Graduate School

Catalog 2003-2005

UNIVERSITY OF
NEW HAVEN

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UNIVERSITY OF NEW HAVEN

Graduate School

300 Orange Avenue
West Haven, CT 06516

Catalog 2003-2005

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UNIVERSITY OF
NEW HAVEN

This catalog supersedes all previous bulletins, catalogs and brochures published by the Graduate School and describes academic programs to be offered beginning in Fall 2003. Graduate students admitted to the university for the Fall of 2003 and thereafter are bound by the regulations published in this catalog.

The University of New Haven is committed to affirmative action and to a policy which provides for equal opportunity in employment, advancement, admission, educational opportunity and administration of financial aid to all persons on the basis of individual merit. This policy is administered without regard to race, color, national or ethnic origin, age, gender, religion, sexual orientation or disabilities not related to performance. It is the policy of the University of New Haven not to discriminate on the basis of gender in its admission, educational programs, activities or employment policies as required by Title IX of the 1972 Educational Amendments. This institution is authorized under federal law to enroll non-immigrant alien students.

Inquiries regarding nondiscrimination, affirmative action, equal opportunity and Title IX may be directed to the university's equal opportunity/affirmative action officer at 300 Orange Avenue, West Haven, CT 06516; phone (203) 932-7199. Persons who have special needs requiring accommodation should notify the university's Disabilities Services and Resources Office at Voice/TDD number (203) 932-7331.

Every effort has been made to ensure that the information contained in this publication is accurate and current as of the date of publication; however, the university cannot be held responsible for typographical errors or omissions that may have occurred. Information changes that may be made subsequent to the date of publication may be found on the university's website.

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The university reserves the right, at any time, to make whatever changes may be deemed necessary in admission requirements, fees, charges, tuition, policies, regulations and academic programs prior to the start of any class, term, semester, trimester or session. All such changes are effective at such times as the proper authorities determine and may apply not only to prospective students but also to those already enrolled in the university.

Dear Graduate Student,

This catalog provides more than just a formal document describing and defining the academic programs and policies for the Graduate School at the University of New Haven. As you examine this information, you will become aware of the breadth and diversity of our graduate programs and recognize the remarkable opportunity they offer. It is my hope that you will find an area of study that intrigues you for your personal, professional and educational growth.

Founded in 1969, the UNH Graduate School is one of the largest in Connecticut; our advanced degree alumni are employed in private industry and the public sector throughout the state, across the nation and around the world. Our graduate programs are focused on responding to the necessity for acquiring updated career credentials to advance in the workplace as well as on helping individuals adapt to changes in their careers and in the fast-paced global environment.

UNH faculty teaching in the graduate programs not only hold doctoral or terminal degrees in their respective fields, but also have professional, real-world experience that is especially vital to students' careers. A wide range of support services, such as the library, computer facilities, science and engineering laboratories, cooperative employment and internship opportunities, enhance the academic atmosphere on campus.

Flexible class scheduling and a trimester-plus-summer-term calendar provide accelerated progress toward a graduate degree for full-time students as well as part-time working adults. Both UNH and Greater New Haven offer a wide range of social, cultural and intellectual activities.

Welcome to UNH. Our mission is to help you achieve a more meaningful career and the benefits of life-long learning.

Sincerely,

Lawrence J. DeNardis
President


Federal Supervisors and Strategic Human Resources Management
2002
FEDERAL
PERSONNEL
GUIDE

GRADUATE SCHOOL PROGRAMS

Master's Degree Programs

Business Administration, M.B.A.
Cellular & Molecular Biology, M.S.
Community Psychology, M.A.
Computer Science, M.S.
Criminal Justice, M.S.
Education, M.S.
  Teacher Certification
  Professional Education
Electrical Engineering, M.S.
Environmental Engineering, M.S.
Environmental Science, M.S.
Executive M.B.A.
Executive Engineering Management, M.S.
Executive Tourism & Hospitality Management, M.S.
Fire Science, M.S.
Forensic Science, M.S.
Health Care Administration, M.S.
Human Nutrition, M.S.
Industrial Engineering, M.S.I.E.
  also M.B.A./M.S.I.E., dual degree
Industrial Hygiene, M.S.
Industrial/Organizational Psychology, M.A.
Labor Relations, M.S.
Management of Sports Industries, M.S.
Mechanical Engineering, M.S.M.E.
National Security & Public Safety, M.S.
Occupational Safety & Health Management, M.S.
Operations Research, M.S.
Professional Counseling, M.S.
Public Administration, M.P.A.
  also M.B.A./M.P.A., dual degree

Graduate Certificates

Accounting
Applications of Psychology
Bioinformatics
Business Management
Civil Engineering Design
Computer Applications
Computer Programming
Computing
Finance
Fire/Arson Investigation
Fire Science Technology
Forensic Computer Investigation
Forensic Science/Advanced Investigation
Forensic Science/Criminalistics
Forensic Science/Fire Science
Geographical Information Systems
Health Care Management
Human Resources Management
Industrial Hygiene
Information Protection & Security
International Business
International Relations
Legal Studies
Logistics
Long-Term Health Care
Management of Sports Industries
Marketing
National Security
Occupational Safety
Psychology of Conflict Management
Public Administration
Public Management
Public Safety Management
Quality Engineering
Taxation
Telecommunication Management
Victim Advocacy & Services Management

CALENDAR 2003-2005

Summer Term 2003 — **Wednesday, July 9 - Thursday, Aug. 21**

Awarding of Degrees, Saturday, Aug. 30

Fall Term 2003 — **Monday, Sept. 8 - Saturday, Dec. 13**

Last day to petition for January graduation, Wednesday, Oct. 15

Thanksgiving recess, no classes
Monday, Nov. 24 - Saturday, Nov. 29

Winter Term 2004 — **Monday, Jan. 5 - Saturday, April 3**

Commencement, 2 p.m., Saturday, Jan. 17

Last day to petition for May graduation, Monday, March 1

Spring Term 2004 — **Monday, April 5 - Saturday, July 3**

Good Friday, no classes, Friday, April 9
A make-up class will be scheduled

Commencement, 10 a.m., Saturday, May 22

Memorial Day, no classes, Monday, May 31
A make-up class will be scheduled

CALENDAR CONTINUED ON NEXT PAGE

Spring Term 2004 **Monday, April 5 - Saturday, July 3** (Cont. from page 7)

Last day to petition for awarding of degrees in August, Tuesday, June 15

Summer Term 2004 **Tuesday, July 6 - Wednesday, Aug. 18**

Awarding of Degrees, Saturday, Aug. 28

Fall Term 2004 **Monday, Sept. 13 - Saturday, Dec. 18**

Last day to petition for January graduation, Friday, Oct. 15

Thanksgiving recess, no classes
Monday, Nov. 22 - Saturday, Nov. 27

Winter Term 2005 **Monday, Jan. 3 - Saturday, April 2**

Commencement, 2 p.m., Saturday, Jan. 15

Good Friday, no classes, March 25
A make-up class will be scheduled

Spring Term 2005 **Monday, April 4 - Saturday, July 2**

Commencement, 10 a.m., Saturday, May 21

Memorial Day, no classes, Monday, May 30
A make-up class will be scheduled

Last day to petition for awarding of degrees in August, Wednesday, June 15

Summer Term 2005 **Wednesday, July 6 - Thursday, Aug. 18**

Awarding of Degrees, Saturday, Aug. 27

* This calendar is under review by the Faculty Senate and the Executive Vice President & Provost; it may be subject to change.

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UNIVERSITY OF
NEW HAVEN

THE UNIVERSITY

The University of New Haven is a private, independent, comprehensive university based in southern New England, specializing in quality educational opportunities and preparation of both traditional and returning students for successful careers and self-reliant, productive service in a global society.

The Graduate School focuses on addressing students' needs for efficient acquisition of career-oriented credentials for advancement in the workplace and on helping individuals adapt to changes in their work environment through continuing education.

The Mission of UNH
To develop career-ready and cultivated graduates, well-prepared for meaningful roles and the pursuit of life-long learning in a global economy and society.

The Vision of UNH
The institution of choice for students who seek the highest quality education for professionally oriented careers. We will be noted for our ability to combine professional education with liberal arts and sciences, and with the development of high ethical and cultural standards among our graduates.

Guiding Principles
UNH is committed to educational innovation, to continuous improvement in career and professional education, and to support for scholarship and professional development.

UNH takes pride in its commitment to service, quality, integrity and personal caring. All academic programs, as well as campus and student life, provide rich opportunities for leadership, personal growth and participation in the aesthetics of life so that the University of New Haven will personify a successful commitment to diversity, equality and the "pursuit of happiness."

Our goal is to distinguish ourselves by the measures of student admissions, retention, career development, collaboration with business, industry and community, and by the success of our graduates and their support as alumni.

Values

- Belief in and practice of UNH's Mission and Vision
- Commitment to the success of our students through caring and responsive service
- Teamwork: help each other succeed and seek help
- Open communications: be trusting, open, honest and straightforward
- Commitment to thoughtful action
- Think, articulate, do and evaluate
- Lead by example with continuous improvement
- Face all issues, no surprises, and be accountable
- Respect for the individual, including his or her thoughtful input
- Recognize success

The Graduate School

The graduate programs at the University of New Haven offer students the opportunity to enhance skills and knowledge for already-chosen careers in highly technical and competitive fields. Other students studying at the graduate level are preparing to enter new careers. Most graduate programs offer multiple areas of specialization; flexibility in elective choices; opportunities for field work, internships, independent study and research; and the possibility of combining a cooperative education work experience as part of the curriculum.

The university's faculty is outstanding in its combination of highly qualified, full-time academics (nearly 90 percent of whom hold doctoral or terminal degrees in their field from a broad spectrum of prestigious institutions) and part-time faculty members employed in area businesses and professions who bring, in addition to academic qualifications, practical insight and experience to the classroom.

The Graduate School offers more than 25 master's degree programs plus more than 30 graduate certificates. Classes are offered at locations across Connecticut.

The main campus in West Haven offers all academic programs. UNH's branch campus located in New London specializes in accelerated graduate degree programs for busy adults. The programs are offered in a cohort style, meaning that the same group of students completes the entire program together. These programs include a Saturday MBA, Master of Science in Computer Science, and an Executive Master of Science in Engineering Management (EMSEM). The EMSEM is offered at two different locations in southeastern Connecticut; in New London and Old Saybrook. Graduate courses in education are offered at the main campus and at off-campus locations in New London and Newington.

In addition to the graduate programs at the main campus in West Haven, the university offers the Master of Science degree in Forensic Science with a concentration in advanced investigation at its California campus in Sacramento and is also authorized to offer the Master of Science in National Security and Public Safety at our UNH-Sandia campus in Livermore, California. Graduate certificates in forensic science advanced investigation, information protection and security, and forensic computer investigation, are also available at the Sacramento site. The human nutrition master's program is also offered at satellite locations in San Francisco and Los Angeles as well as on the main campus. The university offers its M.A. in Industrial/Organizational Psychology program in Athens, Greece.

Most Graduate School courses are offered on a 13-week trimester schedule, beginning in September, January and April.

A condensed summer term is also offered. Most graduate courses are scheduled during the early evenings and on weekends to meet the needs of employed students.

Accreditation

Regional

The University of New Haven is a coeducational, nonsectarian, independent institution of higher learning, chartered by the General Assembly of the State of Connecticut.

The University of New Haven is accredited by the New England Association of Schools and Colleges, Inc., a nongovernmental, nationally recognized organization whose affiliated institutions include elementary schools through collegiate institutions offering postgraduate instruction.

Accreditation of an institution by the New England Association indicates that it meets or exceeds criteria for the assessment of institutional quality periodically applied through a peer group review process. An accredited school or college is one which has available the necessary resources to achieve its stated mission through appropriate educational programs, is substantially doing so, and gives reasonable evidence that it will continue to do so in the foreseeable future. Institutional integrity is also addressed through accreditation.

Accreditation by the New England Association is not partial but applies to the institution as a whole. As such, it is not a guarantee of the quality of every course or program offered, or the competence of individual graduates. Rather, it provides reasonable assurance about the quality of opportunities available to students who attend the institution.

School of Business

The university's School of Business has been admitted to candidacy status for accreditation by the American Assembly of Collegiate Schools of Business. Candidacy status is an indication that an institution has voluntarily committed to participate in a systematic program of quality enhancement and continuous improvement that makes AACSB accreditation a more realistic and operational objective. Candidacy is not accreditation and does not guarantee eventual accreditation.

Engineering

The university is a member of the Accreditation Board for Engineering and Technology (ABET) and the university's bachelor of science degree programs in chemical, civil, electrical, industrial and mechanical engineering are accredited by its Engineering Accreditation Commission (EAC/ABET).

The Computer Science bachelor's degree program is fully accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET).

California Programs

Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education Code and is the students' primary advocate in matters of consumer protection. This authorization applies to the university's master of science program in forensic science with a concentration in advanced investigation and graduate certificates in forensic computer investigation, and in information protection and security offered at the UNH California campus in Sacramento. Authorization for our master of science degree in national security and public safety at our UNH-Sandia campus in Livermore, California, the UNH master of science in fire science offered at Riverside, and the master of science program in human nutrition offered at the UNH locations in San Francisco and Los Angeles is also granted through the Bureau for Private Postsecondary and Vocational Education.

Other Memberships

The university holds membership in the Council of Graduate Schools, the Northeastern Association of Graduate Schools, the Academy of Criminal Justice Sciences, the Accreditation Board for Engineering and Technology, the National Association of Schools of Public Affairs and Administration (NASPAA), the National Association of Boards of Examiners for Nursing Home Administration, the American Council on Education, the Association of American Colleges, the National Association of Independent Colleges and Universities, the College Entrance Examination Board and is a member of other regional and national professional organizations.

History

The University of New Haven was founded in 1920 as the New Haven YMCA Junior College, a branch of Northeastern University. The college became New Haven College in 1926 by an act of the Connecticut General Assembly. The college moved to its current location in 1960.

In 1969, New Haven College added the Graduate School to its established baccalaureate programs. Initially offering programs in business administration and industrial engineering, the Graduate School expanded rapidly. Today, more than 25 master's level programs and additional courses have a graduate enrollment of more than 1800 students.

On the fiftieth anniversary of the founding of the college in 1970, New Haven College became the University of New Haven, reflecting the increased scope and the diversity of academic programs offered.

Today the university offers more than 100 graduate and undergraduate degree programs in six schools: the Graduate School, the College of Arts and Sciences, the School of Business, the School of Engineering and Applied Science, the Tagliatela School of Hospitality and Tourism, and the School of Public Safety and Professional Studies.

The University's Academic Schools

The University of New Haven has five academic schools–each with its own faculty and set of graduate programs.

The College of Arts and Sciences

The College of Arts and Sciences, through the Graduate School, offers master's degree programs in six fields: master of science degrees in cellular and molecular biology, education, environmental science, and human nutrition; master of arts degrees in community psychology and industrial/organizational psychology. Within the field of education, two options are available: master of science degrees in teacher certification and in professional education. The human nutrition program is offered part-time, one weekend per month, at the main campus in West Haven and at two locations in California: San Francisco and Los Angeles. The environmental science program provides many opportunities for field and laboratory experience along with classroom instruction, while students in cellular and molecular biology are training for specialized careers in the fields of biotechnology, basic science and pharmacological research. Graduate certificates provide short, specific programs in several fields including Geographical Information Systems (GIS) and psychology.

At the undergraduate level, the College of Arts and Sciences offers associate and bachelor's degree programs in a wide variety of fields from art to dental hygiene, music and sound recording to psychology. A combined five-year B.S./M.S. program in environmental science is offered for students who meet certain qualifications. Detailed information can be found in the *Undergraduate Catalog.*

The School of Business

The mission of the School of Business at the University of New Haven is to provide quality, career-oriented education to students with varied backgrounds and experi-

ences. The School of Business will seek to accomplish this through comprehensive teaching programs and by engaging in a variety of research and consulting activities involving both the development and communication of knowledge to the academic, business and government sectors. It is the vision of the school to be the regional leader in providing career-oriented, contemporary business education.

As the business environment becomes more complex, the School of Business provides contemporary educational experiences of high quality in order to prepare students who are ready to face the challenges of a dynamic, modern world and to meet their responsibilities within a global society. To meet this goal, career-oriented programs are provided, employing current knowledge and techniques presented in a manner appropriate to the diverse backgrounds and experiences of graduate students.

Through the Graduate School, the School of Business offers an M.B.A. program and master's degree programs in health care administration, labor relations and management of sports industries. A master's in public administration (M.P.A.) as well as two dual degrees, M.B.A./M.P.A. and M.B.A./M.S. Industrial Engineering, are also available. The School of Business also offers an executive M.B.A. program which has been a highly respected education resource for Connecticut business leaders for more than a quarter of a century. In addition, many graduate certificates are available for students who seek a short graduate curriculum concentrated in a specific business area.

At the undergraduate level, the School of Business offers associate and bachelor's degree programs in the departments of accounting, communication, economics and finance, marketing and international business and management. Descriptive information can be found in the university's *Undergraduate Catalog.*

The School of Engineering and Applied Science

Few professions can match engineering for challenge and excitement, and the changing face of engineering will shape the world in the twenty-first century—a world of exotic materials, new sources of energy, staggering telecommunications and computing capabilities, cybernetic factories and public works needed by society. The mission of the School of Engineering and Applied Science is to prepare individuals for the professional practice of engineering and science, and for continual life-long education to keep abreast of new developments.

Master of science degree programs are offered by the School of Engineering and Applied Science—through the Graduate School—in computer science, electrical engineering, environmental engineering, executive engineering management (EMSEM), industrial engineering, mechanical engineering and operations research. A dual degree program combines the M.B.A. with the M.S. industrial engineering degree. Graduate certificates are offered in civil engineering design, computer applications, computer programming, computing, logistics and quality engineering.

At the undergraduate level, the School of Engineering and Applied Science offers degrees in chemistry, computer engineering and general engineering along with its five EAC/ABET accredited engineering degrees in chemical, civil, electrical, industrial and mechanical engineering and its CAC/ABET accredited degree in computer science. Details are included in the UNH *Undergraduate Catalog.*

The Tagliatela School of Hospitality and Tourism

A master of science degree in executive tourism and hospitality management is offered through the Graduate School by the Tagliatela School of Hospitality and Tourism. The graduate curriculum is designed for

persons who have acquired significant managerial or operational experience in the tourism/hospitality industry. The goal of the program is to provide an avenue for students with industry experience to further their education at the graduate level.

Undergraduate degree programs are offered by the Tagliatela School of Hospitality and Tourism in hotel and restaurant management, and in tourism administration. Undergraduate certificates are available in the culinary art and the hotel/restaurant field. Information on undergraduate study is contained in the *Undergraduate Catalog.*

The School of Public Safety and Professional Studies

Through the Graduate School, the university's School of Public Safety and Professional Studies offers career-oriented, graduate degree programs in criminal justice, fire science, forensic science (including the criminalistics laboratory program), industrial hygiene, national security and public safety, occupational safety and health management, and professional counseling. A wide range of graduate certificates are available in the same fields, in forensic computer investigation and in information protection and security for students seeking shorter study in specific subcategories of these disciplines.

Broad professional education is provided, often incorporating classroom learning with laboratory and field experience. The programs attract students of varied ages and levels of expertise, from persons new in the field to seasoned professionals seeking national and/or regional accreditation and licensure.

Safety and professional degree programs and certificates also are offered at the undergraduate level in all the same fields, plus legal studies, and human services. Information on under-graduate programs appears in the *Undergraduate Catalog.*

The New Haven Area

The University of New Haven is located in south central Connecticut, between New York City and Boston, Massachusetts. Situated on a West Haven hillside overlooking Long Island Sound, the campus is easily accessible by car (from Interstate 95), bus and train service as well as local airports.

New Haven, just ten minutes away from the campus, is a city where arts and cultural activities flourish and coexist with science and business. Settled in 1638 and rich in history and heritage, New Haven is proud of its past, prouder of its present and actively planning for its future. The city is a manufacturing center, a deep-water harbor, a major arts center, a college town with seven colleges and universities in the immediate area, and the "Gateway to New England."

New Haven is home to the Shubert, Long Wharf and Yale Repertory theaters; the New Haven Symphony Orchestra; and a number of museums including the Peabody Museum of Natural History, the Eli Whitney Museum, the Yale Center for British Art, and the oldest university gallery in the western hemisphere, the Yale Art Gallery.

The Campus

The university's 78-acre campus contains 25 buildings that house modern laboratory and library facilities, the latest computer equipment, an athletic complex and residential facilities.

The Main Campus includes administration and classroom facilities in Ellis C. Maxcy Hall (the main administration building), Bayer Hall (undergraduate admissions and financial aid), the Phillip Kaplan Hall, the Jacob F. Buckman Hall of Engineering and Applied Science, Echlin Hall (which houses Information Services, the Computer Science Department and the Executive M.B.A. office and classroom), the Marvin K. Peterson Library, Bartels Hall, the campus center, the Psychology Building, Robert B. Dodds Hall

(which has classrooms, offices, laboratories, a theatre, and gallery), Bethel Hall (home to the ELS Language Center), the Campus Store, residence halls, the Gatehouse, and Graduate Admissions.

