campus, where they will perform neuropsychological evaluations under supervision and attend clinical rounds and team meetings.

6300. Clerkship in Clinical Methodology

Variable (1-6) credits. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Supervised clinical training in a community facility.

6301. Practicum in Adult Psychotherapy

Variable (1-3) credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration, others with consent. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Supervised psychotherapy training with adults including diagnostic procedures.

6302. Practicum in Child Psychotherapy

Variable (1-3) credits. Prerequisite: Open only to graduate students in the Clinical Psychology concentration, others with consent. May be repeated for a maximum of 12 credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Supervised psychotherapy training with children and parents including diagnostic procedures.

6303. Didactics of Supervision and Consultation

Three credits. Prerequisite: PSYC 5301, 5304, 6301, and 6302; open only to graduate students in the Clinical Psychology concentration. May be repeated once for credit.

Exposure to theories, models, and empirical data pertinent to providing quality supervision of the

psychodiagnostic and psychotherapeutic activities of mental health professionals.

6304. Practicum in Clinical Supervision

Three credits. Prerequisite: PSYC 5301, 5304, 6301, and 6302; open only to graduate students in the Clinical Psychology concentration. May be repeated for a maximum of 12 credits.

Supervised training in supervising psychodiagnostic and psychotherapeutic activities of less advanced clinical psychology students.

6310. Internship in Clinical Psychology

Zero credits. Prerequisite: Instructor consent.

Students assume professional psychological assessment, psychotherapeutic, and consultation responsibilities under the direct supervision of licensed clinical psychologists.

6505. Teaching Experimental Psychology

Three credits.

The lecture method applied to teaching undergraduate courses in experimental psychology (introductory, cognition, learning and memory, sensation and perception) and giving conference presentations. Attention is given to presentation style and content.

6732. Attitude Organization and Change

Three credits. Prerequisite: Open only to Psychological Sciences graduate students, others with consent.

An overview of the field of attitude theory and research focusing on problems of attitude formation, attitude organization, and attitude change.

6733. Social Cognition

Three credits.

Study of causal attribution, stereotyping, evaluating, judgement and decision-making, persuasion, expectancies, memory, attention as they pertain to social life.

6750. The Social Psychology of Stigma

Three credits. Prerequisite: Instructor consent.

Classic and current theories and research on stigma are covered. General stigma processes as well as group-specific (e.g., race, gender, mental illness) issues will be discussed.

6771. Intergroup Relations

Three credits.

Marxism, social identity theory, realistic group conflict theory, elite theory, equity theory, relative deprivation, authoritarian personality, social dominance theory and evolutionary theory as it pertains to intergroup and gender relations.

Public Health (PUBH)

5201. Essentials of Social Inequality and Health Disparities

Three credits.

Introduction to (a) the extent of health disparities across the US population, (b) how social inequality contributes to health disparities, and (c) why attention to social inequality is essential to the effective practice of clinical medicine and dental medicine. Examination of how society's social, economic, political and cultural institutions are structured and why they perpetuate the unequal distribution of opportunities that systematically limit the life chances and experiences of individuals. A range of social determinants (race/racism, poverty, income inequality, education, environmental conditions, social capital, social

cohesion, social mobility, safety/security, criminal justice system) are considered that may influence health, either directly or as pathways for other determinants. Addresses the function of public health assessment, provides students with a conceptual basis for the complementary course, PUBH 5202.

5202. Eliminating Social Inequality and Health Disparities

Three credits.

Examination of the evidence for structural, community, and individual-level interventions to reduce the impact of inequity on health and health care utilization. Identification and implementation of multi-level interventions that may reduce inequities by altering the social, economic, and other structural aspects of the environment. It will also address challenges of implementation and ways to reduce potential barriers. The course builds on the conceptual basis of PUBH 5201.

5400. Introduction to Public Health

Three credits.

Introduction to the discipline, its scientific foundations, and its relationship to other fields including clinical medicine. The basic concepts and skills necessary for a practitioner of public health are explained. Students gain a better appreciation of epidemiology to guide public health interventions and the development of public health policy.

5401. Principles of Epidemiology

Three credits.

Introduction to epidemiological concepts and methods as applied to public health research, community diagnosis, prevention, health planning and evaluation studies. Intensive use of exercises in descriptive and analytic epidemiology based on current investigations.

5402. Introduction to Biostatistics

Three credits.

Introductory presentation of the fundamentals of biostatistical theory and application, aimed at developing competence in the use of statistics, probability distributions, hypothesis testing, inference and estimation as applied to the most commonly used techniques in parametric and nonparametric statistical methods. Critical appraisal of research reported in journal articles serves as an application of learned techniques.

5403. Health Administration

Three credits.

Examination of past, present, and proposed approaches to the organization and management of health care services. Emphasis is on the role and functioning of the manager and the evolution of health care policy and trends as they affect managerial roles.

5404. Environmental Health

Three credits.

Explores the policy, political and public health implications of such issues as air pollution, drinking water, exposure to hazardous chemicals, indoor air pollution, food protection, lead poisoning, housing, international issues, etc. Provides the student with some basic technical information and familiarity with terms for a better understanding of policy and political decisions and health effects of environmental exposures.

5405. Social and Behavioral Foundations of Public Health

Three credits.

Introductory survey emphasizing basic social science concepts in the analysis of public health including orientations toward health, disease and health care, the origins and distribution of health care resources, and the role of social movements and research in improving public health.

5406. Law and Public Health

Three credits.

Introduction to the American legal system as it relates to health care and public health. Sessions present important applications of law to health including the powers of state governments, public health at the federal level, hospital, physician and HMO liability, emergency care and medical research, mental health law, reproductive health and the right to privacy, the right to refuse treatment and end of life issues, privacy and confidentiality in health care, infectious disease law and disability discrimination, and public health policy and advocacy.

5407. Practicum in Public Health

Variable (1-3) credits. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Under faculty guidance, students undertake an organized set of activities that responds to an identified need of a public health agency or health-related organization. The activities may involve the policy development, planning, implementation, administration or evaluation of public health services, or a combination of such activities. Students should be appropriately advanced before initiating the practicum.

5408. Introduction to Epidemiology and Biostatistics I

Three credits. Prerequisite: Open only to students in the MPH program, others with consent.

This is the first of a two-course sequence introducing students to concepts and methods of epidemiology, biostatistics and public health research. Topics include nature of variability, common probability distributions, causal reasoning, control of bias and confounding, descriptive and analytic design of observational and experimental studies, principles of disease screening and clinical efficacy.

5409. Introduction to Epidemiology and Biostatistics II

Three credits. Prerequisite: PUBH 5408; open only to students in the MPH program, others with consent.

This continuation of a two-course sequence on basic epidemiology, biostatistics and public health research addresses hypothesis generation, data collection methods, point and confidence interval estimation, inference testing, correlation/regression analysis, multivariable interaction, effect modification, power and meta-analysis. Evaluation of study designs, research methods and statistical procedures in clinical and public health literature will be stressed.

5410. Fundamentals of Strategic Planning

Three credits.

Fundamentals of strategic planning for public and non-profit organizations emphasizing the development of mission and vision statements, stakeholder analysis, scanning of internal and external environments; formulation and implementation of goals and objectives, definition of strategic issues, program planning, and

evaluation. Introduction to related concepts in long range planning and group decision making. A group strategic planning project caps the course.

5412. Health Regulation

Three credits.

Focus is on the relationship between law and health care. Regulation of practice, practitioners and facilities. Legal aspects of alternative delivery systems including managed care. Legal and ethical dimensions of the health care provider-client relationship also are addressed.

5414. Health Economics

Three credits.

Introduction to economic theory and various applications of economics in the analysis of the U.S. health care system.

5416. Principles of Quality Improvement

Three credits.

Quality improvement (QI) is the art and science of improving quality of care by continuously making small improvements in key steps or processes. Because systems of care are inherently complex, people need tools and methods to recognize and prioritize what changes are necessary and to know how to implement and evaluate such changes. Several basic principles or concepts underlie QI efforts, such as variation, leadership, systems thinking, and the psychology of motivation. This course will describe critical principles and concepts important to QI and will illustrate their practical application to health care settings.

5419. Public Health Agencies

Three credits.

Takes organization and management theory into practice. The focus is on governmental and non-profit agency management and administration. Emphasis is on developing and defending budgets, personnel management, working within the political context, with the community and with multiple agencies.

5430. Public Health Informatics

Three credits.

An overview of the basic information skills required to clarify a health-related information need and identify and use appropriate information resources to select materials that answer that need. The course will include discussions of health-related networks and information resources, demonstrations of their appropriate use, class exercises and a semester project. Enrollment limited to 12.

5431. Public Health Research Methods

Three credits.

Introduction to conceptualization, methods, and analysis in public health research including formulation of research questions and hypotheses, development of research and analytic models, use of qualitative (interviewing and observation) and quantitative (secondary and survey data) data collection methods, and qualitative and quantitative data analysis leading to the formulation of research projects.

5432. SAS Programming and Data Management

Three credits.

Focuses on SAS programming to introduce the most commonly used features of the language, including data definition, modification and organization; data manipulation and selection; data

display and basic data analysis using descriptive statistics. Students also learn to create datasets using data entry or importing from other programs.

5433. Health Program Evaluation

Three credits.

Methods of evaluating the implementation and impact of health programs. Topics include specification of program objectives and components, experimental and quasi-experimental evaluation designs, collection and analysis of program data, and the dissemination and application of evaluation results.

5434. Topics in Intermediate Biostatistics

Three credits.

An introduction to the interplay of experimental design and data analysis. Begins with a review of statistical estimation and testing. Topics include analysis of variance, linear regression, and power analysis. Applications are emphasized through the demonstration and use of statistical software.

5435. Statistical Methods in Epidemiology

Three credits.

An introduction to the statistical methods most commonly used in analyzing data from epidemiological studies. The course begins with a review of basic epidemiology and statistics. Subsequently, the focus is on contingency table methods and logistic regression with emphasis on dose-response relationships, interaction and confounding. Computer software for data analysis is demonstrated.

5436. Intermediate Epidemiology

Three credits.

Major design and implementation issues in epidemiology and biomedical research. By the conclusion of the course, the student should have a better appreciation of the importance and complexities of epidemiological investigation.

5437. Epidemiological Research Appraisal

Three credits.

A research seminar on uses, strengths and limitations of epidemiological methodology. Major studies in infectious disease, chronic disease and health care epidemiology are critically analyzed. The goal is to promote sound judgment of the scientific validity of epidemiological evidence.

5438. Investigation of Disease Outbreaks

Three credits.

Provides students with the basic skills and perspectives necessary to investigate acute disease outbreaks. The emphasis is on the use of epidemiology to investigate outbreaks of infectious diseases, guide public health interventions, and develop public health policy. Students will participate in an outbreak investigation conducted by the state health department.

5439. Epidemiology of Cancer

Three credits.

Introductory survey of how basic and epidemiological research inform cancer control and prevention. It is geared towards, but not limited to, matriculated MPH students, public health professionals, health care providers, and epidemiologists. No prior knowledge of cancer pathology is required.

5440. Public Health Issues in Genetics

Three credits.

The Human Genome Project and other research initiatives are providing us with new opportunities

to screen, diagnose and provide novel interventions for a range of genetically determined diseases. The goal of this course is to provide sufficient understanding of inheritance patterns and genetics technology to appreciate the associated public health issues.

5450. Public Health Practice

Three credits.

Discussion of initiatives to define the practice of public health, including the Institute of Medicine (IOM) Report on the Future of Public Health and the Public Health Service's "essential functions" of public health. Includes review of expenditures studies and estimates of actual public health infrastructure resource needs, as well as discussion of appropriate future roles for public health.

5451. Maternal and Child Health Policy and Programs

Three credits.

Examination of maternal and child health (MCH) programs and policy from the past to the present. Children's rights, advocacy and MCH history provide a foundation to understanding the philosophy and importance of MCH. The health and development of children are addressed starting with families and working through each of the developmental cycles: maternal and infant health, preschool, school age, and adolescent health. Topics that are cross-cutting across the MCH spectrum such as health disparities, women's health and international health.

5452. Injury and Violence Prevention

Three credits.

Injury and violence are major preventable public health problems with predictable patterns. The purpose of this course is to familiarize the student with the epidemiological literature of intentional and unintentional injuries. Focuses on the knowledge and skills required to design, implement, and evaluate scientifically sound community injury prevention and control programs.

5453. Chronic Disease Control

Three credits.

Chronic diseases are examined from clinical, epidemiological and program planning perspectives. Diseases examined include selected neoplastic diseases, cardiovascular diseases, chronic obstructive pulmonary diseases, cerebrovascular disease and diabetes. The role of public health agencies, for profit and non-profit entities in research, education, and risk reduction activities also are covered.

5454. Infectious Disease Control

Three credits.

Overview of microbiology. Agent-host environment relationship in causation and control of infectious diseases. Epidemiological patterns of major infectious diseases, with emphasis on sexually transmitted diseases, respiratory conditions and nosocomial infections.

5455. Health Education

Three credits.

Methods for planning, presenting, and evaluating health education programs in communities, schools and worksites. Includes use of the Precede Model, setting of goals and objectives, behavior modification theory, group processes, teaching techniques and activities for developing and presenting workshops or courses.

5460. Health and Human Rights

Three credits.

Explores the many ways in which human health and well-being are related to human rights. Human rights are a field of international law that includes major treaties, treaty bodies, and adjudicatory mechanisms. This course will review the ways in which human rights instruments and jurisprudence have addressed health and issues related to health. Students will also study a wide range of substantive public health issues that have a human rights dimension, and consider the ways that human rights are used as advocacy tools to improve the structural environment that shapes the public's health.

5461. Healthcare Law and Ethics

Three credits.

An analysis and evaluation of the legal rights of patients and providers in the health care process. Specific topics may include nature of rights, consent to treatment, contraception, abortion, sterilization, involuntary commitment, and allocation of limited medical resources.

5462. International Health

Three credits.

Examines primary health care as a model suited to the health needs of developing nations. Provides a broader understanding of the genesis of illness in developing countries and analyzes the kind of care required to have an impact on these illnesses.

5463. Comparative Health Systems

Three credits.

An analysis of national health systems in relation to their socio-economic, political, cultural, and epidemiologic contexts. The examination of alternative approaches to organizing scarce health care resources serves as an integrating theme.

5465. Occupational Health

Three credits.

Recognition and prevention of occupational disease and injuries, including social and political aspects and policy issues such as OSHA and Workers' Compensation laws. Overview of some of the major occupational disease issues. Approaches of industrial hygiene, ergonomics, and occupational epidemiology to understanding and preventing occupational health hazards.

5466. Industrial Hygiene

Three credits.

The skills required to recognize, evaluate and control occupational hazards. Review of hazards associated with a variety of work processes and jobs. Students learn how to take an occupational history, to research the hazards associated with an industry, and to conduct a plant walk-through. Control methods, such as ventilation and personal protective equipment, are evaluated.

5467. Occupational and Environmental Disease

Three credits.

Clinical introduction to occupational disease, including diagnostic strategies and patient management techniques. Review of the diseases of primary target organs, including the range of syndromes from that organ, appropriate diagnostic techniques, and treatment options.

5468. Occupational and Environmental Epidemiology

Three credits.

Topics include the history of occupational epidemiology, causal models, occupational

exposure classification systems, environmental epidemiology, cohort mortality studies, cross-sectional surveys, case-control studies, ecologic studies, and statistical and methodological issues in research design and their solutions.

5472. Disability and Public Health

Three credits.

Examines both developmental and acquired disabilities from a public health perspective. Public health issues of cognitive and physical disability, including prevention, diagnostic and definitional considerations, epidemiological and statistical controversies, legal and ethical aspects, treatment considerations and research concerns.

5473. Women, Public Health and Reproduction

Three credits.

The history of reproduction and public health issues in the U.S.; underlying ethical issues in modern reproductive health care and key components of opposing views; major financial, social and emotional considerations in policy making and the increasing role that reproductive health plays in public health as a whole.

5474. Urban Health

Three credits.

Comprehensive overview of historical forces and social factors related to the health status of African-Americans, Hispanics, and other minority groups in American society. Although much of the course content examines current minority health issues, the use of theory and research to identify underlying causes and to suggest practical strategies/interventions for addressing these problems is a major focus.

5475. Public Health and Policy in an Aging Society

Three credits.

Examines the demographics of aging; organization, financing and delivery of health services for older adults; formal and informal caregiving; retirement and housing policy; and end of life care. Policy and ethical aspects of these topics are explored. Research-oriented, integrating empirical evidence to illustrate central concepts. Familiarity with basic principles of research design, including ability to critically read and synthesize scientific literature, is important.

5476. Community Mental Health

Three credits.

Overview of mental illness, substance abuse and related conditions, including epidemiological patterns and interventions. Chronic mental patients, the homeless mentally ill and other special groups. The community mental health movement and role of government. Regulations and mental health law.

5477. Food, Health and Politics

Three credits.

Comprehensive overview of the factors that influence how our food is grown; what foods are available, affordable, and advertised; and the ensuing public health implications. Examines the history of food production in America, the development of public and private food assistance programs, the fast food movement, and food marketing. Students will explore the political, social, economic and environmental factors that impact food availability and consumption, and discuss the implications of these factors on health outcomes, such as obesity, hunger, chronic diseases, and health disparities.

5495. Independent Study in Public Health

Variable (1-9) credits. May be repeated for credit.

An individual course for those wishing to pursue special topics in the public health sciences under faculty supervision.

5497. Graduate Seminar in Public Health

Variable (1-6) credits. May be repeated for credit.

5498. Field Experience in Public Health Systems

Variable (3-9) credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Under direction by field preceptors, students will participate in an intensive service-learning experience wherein they will examine a timely public health issue from the perspective of health indicators/disease surveillance; policy development; planning, implementation, or evaluation of public health services; essential public health functions; and operational issues of a large complex public health agency/organization.

5499. Capstone Project in Public Health

Variable (3-6) credits. Department consent required.

5501. Foundations of Public Health and Disability

Three credits. Prerequisite: Open to students matriculated in the PHCIDS program; others by instructor consent.

Introductory survey of the ways in which disability, both developmental and acquired, are affected by and interact with public health policy and practice. The major goal is to provide a foundational understanding of a comprehensive set of disability issues as related to the core elements of public health. Topics covered include history of disability, definitional and diagnostic issues of disability, epidemiology, disability law, ethics, interventions, research, underlying social attitudes toward disability and their impact on public health policy and practices, and more.

5502. Epidemiology of Disability

Three credits. Prerequisite: instructor consent.

Extends the concepts and methods of epidemiology to disabilities and their risk factors incidence and prevalence rates. Research design and etiologic factors are emphasized. Students will develop competency in identifying and understanding the historical context of disability epidemiology, and epidemiological terminology of specific disability conditions and methodological concepts. The goal is to provide students a foundation in epidemiological methods and an understanding of the ways disability can provide a useful perspective on epidemiological studies that advance the field of public health. Intended for students matriculated in the PHCIDS program.

5503. Disability Law, Policy, Ethics, and Advocacy

Three credits. Prerequisite: instructor consent.

The goal of this course is to provide students a legal, conceptual, and practical understanding of people with disabilities, forms of discrimination on the basis of disability, and protections against such discrimination. Students will evaluate and understand policy, principles, and social issues that affect the lives of persons with disabilities and their families. Topics include federal, state, and international laws, policies, advocacy and ethics specific to health and well-being; discrimination; education, employment; human rights; and more

as related to people with disabilities. Intended for students matriculated in the PHCIDS program.

5504. Public Health Interventions in Disability

Three credits. Prerequisite: instructor consent.

Students will examine and analyze disability public health interventions from the perspective of the interplay between society, community, health and wellness, environment, resources, and services systems. Students will learn, through evidence-supported practices and initiatives, how society, health, and environment shape and are shaped by disability; and how full societal participation, reduction of personal obstacles and harm, and preservation of just and safe environments for people with disabilities can be realized. Intended for students matriculated in the PHCIDS program.

6490. Public Health Seminar

One credit. May be repeated for a total of four credits.

This student-centered seminar series will meet weekly in both the Fall and Spring semesters of the student's first 2 years and will introduce the students to a broad range of faculty and outside speakers in public health. The seminar will follow a cycle where students read and discuss papers for an upcoming presenter, the next week the speaker will present and participate in discussion and questions and answers, and the following week there will be a student presentation. During their fourth semester, students will present an overview of the literature supporting their proposed research project. This seminar is common to all students in the doctoral program in public health.

6491. Advanced Topics in Social and Behavioral Foundations of Public Health

One credit. Corequisite: PUBH 5405; instructor consent.

This seminar course will be given in parallel with PUBH 5405 with the goal of more in-depth exploration of the topics presented in the survey course. The objective is to gain a more advanced understanding of the concepts and theories in the social and behavioral sciences and their ability to explain patterns of health, illness and health care utilization, practices and policies. In conjunction with the survey course, the biopsychosocial paradigm of health and illness will provide the conceptual framework for integrating the societal, interpersonal, and intrapersonal factors that influence the public's health.

6492. Advanced Topics in Health Promotion, Disease and Disability Prevention

One credit. Corequisite: AH 6324; instructor consent.

An in-depth examination of health promotion and disease and disability prevention policies, programs and strategies. Continued examination of important national and international issues in health promotion and disease and disability prevention that compliment those raised in AH 6324. Students will critically analyze the health promotion and disease and disability prevention scientific literature relating to a critical issue of their choice. The format for this critique will be a seminar presentation and a written scientific synthesis.

6493. Occupational and Environmental Health: Exposures, Risk and Prevention

Three credits.

Exposure pathways, risk analysis techniques and prevention strategies relevant to both occupational and environmental settings. Lectures reinforced by discussion of case studies presented by students.