The South Campus includes Harugari Hall, which houses the Tagliatela School of Hospitality and Tourism, and South Campus Hall where students will find the School of Public Safety and Professional Studies and other departments. The university's athletic fields and Charger Gymnasium are located at the North Campus site.

The Alliance Theatre is in residence at UNH and produces a variety of dramatic and musical productions, including children's theater presentations. The campus has a newly renovated art gallery where the work of renowned local and area artists and sculptors is featured along with gallery space devoted to the university's art department.

Orchestra New England (O.N.E.) is in residence at UNH. Under the musical direction of Maestro James Sinclair, O.N.E. has developed a fine reputation as the Chamber Orchestra of New England. Founded at Yale in 1974, the orchestra consists of 20-35 principal musicians.

Admission

General Requirements

Applicants to the University of New Haven Graduate School are required to hold a baccalaureate degree from an accredited institution. Certain programs have additional requirements for admission, details of which are included in the program listings in this catalog.

For most programs admission decisions are based primarily on an applicant's undergraduate record. A prospective student who is currently completing undergraduate study should submit an official transcript complete to the date of application. In such cases, an admission decision may be made on the basis of a partial transcript, contingent upon completion of the baccalaureate degree. Registration will not be permitted until a final, official transcript is submitted to the Graduate Admissions Office.

Students may submit scores from the Graduate Record Examination (GRE), the Graduate Management Admission Test (GMAT) or the Miller Analogies Test in support of their applications. Students applying to certain programs (e.g., the M.B.A. program, which requires the GMAT or the criminalistics concentration in forensic science, which requires the GRE) will be required to submit test scores from one of the above examinations sent directly from the testing service to the Graduate Admissions Office. Information regarding specific requirements for submission of test scores is contained in the program descriptions elsewhere in this catalog.

All students entering the university must comply with state laws regarding immunizations for measles and rubella. Applicants to the Graduate School must complete the Measles Immunization Form and return it to the UNH Health Services Office. In addition, students enrolling at UNH for full-time study must also file a completed Health Examination Report with the Health Services Office. Medical forms and information can be obtained by contacting the Health Services Office at (203) 932-7079 or 1-800-DIAL-UNH, Ext. 7079.

It is the policy of the university to withhold registration at the beginning of each term for noncompliance.

Procedure

An applicant for admission to the Graduate School must submit the formal application form, two letters of recommendation (three letters plus additional forms and an essay for education/teacher certification), complete official transcripts of all previous college work (sent directly from colleges to the Graduate Admissions Office), the nonre-

fundable application fee and test scores (if required). Application materials are located in the back of this catalog.

In addition to the above application materials, all students must submit a completed measles/rubella immunization form to the Health Services Office. All full-time students are also required to submit the Health Examination Report.

In most cases, part-time, domestic students may be admitted for any term with the exception of applicants to the master of science in forensic science and the master of science in cellular and molecular biology who are admitted for the fall term only. Students (including international students required to maintain full-time enrollment based on immigration requirements) who are applying for full-time study may be notified that certain programs are limited to admission in the fall term only due to the planned sequence of courses. Should a student be unable to enter the Graduate School during the term for which admission is granted, the acceptance will remain open for one calendar year. After one year, a new application for admission may be required.

Students accepted into a program will be subject to the specific program requirements and rules of the *Graduate Catalog* in effect for the term in which the student enrolls/enrolled in the first course in that degree program. However, if a student subsequently submits a program change request and is accepted into a new or different program/degree, the student will be subject to the rules of the *Graduate Catalog* in effect at the date/time of acceptance into the newly selected program.

Admission Categories

Admitted applicants and students in the Graduate School are assigned to one of four categories: fully accepted, provisionally accepted, special or auditor.

Domestic students who wish to matriculate in a degree program, but who have not completed the application process and/or have not yet received a formal acceptance decision, may register as in-process students for one term while completing the application process.

A bachelor's degree is required for admission to all categories.

Fully Accepted

Students accepted without special stipulations for entrance into a regular degree program or certificate study are classified as fully accepted students.

Provisionally Accepted

An applicant may be accepted provisionally when that candidate's undergraduate grade point average falls below the standard set for full acceptance, the acceptance requires additional test or document submission to support entrance into the program selected, or if applicant's undergraduate background otherwise indicates a need for additional coursework or a short period of academic supervision and review. Students accepted provisionally should seek advice from the appropriate coordinator or advisor during the provisional period.

Students must complete the requirements stipulated in the provisional acceptance at the beginning of the program of study. Upon completion of the provisional requirements, each student's record will be evaluated for admission as a fully matriculated candidate for the degree.

Special (Nonmatriculated)

Special student status is reserved for students who do not wish to matriculate in a degree program or certificate study. Registration in this category is normally limited to no more than 12 credit hours of graduate work. Students who wish to continue graduate work must be accepted into a specific graduate program. Special students are responsible for meeting prerequisite requirements for the courses they wish to take.

Auditor

An auditor is allowed to attend class and is expected to participate in class discussions and complete the required assignments. An auditor receives no grade or credit toward any degree. While auditor status does not imply admission to any of the graduate degree programs, there is an official registration procedure and a notation of audit placed on the transcript. Both current students and new students are eligible to audit University of New Haven Graduate School courses.

An alumni audit program provides UNH degree-holding alumni/ae with a low-cost method of upgrading information and skills obtained in the process of completing their degrees at the University of New Haven. This program is not intended for the development of new skills or for the learning of new or more advanced topics. Therefore, the courses available (space permitting) to alumni auditors are limited to those at or below the level of the UNH degree obtained by the student.

Admission of International Students

University of New Haven graduate programs are open to qualified international students. To qualify for graduate school, a prospective student must have completed sufficient undergraduate preparation in a degree program acceptable to the University of New Haven Graduate School.

Because the review of applications from international students takes considerable time, it is important that international student applications and all supporting materials be received by the Graduate Admissions Office prior to the deadline dates outlined in the international student information packet.

U.S. Immigration regulations require that a student holding student status make satisfactory progress toward a degree.

Satisfactory progress requires full-time study, which is generally interpreted to mean completing at least three courses each trimester. Prospective international students should note that graduate certificates, the Executive M.B.A., the mechanical engineering master's program and the human nutrition master's program are not designed to permit full-time study. Also, the programs in the Education Department generally do not accept international student applications.

To apply for admission to the Graduate School and to be ready to begin study, prospective international students must complete all of the steps outlined in the following section.

International Application Process

All applicants must submit the following application materials:

1. A completed application form and the appropriate application fee.
2. Two letters of recommendation.
3. Official transcripts of all undergraduate work and graduate work completed. Applicants may be asked to provide substantiation of courses taken, grades received and/or the academic reputation of the undergraduate school within the educational system of the country in which the school is located. A certified English translation must accompany all non-English transcripts.
4. Proof of English proficiency. This must consist of one of the following:
   a. The Test of English as a Foreign Language (TOEFL) examination with a score of 190 (520 on the paper-based test) or above. The official score report must be sent directly from the testing service/site to the Graduate Admissions Office.
   b. Proof of completion of Level 112 in an ELS Language Center program.
   c. Proof that undergraduate academic instruction and courses were completed using the English language.
   Students whose TOEFL scores are less than 220 (560 on the paper-based test) and/or students who enter the Graduate School following completion of an intensive English language training program are required to take and pass

E 600 English Language Workshop in the first term of enrollment at the Graduate School.

5. Financial documentation. International students must provide verification of sufficient funds for study and living expenses at the University of New Haven for 12 months. This verification must be one of the following:
   a. Completed University of New Haven Financial Statement of International Students form and supporting documents.
   b. Current official scholarship letter. *The University of New Haven does not offer need-based financial assistance to international students.*
6. Acceptance fee of $225. This nonrefundable fee must be paid before immigration documents (DS-2019 for J-1 students or Form I-20AB for students entering the United States on F-1 visas) will be issued. This fee is not credited toward tuition and is not required in advance for scholarship students.
7. Medical Forms. All students entering the University of New Haven must comply with health requirements by submitting the following forms required by the UNH Health Services Office:
   a. Measles/Rubella Immunization Form (required for all students)
   b. Health Examination Report (required for all full-time students).

Appropriate documents (Form DS-2019 for J-1 visa/status or Form I-20AB for F-1 visa/status) will be issued only after a student has submitted all required materials, has been accepted in a program of study, has provided acceptable proof of English proficiency and financial status, and has paid the $225 acceptance fee.

The international student acceptance fee is required of all international undergraduate and graduate students at the university. This fee directly and indirectly supports a variety of services and programs for international students including: orientation programs, cross-cultural workshops, local community activities, international alumni programs, subscriptions to international newspapers/magazines for the campus library and operation of the International Services Office.

Initial Attendance at the university. All international students accepted into the Graduate School must report to the International Services Office before registering for graduate classes.

At the time of registration, students will be required to pay the tuition and fees for one trimester.

International students must subscribe to the university's international student health insurance. The premium of $650 per year will be charged to all international students. Requests for information regarding coverage and/or premiums for dependents should be directed to the Health Services department.

Registration

Registration deadlines are listed in the course schedules published for each term. Returning students and new domestic students who have been admitted to programs will receive registration materials and can register by email, fax, or mail.

Domestic students who have not completed the application process and/or have not yet received a formal acceptance decision may register as *in process* students for most programs. International students may not register as *in process* students. In-process students may not receive registration materials in the mail, but they may register in person at the main campus or at an off-campus registration session. Proof that the in-process student has an undergraduate degree will be required at the time of registration; and, whenever possible, transcripts of previous coursework should be provided to facilitate advisement. In-process status remains in effect for one term. In-process students may register for no more than six credits without the approval of the Director of Graduate

Admissions or the coordinator of the program for which they are applying.

It is in the responsibility of in-process students to see to it that all materials in support of their applications are received by the Graduate Admissions Office in time for an acceptance decision before the next term. In-process students will not be permitted to register for a second term until an acceptance decision has been made. Permission to register as an in-process student does not guarantee admission to the Graduate School.

Students who fail to register for three consecutive terms will no longer receive registration materials. It will be the responsibility of such students to notify the Graduate Records Office of their desire to continue graduate study. Files for students who revert to an inactive status will be retained for two years. At the end of that period, only a permanent record of credits earned is maintained.

Students may not add a course after the first class meeting unless written permission of the instructor is received. Course additions may be handled in person, by email, fax, or mail.

A student may not withdraw from a course any time after the seventh scheduled class meeting without permission of the instructor. Course withdrawals may be handled in person, by email, fax, or mail.

The university reserves the right to change class schedules or instructors at any time. It further reserves the right to cancel any course, and, in such cases, will refund full tuition to the students.

Students with an outstanding balance will not be permitted to register. Current students who register after the registration deadline will be assessed a late registration fee.

ACADEMIC POLICIES

Academic Honesty and Ethics

The policies of the University of New Haven require commitment to academic honesty and ethics. Violations of university standards for academic honesty (including plagiarism), whether in fact or in spirit, will usually be handled by the faculty member involved. However, if sufficient reason is found, violation may be grounds for dismissal from the Graduate School.

Students are expected to complete all course requirements on their own initiative, with no collaboration unless specifically authorized by the instructor. In addition, use of the work, ideas or knowledge of another person, publisher, company, government or organization must be properly identified by reference or footnote in all materials submitted by the student.

Students wishing to appeal the decision of a faculty member regarding academic honesty and ethics should contact the Graduate Dean's Office for information.

Access to Academic Records

Academic records are maintained on each student enrolled in the Graduate School. These records are housed in the Graduate Records Office. The following types of academic records are maintained: the application for admission and supporting documents such as test scores, transcripts of undergraduate and other prior study, letters of recommendation, registration forms, grade lists, course schedules, petitions filed by the student and any other documents or correspondence pertaining to the student's academic work.

The Registrar is responsible for controlling access to and disclosure of students' educational records. Students desiring to inspect or review their academic records should address a written, dated request to the Registrar/Graduate Records.

Information regarding confidentiality, privacy and right of access to student records can be obtained from the Registrar.

Attendance

It is the responsibility of the student to meet all classes and to take all examinations as scheduled. Faculty have the right to require a standard of attendance, even if it conflicts with professional and job-related

responsibilities of students. Students whose jobs require that they be absent from class must realize that it is their responsibility to determine whether such absence is permitted by the faculty member involved and to meet the professor's requirements for making up work missed, if the professor allows missed time to be made up.

Make-up Policy

Make-up examinations are a privilege extended to students at the discretion of the instructor, who may grant permission for make-up examinations to those students who miss an exam as a result of a medical problem, personal emergency or previously announced absence. On the other hand, instructors may choose to adopt a "no make-up" policy

A make-up test fee may be assessed when a student is permitted to make up an announced test during the term or to take an end-of-term exam at a time other than the scheduled time. In either case, the make-up examination fee will be paid by the student at the Bursar's Office.

Academic Standards

Course Grading System

The Graduate School uses the following grading system:

Superior performance:

A+ = 4.30 quality points
A = 4.00 quality points
A- = 3.70 quality points

Good performance:

B+ = 3.30 quality points
B = 3.00 quality points
B- = 2.70 quality points

Passing performance:

C+ = 2.30 quality points
C = 2.00 quality points
C- = 1.70 quality points

Failure:

F = Zero quality points

P = Zero quality points
Pass; carries credit hours toward the degree. Use generally limited to thesis, Executive M.B.A. and EMSEM courses.

P+ = Zero quality points
Pass with distinction; carries credit hours toward the degree. Use limited to Executive M.B.A. and EMSEM courses.

S = Zero quality points
Satisfactory performance in a noncredit course.

U = Zero quality points
Unsatisfactory performance in a non-credit course.

W = Zero quality points
Withdrawal from a course

I = Zero quality points
Incomplete; see policy rules below regarding incomplete courses.

T = Zero quality points
Used for thesis students who have not completed work during the term in which they originally registered for the course. Students must complete the work within the time limit for completion of the degree.

AU = Zero quality points
Audit; indicates that a student registered for and attended a class, but received no credit toward any degree.

Any grade change from one letter to another must be approved by the Committee On Instruction.

Some employers require that a letter grade (A+ through C-, or F) be awarded if a student is to receive tuition reimbursement. It is the student's responsibility, in a non-credit course, to inform the faculty member of the need for a letter grade.

Executive M.B.A. and EMSEM students who are in need of a letter grade for tuition reimbursement must inform the faculty member of the need for a letter grade and the Dean's Office will prepare a letter for this purpose.

Grade Reports

Reports of the final grade in each subject will be mailed to the student from the Graduate Records Office soon after the close of each term, providing all financial obligations have been met.

Incomplete Coursework

A grade of Incomplete (I) is given only in special circumstances and indicates that the individual student has been given permission by the instructor to complete the work for the course with the same instructor after the end of the trimester or term. If a student is required to attend the class sessions for the course in a subsequent term, tuition must be paid for this second attendance.

Master's-level students who receive a grade of I (Incomplete) should complete the work within three months after the end of the term in most cases. Master's-level students may have a time period specified by the instructor, and not to exceed one year, to complete the work required for the course and have a grade submitted to the Registrar/Graduate Records.

Any exception to the one year time limit must be approved by the Committee On Instruction.

Quality Point Ratio

The academic standing of each student is determined on the basis of the quality point ratio (QPR) earned each term. Each letter grade is assigned a quality point value. These quality point values are shown in the preceding section describing the grading system.

The quality point ratio is obtained by multiplying the quality point value of each grade by the number of credit hours assigned to each course as listed in the catalog, then dividing the sum of the quality points earned by the number of credit hours attempted in courses for which a grade of A+ through C- or F is awarded.

A cumulative quality point ratio is obtained by calculating the quality point ratio for all courses taken at the University of New Haven which are part of the degree program.

Academic Probation

Any graduate student whose cumulative quality point ration (QPR) is below 3.00 (a "B" average) will be on academic probation, will receive a probation letter and may be required to obtain permission from the program coordinator before registering for additional coursework. Graduate students who are on academic probation will fall within one of the following categories:

Dismissal:

A student whose cumulative QPR is below 2.70 after completion of 18 credits will receive a letter of dismissal and will be required to withdraw from the Graduate School. Appeals concerning required withdrawal from the Graduate School under these circumstances should be directed to the Dean of Graduate Studies.

Probation & Possible Dismissal:

A student whose cumulative QPR is below 2.00 at any time will receive a letter of probation and will be required to meet with the Dean of Graduate Studies, who will review the academic situation with the student's program coordinator. If the Dean of Graduate Studies and the coordinator agree that the student may be permitted to continue study, documentation of specific instructions mandated for continuation will be placed in the student's academic file.

Probation & Registration Held:

A student who has earned 12 credits and whose cumulative QPR is below 2.80 will receive a letter of probation and the student's registration packet for the upcoming term will be withheld pending consultation with the program coordinator. The registration for the upcoming term may be released by the program coordinator after a conference with the student.

Warning:

All students whose cumulative QPRs are below 3.00, other than those in the above categories, will receive a warning letter and should seek advice from their program coordinators regarding their academic progress.

Repetition of Work

A student may repeat a course. The grade received in the second attempt would supersede the original grade in the computation of the quality point ratio (QPR) if the second grade is higher. Both grades remain on the transcript. The course may be used only once for credit toward the requirements for completion of the degree program.

Awarding of Degrees

The University of New Haven awards degrees three times a year, at commencement ceremonies in January and in May and without formal ceremony in August. A cumulative quality point ratio of 3.00 and completion of all program and university requirements are required for graduation and the conferring of master's degrees from the Graduate School. All students must file a graduation petition form in order to have their names placed on the list of potential graduates.

A cumulative quality point ratio of 3.30 in doctoral coursework, satisfactory completion of the written and oral doctoral comprehensive examinations, followed by successful completion and defense of the doctoral dissertation are required for graduation and the conferring of the doctoral degree. All doctoral candidates must also file a graduation petition form in order to have their names placed on the list of potential graduates.

Students completing their degree requirements at the end of the fall term will receive their degrees in January. Students completing their degree requirements at the end of the winter term will receive their degrees at the May commencement. Students completing the requirements for their degrees at the end of the spring term or the summer session may be awarded their degrees at the end of August. Students completing the requirements for their degrees in July or August, as well as receiving their diplomas in August, may request permission from the Registrar to participate in the formal graduation ceremonies at the following January commencement.

Petition for Graduation

Candidates for the January commencement must file a graduation petition with the Graduate Records Office no later than October 15. Candidates for the May commencement must file a graduation petition with the same office no later than March 1. Candidates whose degrees will be awarded in August must file a graduation petition with the Graduate Records Office no later than June 15.

Students completing the 5-year B.S./M.S. program in Environmental Science, the M.B.A./M.P.A. dual-degree program or the M.B.A./M.S.I.E. dual-degree program must fill out two graduation petition forms (one for each degree). However, students who petition for two degrees will pay the full graduation petition rate of $110 for the first degree plus a reduced rate of $75 for the second degree to be awarded at the same commencement date.

Graduation petition forms for this purpose are available in the Graduate Records Office. Payment of the graduation fee must accompany the petition.

Should a candidate not complete all the requirements for graduation before the deadline, after having filed the petition to graduate and paid the fee, the student will have to petition again at a later date. At that time, only the refiling fee will be charged.

All financial obligations to the university must be met prior to graduation.

Time Limit for Completion of Degree

A student must complete all the requirements for the master's degree or certificate within five years of the date of completion of the first course following formal application to the degree program. Any extension of the time limit for completion of the degree can be granted only after approval by the appropriate program coordinator and the Dean of Graduate Studies.

Students who reach the five-year limit with less than 24 graduate credits completed at UNH will be required to apply for readmission to their programs, rather than for an extension. Students readmitted to a graduate program will begin the five-year time limit again and will be subject to the rules of the *Graduate Catalog* in effect at the date/time of the readmission.

Students enrolled in the doctoral program must complete all coursework, pass the doctoral comprehensive examinations and successfully complete and defend the doctoral dissertation within eight years of the date of completion of the first doctoral course.

Residency Requirements

Degree programs have a 30-graduate-credit residency requirement, with the exception of the M.B.A./M.S.I.E. and M.B.A./M.P.A. dual degree programs which have a 60-graduate-credit residency requirement. Credits toward the residency requirement may be earned at the main campus, at the off-campus locations, or through UNH distance learning courses. Generally, students should plan on taking at least some of their courses on the main campus. Credits applied toward the requirement for one graduate degree may not be counted toward the residency requirement for another graduate degree. In other words, completion of a minimum of an additional 30-graduate-credit residency requirement is necessary for those students who plan to complete a second master's degree program. The university policies for transfer of credit and waiver of courses apply in the same manner to students who are candidates for a second master's degree as to those enrolling in their first master's program.

Full-Time Study

A full-time course of study at the master's level is defined as enrollment for nine credit hours in the current term. Required noncredit courses (e.g. E 600) count toward full-time study. Under certain circumstances the program coordinator and the Graduate School administration may approve a reduction in credits.