6495. Independent Study of Special Topics in Advanced Public Health Sciences

Variable (1-9) credits. Prerequisite: Instructor consent.

A doctoral-level independent study course for Ph.D. students who wish to pursue special topics in advanced public health sciences under faculty supervision.

Public Policy (PP)

5300. Independent Study

Variable (1-6) credits. May be repeated for credit.

5301. Special Readings in Public Policy

Variable (1-6) credits. May be repeated for credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

5303. Race and Public Policy

Three credits.

Introduction to the public policy process using the salient, crossing-cutting cleavage of race.

5314. Capstone: Causal Program Evaluation

Three credits.

Survey of the statistical methods and tools commonly used to evaluate causal claims about the impact of public policies and programs. This course is a required MPP course. Cross-listed with ECON 5314.

5315. Capstone in Public Administration I

Three credits. Prerequisite: PP 5370 and 5340; open only to MPA students.

Development of project management skills and the research question, bibliography, and methodology for the capstone project. Open only to students in the Master of Public Administration Program.

5316. Capstone in Public Administration II

Three credits. Prerequisite: PP 5315.

Research and writing of the capstone project.

5317. Capital Financing and Budgeting

Three credits.

Examination of the municipal bond market, capital budgeting techniques, and related public policy issues.

5318. Financial Management for Public Organizations

Three credits.

Management of financial resources in public organizations. Topics include variance analysis, public sector accounting, financial statement analysis, and forecasting.

5319. Program Development and Evaluation

Three credits.

Techniques for evaluating and improving organizational performance and the ability to deal with the challenges posed by changing environments. Topics include strategic planning, program development, program implementation, evaluating effectiveness, and performance measurement and improvement.

5320. Ethics in Policy and Management

Three credits.

Ethics in public policy and management, including contemporary ethical dilemmas and decision-making tools and techniques.

5321. State and Local Fiscal Problems

Three credits.

Analytical tools and concepts to evaluate policies related to government revenues, the delivery of public services, and intergovernmental relations.

5322. Evaluating Public Programs

Three credits. Prerequisite: PP 5376.

The tools and concepts important to evaluation research.

5323. Leading and Governing Nonprofit Organizations

Three credits.

The theory and practice of effective leadership and governance of nonprofit organizations.

5324. Grant Writing and Fund Development for Nonprofit Organizations

Three credits.

Core fundamentals of fund development and grant writing practices for nonprofit organizations.

5325. Labor-Management Relations, Negotiation, and Contract Management.

Three credits.

Overview of the fundamentals associated with collective bargaining in the public sector.

5326. Public Investment Management

Three credits.

Key dimensions of investment decision making in government, including portfolio analysis and understanding of appropriate investment instruments

5327. Analysis for Management Decision Making

Three credits.

Analytic approaches to decision making in a public management environment.

5328. Business Functions of Nonprofit Organizations

Three credits.

Management of financial resources in nonprofit organizations. Topics include variance analysis, nonprofit accounting, financial statement analysis, internal controls, cash management and forecasting.

5330. The Practice of Survey Research

Six credits. May be repeated for a total of 12 credits.

The practice and use of survey research in the United States and throughout the world. The structure, culture and professional norms of the survey community. The role of public opinion polling in government and public policy-making.

5331. Quantitative Methods for Public Policy

Three credits.

Quantitative tools necessary to manage and evaluate public programs.

5332. Advanced Quantitative Methods

Three credits.

Advanced statistics for survey research analysis.

5333. Principles and Methods of Survey Research II

Three credits.

Advanced theory and statistics for survey research.

5334. Focus Groups

Three credits.

Introduction to focus group research.

5337. Economics of Education Reform

(Also offered as EDLR 6322.) Three credits. Prerequisite: Instructor consent.

Examination of a number of prominent education reform strategies, using economics as a lens through which to understand the motivations for and potential impacts of each. Focuses on the incentives created by these policies, allowing us to predict their intended and unintended consequences. We will utilize this framework throughout as we read about and evaluate the effectiveness of various educational interventions and policy reforms. Topics include class size reduction, teacher quality and teacher certification, merit pay, school accountability, school choice, school finance reform, early childhood education, and topics in higher education.

5340. Introduction to Public Policy and Management

Three credits. Prerequisite: Open only to MPA and MPP students.

Introduction to the fundamentals of public policy and public management in the United States with a focus on developing the communication skills required in a professional workplace.

5341. Public Opinion and Democratic Processes

Three credits.

American public opinion in the context of democratic theory.

5342. Policy Analysis

Three credits.

Approaches and techniques used to evaluate public programs and public policy.

5344. Social Policy

Three credits.

Examination of the concepts and principles of public policy analysis, with applications to important social issues.

5345. Project Management in the Public Sector

Three credits.

Theory and techniques for successful management of public sector projects. This is a required MPA course.

5347. Applied Policy Issues

Three credits.

Overview of important policy issues in the United States and integrates a variety of analytical techniques used in the evaluation of public policies.

5358. Administrative Law

Three credits.

The basis legal framework of administrative organization and the rules governing administrative powers and their exercise; also the legal procedures for the enforcement of bureaucratic responsibility in the democratic state.

5360. Information Technology Management for Public Policy

One credit.

Overview of practices and issues in managing the use of information technology in public service organizations.

5361. Theory and Management of Public Organizations

Three credits.

Core management and behavioral concepts to effectively lead a public organization. Topics include leadership, strategic planning, managing

organizational performance, and organizational structure, culture and politics.

5362. Applied Management Project

Three credits. Prerequisite: PP 5370; open only to MPA students.

Application of management concepts and theory, research and practice to problems facing public and nonprofit organizations.

5363. Administrative Functions of Local Government

Three credits.

An examination of the characteristic managerial problems of the several functions of local government such as police, fire, traffic, public works, parks, health, recreation. Designed for individuals planning to work with citizen agencies, in agencies for governmental management, or in journalism.

5364. Public Finance and Budgeting

Three credits.

Techniques, practice, and organization of financial functions in governmental organizations, including revenue analysis, budgeting skills, and financial statement analysis.

5365. Human Resource Management

Three credits.

The structures, processes, and principles of human resource management and labor-management relations in the public service, and examination of contemporary human resource policies and challenges.

5367. Problems in Intergovernmental Administration

Three credits.

Examination of intergovernmental relations as an administrative system, with emphasis on current problems.

5370. Applied Research Design

Three credits.

Research design for organizational management and policy analysis and evaluation. How to communicate, execute and evaluate research. Skills in selecting appropriate analytic procedures and properly interpreting and reporting results.

5372. Capstone Portfolio

One credit. Prerequisite: Open only to MPA and MPP students. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Provides a synthesis of basic skills and competencies important for future professionals in the public service. This is a required MPA and MPP course.

5373. Budgeting in Public Service Organizations

Three credits.

Processes and techniques of public budgeting; the principles and roles of budgets in public service organizations; analytic tools, concepts, and principles of budget analysis and decision making.

5375. Economic Analysis for Public Policy and Management

Three credits.

Application of basic microeconomic analysis to public policy and management problems. Required for the MPA and MPP programs

5376. Applied Quantitative Methods

Three credits. Prerequisite: Open only to students in the Master of Public Administration or the M.A. in Survey Research programs.

Statistical reasoning, tools, and techniques for effective public management.

5377. Qualitative Methods in Public Policy

Three credits.

Development and design of qualitative research.

5378. Methods of Survey Data Collection

Three credits. Recommended preparation: PP 5379.

An exploration of project management techniques applied to survey research projects.

5379. Principles and Methods of Survey Research

Three credits.

Exploration of the theory and practice of survey research, including sampling, questionnaire design, analysis and reporting results.

5382. Project Management in Survey Research

Three credits. Recommended preparation: PP 5379.

This course will explore the application of project management techniques to the management of survey research projects.

5383. Advanced Questionnaire Design

Three credits. Prerequisite: PP 5379.

The art and science of designing survey questionnaires. Psychological and social processes that may influence the survey response in unanticipated ways.

5384. Political Polling

Three credits.

The role of opinion polling in American political campaigns, journalism, and academic research, as well as the methodological aspects of scientific opinion polling.

5385. Attitude Formation

Three credits.

Theories of attitude formation and attitude change

5386. Survey Research Analysis and Reporting

Three credits. Prerequisite: PP 5376. Recommended preparation: PP 5379.

Analytic writing skills that apply specifically to preparing survey research reports.

5387. Surveys for Market Research

Three credits. Recommended preparation: PP 5379.

An exploration of how survey research techniques and methods are used to address market research problems.

5390. Supervised Internship

Variable (3-9) credits. Prerequisite: Open only to students in the Master of Public Administration or the M.A. in Survey Research programs. May be repeated for 36 credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Experience in a public organization under competent supervision.

5397. Special Topics in Public Policy

Variable (1-6) credits. May be repeated for credit.

Romance Language (ROML)

5395. Applied Linguistics for Teachers of Romance Languages

Three credits.

Social Work (SSW)

6400. Social Work Doctoral Program Independent Study

Three credits. Prerequisite: Open only to Social Work Ph.D. students. May be repeated once for credit.

Special Social Work topics not included in the Social Work Doctoral Program curriculum may be the subject of an Independent Study. A proposal must be presented and approved by the Student's advisor and Doctoral Director.

6410. Research I: Research Design and Knowledge Generation

Three credits. Prerequisite: Open only to Social Work doctoral students, others with consent.

Logic and methods of scientific inquiry in the social sciences, with specific emphasis on issues relevant to social work research and practice. Philosophical assumptions, historical and cultural contexts, and ethical dilemmas that drive and inform the selection, structure and application of alternative research designs. Experimental, quasi-experimental and non-experimental design options will be considered. Inductive and deductive processes, hypothesis testing, probability and sampling, and analytic procedures appropriate to the different design options will be examined. Attention to using research to promote human rights and social justice will be explored.

6411. Research II: Survey Research Methods

Three credits. Prerequisite: SSW 6410; open only to Social Work doctoral students, others with consent.

Builds upon the foundation laid by SSW 6410; particularly by looking at the ways that survey design and survey data collection support the development of quasi-experimental research designs. Provides the skills necessary to conduct self-administered surveys to meet the goals of social work practice and research. Surveys as tools for assessing needs, monitoring program activities, measuring outcomes, and assessing attitudes. Students will learn about automated software tools for survey construction such as Qualtrics and Survey Monkey. In-depth exploration of the techniques of program evaluation and explores the role of survey research in program evaluation design and implementation.

6412. Research III: Multivariate Statistics I

Three credits. Prerequisite or corequisite: SSW 6410; open only to Social Work doctoral students, others with consent.

Builds upon an introductory level of statistical knowledge and assumes that you have completed an introductory statistics course, including experiences with data analyses that involve computer interactions (SPSS). Develops an understanding of the general linear model (GLM). Once students gain a solid understanding of GLM, students can extend their knowledge to a variety of more complex statistical tests. Selection and application of appropriate statistical procedures to answer research questions or test hypotheses in social work research, and involves the extensive

use of available statistical packages. While the course emphasizes the understanding of statistical testing, interpretation and written presentation of statistical results, knowledge of the mathematical formulae and assumptions underlying each statistical procedure may be required and are discussed in class. Equivalent courses offered by other UConn schools may be substituted with advisor approval.