For international students who are required to maintain full-time enrollment for their immigration status, full-time doctoral study may be continued as long as their dissertation adviser, department chair and/or director of the doctoral program certify that the student is maintaining continuing registration and is making satisfactory progress toward completion of the comprehensive written/oral examinations and/or dissertation required for the doctoral degree.

A student who wishes to enroll for more than 12 graduate credits/four courses in a given trimester must secure the permission of the program coordinator.

In general, full-time enrollment is available in all master's degree programs *except the mechanical engineering and human nutrition master's degree and the graduate certificates.* In special cases, however, full-time registration may be available in the human nutrition program.

It is important to note that all graduate programs may also be pursued on a part-time basis.

Part-Time Study

Part-time study at the master's level is defined as registration for less than nine credit hours in the current term. Half-time study at the master's level is defined as reg-

istration for a minimum of five credit hours in the current term. Registration for less than five credit hours qualifies as less than half-time study.

The certificates have limited scheduled offerings and, therefore, are generally pursued on a part-time basis.

International students with F-1 or J-1 immigration status may not enroll in study leading to the M.S. in mechanical engineering or only to a certificate because these are part-time study plans.

Transfer Credit

Transfer credit may be given for graduate courses taken at other regionally accredited institutions (which are recognized as such by the university) prior to matriculation at the University of New Haven, subject to the following conditions:

- the courses were at the graduate level;
- each grade was **B-** or better; and
- the course did not fulfill requirements for any other degree already earned by the student.

Coordinated Courses

Graduate students currently matriculated at the university must secure written approval before taking courses at another institution if they plan to transfer that credit into their UNH programs. Course coordination forms are available in the Graduate Records Office for this purpose.

In all cases, an official transcript must be received directly from the institution where the course was taken and placed on file at UNH before transfer credit(s) will be awarded. Transfer credits and coordinated course credits are not included in courses used to establish a student's QPR or residency requirement at the University of New Haven.

Waiver of Courses

Some programs permit waivers of core courses on the basis of undergraduate or graduate courses taken at accredited institutions. Waivers of elective courses and/or concentration courses are not permitted, nor are waivers based on experience. In such cases, substitution of a more advanced course may be allowed.

For a course to be waived, a student must first secure the written approval of the program coordinator, the department chair or a faculty member acting for the chair in the department in which the waiver is requested. Waiver requests should be submitted in writing to the program coordinator.

Even if a waiver has been granted, a student who wishes to take a waived course for review or as a refresher course may do so. However, refunds will not be granted for courses taken and subsequently waived.

Crediting Examinations

Under certain circumstances, students who have independent knowledge of a specific course may apply for permission to take a crediting examination in lieu of taking the course. To qualify for a crediting examination, the student must have taken a similar course at either the graduate or undergraduate level; or have completed the equivalent work in noncredit training courses; or have had extensive, related, on-the-job experience.

Crediting examinations are subject to the following conditions:

- no letter grade is recorded other than P;
- the crediting examination is for required courses only (not concentration courses or electives);
- the credits awarded by examination do not count toward the residency requirement; and
- the crediting examination cannot be taken in the student's last trimester of study.

Permission to take a crediting examination must be granted by the department chair or program coordinator, the chair of the department in which the course is offered, and the Dean of Graduate Studies.

Crediting Examination Permission Forms are available from the Graduate Records Office.

Once permission has been granted and the crediting examination fee of $300 paid, the examination is administered and graded by a full-time faculty member designated by the chair of the department that offers the course.

Prerequisites

Students are expected to meet the prerequisite requirements for each course taken. Exceptions must be approved by the course instructor and the student's adviser or program coordinator. *Credit may be denied to a student who takes a course without the prerequisites.*

Dropping/Adding a Class

A student who wishes to make a change in class schedule must complete a "drop card" or an "add card" or both. These are available from the Graduate Records Office. Written permission of the instructor is required to add a class after the first class meeting. If a student withdraws from a class after the first class meeting, the tuition refund policy is applied.

Comprehensive Examinations

Students who are required to take comprehensive examinations in order to complete their degree programs must obtain the appropriate comprehensive examination approval form(s) from the Student Records Office, secure the necessary approvals and pay the required fees, if applicable. Students should confirm arrangements for comprehensive examinations with the program coordinator.

Research Projects, Independent Study and Internships

All academic programs leading to a degree require the completion of a thesis, a research or other special project, internship or comprehensive examination. Students must have the written approval of the adviser, department chair and program coordinator prior to enrolling for project or internship credit on an individual basis. This is accomplished by completing the appropriate forms and securing the required approvals.

The Graduate School's permission form for registration for research project, internship or independent study is printed in each of the graduate trimester schedule booklets and is also available at Graduate Records.

Students preparing a research project or independent study/internship report may be asked to follow the guidelines presented in the UNH *Dissertation & Thesis Manual* (2nd edition, 1998), copies of which are on reserve at the library.

In addition to the project requirement described above, students may (in certain cases) enroll for independent study/internship under the supervision of a faculty adviser. *A student may not register for more than a total of six credits of independent study/internship within a degree program.* An independent study/internship proposal must be approved by the student's adviser and/or program coordinator as well as the coordinator or chair of the department offering the course.

Thesis

Preparation and completion of a thesis is optional for master's degree programs. A number of preliminary steps are required before registration for thesis will be accepted by the Registrar. The student completes the Proposal for Thesis form (available at the Graduate Records Office), in which the proposed subject, the methodology and the hypotheses are described. The student secures the approval signature of a faculty member who will serve as adviser. The student also must secure the approval of the proposed thesis and the thesis adviser from the department chair and/or program coordinator and the Dean of Graduate Studies.

Only after the Registrar has received the approved form will the student be permitted to register for thesis.

A thesis will carry no fewer than six academic credits taken over no fewer than two academic terms. A preliminary draft must be presented to the adviser at least 75 days prior to commencement. Upon approval by the adviser and program coordinator, unbound copies are presented to the Dean of Graduate Studies. A date and time will then be scheduled by the thesis adviser for the thesis defense before the student's thesis committee and the Dean of Graduate Studies. Successful defense of the thesis must be completed at least *three weeks* prior to the date of commencement. Students must complete and defend the thesis within the time limit for completion of the degree.

After the successful defense and the approval of the thesis by the Dean of Graduate Studies, thesis credit is awarded and final, unbound copies of the thesis are deposited with the Dean of Graduate Studies to be forwarded for binding at the university library where it becomes a part of the permanent collection. Additional copies of the thesis may be required by the department or the program coordinator.

For guidance in the preparation of theses, graduate students should consult the university's *Dissertation & Thesis Manual* (2nd edition, 1998), copies of which are available in the Graduate Records Office. Questions not resolved by the instructions should be settled in consultation with the adviser and by reference to a standard style manual.

The University of New Haven Graduate School participates in the University Microfilms, Inc., (UMI) Dissertation Services program and provides assistance to doctoral students for registration of dissertations and copyrights.

Graduate Certificates

The Graduate School offers a number of graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Persons who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate must complete the Graduate School application form, submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

Inasmuch as the certificates are not graduate degrees, students may transfer credits earned toward a certificate into a master's program at any time, subject to the requirements of the master's degree and the decision of the coordinator of the master's program, and to acceptance in the master's program.

Although students who complete the requirements for a graduate certificate do not attend commencement, a certificate is awarded by the university to each student who qualifies. Two different types of certificates are awarded:

- **Senior Professional Certificates—** awarded to students who already held a graduate/advanced degree at the time they began study for the certificate.
- **Professional Certificates—**awarded to students who held an undergraduate/baccalaureate degree at the time they began study for the certificate.

A petition form requesting certification must be submitted to the Graduate Records Office following payment of the certificate petition fee. Also, students enrolled in master's degree programs who meet the qualifi-

cations for the awarding of a certificate during pursuit of the master's degree, but prior to petitioning for graduation, may submit a petition for certification. The coursework is reviewed by the certificate adviser and the graduate registrar; and, if the work is found to be complete and satisfactory, the appropriate certificate will be mailed to the student. A minimum QPR of 3.00 is required as satisfactory performance in courses taken at the university to qualify for the awarding of a graduate certificate.

All additions, deletions and/or revisions of graduate certificates are subject to review by the Graduate Committee, elected faculty members who serve as the curriculum and academic policy committee for the Graduate School.

Certificate Requirements:

Required coursework usually consists of 12 to 20 credits of graduate study, depending on the subject area selected. Students should contact the faculty adviser for the selected certificate for assistance in planning the course of study.

Course waivers are not permitted for certificates; course substitutions may be granted by the certificate adviser. Course credits used to satisfy the requirements for one certificate may not be used toward the completion of a second certificate.

Students must meet all course prerequisite requirements. Credits for courses taken as prerequisites for certificate courses must be taken outside/in addition to the certificate requirements.

Academic Advising

It is the student's responsibility to select courses in accordance with prerequisites, the adviser's recommendations, the departmental plan of study (if required) and the requirements for the degree.

Students needing further explanation about program requirements or course sequencing should request academic advisement. Appointments for academic counseling should be scheduled through concentration advisers or program coordinators. Advisement sessions are held prior to each trimester.

A student is not required to file a formal plan of study with the Graduate School. It is the student's responsibility to meet the stated requirements for the degree.

Grievance Procedure

A formal policy for the handling of student grievances is available in the office of the university ombudsman.

Notification of Family Educational Rights and Privacy Act (FERPA)

The Family Education Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records, as follows:

(1) The right to inspect and review the student's education records within 45 days of the day the University receives a request for access. Students should submit to the registrar, dean, head of academic department or other appropriate official written requests that identify the record(s) they wish to inspect. The university official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the university official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

(2) The right to request the amendment of the student's education records that the student believes are inaccurate or misleading. Students may ask the university to amend a record that they believe is inaccurate or misleading. They should write the university official responsible

for the record, clearly identify the part of the record they want changed and specify why it is inaccurate or misleading. If the university decides not to amend the record as requested by the student, the university will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding hearing procedures will be provided to the student when notified of the right to a hearing.

(3) The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent. One exception which permits disclosure without consent is a disclosure to school officials with legitimate educational interests. A school official is a person employed by the university in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the university has contracted (such as an attorney, auditor or collection agent); a person serving on the Board of Governors; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.

(4) The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University New Haven to comply with the requirements of FERPA. The name and address of the office that administers FERPA are: Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue SW, Washington, DC 20202-4605.

Diversity Policy

The University of New Haven is committed to achieving a diverse and pluralistic community which reflects the multiracial and culturally diverse society in contemporary America.

The Diversity Committee (a standing committee of the university) has been established to guide the university in implementing this Diversity Policy. The university will work toward attracting and retaining a diverse faculty, staff and student body for the purpose of creating a pluralistic scholarly community. The Committee will assist the administration in the development and implementation of programs and policies that support an enriched educational experience for a diverse university community.

The University of New Haven does not discriminate in admissions, educational programs or employment against any individual on account of that individual's gender, race, color, religion, age, disability, sexual orientation, or national or ethnic origin.

Drug-Free and Smoke-Free Environment

In accordance with federal law concerning a drug-free campus environment, relevant university policy and regulations are provided for all current students and employees. Information is available upon request.

Smoke Free Policy

In order to provide a healthful, comfortable and productive campus environment for all UNH faculty, staff, students and guests, the University of New Haven has adopted a SMOKE FREE Policy.

NO SMOKING will be allowed in any campus administrative, academic or recreational building. This restriction will apply to all UNH offices, classrooms, hallways,

stairwells, restrooms, dining facilities, conference/meeting facilities, athletic facilities, and any other public spaces within these buildings.

Effective January 1, 2003, smoking will be limited to areas, which are 20 feet away from all entrances to University buildings. Signs will be placed on the entrances to inform everyone of the policy and ash receptacles will be place 20 feet away from all entrances. This is not meant to be punitive to those who smoke, but only to allow everyone to enter our buildings without breathing in unwanted smoke. It will be our responsibility as University Community members to *gently* inform those who are not following the rules, to please move away from the entrance.

Smoking in the residence halls will be restricted to rooms, suites and apartments that have been designated as allowing smoking as agreed upon by the roommates. Smoking will not be allowed in lobbies, hallways, laundry rooms, meeting rooms, community rooms or any other public spaces within the residence halls.

Cooperation is expected from all members of the University and their guests. To register a complaint against a non-compliant individual contact:

Student Affairs Office: 932-7199
Human Resources Dept.: 932-7240

This policy will apply to all UNH facilities in West Haven and Southeastern operations, as well as off-campus class sites and other locations where UNH may, in the future, establish operations.

Student Right-to-Know and Campus Security Act

In accordance with Connecticut's Public Act 90-259 concerning campus safety and the 1990 federal law PL101-542: The Student Right-to-Know and Campus Security Act, all colleges and universities receiving state and federal financial assistance are required to maintain specific information related to campus crime statistics and security measures, provide annually such information to all current students and employees, and make the data available to all prospective students and employees upon request.

At the University of New Haven, the required information is compiled by the University Police Department and is published annually.

Policy on Cell Phones and Beepers

Cell phones and beepers are very disruptive to classes, presentations, productions and other public events. As a matter of courtesy, the University of New Haven requests that all audible signals of communication devices be turned off or disabled during all classes or public events. Individual discretion should be used in determining when exceptions should be made related to emergency personnel or situations.

TUITION, FEES AND FINANCIAL AID

The following are the University of New Haven tuition, fees and charges which will be in effect for the fall 2003 term. The university reserves the right, at any time, to make whatever changes may be deemed necessary in admission requirements, fees, charges, tuition, policies, regulations and academic programs prior to the start of any class, semester, trimester or session.

Master's Tuition

Tuition, per credit hour $495
Tuition, per 3-credit course 1,485
School of Engineering & Applied Science
tuition differential, per credit hour* 75
Executive M.B.A.,
complete program 38,000
Executive M.S. in Engineering Management,
complete program 34,020
M.B.A. Cohort, complete program 32,300
M.S. Computer Science Cohort 31,200
Auditor, per course 1,485
E 600, English Language Workshop 1,425

Master's Nonrefundable Fees

Application fee.....$50
Executive MBA application fee.....50
Auditor application fee.....50
Auditor course fee for
UNH alumni/ae, per course 50
Continuing registration fee 100
Co-op registration fee, full-time 150
part-time.....75
Graduate Student Council fee,per term 10
Graduation petition fee.....110
Late filing fee, after March 1 (May),
June 15 (August), Oct. 15 (January).....50
Graduation refiling fee 50
Petition fee for two/dual degrees 185
Health insurance fee (per year, all
full-time, domestic students) 180
International student acceptance fee 225
International student health insurance
premium (per year) 650
Laboratory fees.....20-350
Late payment fee
(after scheduled due date)** 25
Late registration fee, current students 15
Graduate certificate fee (payable upon
completion of courses) 35
Technology fee/per trimester 15
Transcript fee/per copy 5
Make-up examination fee 10
Comprehensive examination fee 300
Crediting examination fee 300

Doctoral Tuition and Nonrefundable Fees

Dissertation tuition, per course..... $1,150.
Graduation Student Council fee, per term .....10.
Continuing registration fee .....700.
Qualifying examination fee (where applicable) .....300.
Doctoral graduation petition fee .....150.
Dissertation copyright and filing fee .....125.

**The Engineering Tuition Differential is charged for all engineering courses beginning with the following prefixes: CE, CEN, CH, CM, CS, EE, ES, IE, ME. This tuition differential is charged for School of Engineering & Applied Science (SEAS) courses in lieu of laboratory/equipment fees to cover the higher costs associated with instructional equipment for SEAS courses.*

***A late fee plus 1 1/2 percent per month penalty will be assessed on outstanding balances.*

Technology Fee

The technology fee paid by all students will afford each student a personal copy of Microsoft Office 2000, which can be used during study at UNH and retained upon graduation from the University. Other benefits of the technology fee include upgrades to computers in the library and campus laboratories and to increased student technology support.

Payment

Tuition for graduate courses is due at registration. However, the university permits graduate students to pay tuition in two installments, paying one half with the registration form and the balance before the end of the first week of the term. All students who have not completed tuition payments by the end of the first week of the term will be assessed the late payment fee.

Students are responsible for payment of tuition to the university, even though they may be eligible for their employer's tuition reimbursement plan. Students are responsible for making their own arrangements with their employers for reimbursement.

The university withholds the giving of grades, the awarding of diplomas, the issuance of transcripts and the granting of honorable dismissal to any student whose account is in arrears. The university accepts American Express, MasterCard and VISA.

Withdrawal

A student may withdraw from a course up through the seventh week of the trimester without a notation on the transcript. After the seventh week withdrawal from a course may be granted only by the instructor, and a "W" would be recorded on the student's transcript at the end of the term when grades are recorded.

To be eligible for a cancellation or refund of tuition charges, students must formally notify the Registrar of their intention to withdraw by completing the university withdrawal form and submitting it to the Registrar by mail or in person. The date of the postmark on the mailed withdrawal forms, or the date of submission on those brought in person, determines the amount of the refund, if any, due the student.

Refunds

The refund policy for graduate students who withdraw from any course or from any program (with the exception of the Executive M.B.A., EMSEM, the M.B.A. cohort and the Human Nutrition programs) is as follows: 100 percent cancellation of tuition upon formal withdrawal prior to the first regularly scheduled class meeting, 80 percent cancellation of tuition upon formal withdrawal prior to the second regularly scheduled class meeting, 60 percent cancellation of tuition upon formal withdrawal prior to the third regularly scheduled class meeting, 40 percent cancellation of tuition upon formal withdrawal prior to the fourth regularly scheduled class meeting, 20 percent cancellation of tuition upon formal withdrawal prior to the fifth regularly scheduled class meeting. No cancellation will be made after the fifth regularly scheduled class meeting. Any refund amount will be credited to the student's UNH account or, if requested,

may be credited to the student's credit card account or issued directly as a check.

No refunds will be made for courses taken and subsequently waived.

The refund policy for the Executive M.B.A. program is as follows: For E.M.B.A. students who withdraw after completion of one module or less, one-half of the year's tuition will be cancelled.

Information regarding the refund policy for the Human Nutrition program is available from the Director.

Financial Aid

The University of New Haven offers a comprehensive program of financial assistance to qualified students including assistantships, fellowships and student loans. Application procedures for financial assistance are detailed below. Applications are available from the Financial Aid Office.

Need-based financial aid programs are available to matriculated students who are U.S. citizens or eligible non-citizens who are enrolled on at least a half-time basis. Merit-based programs are open to all matriculated students.

Need-Based Programs
(U.S. citizens and eligible non-citizens only)

- **Federal Stafford Loans—**The Federal Stafford Loans are need-based loans. Eligible students may borrow up to $8,500 per academic year. The interest rate for new borrowers is variable. The interest rate during in-school, grace and deferment periods is based on the 91-day T-Bill rate plus 1.70 percent and was 3.46 percent during the 2002-2003 academic year. The interest rate during all other periods is based on the 91-day T-Bill plus 2.30 percent during 2002-2003. The interest rate is capped at 8.25 percent. The interest is federally subsidized. Repayment begins 6 months after graduation or withdrawal from the university. Exit interviews must be conducted prior to a student's graduation or withdrawal.

Non-Need-Based Programs
(U.S. citizens and eligible non-citizens only)

- **Unsubsidized Federal Stafford Loans—** A loan program created by the Higher Education Amendments of 1992 for students who do not qualify, in whole or in part, for subsidized Federal Stafford Loans. The terms for unsubsidized loans are the same as the terms for subsidized Stafford Loans except for the following:
  — Interest accrues while the student is in school and during periods of deferment. The federal government does not pay the interest. The student can make monthly or quarterly payments to the lender, or the student and the lender may agree to add the interest to the principal of the loan (capitalization).

Note: A student must submit a complete financial aid application and be considered for a subsidized Federal Stafford Loan before the Financial Aid Office can process an Unsubsidized Federal Stafford Loan.

Merit-Based Programs
(Open to all matriculated students)

- **Assistantships—**Assistantships are competitive appointments available to full-time students. Graduate assistants may work up to 20 hours per week and receive an hourly compensation as well as partial tuition support. Applications for assistantships are made in early spring for the following year. Applications and further information are available from the Financial Aid Office and the University's web site. Appointments are made for the academic year starting in September.

- **Fellowships—**Fellowships are competitive awards made to continuing students on the basis of outstanding academic achievement. Students who have earned at least 24 credits at UNH with the highest levels of academic performance in their chosen fields automatically become eligible for consideration. Recommendations for fellowships also are sought from the faculty. Students may nominate themselves by writing to the Dean of Graduate Studies. Awards

are made by a faculty committee for the academic year starting in September. (No financial aid application is required).

Application Procedure

Students applying for need-based and non-need-based assistance must submit the documents listed below by the following deadlines:

May 1 for the Fall trimester/academic year
October 15 for the Winter trimester
January 15 for the Spring trimester

Note: *International students* who are applying for Graduate Assistantships need to complete only the UNH Non-Need-Based Financial Aid Application. This form is available from the Financial Aid Office.