6413. Research IV: Multivariate Statistics II

Three credits. Prerequisite: SSW 6412; open only to Social Work doctoral students, others with consent.

Building upon SSW 6412, focuses on the selection and application of appropriate statistical procedures to answer research questions or test hypotheses in social work research. Data reduction methods and analyses of discrete or categorical data and involves the extensive use of available statistical packages. While the course emphasizes the understanding of statistical testing, interpretation and written presentation of statistical results, knowledge of the mathematical formulae and assumptions underlying each statistical procedure may be required, and these are discussed in class. Equivalent courses offered by other UConn schools may be substituted with advisor approval.

6414. Research V: Qualitative Research Methods

Three credits. Prerequisite: SSW 6410; SSW 6411, which may be taken concurrently; open only to Social Work doctoral students, others with consent.

Philosophical underpinnings, history, techniques and relevance to social work research of qualitative inquiry traditions such as biography, phenomenology, grounded theory, ethnography and case study methods. Although many of these techniques are also useful in social work practice, this course will focus on the use of qualitative methods for the purpose of expansion of the knowledge base of the profession. As such the course will emphasize techniques, standards of quality, verification, and other indicators of rigor as well as value an ethical issues. After completing this course students will be able to describe various approaches, set up research protocols, utilize qualitative data analysis software (e.g. NVivo), describe quality control techniques and specify standards for report writing.

6420. Critical Analysis of Historical and Philosophical Themes of the Profession

Three credits. Prerequisite: Open only to Social Work doctoral students, others with consent.

Develops critical and historical understanding of social work knowledge, values and interventions. Social, economic, political and intellectual forces that influence the development of social welfare and professional social work. The role that conflicting ideologies and commitments in alleviating stress and suffering. Development and history of social work in the context of changing social, economic, political and intellectual environments.

6435. Social and Behavioral Science: The Knowledge Base for SW Practice with Smaller Target Systems

Three credits. Prerequisite: Open only to Social Work doctoral students, others with consent.

Theoretical and empirical frameworks about human behavior and the social environment upon which contemporary best practices are

built. The theories and frameworks examined include cognitive, behavioral/social learning, psychodynamic, family systems and other related concepts. Other theories that demonstrate a valid underpinning of effective or promising social work practice may be added.

6436. Comparative Social Work Practice Models (Micro Practice)

Three credits. Prerequisite: SSW 6435; open only to Social Work doctoral students, others with consent.

Major past and present social casework and group work practice models from historical, theoretical and empirical perspectives. Current practice approaches/models from related fields empirically shown to be most effective or promising are examined. Selected social work models are examined within the social, political and ideological contexts of their times as well as with respect to their contributions to the profession's knowledge base. Each model's contribution to the profession's knowledge base and to direct practice methods are investigated and related to students' conceptual and practice experiences.

6445. Social and Behavioral Science: Knowledge Base for Practice with Large Target Systems

Three credits. Prerequisite: Open only to Social Work doctoral students, others with consent.

Conveys substantive knowledge from social science disciplines that inform macro practice with large systems and fields of macro practice (community organization, administration and policy practice). It is expected that students demonstrate competence in understanding the development and application of major social science theoretical models relevant to macro practice and with the empirical evidence that supports these theories. Ethical implications for social work of knowledge developed by disciplines with different value bases are considered.

6446. Comparative Social Work Practice Models (Macro Practice)

Three credits. Prerequisite: SSW 6445; open only to Social Work doctoral students, others with consent.

The evolution and development of macro practice in the United States with an emphasis on the use of methods of community organization and policy practice in social work. These distinct methods, as well as different practice models associated with them, will be considered in the context of the social work profession and practice. A conceptual history of macro practice within social work, including the unique role of macro practice methods in carrying out the mission of the social work profession. Attention is given to how different social, economic, and political theories have influenced macro practice. Particular emphasis is placed on the impact of macro practice on historically marginalized and oppressed groups and in addressing social problems.

6451. Dissertation Preparation Seminar

Three credits. Prerequisite: Open only to Social Work doctoral students. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

The Dissertation Seminar is designed to assist students in identifying suitable dissertation topics and developing appropriate methodological approaches. The seminar provides opportunities

to assist students in building a firm foundation upon which to engage in independent research and scholarship to advance existing knowledge. Students are required to prepare papers related to their dissertation topic for presentation and discussion with the doctoral student group. Outside speakers from the UConn community are brought in to engage students on issues related to library resources, report writing, research funding support, data analysis, and the institutional review board process. The seminar will develop and strengthen students' scientific communication skills in preparation for the initiation of their dissertation proposal.

Social Work Elective (SWEL)

5310. Services to Immigrants and Refugees and Cross-Culture Helping

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Examines and connects concepts from migration studies with social work practice knowledge. Highlights the influence of immigration policy and procedures on the lives of immigrants and on service delivery and social work practice. Examines the interrelationship between sending and receiving countries and examines the experiences of individuals in the home country with their experiences in the new country. Emphasizes cultural and cross-cultural issues in each of the migration stages. Highlights different cultural views on health, mental health, help-seeking behavior, family and child-rearing practices and gender role behavior. Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work.

5317. Women, Children, and Families: Social Policies and Programs

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Focuses on the policies and programs that affect women and children, in particular income supports, maternal and child health, housing, domestic violence, foster care and adoption, and parenting and child maltreatment. Special attention will be paid to the legal rights of women and children, especially those who are immigrants, have disabilities, or are members of minority groups. Required course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

5318. Core Concepts of Child and Adolescent Trauma

Three credits.

Incorporates the new National Child Traumatic Stress Network core curriculum on child trauma (CCCT). The course conveys the crucial evidence-based concepts, components, and skills designed by the NCTSN to strengthen competency in assessment, referral, and treatment.

5321. Social Work Perspectives on Adoption

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Focuses on new developments in adoption and the knowledge, values and skills needed by social workers to effectively plan and deliver adoption services to a diverse group of children and families. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

5333. Travel Study for Social Work

Variable (1-3) credits. Prerequisite: Open only to students in the M.S.W. or STEP program; instructor consent.

Combines academic study with travel to examine social work and social welfare in other systems. Addresses the impact of social, economic and political systems on social welfare and social work; a cross-national examination of the profession; and cross-cultural understanding. Elective course for Substantive Area: Focused Area of Study on Puerto Rican/Latino/a Studies Social Work; Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work.

5345. International Development: Theory and Practice

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

International relief, reconstruction and development -- theories and practice strategies to attack poverty and improve human well-being. Among the topics covered will be: building local capacity, developing local partnerships, use of appropriate technology to create sustainability, multi-sectoral work, cultural relevance, ensuring gender sensitive programming, understanding and working with local and national structures, funding streams, and international partnerships. Elective course for Substantive Area: Focused Area of Study on International Social Work.

5348. International Social Work Global Issues

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Cross-national, comparative approach to selected topics in international social problems and social welfare. Consideration of the problem of developing nations and modernization and urbanization as worldwide processes; the role of international organizations; the role of social work in international issues; and the implications of cross-national study for practice. Required course for Substantive Area: Focused Area of Study on International Issues in Social Work; Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

5350. Comparative Social Welfare Policy between the U.S. and the Second World

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Evolution and current state of development of social welfare in the "Second World," a designation that applies to those countries that were part of the Soviet Union or Warsaw Pact. Discussion of a framework for policy analysis and comparative international social welfare policy analysis using selected health, welfare and employment policies as illustrations of current social welfare policy in Armenia and other "Second World" countries. Course will be jointly taught by Dr. Nancy A. Humphreys and Dr. Ludmilla Haroutunian involving a group of UConn M.S.W. students and Armenian graduate students using WebCT technology. Elective course for Substantive Area: Focused Area of Study in International Social Work.

5351. Policy Issues in Aging

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

History, development, and ramifications of social, economic and political policy issues

relevant to the elderly; the elderly as voters and political actors. Major attention to framework for policy analysis. Elective course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

5360. Economic Justice: Labor and Social Work

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

The relationship of social work and the labor movement with particular attention to the labor movement under new leadership and with new direction. Organized around four themes: 1) Common roots of labor and social work, 2) Social workers as union members, 3) Social workers as union organizers and 4) The labor movement as a social movement.

5371. Permanent Families for Children

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Permanency planning as a framework for social work practice in child welfare. Examines the philosophy, theory, and methodology of permanency planning for children and youth placed, or at risk of placement, out of their homes. Programs, skills, and strategies for preventing placement, reuniting placed children with their biological families, or developing other permanent families, particularly through adoption. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

5375. War, Militarism and Social Work

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Theoretical and empirical content on several linked global phenomenon -- imperialism, militarism, and war -- to understand their impact on U.S. and global society. Analysis of "globalization," its relationship to war and militarism, and why this process is relevant to social work practice. Political forces in the United States that support and benefit from militarism to illustrate their effects on social policy and the social work profession. Arguments for and against a dominant and aggressive U.S. role in global affairs will be examined. The adverse impact upon the welfare state and oppressed populations.

5377. Urban Policy Issues

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Urban problems and policy issues as well as social work practice issues in urban settings. Connecticut cities are used to explore the effectiveness of current policies and consider the need for policy change. Current social and economic needs of urban populations and the political environment are also considered. Required course for Substantive Area: Focused Area of Study on Urban Issues in Social Work; Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work.

5380. Political Social Work

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program. May be repeated once for credit.

Exploration of the world of elected politics as a legitimate field of social work practice. Social workers are currently playing many roles in this area including, serving as volunteer and paid

staff in political campaigns at the local, state and federal level; as paid staff of elected politicians; in politically appointed positions; and as elected politicians. Practical realities of each of these positions. Students are required to attend the annual Campaign School sponsored by the Institute for the Advancement of Political Social Work Practice. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

5385. Human Rights and Social Work

Three credits. Prerequisite: Open only to students in the M.S.W. or STEP program.

Theoretical, conceptual, and practical foundation for social workers to engage in a human rights-based approach to social work. Students will gain an understanding of the international human rights system, social work's contribution to achieving human rights, and how international human rights principles can be applied to social work practice. We will use a number of cases from varied countries, including the United States, to examine how social workers can both advocate for and respect human rights in their work.

5386. Transitioning Youth at Risk

Variable (1-3) credits.

Designed to be taken concurrently with the Department of Mental Health and Addiction Services (DHMAS) field placement internship. It is a requirement for the DHMAS cohort, and is limited to this designated group. It is a two semester seminar, which meets on an every other week basis. Students will receive a grade at the end of each semester. Provides an overview and critical analysis of theories of young adult development, the recovery model as it is practiced in Connecticut, the impact of major mental illness on psychosocial functioning in the community, and effective social work interventions.

Social Work Research (RSCH)

5340. Social Work Research Evaluation with Macro and Micro Systems

Two credits. Prerequisite: BASC 5330 or 5333; open to students in the MSW program and STEP program.