- **University of New Haven Financial Aid Application—**This application form must be completed fully and submitted to the University's Financial Aid Office.
- **Free Application for Federal Student Aid (FAFSA)—**This form is required to apply for financial aid from federal student financial aid programs. The UNH code number is 001397. Students can complete the FAFSA on the Internet at *www.fafsa.ed.gov* or paper applications are available at UNH or any college financial aid office.
- **Tax Documentation—**Applicants are required to submit a *signed* copy of their own (and of their spouse's, if applicable) complete federal income tax return from the most recent tax year prior to the academic year for which they are applying for aid. Tax forms must include all pertinent schedules and W-2 forms.
- **Additional Information—**Other forms and documents may be requested from you as your aid application is reviewed.

Refund Policy for Federal Loans

Students who withdraw from courses prior to the end of the fifth week of the trimester may be entitled to a full or partial refund of tuition charges. In the event that a student receiving a refund has received federal student aid, including a Federal Subsidized Stafford Student Loan and/or Federal Unsubsidized Stafford Student Loan, the student should contact the Financial Aid Office to obtain information on the federal refund policy.

External Assistance Programs

- **Family Education Loan Program (FELP)—**FELP is a low-interest loan program administered by the Connecticut Higher Education Supplemental Loan Authority (CHESLA). Students must be enrolled at least half-time and may borrow from $2,000 to a maximum cost of attendance minus financial aid per academic year at a fixed annual rate. Repayment can be up to 140 months. Applicants must be credit-worthy. For an application and further information call 1-800-252-FELP (in Connecticut) or (860) 522-0766.

Cooperative Education

Cooperative education programs at the University of New Haven provide an opportunity for students to combine or alternate periods of career-oriented, temporary work assignments with their academic programs.

Co-op work assignments for graduate students are developed on an individual basis. This enables students to integrate the experiential learning of the workplace with the theoretical work of the classroom.

Resume writing assistance and interviewing information are available in preparation for co-op program participation.

Co-op employers include large corporations, small businesses, government agencies and nonprofit organizations.

Graduate students become eligible to participate in the co-op program after completion of nine credit hours of graduate study. Certain additional requirements must also be met for eligibility for cooperative education. Co-op work assignments may be full-time or part-time, and of varying duration. Co-op assignments carry no academic credit. Students who are interested in registering for Co-op should contact the Co-op Coordinator in the academic school which houses their program of study.

STUDENT AND ACADEMIC SERVICES

Academic Services

Bureau for Business Research

The Bureau for Business Research offers access to databases for research on products, markets, competition and international issues. In addition, the university's biannual, refereed academic journal, the *American Business Review*, is published under the auspices of the bureau.

Campus Copy, Inc.

Campus Copy is a full service copy, type and print shop located in the basement of Maxcy Hall on the main campus. Campus Copy offers a variety of services at reasonable prices including: resume composition, word processing, desktop publishing, photocopying, full-color copying, scanning, faxing and binding. Campus Copy, Inc. is independently owned and operated. For more information, call (203) 931-9844.

Campus Store

The Campus Store provides all necessary texts, new and used, that are required for courses at the university. Used text books may be sold back to the store throughout the year. The bookstore staff will also place special orders for books.

The Campus Store carries related supplies, software, greeting cards, imprinted clothing, gifts, candy and a selection of paperbacks, newspapers and periodicals. It also handles orders for class rings and school chairs. Film processing service is also provided for the campus community.

Students taking classes at the Southeastern (New London) site may purchase their books at that location. The bookstore will ship books and other items to any home or business address. Special educational discounts on computer software are available to faculty and students who have a current UNH Campus Card identification. A computer software catalog is available by calling (203) 933-4000. The Internet access to the bookstore is www.unh.bkstr.com.

Center for Dispute Resolution

The Center for Dispute Resolution at the University of New Haven is a focal point for the interdisciplinary study and practice of dispute resolution. The Center offers conflict management services to individuals and to businesses, institutions, governmental agencies and community organizations. Services include mediation, design of conflict management systems, consultation and training. Through educational programs for students and the community-at-large, the Center also strives to advance the understanding and application of alternative means of dispute resolution, including mediation.

Center for Family Business

The mission of the Center for Family Business, which was founded in 1994, is to strengthen family firms as the backbone of Connecticut's economy and principal hope for economic revival in the region. The University of New Haven has as its business partners in this endeavor the accounting firm of Bailey, Schaefer and Errato, LLC; Deutsche Bank Private Banking; Daniel Smith & Associates/Massachusetts Mutual, one of the nation's largest life insurance and financial management companies; and Wiggin & Dana, a leading Connecticut law firm.

The Center for Family Business provides access to a national family business network and to business programs and services, consultations and seminars.

Center for Learning Resources

The Center for Learning Resources (CLR) provides tutoring services to all UNH students in its Writing Lab. All of the tutors are instructors who are professionals in their fields and who are committed to the learning process. They help students develop unified and coherent writing, recognize writing process weaknesses and implement effective writing strategies. The tutoring emphasis is on the writing process, not the product. Thus, tutors do not edit papers for students.

The Writing Lab has drop-in hours both days and evenings, plus some scheduled appointments on Monday through Friday during the undergraduate academic semesters. The CLR serves as a resource and referral site for students needing tutoring assistance.

Center for the Study of Crime Victims' Rights, Remedies and Resources

The UNH Center for the Study of Victims' Rights, Remedies and Resources is maintained under the auspices of the School of Public Safety and Professional Studies. This center will provide, and is in the process of developing, numerous initiatives to enhance the knowledge base regarding crime victim rights and services to assist crime victims through educational, training and technical assistance opportunities for the various academic disciplines and professional groups that study, advocate for or serve victims. These programs and services will be statewide, regional and national in scope. They will include instructional programs; field and program evaluation research services; internships, fellowships and visiting scholar programs; legal, legislative and public policy analysis and advocacy; and publications, conferences and symposia. Information is available through the director's office at the university.

Computer Services

The Information Services Department provides for the computing needs of both the administrative and academic users at the university. Information Services supports standard word processing, spreadsheet, database management and statistical packages. Most computer laboratories have student lab aides who assist in the lab's operation and are available to answer questions.

The University of New Haven supports and maintains many computing facilities.

The primary, general-purpose computer lab is on the first floor of Echlin Hall. This facility contains PCs with all the university's standard software. This lab also has Internet connectivity allowing for E-mail, FTP and World Wide Web browsing, plus multimedia support.

Marvin K. Peterson Library

The Marvin K. Peterson Library, named in honor of a former university president, was dedicated in 1974. It includes three floors of reading space, stacks and reference areas. Computers with internet access are available for research purposes. Students and faculty can plug-in their laptop computers to connect to the campus network at 165 ports available throughout the library's three floors. Materials are stored in a variety of formats including online, print, audio, video, microform and CD-ROM disks. Information is made accessible through manual as well as electronic retrieval methods.

The library's homepage is available via the web at http://library.newhaven.edu. Many library services are accessible through this home page. The library's online catalog allows for both basic and advanced searching of library holdings. Books already charged-out can be renewed online. Recent additions to the collection are listed on the library's homepage. Library guides that are prepared by professional librarians are posted. Access to over 10,000 Full Text Electronic Journal Holdings are accessible from a link on this home page. Faculty and students in their offices, residence halls, or at home have access to many resources through the "PROXY Connection" available on the library's homepage. UNH subscribes to many online electronic databases in all subjects. Additional resources, including many full-text sources, are accessed in online databases such as LEXIS/NEXIS, ABI/INFORM, Criminal Justice Periodicals Index, Education Complete, Expanded Academic Index ASAP, Engineering Village and Compendex Web, FirstSearch, CCH Online, GPO Access, PsycARTICLES, ProQuest Computing, Psychology and Behavioral Sciences Collection, WestLaw, Hoover's, Science Direct, Reference USA, Country Watch, GPO on SilverPlatter, and IRIS. PsycLIT, GPO on Silverplatter, Newspaper Abstracts OnDisc, Dissertation Abstracts OnDisc, the National Trade Data Bank, Census of Population and Housing, Toxic Chemical Release Inventory, and County Business Patterns are some of the titles on CD-ROM.

The UNH library holdings include approximately 300,000 volumes on the main campus. The library subscribes to hundreds of journals and uses telefacsimile and electronic means to transmit articles and information between its own and other libraries across the country.

The main library is a U.S. Government Documents Depository Library and selects approximately one third of the U.S. government yearly output to support UNH programs.

UNH students may borrow materials from the Albertus College Library. Students who obtain a borrowing card from a Connecticut public library may borrow from other public libraries in the state. As a member of OCLC, UNH has access through interlibrary loan to the holdings of more the 40,102 member libraries' over 48 million records.

Students are assisted by professional reference librarians. One-on-one consultations are available to locate information for research papers and projects. Freshmen receive instruction in how to use a library. Upperclass and graduate students have subject-specific library orientations available. Bibliographic instruction courses, geared to international students, are also provided.

Library guides, as well as selected instructional support resource materials, are provided; and a reserve collection is in place to support courses taught at UNH.

Technology Fee

The technology fee paid by all students will afford each student a personal copy of Microsoft Office 2000, which can be used during study at UNH and retained upon graduation from the University. Other benefits of the technology fee include upgrades to computers in the library and campus laboratories and to increased student technology support.

Special-purpose computing facilities are available at other locations on the main campus. They are as follows: the CAEC lab in Buckman 225, the graphic art and design lab in Dodds 413, the Industrial Engineering CAD/CAM lab in Buckman 129, the Center for Learning Resources (CLR) lab in Maxcy 106, the CLR classroom in Maxcy 127, the Computer Science AT&T lab in Echlin 206, the AT&T multimedia lab in Buckman 227, the Electrical Engineering lab in Buckman 203, the Biology & Environmental Science (GIS) lab in Dodds 305, the Education Department lab on the second floor of South Campus Hall, the Mechanical Engineering Instrumentation Lab in Buckman 223, the Physics Department lab in Maxcy 216, the School of Hospitality & Tourism lab in Harugari 114, the School of Business lab in Dodds 103, the Internet Crime lab in Dodds 101, a faculty lab in Echlin 119, and the UNH Southeastern lab at New London.

Finally, Room 129 in Maxcy Hall is a classroom designated for computer instruction. When members of the faculty are not using Room 129 for classes, Information Services schedules open labs for general-purpose use. The hours for open labs change each semester; hours are posted on the door of the lab, or may be obtained browsing http://intra.

UNH Foundation

The role of the University of New Haven Foundation is to initiate, facilitate and participate in programs and projects aimed at furthering and improving the educational, scientific and research endeavors at the university.

The entities which are administered under the auspices of the UNH Foundation are: The Center for Family Business, the Institute for Progressive Business Management and the University of New Haven Press.

The University of New Haven Press publishes scholarly texts, monographs and academic publications in a variety of fields including arts and sciences, business, criminal justice, public safety and sports. The press also publishes *The International Sports Journal.*

The UNH Foundation also oversees, in cooperation with the Art Department faculty, the operations and administration of the UNH Art Gallery located in Dodds Hall. The Art Gallery offers changing exhibits, open to the public, of works by professional artists and UNH students. Connecticut's premiere chamber orchestra, Orchestra New England, is in residence on the University of New Haven campus; and the UNH Foundation provides the university's support and administrative functions in conjunction with the Music Director, Manager and Board of Trustees of the orchestra.

University of New Haven Press/Academic Publications

The University of New Haven Press publishes scholarly texts, monographs and academic publications in a variety of fields including arts & sciences, business, criminal justice, public safety and sports. A publication launched in 1997 is *The International Sports Journal.*

Under the auspices of the Bureau of Business Research, UNH Press publishes the *American Business Review*, a biannual, refereed academic journal. Information regarding subscriptions and submission of manuscripts may be obtained from the Bureau of Business Research at the School of Business.

The University of New Haven also pub-

lishes *Essays in Arts and Sciences*, an interdisciplinary scholarly journal devoted to a broad range of interests including literature, the arts, the social sciences and the natural sciences. The journal has been published annually since 1971, with occasional additional issues on special topics. The journal's distribution includes approximately 200 cooperating college and university libraries.

Student Services

Alumni Relations

Students are eligible for membership in the Alumni Association immediately upon graduation. Non-degreed students are eligible for membership upon completion of 12 graduate credit hours or 27 undergraduate credit hours. A one-time membership fee is included in the graduation petition fee. There are currently more than 30,000 eligible alumni.

Alumni Association members enjoy special privileges such as use of the library, Career Development services and special rates to audit classes. Permanent lifetime membership ID cards are issued to Alumni Association members soon after graduation.

Insight, the alumni magazine, is mailed to all members regularly. Homecoming, class reunions, an annual Scholarship Ball, estate planning seminars plus other educational and social events offer opportunities for continued contact with UNH and fellow UNH alumni.

Multiple regional alumni clubs which span the nation offer additional opportunities for active involvement. Alumni clubs sponsor social and career networking receptions, seminars, family-oriented events, fund raising and sporting activities.

Alumni board members govern the association with the assistance of additional alumni volunteers. The board serves as an advisory group to the university, working to strengthen bonds by promoting communication between alumni and the UNH community.

Athletics

Graduate students are encouraged to make use of the North Campus athletic complex. Facilities include two basketball courts, racquetball court, fitness center, six tennis courts, a softball field, Vieira Baseball Field and Dodds Stadium.

Graduate students are eligible to take part in the intramural competitions in touch football, table tennis, basketball, racquetball, softball, tennis and volleyball.

A student ID card must be presented for admittance to the gymnasium building/facilities after 5 p.m. on weekdays and at all times on weekends.

Career Development

The Career Development Office provides information regarding current employment trends as well as resume development and interviewing tips.

The office is not an employment service. Extensive listings of both full-time and part-time positions are maintained to provide a common meeting ground for employers and prospective employees. Graduate students will find this useful in locating part-time and full-time jobs while in school, as well as seeking employment following graduation. Alumni are also encouraged to use these services. However, the Career Development Office can not guarantee jobs to all students, nor is it a placement service.

Career Development maintains a list of available internship positions in Connecticut and surrounding states for both under-graduate and graduate students. Those seeking an internship should check with their specific academic department and professors, as they frequently are aware of opportunities.

Career Development also assists students with questions regarding alternative career paths and maintains a research library of

career information, vocational resources, brochures and annual reports of employers.

The Career Development Office produces the career development section for the alumni newsletter, *Insight*, and a career section in *The Charger Bulletin*. Information on career development events, workshops, seminars, recruitment visits, employment outlook for graduates, job listings and search hints are available in the Career Development Office.

Counseling Center

The Counseling Center in the lower level of Sheffield Hall offers assistance and counseling to students with vocational and personal problems.

The Counseling Center also offers testing, including learning disability evaluations and vocational interest testing.

For students who do not know where to go for help with a problem, the Counseling Center serves as a resource for information and direction.

Dental Center

The University of New Haven Dental Center is the clinical education site for the University of New Haven's Dental Hygiene students. Student dental hygienists, under the supervision of licensed dental hygiene and dental faculty, provide preventive dental services to the public including dental examinations, prophylaxes (cleanings), oral hygiene instructions, fluoride treatments, pit and fissure sealants, and radiographs.

Fees are charged on a sliding scale, according to the client's UNH employee/student status and/or ability to pay. For more information, or to schedule an appointment, call (203)931-6028.

Disability Services and Resources

The Disability Services and Resources Office handles all referrals regarding any student with a disability, whether temporary or permanent. The director provides guidance, assistance and information for students with disabilities and assists the university's ADA coordinator with oversight of the university's compliance with Section 504 of the H.E.W. Rehabilitation Act of 1973, the Americans with Disabilities Act and other governmental regulations.

Referrals and inquiries concerning any matters relating to students with disabilities, accessible facilities and/or reasonable accommodations should be directed to this office. In order to receive accommodations for a disability, students with disabilities must initiate a request for services. It is the responsibility of the student to make his/her needs known by self-identifying as a student with a disability. In order to do so, students with disabilities should contact the Director of the Disability Services and Resources Office and should submit the required documentation of the disability upon acceptance to the university. These records are considered confidential and are maintained in the Disability Services and Resources Office, separate from other school records. It is not a requirement that documentation be submitted with your application for admission.

The Disability Services and Resources Office is located on the ground level of Sheffield Hall, and the Director can be reached by voice/TDD at (203) 932-7331. The Vice President for Student Affairs and Athletics has been designated as the university's 504/ADA coordinator and can be reached at (203)932-7199.

Food Services

The UNH Campus Food Service provides a variety of dining opportunities on campus. In addition to its traditional food plans for full-time students, the Marketplace Food Court on the lower level of Bartels Hall, the campus center, offers a wide selection of food and beverages, including hot entrees, made-to-order items, soups, sandwiches, pizza,

grill items and a Vegan menu, as well as a full salad bar and desserts. The Marketplace serves full breakfast, lunch and dinner on weekdays; a limited menu mid-morning and mid-afternoon weekdays, and a limited menu on weekday evenings until 10:00 p.m.. Weekend service includes a mid-day brunch and dinner in the evening.

Jazzman's Café, located on the main floor of Bartels Hall, the campus center, features coffee and cappuccino, cold beverages, fresh baked goods, as well as grab-and-go sandwiches, salads and desserts. The Quad Convenience Store operates on the ground floor of the Botwinik Hall dormitory, providing a full range of grocery, beverage, snack and health & beauty items, and is open 7 days a week.

Graduate Housing

On-campus housing for graduate students is not currently available. However, the Office of Residential Life maintains a listing of off-campus housing accommodations in the area that includes apartments, houses and private rooms. The university does not screen these listings and takes no responsibility for the condition of the room or apartment or for the rents asked, but the listings are an excellent source to assist graduate students in locating housing accommodations.

Health Services

The university's Health Services Center, located in the lower level of Sheffield Hall on the main campus, is open to all students without charge. The center is staffed by registered nurses and a part-time physician. A weekly women's clinic is staffed by nurse practitioners. Health Services provides initial care for minor illnesses and injuries as well as diagnosis, referral and follow-up care for more serious conditions. The center also is a resource for information about medical questions and other medical facilities in the community.

All full-time students entering the university must comply with state laws regarding immunizations for measles and rubella. Applicants to the Graduate School must complete the Immunization Form and return it to the UNH Health Services Office. In addition, students enrolling at UNH for full-time study must also file a completed Health Examination Report with the Health Services Office. Medical forms and information can be obtained by contacting the Health Services Office at (203) 932-7079 or 1-800-DIAL-UNH, ext. 7079.

Connecticut State law requires that each student who resides in University owned housing be vaccinated against meningitis as a condition of such residence.

It is the policy of the university to withhold registration at the beginning of each term for noncompliance.

International Student Services

Each year the University of New Haven admits students from many nations. These students, representing more than 50 different countries, bring an international dimension to the campus.

The International Services Office provides for the special needs and concerns of all international students. The office staff assists students with government regulations, provides information on travel to and from the United States and advises students on academic, social and cultural adjustment. The office also serves as a liaison between the student and the university community.

A wide range of programs has been developed including publication of an international newsletter, special orientation events, information seminars, and an international festival. For more information, call (203) 932-7475.

Office of University Advancement

Staff members of this office work with the president of the university, the Board of Governors, faculty and staff to secure both short- and long-term funding for enhancement of the university's programs and facilities. Funds are sought for new buildings and renovations; student financial aid; endowed chairs, professorships and lectureships; faculty development; scientific and technical equipment; library resources; and other institutional opportunities for growth over and above what can be achieved from regular and anticipated university income.

National and local foundations, corporations, parents, students, alumni, faculty and friends support these efforts and contribute to the excellence of the university.

Multicultural Affairs and Services

The staff of the Office of Multicultural Affairs and Services works cooperatively with the campus community to assist and support students of color. The mission of the staff is to serve minority students by developing cultural and cross-cultural programs, workshops and lectures as well as providing supplemental counseling for social, personal and academic needs.

It is a goal of this department to enrich the educational experience of minority students by encouraging utilization of the facilities and programs at the university and in the Greater New Haven area. In addition, the staff is dedicated to enhancing awareness of and sensitivity toward the needs of the minority student population.

University Police Department

The staff of the University Police Department are certified police officers who undergo continuous training and who have been trained in emergency medical procedures, first aid and CPR. They conduct regularly scheduled campus patrols and work closely with local, state and federal agencies to enforce the laws of the State of Connecticut, especially those most pertinent to campus safety and security. The University Police Department is fully staffed 24 hours/day, and it is located in the lower level of the Campus Store building. The telephone number is (203) 932-7014 or 1-800-DIAL-UNH, ext. 7014.

Veteran's Affairs

The Graduate Registrar, a full-time administrator in the Graduate Records Office, handles support services for veterans attending the University of New Haven. Students who are veterans should contact the Veterans' Affairs Officer at (203) 932-7388 prior to each term to verify enrollment information.

Student Organizations

Alpha Phi Sigma– Alpha Tau Chapter

Alpha Tau is the local chapter of Alpha Phi Sigma, the National Criminal Justice Honor Society. Alpha Tau's purpose is to recognize and promote academic excellence among undergraduate and graduate students. The local chapter was formed in 1998 and embraces the full spectrum of criminal justice students from criminal justice and forensic science to pre-law and the related social sciences.

Graduate students who have a 3.4 cumulative QPR and who have completed at least 12 credit hours of graduate work, or 9 credit hours of graduate work and at least 3 additional undergraduate credit hours, are eligible for membership. Undergraduate students who have completed 60 credit hours and at least four criminal justice courses, and who have at least a 3.4 cumulative QPR are

eligible for membership.

Additional information may be obtained by contacting the Alpha Tau adviser, Dr. James Monahan, in the Department of Criminal Justice.

Black Graduate Association

Founded in 1993, the Black Graduate Association provides a cultural, academic and social environment within which graduate students and alumni/ae of African descent may interact, network and associate. A major interest of the BGA is development of scholarship support for graduate study. Meetings and events are held evenings and weekends to accommodate working students. Membership is open to current graduate students and alumni of the Graduate School.

Criminal Justice Club

The American Criminal Justice Association (ACJA) is a national professional and preprofessional organization with goals that include improved technology, training and service for the benefit of the criminal justice system. The UNH local student chapter of ACJA is the Psi Omega chapter. This club offers students a variety of activities including community service as well as the opportunity to meet and work with practitioners in the field. Students also meet others with similar interest and are eligible to participate in regional and national programs and activities.

Graduate Student Council

The Graduate Student Council of the University of New Haven was founded in 1976. Since that time it has expanded its horizons through diverse programming and as a result of the increased enrollment of graduate students.

The Graduate Student Council is a student organization funded by the fee paid by all graduate students each trimester. Thus, all graduate students enrolled at UNH are automatically members and share in the activities of the council.

The purpose of the Graduate Student Council is to promote the welfare of the student body of the Graduate School, to give counsel and encouragement to all students in the Graduate School, to encourage the active participation of all graduate students in determination of their academic environment, to develop and encourage a school spirit among the graduate student body through social and other activities, and to convey student opinion to the university administration. The Graduate Student Council annually elects one of its members to serve as a delegate to the university's Board of Governors.

The council serves as a cultural, social and educational organization through a variety of activities including the biannual receptions for graduating students, a class gift to the university each year and other supportive services.

Lambda Pi Eta

The Beta Kappa Chapter of Lambda Pi Eta is the university's affiliate of the national honor society in communication. Founded in 1985, the chapter became an affiliate of the National Communication Association in 1994. The name represents what Aristotle described in his *Rhetoric* as the three modes of persuasion: *logos*, meaning logic; *pathos*, relating to emotion; and *ethos*, defined as character credibility and ethics. Lambda Pi Eta's purpose is to recognize, foster and reward outstanding scholastic achievement; stimulate interest in the field of communication; and provide opportunities for dialogue among faculty and students interested in communication.

NAGPS Affiliation

The Graduate School is an affiliate of the National Association of Graduate-Professional Students. NAGPS is a nonprofit

organization dedicated to improving the quality of graduate and professional student life in the U.S. NAGPS works to actively promote the interests and welfare of graduate students and graduate education at local, regional and national levels.

Information is available at their web site about current lobbying efforts in the U.S. Congress on issues affecting financial aid, student loans and taxation of tuition benefits, etc. NAGPS also operates a NAGPS Job Bank in a special section of the web site. Graduate students enrolled at UNH are eligible to obtain access to the Job Bank, as well as the Fellowship/Scholarship and Grants databank. At the NAGPS web site www.nagps.org all students can find additional benefits such as discounts on books, insurance and other information.

Psi Chi

The Department of Psychology at UNH supports a chapter of Psi Chi, the National Honor Society in Psychology. Founded on the UNH campus in 1976, the chapter is one of over 700 chapters. This honorary society was founded at the Ninth International Congress of Psychology at Yale University in 1929. Psychology program students are elected to Psi Chi to honor achievement in their chosen field.

Sigma Beta Delta

Sigma Beta Delta is a national honor society in business, management and administration. The UNH School of Business chapter of Sigma Beta Delta was inaugurated in May of 1994. UNH faculty are inducted as members and graduate and undergraduate students are honored with initiation.

Student Publications

Student publications include *The Charger Bulletin*, the university student newspaper, and *The Chariot*, the annual yearbook. Published under the auspices of the English Department, *The Elm City Review* is a student literary publication that provides an audience for creative writing selected from students' submissions of prose fiction and nonfiction as well as poetry. Students may volunteer to work on these student publications.

WNHU Radio

WNHU, the university's student-operated FM stereo broadcast facility, is operated by the Communication Department of the School of Business throughout the year on a frequency of 88.7 MHz at a power of 1,700 watts. This extracurricular enterprise, open to all undergraduate and graduate students, has a 30-mile radius which serves southern Connecticut and eastern Long Island with music, news, sports and weather. The WNHU broadcast day consists of a variety of different types of music played from 6 a.m. to 2 a.m., seven days a week, every day of the year!

Most WNHU activities in programming, business and engineering operations are performed by students in the university's day, evening and graduate divisions. The station personnel will train all qualified students in their respective areas of interest; no prior radio experience is necessary.

College of Arts & Sciences

Graduate Degree Programs

Cellular & Molecular Biology, M.S.
Community Psychology, M.A.
Education, M.S.
- Teacher Certification
- Professional Education

Environmental Science, M.S.
Human Nutrition, M.S.
Industrial/Organizational
- Psychology, M.A.

Graduate Certificates

Applications of Psychology
Bioinformatics
Geographical Information Systems
International Relations
Legal Studies
Psychology of Conflict Management

School of Business

Graduate Business Degree Programs

M.B.A., Business Administration
M.B.A., Executive Program

Other Graduate Degree Programs

M.P.A., Public Administration
M.B.A./M.P.A., dual degree
Health Care Administration, M.S.
Labor Relations, M.S.
Management of Sports Industries, M.S.

Graduate Certificates

Accounting
Business Management
Finance
Health Care Management
Human Resources Management
International Business
Long-Term Health Care
Management of Sports Industries
Marketing
Public Administration
Public Management
Taxation
Telecommunication Management

School of Engineering & Applied Science

Graduate Degree Programs

Computer Science, M.S.
Electrical Engineering, M.S.
Environmental Engineering, M.S.
Executive Engineering Management, M.S.
Industrial Engineering, M.S.I.E.
M.B.A./M.S.I.E., dual degree
Mechanical Engineering, M.S.M.E.
Operations Research, M.S.

Graduate Certificates

Civil Engineering Design
Computer Applications
Computer Programming
Computing
Logistics
Quality Engineering

School of Hospitality & Tourism

Graduate Degree Program

Executive Tourism & Hospitality Management, M.S.

School of Public Safety & Professional Studies

Graduate Degree Programs

Criminal Justice, M.S.
Fire Science, M.S.
Forensic Science, M.S.
Industrial Hygiene, M.S.
National Security & Public Safety, M.S.
Occupational Safety &
Health Management, M.S.
Professional Counseling, M.S.

Graduate Certificates

Fire/Arson Investigation
Fire Science Technology
Forensic Computer Investigation
Forensic Science/Advanced Investigation
Forensic Science/Criminalistics
Forensic Science/Fire Science
Industrial Hygiene
Information Protection and Security
National Security
Occupational Safety
Public Safety Management
Victim Advocacy and Services Management

COLLEGE OF ARTS AND SCIENCES

Daniel N. Nelson, Ph.D., Dean
Robert D. Greenberg, Ph.D., Associate Dean

Gordon R. Simerson, Ph.D., Associate Dean

Graduate programs in the College of Arts and Sciences offer opportunities for career preparation through the conscientious application of core liberal arts and sciences disciplines. Faculty with practical experience and engaging learning approaches work closely with students to cultivate their professional identities, skills, and awareness of global trends and challenges in their chosen fields. Graduate courses are offered through all of the Arts and Sciences departments.

The College of Arts and Sciences, through the Graduate School, offers master's degree programs in six fields: master of science degrees in cellular and molecular biology, education, environmental science and human nutrition; master of arts degrees in community psychology and industrial/organizational psychology.

Within the field of education, students may select either a teacher certification program which has an optional full-time internship experience or an advanced professional education program for persons who already hold certification. The human nutrition program is offered part-time, one weekend per month, at the main campus in West Haven and at two locations in California—San Francisco and Los Angeles. The environmental science program provides many opportunities for field and laboratory experience along with classroom instruction, while students in cellular and molecular biology are training for specialized careers in the fields of bioinformatics, basic science and pharmacological research.

Graduate certificates provide short, specific coursework in several fields including Geographical Information Systems (GIS) and the psychology of conflict management.

At the undergraduate level, the College of Arts and Sciences offers associate and bachelor's degree programs in a wide variety of fields from art and graphic design to dental hygiene, music and sound recording to psychology, and a liberal studies degree. A combined five-year B.S./M.S. program in environmental science is offered for students who meet certain qualifications.

The College of Arts and Sciences sponsors a variety of cultural, educational2 and artistic endeavors at the university, including faculty forums, performing artists and guest speakers.

Cellular and Molecular Biology

Coordinator: Eva Sapi. Assistant Professor of Biology and Environmental Science, Ph.D., Eotvos Lorand University, Budapest, Hungary.

The master of science program in cellular and molecular biology is intended for those individuals interested in the rapidly expanding fields of biotechnology, basic science and pharmacological research. The level of experience required for an individual to contribute in these fields is not satisfied by an undergraduate degree; therefore, individuals with advanced training are in demand.

This program, with strong emphasis on biochemistry and molecular biology techniques, will provide students with the preparation needed to meet this need for advanced training. The central curriculum consists of courses in biochemistry, cell biology, genomics, and molecular biology. These courses will develop the student's ability to function as an independent scientist by stressing both the conceptual and technical aspects of each subject.

Admission Policy

Application for the cellular and molecular biology program may be submitted at any time; however, full time admission to the program will be granted for the Fall trimester only.

Candidates for admission to the cellular and molecular biology program are expected to have a bachelor's degree in biology, chemistry or a related discipline. The undergraduate coursework should have included general biology, advanced biology electives, general chemistry and organic chemistry. It also recommended that applicants have taken introductory statistics, calculus, molecular biology and biochemistry.

Students who do not hold a bachelor's degree in an appropriate field or who lack the minimum program prerequisite requirements may be provisionally accepted to the program. Students receiving provisional acceptance must complete the requirements stipulated at the beginning of the program study. Upon completion of the provisional requirements, the student's record will be evaluated for full admission. In addition, provisionally accepted students may be prevented from enrolling in certain specific graduate courses until prerequisites are met, as determined by the program coordinator.

M.S., Cellular and Molecular Biology

A minimum of 38 credit hours of graduate work must be completed to earn the Master of Science degree in cellular and molecular biology. The program consists of eight required courses and at least four elective courses.

Students are required to participate in research. The research requirement may be satisfied by completion of a research project or an internship or a thesis. Research project and internship options are intended for those students who are interested in learning about academic or industrial research environments or who are already employed. Thesis option is intended for students who are interested in future pursuit of a doctoral degree.

Cooperative education experience may also be used for research credit with the approval of the program coordinator.

Students who elect to write a thesis, as a part of the program of study, must take MB698 and 699, Thesis I and II (6 credits). For those students a minimum of 41 credit hours of graduate work must be completed to earn the Master of Science degree in cellular and molecular biology. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departments requirements.

Required Courses

- BI 605 Biostatistics
- E 659 Writing and Speaking for Professionals
- MB 601 Protein Biochemistry and Enzymology
- MB 603 Nucleic Acid Biochemistry
- MB 606 Molecular Genetics/Genomics
- MB 607 Cellular Biology

2 of the following courses:

- MB 611 Molecular Biology of Proteins with Laboratory (4 credits)
- MB 613 Molecular Biology of Nucleic Acids with Laboratory (4 credits)
- MB 617 Cell Culture Techniques with Laboratory (4 credits)

Research options

- MB 690 Research Project
- MB 688/689 Internship I and II
- MB 698/699 Thesis I and II

Electives

- MB 602 Biochemistry of Bioenergetics
- MB 620 Bioinformatics
- MB 636 Immunology
- MB 644 Cellular Development
- MB 648 Cytoskeleton and Extracellular Matrix
- MB 650 Oncogenes and Cytokines
- MB 656 Receptor Effector Systems
- MB 670 Special Topics
- MB 680 Graduate Seminar
- MB 695/696 Independent Study I and II
- MG 670 Special Topics in Biotechnology Management

Total Credits: 38-41

Community Psychology

Coordinator: Robert J. Hoffnung, Professor of Psychology, Ph.D., University of Cincinnati

Community psychology applies the theories and techniques of psychology and related social sciences to understanding and modifying the complex social forces which influence individual and community well-being.

Accordingly, the master of arts program in community psychology provides broad training in current approaches to preventing and treating psychological distress at the level of social institutions, organizations and groups rather than just the individual. Methods of community analysis, consultation and crisis intervention are considered as well as program development, administration and evaluation.

Classroom study is closely integrated with supervised field experiences in a variety of human service organizations and community settings.

Graduates are able to assume positions of responsibility in a broad range of human service settings, such as mental health programs, youth service bureaus, community centers, child development programs, municipal services, halfway houses, senior citizen centers, private agencies, health care systems and community action programs.

Admission Policy

An undergraduate degree from an accredited institution is required. A major in psychology is preferred but not required. However, all students are expected to have at least an introductory-level understanding of psychological concepts, principles and methods before entering. Students who have not had an undergraduate course in statistical methods will be required to take one

before entry into P 608. Related work experience as well as academic performance is considered in admission decisions.

Along with the application materials required by the Graduate School, applicants may be asked to submit a questionnaire. Applicants may be required to submit scores from either the Miller Analogies Test or the Graduate Record Examination Aptitude Test, at the discretion of the department. Students intending to go on for further graduate work are strongly encouraged to take the GRE early in their first year of study in the master's program.

Fieldwork and Seminars

Supervised field experience in a variety of settings is a major vehicle through which students in the program develop applied skills. Students plan their fieldwork activities in collaboration with both the program's field training director and their supervisors from the field setting. Field experience is provided in the areas of individual intervention, consultation and systems intervention. Students with a year or more of appropriate full-time human service experience in a particular fieldwork area will be allowed to substitute an elective course for the fieldwork course in that area, contingent upon the approval of the community psychology program coordinator.

In addition to the fieldwork, three separate seminar courses provide a theoretical and research framework within which the development of these applied skills will be examined and discussed. These seminars enable students to conceptualize the issues encountered in the field within a broader context. In addition, a comprehensive project report in which students analyze and integrate fieldwork experience with relevant research and coursework is required.

Thesis

Students may elect to write a thesis as part of the program of study. The thesis must show ability to organize materials in a clear and original manner and present well-reasoned conclusions. A thesis is strongly recommended for students wishing to pursue doctoral training after graduation. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements.

M.A., Community Psychology

The program consists of 45 credit hours, 24 of which comprise the core curriculum completed by all students and 12 of which constitute one of three areas of concentration. Typically, students complete most of the core requirements before focusing on the concentrations.

Required Courses

P 605 Survey of Community Psychology
P 608 Psychometrics and Statistics
P 609 Research Methods
P 610 Program Evaluation
P 612 Consultation Seminar
P 615 Consultation Fieldwork
P 611 Individual Intervention Seminar, *or*
P 613 Systems Intervention Seminar
P 614 Individual Intervention Fieldwork, *or*
P 616 Systems Intervention Fieldwork
Electives (three courses)
Concentration (four courses)
Total credits: 45

Concentration in Community-Clinical Services

The community-clinical services concentration is designed to prepare students for careers in clinical, mental health and related human service settings. Direct work with individuals within the social and community contexts in which they live as well as consultation, social problem analysis, and prevention techniques and strategies are stressed.

P 625 Life Span Developmental Psychology
P 628 The Interview
P 629 Introduction to Psychotherapy and

Counseling
P 632 Group Treatment and Family Therapy
Total credits: 12

See the Table of Contents for the community-clinical concentration offered in the degree program leading to the master's of public administration (M.P.A.) and for the correctional counseling concentration in the master of science program in Criminal Justice.

Concentration in Program Development

The program development concentration is designed to prepare students for careers which emphasize the administration of traditional and nontraditional programs and services. The concentration involves planning, development and evaluation of innovative approaches to treatment and prevention at the community, organizational and social systems levels in the public and private human service sectors as well as in business and industry.

P 619 Organizational Behavior
P 628 The Interview
PA 604 Communities and Social Change
PA 641 Financial Management of Health Care Organizations, *or*
PA 643 Health and Institutional Planning
Total credits: 12

Education Programs

The Education Department offers two programs of graduate study in education: (1) Teacher Certification for those seeking initial teacher certification and (2) Professional Education for currently certified teachers seeking professional advancement. Both programs lead to the Master of Science in Education degree. These programs represent the University's commitment to the preparation of future educators for meaningful roles in teaching the youth of the 21st century.

Education: Teacher Certification

Chair: Shirley A. Wakin, Professor Mathematics and Education, Ph.D., University of Massachusetts
Director of Student Teaching & Chief Certification Officer: Phyllis S. Gwatkin, M.S., Fordham University; C.A.G.S., St. Joseph College
Coordinator of Internships: Nicholas Maiorino, M.S., Sixth Year Certificate, Southern Connecticut State University

The Teacher Certification program prepares educators for teaching diverse student populations with a variety of learning needs. This interdisciplinary, knowledge-based program is intended to promote reflective practice. Teacher candidates are required to enter the program with a strong liberal arts background from their undergraduate institution. The Education Program builds on this previous knowledge while blending educational theory and practice within the context of effective pedagogical practices. Particular emphasis is placed on linking field experiences to coursework. Because teacher candidates are expected to teach diverse student populations, all students are required to participate in both urban and suburban field experiences.

Admission Policy

Applicants must hold a baccalaureate degree from an accredited institution of higher education with an academic or interdisciplinary major. Applicants must have a broad range of general education courses as well as courses specific to the subject area and/or level of certification sought. In addition, all candidates must meet the requirement for one three-credit course in United

States history, which may be credited from undergraduate coursework or fulfilled in the University's graduate program by taking an elective (HS610 Survey of United States History). Official undergraduate transcripts must be submitted for review by the Chief Certification Officer to determine whether or not candidates have successfully met background requirements. The Education Department's determination of undergraduate deficiencies is final.

A minimum grade point average of 2.7 (equivalent to a B-) is required for admission. Waivers of this requirement may be granted in special circumstances. Students with undergraduate grade point averages lower than 2.7 must submit an application for a waiver together with supporting documentation to the Education Department Admissions Committee. Students should contact the UNH Education Department for further information about this requirement.

In addition to coursework and grade requirements, all applicants must pass PRAXIS I PPST or obtain an approved waiver from the state of CT prior to admission. Applicants must submit three letters of recommendation and an essay describing experience relevant to teaching as well as reasons for applying to the program. All prospective students must be interviewed. Information packets outlining all admission criteria are available from the Education Department Office and information sessions are held at various times throughout the year.

M.S., Education (Teacher Certification)

A total of 36 credit hours is required for completion of the degree of Master of Science in Education. Typically, the Master of Science degree can be completed in one year. To obtain teaching certification, students must also take six credits of student teaching (ED 600), which is required for Connecticut certification. Students should note that these six credits are taken in addition to the 36 credits required for the M.S. degree and student teaching credits do not count toward the M.S. degree. Successful completion of student teaching is required before students are recommended to the Connecticut State Department of Education for initial teacher certification.

All students begin the program by taking ED 601(Introduction to Education), a one-credit course designed to introduce students to the field of education. ED 601 is offered in August for those students beginning their studies in September and in December for those who begin in January. Thus, students must begin the program in either the fall term or the winter term; students are not allowed to begin the program in April or during the summer session.

Full-time students take their courses together as a cohort, fostering collegiality and professional relationships that frequently continue beyond the program's duration.

Field Experiences

Internships: Supervised internships are available. An intern is expected to work as a paraprofessional in a school district in CT for the entire school year. In return, the school district and the University pay the student's tuition for the 36-credit Master of Science degree. Students must attend a training module before beginning their internship.

Capstone Project: Students who do not choose the internship option must complete a field experience in their final trimester. In this project, students work in the classroom under the guidance of an experienced teacher and university supervisor for a minimum of two weeks. This field experience provides students opportunities for observing experienced teachers, implementing selected lesson plans, and reflecting on practice.

Student Teaching: Before beginning the

student teaching field experience, all students must pass PRAXIS II, complete all background deficiencies and complete all professional courses. Candidates participate in a supervised field placement under the guidance of a qualified classroom teacher. Students are also required to attend student teaching seminars during this period.