Focuses on the development of knowledge, attitudes and skills appropriate to the ongoing critical evaluation of social work practice with small and large systems from diverse populations. Prepares students to integrate evaluation methods into assessment, planning, intervention and evaluation of their professional social work practice. Provides students with the knowledge to develop skills for evaluating practice through the use of evaluation designs appropriate for use in micro and macro level practice.

5341. Advance Research: Program Evaluation

Three credits. Prerequisite: A grade of C or better in BASC 5333, or a grade of B or better in a basic undergraduate or graduate social work research course within the past six years.

Development of knowledge, attitudes and skills appropriate to the ongoing critical evaluation of social work practice with systems from diverse populations. Social workers have a responsibility to evaluate their individual practice effectiveness and the effectiveness of interventions used with clients in accord with both the ethical standards articulated in the NASW Code of Ethics as well as the accountability standards required by agencies

and other funding sources. Prepares students to integrate evaluation methods into assessment, planning, intervention and evaluation of their professional social work practice. Provides students with the knowledge to develop skills for evaluating practice through the use of evaluation designs. Students will learn to employ these designs and to analyze the data drawn from these designs in order to inform professional practice decision-making.

5342. Advanced Research Topics: Variable Topics

Three credits. Prerequisite: BASC 5333.

Variable topics in research methodology that provides advanced skills and knowledge for social work practice. Course topics could include applied qualitative research, participatory action research, historical methods, and statistics in social work research.

Social Work Special Topics (SPTP)

5318. Special Topics

Variable (1-3) credits. Prerequisite: Open only to M.S.W. students. May be repeated for a maximum of 12 credits.

Introduces new and innovative material into the curriculum on an experimental basis. Any special topics course may be offered only twice and may not duplicate content already available in the regular curriculum. Any instructor offering a special topics course must submit the title and a brief statement of focus of the course to the Registrar for inclusion in the course registration schedule. A student may apply up to eight credits of Independent Study and Special Topics in Social Work (combined) toward the M.S.W. degree.

Sociology (SOCI)

5001. Proseminar

One credit. Prerequisite: Instructor consent. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Required of all M.A. candidates in the first year of study. Covers issues of successful graduate education and professionalization, including transitioning from the role of student to scholar; mentoring; networking; choosing thesis topics; presenting papers at conferences; getting papers published; getting grants; and developing vitae.

5003. Teaching Sociology

Variable (1-3) credits. Prerequisite: Open only to Sociology graduate students.

A survey and discussion of the content, viewpoints and methods that can be employed in teaching sociology. Emphasis is on course preparation for new teachers.

5201. The Logic of Social Research

Three credits.

Required of all M.A. candidates in the first year of study. Covers the logic of how to frame and design social research. Topics include the link between theory and method, selection of a research topic, inductive versus deductive reasoning, causality (including research designs for identifying causal relations) and causal errors, conceptualization, operationalization, levels of analysis, measurement, reliability and validity, sampling, using mixed methods, research ethics, and the politics of social research.

5203. Quantitative Research I

Three credits. Prerequisite: SOCI 5201; instructor consent.

Required of all M.A. candidates in the first year of study. Introduction to quantitative methods of social research. Topics include linear regression, including ANOVA and ANCOVA; hypothesis testing and model selection; regression diagnostics; non-linearity and functional form; path analysis; and factor analysis.

5205. Topics in Quantitative Methods

Three credits. Instructor consent. May be repeated for a total of nine credits.

Special topics in quantitative methods in sociological research. Topics will vary by semester.

5210. Applied Survey Design and Analysis

Three credits. Prerequisite: SOCI 5203; instructor consent.

The design, administration, and analysis of sample surveys.

5231. Qualitative Research I

Three credits. Prerequisite: Open only to Sociology graduate students; instructor consent.

Introduction to qualitative methods of social research. Topics include epistemologies of qualitative methodologies; ethical issues in qualitative research; the Chicago School; symbolic interactionism and grounded theory; introduction to fieldwork; basic fieldwork techniques; interviewing; narrative analysis; textual analysis; data analysis; content analysis using computers; and writing analyses of data.

5235. Topics in Qualitative Methods

Three credits. Instructor consent. May be repeated for a total of nine credits.

Special topics in qualitative methods in sociological research. Topics will vary by semester.

5251. Core Theorists

Three credits. Prerequisite: Instructor consent.

An examination of the original writings of the major figures in sociological theory: Durkheim, Marx, Weber, and Simmel. The course focuses upon the theories of these major figures, their relations with contemporaries, their interconnections, and their influence upon subsequent theory and theory groupings.

5255. Topics in Sociological Theory

Three credits. Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory. Topics will vary by semester.

5275. Topics in Culture

Three credits. Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory and research in culture. Topics will vary by semester.

5301. Seminar on Crime and Justice

Three credits. Instructor consent.

Broad survey of topics and issues relating to crime and the criminal justice system in the United States. Emphasis on policy issues.

5311. Deviant Behavior

Three credits. Prerequisite: Instructor consent.

Review of theory and research, with emphasis on their implications for a general theory of deviant behavior.

5315. Topics in Deviance and Crime

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory and research in deviance and crime. Topics will vary by semester.

5351. Seminar on Society and the Individual

Three credits. Prerequisite: Instructor consent.

A comparative analysis of the major theoretical approaches to individual-society relations, with an emphasis upon interdisciplinary contributions and trends of development. Contemporary issues and the prospects for theoretical integration are examined in the perspective of the long-term development of the field.

5355. Topics in Individuals and Society

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory and research concerning the relationship between individuals and society. Topics will vary by semester.

5401. Analysis of Social Organization

Three credits. Prerequisite: Instructor consent.

An examination of patterns of social organization found in bureaucracies and voluntary associations.

5406. Health Organizations and Their Environments

Three credits.

An in-depth analysis of the interaction between organizations and their sociological environments. An emphasis is placed on health service organizational obstacles to health planning.

5411. Sociology of Work

Three credits. Prerequisite: Instructor consent.

Analysis of work behavior with particular attention to formal and informal organization of labor, white collar, executive and professional roles.

5421. Seminar in Social Stratification

Three credits. Prerequisite: Instructor consent.

Social class theories, and problems of distribution of power and privileges. Some attention will be given to a comparative analysis of class systems.

5425. Topics in Stratification and Inequality

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory and research in social stratification and inequality. Topics will vary by semester.

5453. Medical Sociology

Three credits. Prerequisite: Instructor consent.

An examination of the institutional pattern of health care, including the social aspects of health and sickness, types of practitioners, and the social organization of therapeutic settings.

5461. Social Gerontology

Three credits. Prerequisite: Instructor consent.

A basic consideration of the societal aspects of aging including the social psychological concomitants of adjustments, changing roles, and systems of social relationships.

5471. Energy, Environment, and Society

Three credits.

Sociological perspectives on energy production, distribution and consumption; environmental impacts and constraints; alternative energy and environment futures; and cross-national studies of policy formation and implementation.

5501. Racism

Three credits. Prerequisite: Instructor consent. May be repeated for a total of six credits.

Variable topics in the study of racism, such as racism and U.S. social policy, white racism, and the social construction of whiteness. Topic may vary by semester.

5505. Topics in Racism and Ethnic Group Relations

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological analyses of racism and ethnic group relations. Topics will vary by semester.

5511. Seminar on American Jewry

Three credits.

Applications of sociological theory and methods to the analysis of American Jewry.

5515. Sociology of Immigration

Three credits. Prerequisite: Instructor consent.

Theoretical and empirical work on immigration and ethnicity including forms of assimilation, ethnicity and transnationalism; challenges and opportunities for incorporation, and struggles over political, social, economic human rights. The course focuses on the US with selected cases from Europe and Asia.

5601. Gender and Society

Three credits. May be repeated for a total of six credits.

Critical appraisal of social scientific perspectives on women and men. Feminist theory and current social science research on gender. Emphasis on interdisciplinary approaches.

5605. Topics in Gender and Sexualities

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory and research in gender and sexualities. Topics will vary by semester.

5612. Feminist Theory and Social Science

Three credits. Prerequisite: Instructor consent.

Examines intellectual background and contemporary context for feminist theoretical debates in the social sciences. Explores these debates with reference to feminist perspectives on political theory, science, economics, postmodernism, postcolonialism, globalization, socialization, and sexuality.

5651. Seminar in the Family

Three credits. Prerequisite: Instructor consent.

An analytical study of the family as a social group in terms of structure, member roles, and function with an examination of ethnic, religious, and class differences. The interrelationship between the family and its cultural context is analyzed with particular reference to the impact of modern culture.

5701. Urban Sociology

Three credits. Prerequisite: Instructor consent.

A survey of topics in urban sociology. Examines both classical and contemporary perspectives on the social organization of cities including urbanization, suburbanization, spatial characteristics of cities, residential segregation, immigration, poverty and wealth, and urban-based social problems.

5703. The Metropolitan Community

Three credits. Prerequisite: Instructor consent.

Topics in urban sociology.

5705. The Community

Three credits. Prerequisite: Instructor consent.

A critical analysis of current theories of the nature of the community, its types, functions, processes, agencies, and values. Emphasis is given to community surveys and community organization.

5706. Seminar in Comparative Urbanization

Three credits. Prerequisite: Instructor consent.

Urbanization as a factor in social and cultural change, particularly in developed areas: Asia, Africa and Latin America.

5751. Demography

Three credits. Prerequisite: Instructor consent.

Survey and analysis of theories and present problem areas in demography. This includes such topics as: population growth and distribution, population composition, mortality, fertility, migration, and population policy.

5753. Methods of Population Analysis

Three credits. Prerequisite: Instructor consent.

The sources and characteristics of demographic data and vital statistics and the methods and problems of population data analysis.

5757. Seminar in Human Fertility, Mortality, and Migration

Three credits. Prerequisite: Instructor consent.

A review and critique of the literature on fertility, mortality and migration, and the dynamic interaction of these variables in population change.

5801. Political Sociology

Three credits. Prerequisite: Instructor consent.

Sociological aspects of political institutions and behavior; social and economic bases of political power, ideology, and mobilization of support; community and national power systems, political parties, and elites.

5805. Topics in Political Sociology

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Special topics in sociological theory and research in political sociology. Topics will vary by semester.

5806. Seminar in Theories of the State

Three credits.

A sociological examination of theoretical analysis of the role of the state in modern society, and the relationship between the state and the applications of these theories to empirical analyses of specific research questions.

5809. Inequality and the Welfare State

Three credits. Prerequisite: Instructor consent.

Analysis of the relationship between systems of racial, class, and gender inequality, and the formation and implementation of social policy by the contemporary U.S. welfare state.

5821. Social Movements

Three credits. Prerequisite: Instructor consent.

Analysis of the conditions and processes underlying movement formation and participation and influencing their careers and outcomes.

5829. Social Change

Three credits. Prerequisite: Instructor consent.

A study of the forces prompting and impeding societal change with particular attention to those operative in contemporary society. Major theories of social change are examined.