Elementary Certification (Grades 1-6)

The following courses are required for students seeking elementary certification (grades 1-6):

Required Courses

Core Courses (16-17 credits)
ED 601 Introduction to Education (1 credit)
ED 604 Educational Psychology
ED 605 Students with Special Needs
ED 608 Child Development
ED 620 Seminar in Multicultural Issues (1 credit)
ED 680 Contemporary Issues
ED 683 Computer Applications for Teachers (2-3 credits)

Strategies Courses (14 credits)

ED 621E Teaching Strategies in Mathematics (2 credits)
ED 622E Teaching Strategies in Science (2 credits)
ED 623E Teaching Strategies in Social Studies (2 credits)
ED 626E Strategies for Teaching Reading & Language Arts in Elementary School
ED 628 Reading Diagnosis and Remediation
ED 630E Children's Literature (2 credits)

Field experience (2 credits)

Internship: ED 694 (2 credits) *or*
Capstone Project: ED 691 (2 credits)
(Both will require a teaching portfolio.)

Other requirements

Students may be required to pass a comprehensive examination on pedagogy.

Plus:
Electives
Total credits: 36

Secondary Certification (Grades 7-12)

The following courses are required for students seeking secondary certification (grades 7-12):

Required Courses

Core Courses (19-20 credits)
ED 601 Introduction to Education (1 credit)
ED 604 Educational Psychology
ED 605 Students with Special Needs
ED 609 Adolescent Development
ED 620A Seminar in Multicultural Issues (1 credit)
ED 680 Contemporary Issues
ED 682 Measurement, Assessment and Evaluation
ED 683 Computer Applications for Teachers (2-3 credits)

Strategies Courses (7 credits)

ED 626S Reading in the Content Areas (2 credits)

One of the following:
ED 627 Writing in the Content Areas (2 credits) or ED 630S Literature for Secondary School (2 credits)
Plus one of the following (depending on subject area certification):
ED 621S Teaching Strategies in Mathematics
ED 622S Teaching Strategies in Science
ED 623S Teaching Strategies in Social Studies
ED 624 Teaching Strategies in Business
ED 625S Teaching Strategies in Language Arts/Secondary School

Field experience (2 credits)

ED 694 (2 credits) *or*
Capstone Project: ED 691B (2 credits)
(Both will require a teaching portfolio.):

Other requirements:

Students may be required to pass a comprehensive examination on pedagogy.

Plus:
Electives
Total credits: 36

Applying for State Certification

The certification process is separate and distinct from the petition for graduation. After students have successfully completed the professional courses in their program, including Student Teaching (ED 600), the Certification Officer conducts exit interviews to verify that students have met all requirements and then recommends, with department approval, candidates for certification. Exit interviews are usually conducted during the term in which students take Student Teaching (ED 600). **The courses taken for a particular certification must be consistent with the statutory requirements of laws current at the time of application for certification rather than the laws operating at the time of admission to the university.**

U.S. Department of Education Title II Report

Section 207 of Title II of the Higher Education Act mandates that the Education Department collect data on assessments, requirements and standards for teacher certification and licensure as well as performance of teacher preparation programs. The law requires that this data be used to submit an annual report on the quality of teacher preparation to the U.S. Congress. The full report of annual data for the University of New Haven's performance is available from the Education Department.

Education: Professional Education

Chair: Shirley A. Wakin, Professor of Mathematics and Education, Ph.D., University of Massachusetts

This program, also leading to the master of science degree in education, provides a curriculum for continuing professional growth. Applicants must hold a baccalaureate degree from an accredited institution of higher learning and teaching certification in Connecticut or elsewhere.

Three letters of recommendation and an essay setting forth the student's reasons for enrolling in the teacher preparation program, emphasizing experience relevant to teaching, are also required. Information packets outlining all admission criteria are available from the Education Department Office, and information sessions are held at various times throughout the year.

All prospective students are required to complete an interview and to have their undergraduate transcripts evaluated by the Chief Certification Officer.

M.S., Professional Education

A total of 36 credits is required for completion of the master of science degree in education. Five required courses are in professional education. Recognizing the breadth that strategies courses offer even to professional teachers, eight or more credits of strategies courses are required. In addition, students are encouraged to take content electives.

Students who are classroom teachers may elect to complete a research project using their own classroom for their research; others will be required to complete a teaching portfolio.

Required Courses

Core Courses (16 credits)
ED 604 Educational Psychology
ED 612 Curriculum Design
ED 620 Seminar in Multicultural Issues (1 credit)
ED 682 Measurement, Assessment and Evaluation
ED 683 Computer Applications for Teachers

Plus:
ED 685 Research in the Schools, *or*
ED 691 Capstone Project

Plus:
Approved electives (20 credits)
Total credits: 36

Environmental Science

Coordinator: Roman N. Zajac, Professor of Biology and Environmental Science, Ph.D., University of Connecticut

The purpose of this program is to provide graduate-level education for careers in environmental science as well as for other areas requiring knowledge of environmental principles. It is intended to meet the needs of those who wish to enter this dynamic and expanding field, those who are active environmental scientists and managers, and also those students who plan to pursue graduate training beyond the master's level. An interdisciplinary program comprised of courses in ecology, geology, chemistry and legislation, it provides the advanced skills and knowledge necessary to meet the increasing demand for scientists with an environmental background. Field and laboratory work provide practical experience for students enrolled in the program, while ongoing faculty projects provide opportunities to perform research on various environmental problems and issues.

Scientists knowledgeable in environmental issues and science are needed by employers in these major areas:

- government agencies, particularly in the areas of environmental protection and management;
- water, sewer and power-generation utilities;
- analytic laboratories;
- environmental and engineering firms;
- industries in the field of pollution control;
- private industry and management;
- non-governmental organizations such as the United Nations the World Bank on conservation groups; and
- Educational institutions such as Museums and Science Centers.

Admission Policy

Candidates for admission to the environmental science program are expected to have a bachelor's degree in the sciences with courses in biology, general chemistry, organic chemistry and calculus. Also suggested are a course in introductory statistics and a course in physics. Students who do not hold a bachelor's degree in science or who lack the minimum program prerequisite requirements will be required to complete them before enrolling in certain specific graduate courses. This will be determined in consultation with the program coordinator.

It is expected that all prerequisites will be completed either prior to enrolling in graduate courses or within one year of admission into the program. This period can be extended only with the consent of the program coordinator. Students who must take a course in organic chemistry as a program prerequisite may choose to take CH 600 Introduction to Environmental Chemistry to fulfill this requirement. It should be noted, however, that CH 600 Introduction to Environmental Chemistry is taken on an excess credit basis and will not be counted towards fulfilling the program requirement of 42 graduate credits.

M.S., Environmental Science

A minimum of 42 credit hours must be completed to earn the master of science in environmental science degree. The transfer of credit earned at other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

The program consists of five required core courses plus an additional nine courses that may be taken in a specified area of concentration. Students who do not choose to concentrate in a particular area may follow a general plan of study developed in consultation with the program coordinator. Required courses cover common areas in environmental science, while the electives and concen-

tration options enable students to study in a particular area of interest or subjects with direct application to their current professional situations.

Students may elect to write a thesis as part of the program of study. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements. A thesis is recommended for students who wish to pursue doctoral training after graduation and for those with specific professional interests. For students who choose the thesis option, the selection of thesis courses will be determined in consultation with the program coordinator and thesis adviser and will include EN 698 and 699 Thesis I and II in lieu of other courses in the program.

Students should note that a number of courses in this program require some weekend field trips, lab sessions or acceptable alternatives. In addition, students should consult the program coordinator for advice in selection of appropriate courses and to assure compliance with prerequisite requirements.

Required Courses

CE 606 Environmental Law and Legislation
CH 601 Environmental Chemistry
EN 600 Environmental Geoscience
EN 601 Principles of Ecology with Laboratory (4 credits)
EN 690 Research Project*
Concentration, or Approved Electives
Minimum total credits: 42

**Students will select a topic in their area of concentration for completion of EN 690 Research Project.*

Note: Students who select the general program rather than a concentration in a specific area will be required to follow a plan of study determined in consultation with the program coordinator.

Concentrations

Students may elect to pursue one of the following four specific concentrations for the elective portion of the program. As students declare a concentration, they will be assigned to the faculty adviser responsible for the specified concentration. The concentration adviser will help the student formulate an individual program and the required approved electives, which must be selected from at least two other concentration areas.

Concentration in Environmental Ecology

Concentration Adviser: Roman N. Zajac, Professor of Biology and Environmental Science, Ph.D., University of Connecticut

EN 602 Environmental Effects of Pollutants
EN 606 Environmental Data Analysis
EN 607 Environmental Reports and Impact Assessment
EN 615 Toxicology
Restricted Electives (two courses, from two other concentrations)

*Plus two to three of the following:***

EN 603 Wetlands Ecology with Laboratory (4 credits)
EN 604 Ecology of Inland Waters
EN 605 Marine and Estuarine Ecology
EN 608 Landscape Ecology
EN 621 Hydrology (4 credits)
EN 650 Environmental Microbiology (4 credits)
EN 670 Selected Topics
Minimum total credits: 26

Concentration in Environmental Geoscience

Concentration Adviser: R. Laurence Davis, Professor of Earth and Environmental Science, Ph.D., University of Rochester

EN 621 Hydrology (4 credits)
EN 622 Groundwater Geology (4 credits)
EN 632 Field Geology of the Northeast (4 credits), *or*

EN 633 Selected Topics in Field Geology (1-4 credits)
Restricted Electives (two courses, from two other concentrations)

*Plus two to four of the following:***

EN 617 Subsurface Assessment
EN 620 Advanced Environmental Geology (4 credits)
EN 625 Geomorphology (4 credits)
EN 626 Glacial Geology
EN 627 Soil Science
EN 670 Selected Topics
Minimum total credits: 26

Concentration in Environmental Health and Management

Concentration Adviser. Roman N. Zajac, Professor of Biology and Environmental Science, Ph.D., University of Connecticut

EN 607 Environmental Reports and Impact Assessment
EN 615 Toxicology
EN 617 Subsurface Assessment
EN 618 Hazardous Materials Management
Restricted Electives (two courses, from two other concentrations)

*Plus two to three of the following:***

CE 605 Solid Waste Management
EN 602 Environmental Effects of Pollutants
EN 610 Environmental Health
EN 612 Epidemiology
EN 613 Radioactivity and Radiation in the Environment
EN 616 Human Health and Environmental Risk Assessment
EN 670 Selected Topics
SH 608 Industrial Hygiene Practices
SH 620 Occupational Safety and Health Law
Minimum total credits: 26

Concentration in Geographical Information Systems and Applications

Concentration Adviser: Steven Citron-Pousty, Practitioner-in-Residence in Biology and Environmental Science, Ph.D. University of Connecticut

EN 640 Introduction to Geographical Information Systems
EN 641 Geographical Information System Techniques and Applications I
EN 642 Geographical Information System Techniques and Applications II
EN 643 Application of GIS in Environmental Science
Restricted Electives (two courses, from two other concentrations)

*Plus two to three of the following:***

EN 608 Landscape Ecology
EN 620 Advanced Environmental Geology (4 credits)
EN 625 Geomorphology (4 credits)
EN 670 Selected Topics
Minimum total credits: 26

See the Table of Contents for the certificate in geographical information systems.

***Other courses may be substituted with the approval of the concentration adviser/program coordinator. Courses in environmental engineering, chemistry, occupational safety and health, and/or computer science may also be approved as electives.*

Human Nutrition

Chair: Michael J. Rossi, Human Nutrition Program, Ph.D., University of Kentucky

The purpose of the program leading to the master of science degree in human nutrition is to provide top quality nutrition education at the graduate level for working adult students in the food, pharmaceutical, and allied health fields so that they may apply up-to-date and in-depth nutritional knowledge in their areas of specialization and gain a foundation for further study at the Ph.D. level. The focus of the program is the role of nutrition in health and disease. Therefore, the curriculum is designed to prepare graduates with a deep understanding of the close connection between nutrition, health and disease as well as to provide

them with a detailed study of the body of knowledge necessary to understand these close connections and the evidence supporting them.

For the convenience of students whose work schedules and other obligations preclude attendance at evening classes, this program is offered on a weekend schedule. At the main campus classes meet monthly both Saturdays and Sundays from 9 a.m. to 5 p.m.

This master of science degree program in human nutrition is also offered at the California Pacific Medical Center in San Francisco and at Cedars-Sinai Medical Center in Los Angeles under the approval of the Bureau for Private Postsecondary and Vocational Education, which is the agency of the State of California that monitors out-of-state institutions.

Admission Policy

This program is most appropriate for registered dietitians and certain other licensed health professionals, or for high school science teachers and/or others with undergraduate majors in chemistry or the biological sciences. Minimum admission requirements are a four-year baccalaureate degree from an accredited university or equivalent, with an above-average undergraduate record and including successfully completed coursework in introductory biochemistry or organic chemistry plus human anatomy and physiology.

M.S., Human Nutrition

Completion of a total of 33 graduate credit hours is required for the master of science degree in human nutrition.

Required Courses

NU 601 Nutritional Biochemistry I — Fundamentals
NU 602 Nutritional Biochemistry II — Applications, *or*
NU 606 Cell and Molecular Biology of Nutrition
NU 603 Nutritional Physiology
NU 604 Vitamin Metabolism
NU 605 Mineral Metabolism
NU 609 Research Methodology in Nutrition
NU 610 Nutrition and Disease I
NU 611 Nutrition and Disease II
NU 612 Nutrition and Health: Contemporary Issues and Controversies
NU 613 Maternal and Child Nutrition
NU 690 Research Project
Total credits: 33

Program Options—Human Nutrition

Students enrolled in the Master of Science, Human Nutrition program may wish to complete undergraduate courses that would fulfill the foundation knowledge and skills for the didactic component of a DPD program approved by the Commission on Accreditation for Dietetics Education (CADE) of The American Dietetic Association, 216 W. Jackson Blvd., Chicago, IL 60606-6995, (312) 899-5400. The UNH Dietetics Program is approved by CADE and encourages students to request a transcript evaluation from the Director for Dietetics, Georgia Chavent (203) 932-7410 to determine course requirements that would enable them to receive a Verification Statement. Students holding a Verification Statement may apply to a Supervised Practice Program such as a Dietetic Internship. Following completion of the practice program, the candidate may sit for the exam to become a registered dietitian.

Industrial/Organizational Psychology

Coordinator: Stuart D. Sidle, Assistant Professor, Industrial Organizational Psychology, Ph.D., DePaul University

The study and practice of industrial and organizational psychology is directed toward enhancing the effectiveness and functioning of organizations by applying psychological principles to human work

behavior.

The primary goal of the program leading to the master of arts degree in industrial and organizational psychology is to provide students with the knowledge and experience necessary to improve the satisfaction and productivity of people at work.

Graduates typically perform activities in a number of areas that focus on individual, group and organizational processes including:

- Organizational change and development
- Consultation
- Motivation and morale
- Leadership and managerial development
- Conflict management
- Team/group dynamics
- Recruiting, selection, and placement
- Performance management
- Attitude and opinion measurement
- Training design and implementation
- Strategic human resource planning
- Employment law
- Job analysis and evaluation
- Job design and enrichment
- Employee assistance programs
- Compensation and benefits
- Program evaluation

Building on a strong foundation of theory, the program emphasizes application of principles in a wide variety of work settings. The curriculum is strengthened by ongoing, active relationships with local and regional human resource and applied psychological associations. Another unique feature of the program is The Center for Dispute Resolution (CDR) which offers mediation services to UNH students, faculty, and staff as well as providing training in mediation and negotiation. Furthermore, the I/O Psychology program at UNH conforms to the standards of The Council of Applied Master's Programs in Psychology (CAMPP).

This master's degree prepares students for careers in private and public corporations, consulting firms, government agencies and applied research institutions. Persons aspiring to enter the field, practicing professionals and individuals who plan to pursue graduate training beyond the master's level will find their educational needs accommodated due to the flexible nature of the program.

Admission Policy

Applicants are expected to possess social and interpersonal characteristics that will support success in organizational settings. Students who give evidence of a mature interest in the application of psychological principles to organizational problems and who hold an undergraduate degree from an accredited college or university are eligible for admission.

Students who haven taken the Graduate Record Examination (GRE) within the past five years are asked to report their scores to the Graduate School. In addition to the Graduate School application form, applicants will be asked to complete an I/O program questionnaire and submit it directly to the Graduate School. For applicants whose native language is not English, TOEFL scores must be reported to the Graduate School. ESL certification is also welcomed.

An undergraduate major in psychology is not specifically required as a basis for consideration. However, all students are expected to have at least an introductory-level understanding of psychological concepts, principles and methods before taking courses in the master of arts in industrial/organizational psychology program.

M.A., Industrial/ Organizational Psychology

A total of 48 credit hours is required of candidates for the degree of master of arts in industrial/organizational psychology.

Candidates for this degree must complete 24 credit hours of required courses in the core curriculum. Another 24 credit hours (including concentrations, program options and electives) are chosen after consultation with the program coordinator in light of the student's academic and professional goals. Students may not complete more than nine credit hours of electives until they have satisfied the core requirements. Up to nine credit hours of electives may be taken in other departments, such as industrial engineering, economics, management, marketing or public administration.

Transfer Credit

The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer of credit detailed elsewhere in this catalog.

Thesis

Students may elect to write a thesis as part of the program of study. The thesis must show ability to organize materials in a clear and original manner and present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements.

Program Options

Students have the opportunity to develop a program that meets their particular needs and interests by choosing from many elective courses and various program options. These options include a thesis, for those students interested in future pursuit of a doctoral degree; an internship, for those students interested in a realistic introduction to an organizational environment; or a practicum, for those students who are already employed.

Option 1 (Thesis) is intended primarily for those students who are interested in continuing their education in doctoral-level programs. This option gives students the research experience necessary to be successful in pursuit of admission to and completion of a Ph.D. program.

Option 2 (Internship/Practicum) allows the student to acquire special skills through coordinating formal coursework with an internship or practicum in an organizational setting. The internship gives the student with limited work experience the opportunity to work in cooperating organizations or consulting firms. The practicum experience is for the student who is currently employed.

The content of the practicum or internship will be established jointly by the cooperating organization, the program coordinator and the student. A comprehensive project report is required in which the student will analyze and integrate internship/practicum experiences with relevant research and coursework.

Option 3 (Approved Electives) consists of elective courses selected under faculty advisement. The choice of electives is intended to provide the student with a broad interdisciplinary background, complementing the student's own academic training and interest. A comprehensive examination covering material from the required core psychology courses is required under this option.

Program Concentrations

Within each of the program options described above, students may concentrate in (1) the industrial-personnel area, (2) the organizational area or (3) the field of conflict management. A concentration requires 12 credit hours of specific elective courses, which would be counted as part of the 24 credits required in the elective option (Thesis, Internship/Practicum or Approved Electives) selected by the student for completion of the program. If a concentration is selected, the student must notify the program coordinator as well as the Registrar. A concentration is not required if the student's educational or career goals can best be met without this specialization.

Required Courses (24 credits)

EC 625 Industrial Relations

P 608 Psychometrics and Statistics*
P 609 Research Methods
P 619 Organizational Behavior
P 620 Industrial Psychology
P 635 Psychological Tests and Measurements in Industry
P 640 Industrial Motivation and Morale
P 645 Seminar in Industrial/Organizational Psychology
Program option** (24 credits)
Total credits: 48

Program Options

Option 1 (Thesis)
P 698/699 Thesis I and II
Electives** (18 credits)

Option 2 (Internship/Practicum)
P 693/694 Organizational Internship I and II, *or* P 678/679 Practicum I and II
Electives** (18 credits)

Option 3 (Approved Electives)
Comprehensive examination required
Electives** (24 credits)

**Undergraduate preparation in statistics is prerequisite.*

** *The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

Concentration in Industrial-Personnel Psychology

Students who select this concentration will count these course credits toward the elective courses required in one of the program options listed previously.

P 610 Program Evaluation
P 644 Performance Appraisal Systems

Plus two of the following:

MG 645 Management of Human Resources
P 628 The Interview
P 641 Personnel Development and Training
Total credits: 12

Concentration in Organizational Psychology

Students who select this concentration will count these course credits toward the elective courses required in one of the program options listed previously.
P 642 Organizational Change and Development
P 643 The Psychology of Conflict Management I

Plus two of the following:

P 612 Consultation Seminar
P 623 Psychology of the Small Group
P 624 Experiential Self-Analytic Group
P 638 Psychology of Communication and Opinion Change
Total credits: 12

Concentration in the Psychology of Conflict Management

Students who select this concentration will count these course credits toward the elective courses required in one of the program options listed previously.

P 643 The Psychology of Conflict Management I
P 646 The Psychology of Conflict Management II

Plus two of the following:
MG 667 Multicultural Issues in the Workplace
P 612 Consultation Seminar
P 623 Psychology of the Small Group
P 638 Psychology of Communication and Opinion Change
P 647 Industrial and Organizational Psychology in Global Settings
PS 655 Conflict Resolution
Total credits: 12

Graduate Certificates

The College of Arts and Sciences offers the following graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of

study at the graduate level. Persons who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate must complete the Graduate School application form, submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Table of Contents for the Academic Policies section of the catalog to find a complete description of the options, regulations and requirements for study and completion of a Graduate Certificate.

Applications of Psychology Certificate

Adviser: Thomas L. Mentzer, Professor of Psychology, Ph.D., Brown University

The certificate in applications of psychology is designed to assist professionals who wish to acquire specific kinds of skills in areas dealing with human services or personnel functions. Study can be tailored to the needs of either one whose degree is in a nonpsychological field or one with a degree in psychology who wishes to broaden skills to a new area of psychology. Courses will be selected depending upon the student's career objectives and academic preparation. These courses may be from the following list, but other courses, independent study or special topics courses may be chosen where appropriate.

Any four of the following:

P 610 Program Evaluation
P 621 Behavior Modification I: Principles, Theories and Applications
P 623 Psychology of the Small Group
P 625 Life Span Developmental Psychology
P 628 The Interview
P 629 Introduction to Psychotherapy and Counseling
P 632 Group Treatment and Family Therapy
P 636 Abnormal Psychology
P 638 Psychology of Communication and Opinion Change
P 641 Personnel Development and Training
P 642 Organizational Change and Development

Total credits: 12

Bioinformatics Certificate

Adviser: Eva Sapi, Assistant Professor of Biology and Environmental Sciences, Ph.D., Eotvos Lorand University, Hungary.

This certificate program will provide a practical, "hands-on" approach to computer applications in molecular biology, and will focus on the major issues concerning representation and analysis of biological sequence and structural information. With a strong foundation of computer science and molecular biology, students will acquire a background in generating, analyzing, and interpreting biological data, as well as the ability to apply such knowledge in biotechnology and medicine. The curriculum is designed to accommodate two convergent audiences: molecular biology students with limited experience in computer systems who wish to upgrade their skills and knowledge in the field of bioinformatics, as well as those computer science students with existing computational or mathematical skills who wish to learn how to apply those skills to real biological problems.

The curriculum for this concentration includes five courses (a total of 15 credits), which combine computer science, molecular genetics, and bioinformatics courses.

Required courses:

MB 606 Molecular Genetics/Genomics

One of the following courses:
CS 604 Introduction to Programming/C
CS 610 Intermediate Programming/C

CS 622 Database systems
MB 620 Bioinformatics
MB 625 Advanced Bioinformatics

Prerequisites for the certificate:

The prerequisites are undergraduate molecular biology or biochemistry and college algebra.

Geographical Information Systems Certificate

Adviser: Steven Citron-Pousty, Practitioner-in-Residence in Biology and Environmental Science, Ph.D., University of Connecticut

The certificate in geographical information systems (GIS) provides professional training in the technology and application of computerized cartography and spatially referenced databases. GIS is an increasingly important technology in environmental sciences, urban and regional planning and management, marketing, criminal justice, communications, and energy and natural resource protection. Coursework provides knowledge in basic and advanced GIS techniques, developing procedures and databases for specific applications, as well as technologies and analyses supporting GIS. The program is flexible in order to accommodate both students new to GIS and those who already have some experience with this technology.

Students entering this program are required to have a working knowledge of personal computers.

EN 640 Introduction to Geographical Information Systems
EN 641 Geographical Information System Techniques and Applications I
EN 642 Geographical Information System Techniques and Applications II
EN 643 Application of GIS in Environmental Science, *or*
EN 690 Research Project
Total credits: 12

Students having previous GIS experience may substitute, with the adviser's approval, other courses for EN 640 and/or EN 641. Suggested substitutions, depending on a student's area of interest, may include, but are not limited to, the following:

CJ 612 Criminal Justice Management
EN 600 Environmental Geoscience
EN 608 Landscape Ecology
EN 620 Advanced Environmental Geology (4 credits)
EN 690 Research Project
EN 695 Independent Study I
MK 609 Marketing

International Relations Certificate

Adviser: Natalie J. Ferringer, Professor of Political Science, Ph.D., University of Virginia

This certificate is designed to introduce students to elements of international life that are relevant to the growth of a global political-economic system. Courses will provide increased knowledge and awareness in the area of international relations for corporate executives, teachers and professionals. Factors such as power, diplomacy, law, trade, monetary affairs, multinational corporations, investment, aid and differing cultural and geographical characteristics will be examined.

PS 606 Advanced International Relations
PS 641 The Politics of the World Economy

Plus two of the following:

HS 607 World History in the Twentieth Century
HS 670 Selected Topics
HS 695 Independent Study
IB 643 International Business
PS 603 International Law
PS 604 Human Rights and the Law

PS 625 Transnational Legal Structures
PS 628 Change and Government
PS 645 Government and the Industrial Sector
PS 670 Selected Topics
PS 695 Independent Study
Total credits: 12

Legal Studies Certificate

Adviser: Natalie J. Ferringer, Professor of Political Science, Ph.D., University of Virginia

This certificate is designed to provide the student with a background in and orientation to constitutional and legal issues in contemporary American and global societies by exploring basic constitutional principles and the levels at which legal conflicts may arise. Students will be introduced to basic principles and practices in the American legal system, including some elements that pertain to international activity, and will learn to recognize areas of potential legal conflict at all levels of the system—legislative, judicial, administrative and regulatory.

PS 601 Constitutional Law
PS 610 Legal Methods I
PS 655 Conflict Resolution

Plus one of the following:

PS 602 Civil Liberties and Rights
PS 603 International Law
PS 604 Human Rights and the Law
PS 605 Criminal Law
PS 608 The Legislative Process
PS 612 Contracts, Torts and the Practice of Law
PS 616 Urban Government
PS 617 Law, Science and Ethics
PS 625 Transnational Legal Structures
PS 626 Decision Making in the Political Process
PS 628 Change and Government
PS 633 The Political Process and the Aged
PS 635 Law and Public Health
PS 640 Law and Education
PS 645 Government and the Industrial Sector
PS 670 Selected Topics
PS 695 Independent Study
Total credits: 12

Psychology of Conflict Management Certificate

Adviser: Tara L'Heureux, Assistant Professor of Psychology, Ph.D., University of Connecticut

This certificate is designed for professionals who wish to develop skills in communication, negotiation and mediation. Students will learn theoretical models of conflict escalation and resolution in addition to receiving training in basic communication, negotiation and mediation skills. Skill development will enable students to resolve both personal and professional conflicts more effectively, as well as help build the tools necessary for those interested in becoming a mediator or organizational consultant specializing in conflict management.

P 643 The Psychology of Conflict Management I
P 646 The Psychology of Conflict Management II

Plus two of the following:

MG 667 Multicultural Issues in the Workplace
P 612 Consultation Seminar
P 623 Psychology of the Small Group
P 638 Psychology of Communication and Opinion Change
P 647 Industrial and Organizational Psychology in Global Settings
PS 655 Conflict Resolution
Total credits: 12

SCHOOL OF BUSINESS

Zeljan Schuster, Ph.D., Interim Dean
Parbudyal Singh, Ph.D., Assistant Dean

The primary mission of the School of Business of the University of New Haven is to provide quality, career-oriented education to students with varied economic and cultural backgrounds, experiences and academic preparation. We seek to accomplish this through comprehensive programs designed to accommodate a full-time undergraduate and a substantial part-time evening student body, and by engaging in teaching, research and consulting involving both the development and communication of knowledge. It is the vision of the school to be a regional leader in providing career-oriented, contemporary business education.

As the business environment becomes more complex, the School of Business provides contemporary educational experiences of high quality in order to prepare students who are ready to face the challenges of a dynamic, modern world and to meet their responsibilities within a global society. To meet this goal, career-oriented programs are provided, employing current knowledge and techniques presented in a manner appropriate to the diverse backgrounds and experiences of graduate students.

Through the Graduate School, the School of Business offers an M.B.A. program, an Executive M.B.A. program and master's degree programs in a number of other business fields. A master's in public administration (M.P.A.) as well as two dual degrees, M.B.A./M.P.A. and M.B.A./M.S. Industrial Engineering, are also available. Master of Science degrees are offered in health care administration, labor relations and management of sports industries. In addition, more than a dozen graduate certificates are available for students who seek a short graduate curriculum concentrated in a specific business area.

At the undergraduate level, the School of Business offers associate and bachelor's degree programs in the departments of accounting, communication, economics and finance, marketing and international business, and management.

Master of Business Administration (M.B.A.)

Coordinator: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University
Director M.B.A. and Accelerated Programs: Richard Laria, M.B.A., Adelphi University

The M.B.A. curriculum is designed to prepare managers for today's increasingly complex, global, and multidimensional work environment. It includes a strong focus on leadership, teamwork and integrative management activities. The program offers flexibility, providing choices within the advanced courses and a variety of functional concentrations with a broad selection of courses offered each trimester. In addition to this M.B.A. program, the University of New Haven offers two M.B.A. dual degree programs: one combined with the master's program in public administration (M.B.A./M.P.A.) and one combined with the master's program in industrial engineering (M.B.A./M.S.I.E.).

Students with a recent degree in business may be able to complete the program with as few as 33 graduate credits, while other students may require the maximum 51 credits. Because the UNH Graduate School operates on a trimester calendar with three full-length terms each year plus an abbreviated summer session, full-time students may complete their studies in 12 to 22 months.

Admission Policy

Candidates for admission to the M.B.A. program are required to hold a four-year baccalaureate degree (or equivalent) from an accredited institution. An undergraduate degree in business is not a requirement; qualified students from all backgrounds are encouraged to submit applications. An admission decision is based on a combination of a student's undergraduate and/or graduate academic performance, professional experience, letters of recommendation, and scores on the Graduate Management Admissions Test (GMAT). Students must have full acceptance to the MBA program before first registration..

Curriculum

The M.B.A. curriculum is focused primarily on advanced topics; however, students without previous studies in business will complete a maximum of 18 credits in introductory core courses before proceeding to the 33 credits of advanced courses and electives. The program stresses alternate approaches to studies in organizational communication, production, corporate valuation, and organizational change.

Students may choose from a wide variety of alternatives for their advanced elective courses. Concentrations are offered in nine different areas ranging from accounting to sports management.

Students will begin their studies with the six required Core Courses. Any of these six required Core Courses may be waived on the basis of the student's undergraduate coursework or previous graduate courses, if taken at a regionally accredited institution within the last seven years. Waiver guidelines for these six Core Courses are outlined on the next pages.

After satisfying the appropriate prerequisites, students proceed to the next level in the program: the seven Advanced Courses plus the four elective, or concentration, courses. No waivers are permitted for the 33

credits of Advanced Courses plus electives; however, transfer credit(s) toward advanced courses and/or electives may be granted for graduate courses with a grade of "B" (3.0) or better if taken within the last four years at a regionally accredited institution, subject to the transfer policies of the Graduate School. After admission, any graduate courses taken for transfer must have prior approval with a signed Coordinated Course Form.

Completion of the elective portion of the M.B.A. program may be accomplished by taking graduate courses offered through the various departments or programs of the university or by choosing a concentration in a specific area of study. Students should select courses that will enhance their career objectives. Concentrations allow students to develop specialized skills in a particular field and they are described in the pages immediately following this section. Students taking non-business elective courses must contact the M.B.A. program director for approval and seek academic advice from the graduate program coordinator of the non-business department.

In appropriate cases having special approval, a student may elect to write a thesis. Candidates for the M.B.A. electing to write a thesis must register for a minimum of six thesis credits in the appropriate business department and would substitute these six credits of Thesis I and II for two elective courses in the program. The thesis must show ability to organize material in a clear and original manner and must present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements.

Students who begin as in-process students taking graduate courses in the School of Business may enroll only in the Core Courses (A 620, EC 601, FI 601, MG 637, MK 609, QA 604) unless permission is granted by the coordinator of the M.B.A. program.

In order to become fully matriculated in the M.B.A. program, students who are admitted provisionally must complete, with satisfactory grades as specified in the letter of acceptance, the following courses before enrolling in elective courses: QA 604 and any three other required Core Courses for which the prerequisites have been met. (Refer to the course descriptions elsewhere in this catalog for course prerequisites.)

Required Courses

Core Courses (18 credits; waivable)
A 620 Financial Accounting for Managers
EC 601 Macroeconomics and Microeconomics
FI 601 Finance
MG 637 Management Process
MK 609 Marketing
QA 604 Probability and Statistics

Advanced Courses (21 credits; not waivable)[1]

a. Communicating a Vision[2] (choose one)
CO 621 Managerial Communication
MG 663 Leadership and Team Building

b. Product Creation (choose one)
MK 643 Product Management
QA 614 Decisions in Operations Management

c. Valuation and Control[3] (choose one)
A 621 Managerial Accounting
FI 602 Corporate Valuation and Business Strategy

d. Global Issues[4] (choose one)
EC 641 International Economics
IB 643 International Business

e. Managing Change (choose one)
MG 667 Multicultural Issues in the Workplace
P 642 Organizational Change and Development

f. Interaction with the External Environment
EC 629 Business and Society

g. Planning and Strategic Vision
MG 669 Strategic Management

Electives or Concentration (12 credits)

Total credits: 51

[1]*Any course may be counted for credit only once; therefore, if a given course is listed both as an Advanced Course and as a concentration course, it may be counted as an Advanced Course or as a concentration course, but not both.*

[2]*MG 663 is required for the Public Relations concentration.*

[3]*FI 602 is required for the Finance concentration.*

[4]*IB 643 is required for the International Business concentration.*

Waiver Policy

Any of the six required Core Courses may be waived on the basis of appropriate undergraduate or graduate courses taken within the last seven years at a regionally accredited institution. Waivers will be considered at the time of admission; waivers based on a "B" (3.0) or better in the appropriate courses will be considered and granted. Students who seek additional waivers must submit a **written request** (with a course syllabus, preferably, or course description of the previously completed coursework) to the M.B.A. coordinator during the first semester of attendance. Normally, waivers are decided within the first semester of study. **Only courses with grades of "B" or better may be used in meeting waiver guidelines for the required courses. Only required Core Courses may be waived.**

A course that has been waived may not be taken for or used for elective credits. No tuition refund or cancellation will be issued for courses taken and subsequently waived.

Waiver Guidelines

The minimum course requirements, all taken within the last seven years, for waivers are:

A 620: One upper division course in financial accounting.

EC 601: One course in macroeconomics and one course in microeconomics.

FI 601: One upper division course in corporate finance.

MG 637: One upper division course in management or organizational behavior.

MK 609: One upper division course in marketing.

QA 604: Two courses in statistics, or one course in statistics and one course in quantitative business analysis.

Concentrations

Within the M.B.A. program students may use the elective credits to concentrate their studies in a specific area. It is recommended, but not required, that concentrations be indicated on the application for admission to the M.B.A. program, or as soon as possible thereafter.

The M.B.A. concentrations and their course requirements are presented on the following pages. Concentrations consist of 12 credits. In certain special circumstances, students may be allowed to substitute other appropriate courses for those listed as part of the concentration. **Any course substitution for a listed concentration course must be approved in writing by the student's concentration adviser prior to enrollment in the course.**

The courses listed for some concentrations include courses that also appear in the Advanced Courses. **Students enrolled in a concentration who take any course(s) that are listed for that concentration to satisfy Advanced Course requirements may not count the same course credits toward the concentration credit requirement. Instead, the student will take other courses listed in the concentration to satisfy the required concentration credits.**

The concentrations in finance, international business and public relations have special requirements which affect the required portion of the curriculum. Students should consult the concentration descriptions and contact the appropriate adviser for additional information.

Concentration in Accounting

Concentration Adviser: Robert E. Wnek, Professor of Tax Law, Accounting and Business Law, L.L.M., Boston University School of Law; CPA

The concentration in the accounting program is recommended to those M.B.A. students who desire an accounting specialization.

A 630 Topics in Corporate Financial Reporting*
Plus any three accounting or taxation electives
Total credits: 12

**Students having had two intermediate accounting undergraduate courses will substitute an accounting taxation elective for A 630.*

See the Table of Contents for the graduate certificate in accounting.

Concentration in Business Policy and Strategy

Concentration Adviser: Abbas Nadim, Professor of Management, Ph.D., University of Pennsylvania

The concentration in business policy and strategy is designed to prepare managers to deal with the increasing emphasis given by companies to the development and implementation of innovative global business strategies. The program focuses on strategic concepts and processes and relates them to general management and functional supervision. A grounding in formulation of business policy and strategy for both internal growth and growth by mergers and acquisitions is provided.

MG 650 Entrepreneurship
MG 655 Corporate Governance and Business Strategy

Plus two of the following:

FI 630 Corporate Financial Analysis and Applications
IB 652 Multinational Business Management
MG 663 Leadership and Team Building (*if not taken as Advanced Course*)
MG 664 Organizational Effectiveness
MG 670 Selected Topics *(with permission of concentration adviser)*
Total credits: 12

Concentration in Finance

Concentration Adviser: Steven J. Shapiro, Associate Professor of Economics and Finance, Ph.D., Georgetown University

The goal of the finance concentration is to provide individuals with advanced material in the areas of financial services and corporate finance. The courses stress the understanding and application of the conceptual foundations of finance and analytic finance techniques. Students interested in a career in finance should consult with the finance adviser as soon as possible.

Within the required M.B.A. Advanced Courses, finance concentration students take FI 602 Corporate Valuation and Business Strategy in the Valuation and Control area.

Any four of the following:

FI 610 Capital Market Theory
FI 611 Equity Market Valuation and Analysis
FI 612 Applied Portfolio Management
FI 613 Derivative Market Analysis and Trading Techniques
FI 620 Capital Markets and the Valuation of Fixed Income Securities
FI 630 Corporate Financial Analysis and Applications
FI 631 Management of Financial Services
FI 632 International Financial Management
FI 670 Selected Topics
Total credits: 12

Students interested in preparing for/enhancing a career in finance or in obtaining professional financial certification (CFA, CFM, CFP) should contact the finance adviser at the beginning of their graduate studies to discuss appropriate alternatives.

Concentration in Health Care Management

Concentration Adviser: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

The concentration in health care management is designed for those individuals currently in or those who anticipate a career in health care management. Courses are designed to provide students with the conceptual and practical skills necessary for management of a health care organization.

PA 651 Health Care Ethics

Plus one of the following:

MG 630 Management Information Systems in Health Care
PA 642 Health Care Delivery Systems
PA 647 Alternative Health Care Delivery Systems
PA 652 Introduction to Managed Care

Plus two of the following:

MG 630 Management Information Systems in Health Care
PA 641 Financial Management of Health Care Organizations
PA 653 Cost Containment in Health Care
PA 657 Health Care Reimbursements
PA 659 Human Resource Planning in Health Care
PA 664 Survey of Medical Group Management
PA 670/671 Selected Topics*
PS 635 Law and Public Health
Total credits: 12

**PA 670/671 Selected Topics may be taken more than once.*

See Table of Contents for the M.S. in Health Care Administration and the certificate in health care management.

Concentration in Human Resources Management

Concentration Adviser: Robert Metchick, Assistant Professor of Management, Ph.D., Rensselaer Polytechnic Institute

This concentration is designed for the human resource professional or the individual in another field who aspires to work in human resources. It provides an overview of the field and an opportunity to study various subfunctions (such as training, labor relations or compensation) in greater depth.

MG 645 Management of Human Resources

Plus three of the following:

EC 627 Economics of Labor Relations
EC 679 Industrial Relations Seminar
EC 687 Collective Bargaining
MG 663 Leadership and Team Building (*if not taken as Advanced Course*)
MG 664 Organizational Effectiveness
MG 665 Compensation Administration
MG 667 Multicultural Issues in the Workplace
MG 678 Personnel Management Seminar
P 628 The Interview
P 641 Personnel Development and Training
Total credits: 12

For information on other program choices related to this field, see the Table of Contents under Human Resources, Industrial/Organizational Psychology and Labor Relations.

Concentration in International Business

Concentration Adviser: Ben B. Judd, Professor of Marketing, Ph.D., University of Texas at Arlington

This concentration is designed to prepare managers to deal with the latest methods of analysis related to international business. These include the basic techniques and skills, such as adapting to new political and cultural environments, which are not normally covered by traditional courses. It is strongly recommended that students contact the international business adviser as early as possible to program the appropriate sequence of courses. Students in this concentration are required to take IB 643 International Business in the Global Issues area of the M.B.A. Advanced Courses.

Any four of the following:

EC 641 International Economics, *or*
FI 632 International Financial Management
IB 645 Comparative International Business Environments
IB 650 International Business Negotiating
IB 651 International Marketing
IB 652 Multinational Business Management
IB 660 East and Southeast Asian Business Systems
IB 670 Selected Topics
IB 693 Internship
Total credits: 12

See the Table of Contents for the certificate in international business.

Concentration in Marketing

Concentration Adviser: Ben B. Judd, Professor of Marketing, Ph.D., University of Texas at Arlington

The concentration in marketing allows the student to develop analytic skills and a deeper understanding of marketing phenomena. Specific emphasis is given to the development of content knowledge and skills necessary for operating managers of the marketing function.