5831. Law and Society

Three credits. Prerequisite: Instructor consent.

An overview of theoretical perspectives in the sociology of law, with emphasis on classical social theory.

5833. Gender, Politics and the State

Three credits. Prerequisite: Instructor consent.

Explores gendered construction of state and politics with attention to changes over time, across cultures and political institutions. Examines key debates within feminist political and legal theories and third world feminist and post colonialist theories of the state. Discusses links between local resistance, immigration, cultural citizenship, international politics, neoliberal discourse, and global economic restructuring.

5895. Investigation of Special Topics

Variable (1-3) credits. Prerequisite: Instructor consent. May be repeated for credit.

A seminar course. Topics vary by semester.

5899. Independent Study for Graduate Students

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

Special topic readings or investigations.

6005. Advanced Topics in Sociology

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological analysis. Topics will vary by semester.

6203. Quantitative Research II

Three credits. Prerequisite: Instructor consent.

Advanced quantitative methods of social research. Topics include generalized linear models, including binary logit and probit, multinomial logit, ordered logit and probit, and count data; censoring, truncation, and sample selection; panel data; and correlated errors

6205. Advanced Topics in Quantitative Methods

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in quantitative methods in sociological research. Topics will vary by semester.

6231. Qualitative Research II

Three credits. Prerequisite: Instructor consent.

Advanced topics in qualitative methods of social research. Topics include contemporary debates in qualitative methodology; critical perspectives on qualitative methodology; feminist research; institutional ethnography; the case method; extended case method; Third World and postcolonial approaches to social research; analyzing and reanalyzing field data; applied and evaluation research; participatory and activist research.

6251. Current Theory and Research

Three credits. Prerequisite: SOCI 5251; instructor consent.

An examination of current theories. Topics include: consideration of their continuities with classical theories, conceptual and measurement problems in testing and constructing current theories, and the interplay between theory and research.

6255. Advanced Topics in Qualitative Methods

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in qualitative methods in sociological research. Topics will vary by semester.

6265. Advanced Topics in Sociological Theory
Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory. Topics will vary by semester.

6275. Advanced Topics in Culture

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in culture. Topics will vary by semester.

6315. Advanced Topics in Deviance and Crime

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in deviance and crime. Topics will vary by semester.

6355. Advanced Topics in Individuals and Society

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in the relationship between individuals and society. Topics will vary by semester.

6425. Advanced Topics in Stratification and Inequality

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in social stratification and inequality. Topics will vary by semester.

6505. Advanced Topics in Racism and Ethnic Group Relations

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in racism and ethnic group relations. Topics will vary by semester.

6605. Advanced Topics in Gender and Sexualities

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in gender and sexualities. Topics will vary by semester.

6805. Advanced Topics in Political Sociology

Three credits. Prerequisite: Instructor consent. May be repeated for a total of nine credits.

Advanced topics in sociological theory and research in political sociology. Topics will vary by semester.

Spanish (SPAN)

5320. Independent Study

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

5323. Concepts of Literary Criticism

Three credits.

A practical approach to the theories and methods of literary criticism with particular reference to Hispanic literature.

5325. Cervantes Studies

Three credits. May be repeated for a total of nine credits.

Don Quixote I and II and the critical corpus. The Novelas Ejemplares, Entremeses and other works.

5334. Modern Spanish-American Poetry

Three credits.

Selected poets and movements in Spanish America from the late nineteenth century to the present.

5335. The Theatre in Spanish America

Three credits.

The works of selected dramatists, with emphasis on the modern period.

5336. Colonial Latin American Literature

Three credits.

Study of particular aspects of colonial literary production: religious and secular historiography; humanist thought in the colonies, poetry, and society; literature and the Baroque city; political and scientific thought.

5350. The Essay in Spanish America

Three credits.

The Spanish-American essay as a literary genre and a vehicle of ideas. Reading in the works of the chief essayists of the Spanish-American nations.

5356. Twentieth-Century Novel and Essay

Three credits. May be repeated for a total of 12 credits.

Selected works either of authors from 1895 to 1936, or of authors from 1936 to the present.

5359. Special Topics in Early Modern Spanish Literature

Three credits. May be repeated for a total of nine credits.

The novel, the short story, and other prose genres in the early modern period.

6339. Seminar on Sixteenth or Seventeenth Century Studies

Three credits. May be repeated for a total of nine credits.

Open topics.

6402. Studies in Spanish-American Literature

Three credits. May be repeated for a total of nine credits.

6403. Studies in Spanish Literature

Three credits. May be repeated for a total of nine credits.

May be repeated for up to nine credits with a change of topic.

6404. Special Topics in Nineteenth-Century Spanish-American Literature and Cultural Production

Three credits. May be repeated for a total of nine credits.

Nineteenth century Spanish-American cultural production from Independence to the end of the nineteenth century. Emphasis on the interaction of literature and social thought, on the relations between literature and other forms of art, or on the role of artistic and intellectual practices in shaping the new nations.

6405. Special Topics in Twentieth-Century Spanish-American Literature and Cultural Production

Three credits. May be repeated for a total of nine credits.

Twentieth century Spanish-American cultural production. Emphasis on the interaction of artistic practices and social thought, or on the relations between literature, other forms of art, and social or political movements.

6407. Special Topics in Modern Spanish Cultural Production

Three credits. May be repeated for a total of nine credits.

Spanish culture from the Enlightenment to the present. Emphasis on the interaction of art and social thought, on the relations between art and the media, or on the role of intellectual practices in shaping or challenging notions of gender, ethnic, and national identity.

6408. Special Topics in Nineteenth Century Spanish Literature

Three credits. May be repeated for a total of nine credits.

Nineteenth century Spanish literature. Emphasis on the interaction of literature and social thought or the relations between literature and other forms of art.

6416. Theoretical Debates and the Hispanic Tradition

Three credits. May be repeated for a total of nine credits.

Aspects of methodology, theory, and history relevant to the study of cultural production in Hispanic societies.

Speech, Language and Hearing Sciences (SLHS)

5302. Summer Clinical Practicum in Speech Disorders

One credit.

Summer practicum in Speech Disorders

5303. Advanced Topics in Medical Speech Pathology

Three credits. Prerequisite: SLHS 5302.

Advanced practice management in the prevention, assessment and treatment of medically based disorders in the field of Speech-Language Pathology. Integration of content from previous didactic and practicum courses applied in a lifespan approach to emphasize the role of a collaborative health care team in a multidisciplinary context.

5320. Directed Observation in Hearing

Variable (1-3) credits. Lecture. May be repeated for a total of three credits.

Directed observation of diagnostic and rehabilitative procedures in audiology for pediatric and adult populations. Effects of etiology considered. Credits and hours by arrangement.

5321. Otologic Basis of Hearing Loss

Three credits.

Basic and advanced principles of medical audiology including anatomy and physiology of the system, disorders of the auditory system, genetics, radiology, and functional brain imaging.

5322. Electrophysiology Techniques and Interpretation I

Four credits. Three class periods and one 1-hour laboratory period.

Review of clinical applications of otoacoustic emissions, auditory brainstem response, electrocochleography, and auditory steady state potentials with emphasis on diagnostic issues.

5323. Geriatric Audiology

Three credits.

The physical effects of aging on the auditory periphery and central nervous system, as well as the consequences of aging on diagnostic and rehabilitative services to older clients.

5324. Psychosocial Issues of Hearing Loss

Three credits.

Contemporary counseling issues related to working with individuals with hearing disorders.

Emphasis on family systems and the impact of a hearing disorder.

5325. Adult Aural Rehabilitation

Three credits. Prerequisite: SLHS 5356.

The provision of aural rehabilitation services to adults with hearing loss including auditory training, speechreading, auditory-visual integration, effective communication strategies, and Deaf culture.

5326. Professional Issues in Audiology

Three credits.

Issues related to ethics and practice in the field of audiology, multicultural sensitivity, legal rights and responsibilities.

5327. Introduction to Clinical Topics in Audiology

Three credits. May be repeated for credit with a change in topic.

Provides mandated training required prior to any interaction with patients during clinical observations and supports early experiences once clinical practicum has begun. Students will demonstrate understanding and practice of evaluation protocols, professionalism, documentation and interpersonal communication required prior to practicum.

5328. Intermediate Clinical Topics in Audiology

Three credits. May be repeated for credit with a change in topic.

Intermediate-level topics in providing clinical audiology services with a focus on prevention and intervention; supports ongoing clinical practicum.

5329. Advanced Clinical Topics in Audiology

Three credits. May be repeated for credit with a change in topic.

Integrating advanced diagnostic and treatment topics with evidence-based practice through presentations and case studies.

5335. Fluency Disorders

Three credits.

Research data and theoretical models regarding the etiology and characteristics of fluency disorders (primarily stuttering) are integrated to form the foundation for clinical management. Treatment approaches for children and adults are presented.

5336. Clinical Practicum in Speech Disorders

Three credits. May be repeated for credit.

5337. Clinical Practicum in Hearing

Variable (1-6) credits. Discussion. May be repeated for credit.

5342. Aphasia

Three credits.

The differential diagnosis of acquired neurogenic communication disorders as well as research, theory, and efficacy of language interventions for aphasia in adults.

5343. Cognitive-Communicative Disorders

Three credits.

Cognitive-communicative disorders in adults secondary to right hemisphere damage, traumatic brain injury, and dementia. Emphasis on differential diagnosis and theories and research pertaining to clinical management including the efficacy of interventions.

5344. Pediatric Rehabilitative Audiology

Three credits.

Auditory-based components of managing hearing loss in children; the role of the family and cultural environment in service delivery.

5345. Motor Speech Disorders

Three credits.

The effects of acquired and developmental neuropathology on speech. Emphasis on differential diagnosis and clinical management.

5346. Dysphagia

Variable (1-3) credits.

Dysphagia secondary to neurologic impairments, cancer, and degenerative disease. Anatomy and physiology of normal and disordered swallowing, evaluation including instrumental assessment techniques, and multidisciplinary management.

5348. Language Disorders I: Birth to 5 Years

Three credits.

The nature, assessment, and intervention of delayed and disordered language in children birth to five years of age.

5349. Language Disorders II: School Age Population

Three credits.

The nature, assessment, and intervention of delayed and disordered language in school-age children.

5351. Amplification for Residual Hearing

Three credits.

Introduction to hearing aids and assessment of the personal amplification needs of hearing-impaired individuals.

5353. Speech Sound Disorders in Children

Three credits.

Prevention, assessment, and intervention of anatomical, physiological, and language-based disorders affecting the production of speech in children.

5354. Physiological and Psychological Acoustics

Three credits.

Anatomy, physiology and psychoacoustics of the auditory system.

5355. Psychoacoustics

Three credits.

Basic principles of human perception of sound.

5356. Audiological Assessment

Three credits.

The development and administration of advanced pure-tone and auditory discrimination tests; the interpretation of audiometric findings for adults and children.

5357. Organic Disorders of Communication

Three credits.

Research and theory pertaining to speech and language disorders resulting from congenital structural anomalies.

5359. Voice Disorders

Three credits.

Normal anatomy and physiology of voice production including the effects of: aging across the lifespan, gender, and multicultural issues. Voice disorders, diagnostic procedures and management techniques to remediate voice disorders will be discussed.

5360. Laboratory Instrumentation

Three credits.

Presentation of basic concepts necessary for the application of electronic instrumentation to the study of speech and hearing. Description, analysis, and application of electronic and electro-acoustical

instrumentation employed in communication science research.

5361. Advanced Speech Science I

Three credits.

Generation, transmission, detection, and analysis of the speech signal. Special attention is given the myology of speech production and the physiological correlates of the acoustic output. Theoretical models of speech production are examined in light of recent empirical findings. Biomedical and other research techniques are employed in the laboratory setting to investigate the speech communication processes.

5362. Advanced Speech Science II

Three credits. Prerequisite: SLHS 5361.

A continuation of SLHS 5361.

5372. Central Auditory Disorders

Three credits.

Assessment of auditory processing in adults and children. Effects of processing problems on communication and a discussion of management techniques. Electrophysiological measurement techniques are stressed.

5373. Pediatric Audiology

Three credits.

Physiological and perceptual maturation of the auditory system from gestation through two years of age. Assessment of children's hearing, including difficult to test children, public school and neonatal screening.

5374. Clinical Project in Speech-Language Pathology

Three credits.

Written report and oral presentation on a client's clinical intervention. The clinical project must be successfully completed to graduate with an M.A. in speech-language pathology via the non-thesis track.

5375. Auditory System: Anatomy and Physiology

Three credits. Prerequisite: Instructor consent.

Review of the structure and function of the human auditory system, with emphasis on the clinical/applied aspects of anatomy and physiology. Oriented towards relationships to various auditory disorders.

5376. Language Impairments and Literacy

Three credits. Prerequisite: Instructor consent.

A research seminar covering the theories, assessment, and treatment of children with reading disabilities from a language-based perspective. Open to graduate students in Communication Disorders, others with permission. Recommended preparation: a course in normal language development and language disorders in preschool and school-age children.

5377. Introduction to Research

Three credits. Prerequisite: Instructor consent.

Introduction to research, experimental design, and statistics. Includes ethics in research, publishing, grant writing, general research skills, and computerized statistics. Open to graduate students in Communication Disorders, others with permission.

5378. Augmentative Alternative Communication in Speech-Language Pathology

Three credits. Prerequisite: Open only to second-year Speech, Language and Hearing Sciences M.A. students, others with consent.

Principles of assessment, therapeutic intervention and diagnostic selection of no, low, mid and/or high-technology Augmentative Alternative Communication for individuals with complex communication needs.

5379. Introduction to Medical Speech Pathology 1

One credit. Intended for first year graduate students enrolled in the SLHS M.A. program.

Lectures and clinical rotations at UConn Health to prepare students for their off-campus medical practicum.

5380. Introduction to Medical Speech Pathology II

One credit. Prerequisite: SLHS 5379. Intended for first year graduate students enrolled in the SLHS M.A. program.

Lectures and clinical rotations at the UConn Voice Clinic, to prepare students for their off-campus medical practicum.

5385. Advanced Topics in Medical Speech Pathology

Three credits. Prerequisite: SLHS 5302.

Advanced practice management in the prevention, assessment and treatment of medically based disorders in the field of Speech-Language Pathology. Integration of content from previous didactic and practicum courses applied in a lifespan approach to emphasize the role of a collaborative health care team in a multidisciplinary context.

6123. Bilingualism in Typical and Atypical Populations: Language and Cognition

Three credits. Prerequisite: instructor consent. Recommended preparation: A course in phonetics, language development and disorders.

Biological and cognitive factors associated with language acquisition, cognitive reserve, Specific Language Impairment in bilinguals. Emphasis on diagnosis, cognitive factors in language selection, and differences in reading opaque vs. transparent languages.

6300. Independent Study in Communication Disorders

Variable (1-6) credits. May be repeated credit.

Periodic conferences with the instructor are required.

6319. Practicum in Research

Variable (1-6) credits. May be repeated for credit.

Practicum. May be repeated for credit.

6363. Seminar in Speech Pathology

Variable (1-6) credits. Seminar. May be repeated for credit with a change in content.

6364. Seminar in Audiology

Variable (1-6) credits. Seminar. May be repeated for credit with a change in content.

6365. Seminar in Speech Science

Variable (1-6) credits. Seminar. May be repeated for credit with a change in content.

6366. Seminar in Hearing Science

Variable (1-6) credits. Seminar. May be repeated for credit with a change in content.

6367. Topics in Hearing and Speech Science

Variable (1-3) credits. Lecture. May be repeated for credit with a change in content.

6368. Topics in Speech Pathology

Variable (1-3) credits. Lecture. May be repeated for credit with a change in content.

6369. Topics in Audiology

Variable (1-3) credits. Lecture. May be repeated for credit with a change in content.

6370. Seminar in Psycholinguistics

Three credits. May be repeated for a total of 12 credits with a change of content.

Reports and discussion of current research on a selected topic each semester.

6401. Amplification of Residual Hearing II

Three credits. Prerequisite: SLHS 5351.

Theoretical and clinical issues related to hearing aid candidacy and fitting with an emphasis on advanced signal-processing strategies.

6402. Hearing Conservation / Industrial Audiology

Three credits.

Effects of noise on the structure and function of the auditory system. Elements of noise measurements, otoprotection, and key issues in establishment and maintenance of a hearing conservation program.

6410. Vestibular System: Clinical Aspects

Four credits. Prerequisite: Open only to graduate students in Audiology; instructor consent.

Anatomy, physiology and functional assessment of the vestibular system including instrumentation, procedures, and interpretation of clinical tests. Hands-on laboratory exercises included.

6422. Electrophysiologic Techniques and Interpretation II

Four credits. Prerequisite: SLHS 5322.

Methods of acquiring, averaging and analyzing cortical evoked and event-related potentials following auditory input. Emphasis on utilization of multi-channel recording devices for research and clinical purposes.

Statistics (STAT)

5005. Introduction to Applied Statistics

Three credits. Not open for credit to students who have passed STAT 2215Q.

One-, two- and k-sample problems, regression, elementary factorial and repeated measures designs, covariance. Use of computer packages, e.g., SAS and MINITAB.

5099. Investigation of Special Topics

(Also offered as BIST 5099.) Variable (1-6) credits. Prerequisite: Open only to Statistics graduate students; instructor consent. May be repeated for credit.

5105. Quantitative Methods in the Behavioral Sciences

Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Acquaints the student with the application of statistical methods in the behavioral sciences. Correlational methods include multiple regression and related multivariate techniques.

5192. Supervised Research in Statistics

Variable (1-6) credits. Prerequisite: Open only to Statistics graduate students, others with consent.

5315. Analysis of Experiments

Three credits. Prerequisite: STAT 5005. Not open for credit to students who have passed STAT 3115Q.

Straight-line regression, multiple regression, regression diagnostics, transformations, dummy variables, one-way and two-way analysis of

variance, analysis of covariance, stepwise regression.

5361. Statistical Computing

(Also offered as BIST 5361.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Use of computing for statistical problems; obtaining features of distributions, fitting models and implementing inference. Basic numerical methods, nonlinear statistical methods, numerical integration, modern simulation methods.

5415. Advanced Statistical Methods

Three credits. Prerequisite: Open only to Statistics graduate students; instructor consent.

Discrete and continuous random variables, exponential family, joint and conditional distributions, order statistics, statistical inference point estimation, confidence interval estimation, and hypothesis testing.

5505. Applied Statistics I

(Also offered as BIST 5505.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Exploratory data analysis: stem-and leaf plots, Box-plots, symmetry plots, quantile plots, transformations, discrete and continuous distributions, goodness of fit tests, parametric and non-parametric inference for one sample and two sample problems, robust estimation, Monte Carlo inference, bootstrapping.

5515. Design of Experiments

(Also offered as BIST 5515.) Three credits. Prerequisite: STAT 5005 or enrollment in Statistics M.A. or Ph.D. program. Not open for credit to students who have passed STAT 3515Q.

One way analysis of variance, multiple comparison of means, randomized block designs, Latin and Graeco-Latin square designs, factorial designs, two-level factorial and fractional factorial designs, nested and hierarchical designs, split-plot designs.

5525. Sampling Theory

(Also offered as BIST 5525.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Sampling and nonsampling error, bias, sampling design, simple random sampling, sampling with unequal probabilities, stratified sampling, optimum allocation, proportional allocation, ratio estimators, regression estimators, super population approaches, inference in finite populations.

5585. Mathematical Statistics I

(Also offered as BIST 5585.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Introduction to probability theory, transformations and expectations, moment generating function, discrete and continuous distributions, joint and marginal distributions of random vectors, conditional distributions and independence, sums of random variables, order statistics, convergence of a sequence of random variables, the central limit theorem.

5605. Applied Statistics II

(Also offered as BIST 5606.) Three credits. Prerequisite: STAT 5505.

Analysis of variance, regression and correlation, analysis of covariance, general liner models, robust regression procedures, and regression diagnostics.

5625. Introduction to Biostatistics

(Also offered as BIST 5625.) Three credits. Prerequisite: Open only to Statistics graduate students; instructor consent.

Rates and proportions, sensitivity, specificity, two-way tables, odds ratios, relative risk, ordered and non-ordered classifications, trends, case-control studies, elements of regression including logistic and Poisson, additivity and interaction, combination of studies and meta-analysis.

5635. Clinical Trials

(Also offered as BIST 5635.) Three credits. Prerequisite: Open only to Statistics graduate students; instructor consent.

Basic concepts of clinical trial analysis; controls, randomization, blinding, surrogate endpoints, sample size calculations, sequential monitoring, side-effect evaluation and intention-to-treat analyses. Also, experimental designs including dose response study, multicenter trials, clinical trials for drug development, stratification, and cross-over trials.

5645. Concepts and Analysis of Survival Data

(Also offered as BIST 5645.) Three credits. Prerequisite: Open only to Statistics graduate students; instructor consent.

Survival models, censoring and truncation, nonparametric estimation of survival functions, comparison of treatment groups, mathematical and graphical methods for assessing goodness of fit, parametric and nonparametric regression models.

5665. Applied Multivariate Analysis

(Also offered as BIST 5665.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Multivariate normal distributions, inference about a mean vector, comparison of several multivariate means, principal components, factor analysis, canonical correlation analysis, discrimination and classification, cluster analysis.

5685. Mathematical Statistics II

(Also offered as BIST 5685.) Three credits. Prerequisite: STAT 5585.

The sufficiency principle, the likelihood principle, the invariance principle, point estimation, methods of evaluating point estimators, hypotheses testing, methods of evaluating tests, interval estimation, methods of evaluating interval estimators.

5725. Linear Statistical Models

(Also offered as BIST 5725.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Linear and matrix algebra concepts, generalized inverses of matrices, multivariate normal distribution, distributions of quadratic forms in normal random vectors, least squares estimation for full rank and less than full rank linear models, estimation under linear restrictions, testing linear hypotheses.

5825. Applied Time Series

(Also offered as BIST 5825.) Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Introduction to prediction using time-series regression methods with non-seasonal and seasonal data. Smoothing methods for forecasting. Modeling and forecasting using univariate autoregressive moving average models.

6315. Statistical Inference I

Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Exponential families, sufficient statistics, loss function, decision rules, convexity, prior information, unbiasedness, Bayesian analysis, minimaxity, admissibility, simultaneous and shrinkage estimation, invariance, equivariant estimation.

6325. Advanced Probability

Three credits. Prerequisite: Open only to Statistics graduate students, others with consent.

Fundamentals of measure and integration theory: fields, σ -fields, and measures; extension of measures; Lebesgue-Stieltjes measures and distribution functions; measurable functions and integration theorems; the Radon-Nikodym Theorem, product measures, and Fubini's Theorem. Introduction to measure-theoretic probability: probability spaces and random variables; expectation and moments; independence, conditioning, the Borel-Cantelli Lemmas, and other topics as time allows.

6494. Seminar in Applied Statistics

(Also offered as BIST 6494.) Variable (1-6) credits. Prerequisite: Open only to Statistics graduate students, others with consent. May be repeated for credit.

6515. Statistical Inference II

Three credits. Prerequisite: STAT 6315; open only to Statistics graduate students, others with consent.

Statistics and subfields, conditional expectations and probability distributions, uniformly most powerful tests, uniformly most powerful unbiased tests, confidence sets, conditional inference, robustness, change point problems, order restricted inference, asymptotics of likelihood ratio tests.

6694. Seminar in Multivariate Statistics

Variable (1-6) credits. Prerequisite: Open only to Statistics graduate students, others with consent. May be repeated for a maximum of 12 credits.

6894. Seminar in the Theory of Probability and Stochastic Processes

Variable (1-6) credits. Prerequisite: Open only to Statistics graduate students, others with consent. May be repeated for a maximum of 12 credits.

Systems Engineering (SE)

5000. Introduction to Systems Engineering

Three credits.

Introduction to the hard and soft skills that are required of good systems engineers. Lectures follow the competency models for systems engineers and include topics such as systems thinking, needs identification, requirements formulation, architecture definition, technical management, design integration, as well as verification and validation of designs. Some of the key systems engineering (SE) standards will be covered and the roles of organizations in enabling engineers to develop systems will be explored. Applications of SE concepts and tools in various settings will be discussed through examples and case studies. Students will learn to apply the SE methodologies in modern complex system development environments such as aerospace and defense, transportation, energy, communications, and modern software-intensive systems.

5095. Special Topics

Variable (1-3) credits. May be repeated for credit. General topics in systems engineering.

5101. Foundations of Physical Systems Modeling

Three credits. Recommended preparation: Undergraduate degree in Mechanical Engineering, Chemical Engineering, and Modelica Software.

Provides students with the foundations of physical systems modeling and computational methods for performance analysis. Students will develop skills in the areas of fundamental physical and mathematical representations of fluid dynamics, thermodynamics, heat transfer, and electro-mechanics. Introduction to concepts on how systems can be architected and designed with the aid of models. Topics include system and component requirements specification, creation of system models for design and control analysis of physical systems. Emphasis is placed on the modeling of such systems in the equation oriented programming environment of the Modelica language, and the utilization of these system models within the Functional Mockup Interface for co-simulation and Model Exchange. Examples of Aircraft Environmental Control, Chiller Systems and Plants, Engine Fuel Systems, Variable Frequency Drives and Electric Machines are used for the demonstration of the theoretical and modeling aspects of physical system modeling.

5102. Uncertainty Analysis, Robust Design, and Optimization

Three credits. Prerequisite: SE 5101.

Provides students with a thorough understanding of platform-based and model-driven methods for uncertainty analysis and robust design of cyber-physical systems. Topics include modeling of uncertainties, sensitivity analysis, robust design analysis methodologies (DFSS, IDOV), and critical parameter management (CPM).

5103. Design Flows for Robust Design

Three credits. Prerequisite: SE 5101 and 5102.

Provides students with the platform-based design flows for robust design of physical systems. Students develop skills in requirements analysis of a physical systems, architectural selection, model-based system design, and verification and validation at various model abstraction levels. Special emphasis will be placed on development processes spanning system design and the requirements validation analyses (Sizing and Performance, Robustness, Dynamics and control, and Safety).

5195. Capstone Projects for System Design

Three credits. Prerequisite: SE 5101, 5102, and 5103.

This project course is designed to provide students with a thorough understanding of cyber-physical systems modeling and design through a comprehensive capstone project. These projects will be practical and relevant to industry needs.

5202. Foundations of Control

Three credits. Prerequisite: SE 5101. Recommended preparation: undergraduate course in systems analysis.

Familiarizes students with system design flows used for designing, implementing and verifying control systems and to provide skills necessary to design and analyze practical regulatory controllers for Cyber-Physical systems. Successful students

will be cognizant of the role of controls in the system design process and will be proficient in specifying control system requirements, especially as they relate to attenuation of load disturbances, robustness to dynamic system model uncertainty, actuator nonlinearities, and measurement noise; knowledgeable of the distinctions between modeling systems for control and understanding the fundamental limits of regulatory control systems; knowledgeable of the role of control architectures for regulatory controllers, including sensor selection and sizing of actuators; aware of practical control design methods focusing on PID controllers; controller implementation, validation, testing, diagnostics and tuning. Use of computer-aided engineering tools (Dymola, MATLAB/Simulink) in the design flows for control of cyber-physical systems is emphasized.

5203. Design Flows for Control and Verification

Three credits. Prerequisite: SE 5101 and 5102.

Familiarizes students with platform-based design flows for control and verification of cyber-physical systems, and to provide skills necessary to capture system-level requirements under nominal and hazardous conditions; select functional architecture and system structure considering hazards and reliability; conduct preliminary as well as detailed control system design for performance, reliability, robustness, implementation and cost; and carry out verification and validation processes for cyber-physical systems. Successful students will be cognizant of the role of controls in the system design process and will be proficient in specifying system requirements performing hazard analysis for dynamics and control of cyber-physical systems; understanding functional architecture and control structure evaluation, selection and validation considering hazards and reliability; preliminary as well as detailed model-based control system design for performance, reliability, robustness, implementation and cost; and verification and validation of control systems at various model abstraction levels. Special emphasis will be on development processes spanning requirements, dynamics and control, robustness, safety and computational and embedded system implementation issues. Use of computer-aided engineering tools (e.g., Rhapsody, Dymola, and MATLAB/Simulink) in the design flows for control of cyber-physical systems is stressed.

5295. Capstone Projects - Controlled Systems

Three credits. Prerequisite: SE 5101, 5102, and 5103.

This project course is designed to apply the skills, concepts and tools learned on requirement analysis, architecture selection, basic design and development, and design flows for controls on industry-relevant challenges. An industry and UConn mentoring team advises students on capstone projects.

5301. Embedded/Networked Systems Modeling Abstractions

Three credits. Recommended preparation: Background in hardware and/or software design.

Familiarizes students with design flows for designing, implementing and verifying embedded systems, and to provide skills necessary to specify requirements and perform platform-based design, analysis and modeling of embedded and networked systems. These models will be motivated by applications which demonstrate embedded systems

design challenges of satisfying time-critical, event-driven, and data-centric requirements. Students will be cognizant of the role of embedded controllers and devices in the system design process, as they relate to event-driven and data-driven systems, and supervisory control of hybrid (continuous and discrete-time) systems. This will include exposure to platform-based design principles with an emphasis on requirements capture and refinement to platform architecture mapping, analysis and verification. Students will learn the technical aspects of modeling principles relevant to embedded systems, specifically modeling system architecture, system functions, computation, software, real-time systems, and distributed systems.

5302. Formal Methods

Three credits. Prerequisite: SE 5301.

Introduction to formal methods as a framework for the specification, design, and verification of software-intensive embedded systems. Topics include automata theory, model checking, theorem proving, and system specification. Examples are driven by cyber-physical systems.

5303. Design Flows for Embedded / Networked Systems

Three credits. Prerequisite: SE 5301 and 5302. Recommended preparation: Background in hardware and/or software design.

Provides students with a thorough understanding of the design, verification, and validation of embedded/network systems and software-intensive systems. The student will develop skills in specifying requirements for embedded software systems, model based architecture and design, and verification and validation of embedded systems. Special emphasis will be placed on distributed embedded systems and real-time systems. The platform-based design (PBD) flow will be used as the common thread through the course. Examples are driven by cyber-physical systems.

5395. Capstone Projects - Embedded Systems

Three credits. Prerequisite: SE 5301, 5302, and 5303.

This project course is designed to provide students with a thorough understanding of all embedded system modeling, design, and verification through a comprehensive capstone project. These projects will be practical and be relevant to industry needs.

Translation Studies (TRST)

5310. Literary Translation: Theory and Practice

Three credits. Prerequisite: Six credits of upper division coursework (3000-level or higher) in a foreign language (or the equivalent).

A study of the theoretical and practical aspects of literary translation. Translating literature from various genres.

5311. Literary Translation Seminar

Three credits. Prerequisite: Six credits of upper division coursework (3000-level or higher) in a foreign language (or the equivalent).

Translating literature and studying the practical aspects of the craft of literary translation.

Women's, Gender, and Sexuality Studies (WGSS)

5315. Gender and Culture

Three credits.

Anthropological perspectives on the analysis of gender with special focus on dynamics of gender, culture, and power.

5333. Topics in the History of American Women

Three credits. Prerequisite: Instructor consent. May be repeated for a total of 12 credits.

5341. Analysis of Rituals

Three credits. Prerequisite: ANTH 5311.

Examines various theoretical contributions to the anthropological study of ritual. Controversies and ambiguities surrounding the social and symbolic significance of the ritual act for both men's and women's experiences and participation are addressed.

5365. Feminist Methodologies

Three credits.

Theoretical underpinnings of diverse feminist methodologies and interdisciplinary scholarship. Contemporary debates in the field and ethical dilemmas faced by researchers using feminist, interdisciplinary and intersectional epistemologies. Relationship to critical race, indigenous, and queer methodologies. Guided experience in designing and producing feminist scholarship.

5366. Feminist Pedagogy

Three credits.

Overview of feminist and critical epistemologies and pedagogical tools for use in interdisciplinary classrooms in varied academic contexts.

5371. Genders, Sexualities, and Theories

Three credits.

Genders and sexualities with special attention given to lesbian, gay, bisexual, and transgender issues.

5390. Independent Study for Graduate Students

Variable (1-6) credits. Prerequisite: Instructor consent. May be repeated for credit.

5395. Special Topics Seminar in Women's Studies

Three credits. May be repeated for a total of nine credits.

Topics of current interest from a feminist perspective.

5398. Variable Topics in Women's Studies

Three credits. With change in topic, may be repeated for credit.

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