MK 639 Marketing Research and Information Systems
MK 641 Marketing Management

Plus two of the following:

IB 651 International Marketing
MK 616 Buyer Behavior
MK 632 Nonprofit and Services Marketing
MK 638 Competitive Marketing Strategy
MK 643 Product Management
(if not taken as Advanced Course)
MK 645 Distribution Strategy
MK 670 Selected Topics
MK 693 Internship
Total credits: 12

See the Table of Contents for the certificate in marketing.

Concentration in Public Relations

Concentration Adviser: Jerry L. Allen, Professor of Communication, Ph.D., Southern Illinois University at Carbondale

The concentration in public relations is designed to orient managers to and prepare public relations practitioners for the many demands placed on public and private corporations and state and local governments.

The program focuses on theory, media relations and contemporary issues affecting business and the public.

CO 621 Managerial Communication
CO 631 Public Information Dynamics
CO 632 Contemporary Public Relations Issues

Plus one of the following:

MG 680 Current Topics in Business Administration
MK 639 Marketing Research and Information Systems
P 638 Psychology of Communication and Opinion Change
Total credits: 12

Concentration in Sports Management

Concentration Adviser: Gil B. Fried, Associate Professor of Sports Management, J.D., Ohio State University

As sports has grown as an industry, the need has increased for sports managers with specialized business skills and training. This concentration is designed for students who would like to pursue careers in the sports industry as well as for those who already work in this industry who are seeking career advancement.

MG 610 The Sports Industry

Plus three of the following:

CO 632 Contemporary Public Relations Issues
EC 687 Collective Bargaining
MG 611 Sport Industry Marketing, Promotion and Public Relations
MG 612 Sports Law
MG 613 Sports Facility Management
MG 694 Internship
PS 612 Contracts, Torts and the Practice of Law
Total credits: 12

See the Table of Contents for the M.S. in Management of Sports Industries and the certificate in management of sports industries.

Executive Master of Business Administration (Executive M.B.A)

Interim Director: Leon Anziano, M.S. Cornell University Executive Management Program, University of Michigan

The Executive Master of Business Administration is a fully accredited, graduate-level degree program designed for middle- and upper-level professionals who have acquired meaningful managerial responsibility. Applicants are required to hold a baccalaureate degree from an accredited institution. The Executive M.B.A. program provides the opportunity to earn an M.B.A. degree, the quality standard in business education, without interruption to a demanding career. The M.B.A. degree is conferred on completion of a two-year graduate program.

The Executive M.B.A. program is uniquely scheduled so that working professionals can participate with maximum convenience for themselves, their families and their companies. Each class progresses through the program as a group, thus providing an opportunity for a continuing exchange of ideas and information. Individual participation is emphasized through class discussions, interaction and cooperation with other professionals in the class. The program fosters a direct connection between what is learned in class and what is applied in business. Classes meet one afternoon per week for six hours. The university also offers a Saturday class beginning every two years. The Executive M.B.A. program makes the experience convenient, enjoyable and personalized.

Generally, no transfer credit is accepted for admission to the Executive M.B.A. program. Admission to the Executive M.B.A. program is by a special application available from the Director. No GMAT is required.

Prospective candidates are encouraged to apply as early as possible. New classes begin in September and February of each year. The admission procedure includes a screening interview with the Director and review of the applicant's credentials by the Faculty Selection Committee. Each candidate is considered on the basis of the special application form, official transcripts from all undergraduate and graduate schools attended, two business-related letters of recommendation and a letter of organizational support.

The Executive M.B.A. program invites both individual and employer-sponsored applications. Information and applications for the Executive M.B.A. program are available from the Office of the Executive M.B.A. Director, Room 200, Echlin Hall, (203) 932-7386, or fax (203) 932-7261, or E-mail: *lcarlone@charger.newhaven.edu.*

Executive M.B.A.

The program consists of 18 modules, scheduled into two academic calendar years, plus either a master's-level research paper or a domestic or international seminar. Classes meet from 2:30 to 8:30 p.m. one weekday each week in designated conference facilities. Each module is five sessions in length and has the value of 3 credits, with the

exception of the two full days for the 2-credit Communication Process module. Participants must be prepared to attend all classes except for emergencies. Students must also be prepared to devote significant additional time for class preparation and reading assignments.

Modules

First Year
EXID 903 The Communication Process (2 credits)
EXID 915 Quantitative Decision Making
EXID 918 Managerial Economics
EXID 912 Financial Accounting
EXID 921 Executive Management and Leadership
EXID 924 Financial Management I
EXID 927 Financial Management II
EXID 942 Managerial Accounting
EXID 930 Marketing Practice
EXID 998 Marketplace–Business Simulation
EXID 954 Organizational Development

Second Year
EXID 951 Marketing Management
EXID 933 Managing the Global Marketplace
EXID 939 Operations Management
EXID 960 Information Management
EXID 948 Business Law
EXID 909 Business and Government Relations
EXID 999 Special Research Topics, *or*
EXID 997 The Washington Campus—How Washington Works/International Seminar
EXID 957 Corporate Policy and Strategy
Total credits: 56

Public Administration

Coordinator: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

The general purpose of the master of public administration degree is the training of men and women at the graduate level for public service careers. Specifically, the program strives to:

- equip students with modern analytic and quantitative tools of decision making and their application to complex problems of government and nonprofit organizations;
- expose students to the wide range of administrative and managerial problems and responsibilities in the public sector; and
- increase the student's knowledge and skills in the particular management functions of budgeting, planning, public policy formulation, public finance, public personnel administration and collective bargaining.
- Beginning in 2003, The School of Business, Department of Public Management will host a chapter of the Public Administration Honorary Society (Pi Alpha Alpha). The National Association of Schools of Public Affairs and Administration awarded the chapter to the University after a rigorous examination of the quality of UNH's Public Administration Program.

M.P.A.

The program consists of 42 graduate credit hours which are required of candidates for this degree.

Required Courses

EC 601 Macroeconomics and Microeconomics
PA 601 Principles of Public Administration
PA 602 Public Policy Formulation and Implementation
PA 604 Communities and Social Change
PA 611 Research Methods in Public Administration
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 625 Administrative Behavior
PA 632 Public Finance and Budgeting
PA 690 Research Seminar
Electives or Concentration (five courses)
Total credits: 42

Concentration in City Management

The courses selected for this concentration will enable local government practitioners to develop and make better use of their personnel and budgetary resources. This ability is especially important today, as the federal government is reducing its fiscal support to local governments.

Students choosing the concentration in city management will take the required core curriculum of nine courses and follow the city management concentration in lieu of their five elective courses.

PA 630 Fiscal Management for Local Government
PA 661 Problems of Metropolitan Areas
PS 616 Urban Government

Plus two of the following:

E 659 Writing and Speaking for Professionals
EC 665 Urban and Regional Economic Development
P 610 Program Evaluation
PA 670 Selected Topics
SO 610 Urban Sociology
Total credits: 15

Concentration in Community-Clinical Services

This concentration is designed to prepare students for administrative careers in clinical, mental health and related human service settings. The administration of programs within the contexts of social and community environments is stressed. Students will learn how to deliver services effectively within this turbulent environment.

Students choosing the community-clinical services concentration take the core curriculum of nine courses and the four courses in the concentration plus one additional elective course.

P 605 Survey of Community Psychology
P 629 Introduction to Psychotherapy and Counseling
P 632 Group Treatment and Family Therapy

Plus one of the following:

MG 640 Management of Health Care Organizations
MG 663 Leadership and Team Building
MG 664 Organizational Effectiveness
Total credits: 12

Concentration in Health Care Management

This concentration is designed for those individuals currently in health care management or those who anticipate a career in health care management. Courses provide students with the conceptual and practical skills necessary for the management of a health care organization.

Students choosing the health care concentration will take the core curriculum of nine courses and follow the health care concentration in lieu of their five elective courses.

MG 640 Management of Health Care Organizations
PA 641 Financial Management of Health Care Organizations
PS 635 Law and Public Health

Plus two of the following:

E 659 Writing and Speaking for Professionals
MG 630 Management Information Systems in Health Care
PA 642 Health Care Delivery Systems
PA 643 Health and Institutional Planning
PA 644 Administration of Programs and Services for the Aged
PA 645 Health Care Economics and Finance
PA 646 Organization and Management of Long-Term Care Facilities
PA 647 Alternative Health Care Delivery Systems
PA 648 Contemporary Issues in Health Care
PA 649 History and Development of Health Care Institutions

PA 651 Health Care Ethics
PA 652 Introduction to Managed Care
PA 653 Cost Containment in Health Care
PA 657 Health Care Reimbursements
PA 659 Human Resource Planning in Health Care
PA 664 Survey of Medical Group Management
PA 670 Selected Topics
Total credits: 15

See the Table of Contents for the M.S. degree in Health Care Administration, the M.B.A. concentration in this field and the certificates in health care management and long-term health care.

Concentration in Long-Term Health Care

This program is approved by the Department of Health Services, State of Connecticut, as a course of study in long-term health care. Students who complete these concentration courses are eligible to take the state licensing examination for long-term care administration, preparing individuals for participation in this area of expanding opportunities for health care practitioners.

In the following sequence, PA 646 must be taken before or concurrently with PA 681 or PA 683; PA 682 must be taken after PA 681 and PA 646. No waivers, substitutions or transfer credits will be permitted in this concentration.

There are two possible options for the Concentration in Long-Term Care. The options are shown below. Please contact the Program Coordinator prior to selecting an option as the State of Connecticut has different requirements for each option.

PA 641 Financial Management of Health Care Organizations
PA 646 Organization and Management of Long-Term Care Facilities
PA 681 Long-Term Health Care Internship I (450 Hours)
PA 682 Long-Term Health Care Internship II (450 Hours)
One Health Care Elective

Total Concentration credits: 15
Total Program credits: 42

Concentration in Personnel and Labor Relations

The concentration in personnel and labor relations is designed to meet the need for better trained personnel and labor relations specialists in the public sector. The public sector has experienced a growth in union membership, but has not had a corresponding growth in the capability to deal with public sector/union relationships. In addition, the courses in this concentration will provide training for public administrators in areas such as employee motivation, organizational change and group dynamics.

Students choosing this concentration will take the required core curriculum of nine courses and follow the personnel and labor relations concentration in lieu of their five elective courses.

MG 645 Management of Human Resources, *or* SH 602 Safety Organization and Administration

*Plus two of the following:**

EC 625 Industrial Relations
EC 627 Economics of Labor Relations
EC 687 Collective Bargaining

*Plus two of the following:***

CO 621 Managerial Communication
E 659 Writing and Speaking for Professionals
MG 664 Organizational Effectiveness
P 620 Industrial Psychology
P 628 The Interview
P 632 Group Treatment and Family Therapy
P 640 Industrial Motivation and Morale
P 642 Organizational Change and Development
P 643 The Psychology of Conflict Management I
P 646 The Psychology of Conflict Management II
Total credits: 15

**Prerequisite for this group: EC 601 Macroeconomics and Microeconomics, or permission of the M.P.A. coordinator.*
***Prerequisite for this group: PA 625 Administrative Behavior, or permission of the M.P.A. coordinator.*

Public Administration Dual Degree Program (M.B.A./M.P.A.)

Coordinator: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

The M.B.A./M.P.A. dual degree program is designed for those students whose interests or career objectives are focused at both the public and private sectors of the economy. The program broadly stresses the use of management skills and analytic techniques applied to business, industrial, governmental and not-for-profit organizations.

Applicants to the dual degree program are required to meet the requirements outlined in the admissions policy sections of each of the relevant degree programs, including submission of scores from the Graduate Management Admissions Test (GMAT) as specified in the M.B.A. program description.

M.B.A./M.P.A. Dual Degree

The M.B.A./M.P.A. program consists of 75 credit hours. Up to 15 of these credit hours may be waived on the basis of undergraduate coursework, leaving a minimum requirement of 60 credit hours. All waivers must be approved in writing by the appropriate department and are conditional upon subsequent academic performance.

Graduate credit may be transferred from other accredited institutions subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. In all cases, the residency requirement for the two degrees shall be 60 credit hours completed at the University of New Haven. Within these 60 credit hours, a minimum of 21 credit hours must be earned in business courses and a minimum of 21 credit hours must be earned in public administration courses.

Project/Thesis Requirement

Students must choose one of two alternatives for completion of the final six credits of coursework in the M.B.A./M.P.A. dual degree curriculum. Most students will take the two capstone/research project courses PA 690 Research Seminar and MG 669 Strategic Management. Alternatively, students may elect to take the two-course, six-credit thesis option (Thesis I and II). If the thesis option is selected, the thesis must show ability to organize material in a clear and original manner and present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements.

Required Courses

Business Core Courses (waivable)*
A 620 Financial Accounting for Managers
EC 601 Macroeconomics and Microeconomics
FI 601 Finance
MG 637 Management Process
MK 609 Marketing
QA 604 Probability and Statistics

Advanced Business Courses (not waivable)
CO 621 Managerial Communication, *or*
MG 663 Leadership and Team Building
MK 643 Product Management, *or*
QA 614 Decisions in Operations Management
A 621 Managerial Accounting, *or*
FI 602 Corporate Valuation and Business Strategy
EC 641 International Economics, *or*
IB 643 International Business
MG 667 Multicultural Issues in the Workplace, *or*
P 642 Organizational Change and Development
EC 629 Business and Society
MG 669 Strategic Management
Business Electives (two courses)

Public Administration Courses
PA 601 Principles of Public Administration
PA 602 Public Policy Formulation and Implementation
PA 604 Communities and Social Change
PA 611 Research Methods in Public Administration
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 625 Administrative Behavior
PA 632 Public Finance and Budgeting
PA 690 Research Seminar
Public Administration Electives (two courses)
Total credits: 75

**Up to five of the six Business Core Courses (not more than 15 credits) may be waived by students who meet the waiver guidelines established for these courses within the M.B.A. program; see M.B.A. program for information.*

Health Care Administration

Coordinator: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

This program of study, leading to the master of science degree, is designed to give students the best possible preparation for careers in health care administration. The health care field is unique in that it functions in a highly regulated, yet highly competitive environment. The core courses in this degree program provide students with an appreciation of the past, present and future of health care administration. The concentrations allow students to specialize in long-term care, human resource management in health care, medical group management, health care marketing, health policy and finance or managed care.

In addition to earning the advanced academic degree, students who complete the concentration in long-term care become eligible to take the State of Connecticut exam for certification as a long-term care administrator.

M.S., Health Care Administration

A total of 42 graduate credit hours is required for completion of the master of science in health care administration. The program consists of nine required courses plus five additional courses which may be taken as unrestricted electives or may be used to complete one of the six concentrations in the master's program.

Students entering this program who lack adequate preparation in quantitative techniques may be required to undertake additional study in order to satisfy a prerequisite requirement. Adequate preparation is defined as satisfactory completion of three credit hours of introductory statistics.

Required Courses

MG 630 Management Information Systems in Health Care
MG 640 Management of Health Care Organizations*
PA 611 Research Methods
PA 625 Administrative Behavior, *or*
P 619 Organizational Behavior
PA 641 Financial Management of Health Care Organizations
PA 649 History and Development of Health Care Institutions
PA 651 Health Care Ethics
PA 690 Research Seminar
PS 635 Law and Public Health
Electives or Concentration (5 courses)
Total credits: 42

**M.S. Health Care students may use MG 640 in lieu of MG 637 to satisfy listed prerequisites for graduate courses.*

Concentration in Health Care Marketing

CO 623 Communication in Health Care
CO 631 Public Information Dynamics
CO 632 Contemporary Public Relations Issues
MK 609 Marketing, *or*
MK 641 Marketing Management
MK 638 Competitive Marketing Strategy
Total credits: 15

Concentration in Health Policy and Finance

PA 602 Public Policy Formulation and Implementation
PA 645 Health Care Economics and Finance
PA 653 Cost Containment in Health Care

Plus two of the following:

A 620 Financial Accounting for Managers
PA 648 Contemporary Issues in Health Care
PA 652 Introduction to Managed Care
PA 657 Health Care Reimbursements
PS 626 Decision Making in the Political Process
Total credits: 15

Concentration in Human Resource Management in Health Care

MG 645 Management of Human Resources

Plus four of the following:

CO 623 Communication in Health Care
EC 625 Industrial Relations
P 641 Personnel Development and Training
P 642 Organizational Change and Development
PA 659 Human Resource Planning in Health Care
Total credits: 15

Concentration in Long-Term Care

There are two possible options for the Concentration in Long-Term Care. The options are shown below. Please contact the Program Coordinator prior to selecting an option as the State of Connecticut has different requirements for each option.

PA 646 Organization and Management of Long-Term Care Facilities
PA 681 Long-Term Health Care Internship I (450 Hours)
PA 682 Long-Term Health Care Internship II (450 Hours)

Plus two of the following:

P 625 Life Span Development Psychology
PA 644 Administration of Programs and Services for the Aged
PS 633 The Political Process and the Aged
SH 602 Safety Organization and Administration
SO 651 Social Gerontology

Total Concentration credits: 15
Total Program Credits: 42

Concentration in Managed Care

PA 647 Alternative Health Care Delivery Systems
PA 652 Introduction to Managed Care
PA 653 Cost Containment in Health Care

Plus two of the following:

CO 623 Communication in Health Care
CO 632 Contemporary Public Relations Issues
MK 609 Marketing
MK 638 Competitive Marketing Strategy
Total credits: 15

Concentration in Medical Group Management

PA 652 Introduction to Managed Care
PA 657 Health Care Reimbursements
PA 664 Survey of Medical Group Management

Plus two of the following:

A 620 Financial Accounting for Managers
MG 645 Management of Human Resources
MG 665 Compensation Administration
PA 653 Cost Containment in Health Care
Total credits: 15

In addition to the master of science program, health care concentrations are available in both the M.B.A. and M.P.A. programs along with graduate certificates in the health care field. See Table of Contents to locate these other related programs.

Labor Relations

Coordinator: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

Environmental forces over the past decades have created a demand for greater sophistication and professionalism from those responsible for personnel functions within all organizations whether public or private, profit or nonprofit, unionized or not. More and more companies and institutions are requiring the services of people conversant with both the large body of available tools and the constraints that have evolved during this period. The program leading to the master of science degree in labor relations represents a flexible response to this demand.

Labor relations, as a management and behavioral science discipline, is concerned with all aspects of the employment relationship and, in particular, with the organization's maintenance of the human resources necessary to achieve organizational objectives. As an academic discipline and profession, labor relations is an interdisciplinary, problem-solving field that attempts to maintain harmony and resolve conflicts among the four major parties to the employment relationship—employees, employers, government and, where applicable, unions.

The M.S. in labor relations program is aimed at people presently employed in or aspiring to positions in various kinds of organizations in the fields of employment, training and development, wage and salary administration, employee services and benefits, labor-management relations, job and organizational design, labor economics and manpower planning.

Admission Policy

Candidates for admission are required to hold a baccalaureate degree from an accredited institution of higher education. While not an absolute necessity, the undergraduate degree should preferably be in business administration, public administration or in a social or behavioral science (e.g., economics, history, political science, psychology or sociology). Application for admission is also open to full-time employed professionals in personnel and labor relations holding a baccalaureate degree in any field from an accredited institution.

Though admissions decisions are usually based on an applicant's undergraduate record, in some cases the applicant may be required to submit scores from the Graduate Management Admission Test (GMAT).

M.S., Labor Relations

A total of 30 graduate credit hours is required for completion of the master of science degree in labor relations. Of these, 21 credits (seven courses) are required courses and 9 credits (three courses) are approved concentration/elective courses. Two concentrations are offered: a Private Sector Track and a Public Sector Track. There is no thesis option.

Required Courses

EC 625 Industrial Relations
EC 627 Economics of Labor Relations
EC 687 Collective Bargaining
MG 637 Management Process
P 642 Organizational Change and Development
PA 611 Research Methods in Public Administration
PA 690 Research Seminar
Approved electives or concentration (three courses)
Total credits: 30

Private Sector Track

Three of the following courses:
CO 621 Managerial Communication
E 659 Writing and Speaking for Professionals
EC 679 Industrial Relations Seminar
MG 645 Management of Human Resources
MG 664 Organizational Effectiveness
MG 667 Multicultural Issues in the Workplace

Public Sector Track

Three of the following courses:
CO 621 Managerial Communication
E 659 Writing and Speaking for Professionals
MG 667 Multicultural Issues in the Workplace
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 625 Administrative Behavior
PA 659 Human Resource Planning in Health Care
SH 602 Safety Organization and Administration

Management of Sports Industries

Coordinator: Gil B. Fried, Associate Professor, Sports Management, J.D., Ohio State University

The main objective of the master's degree program in management of sports industries is to provide the general knowledge and skills necessary for careers in the business of sports. This master's program is the first of its kind offered in the Connecticut and one of only about five such programs offered by schools of business across the nation. Other graduate programs exist in non-business areas, but our focus is to prepare students for careers in a wide variety of sport-related businesses and/or facility management. Such career choices might include:

- collegiate athletic administration
- sports marketing
- sport finance
- personnel management
- recreation management
- major and minor league sports
- facility management, including
  - space allocation and event booking
  - construction and renovation
  - facility maintenance and safety
  - sales and box office management

Admission Policy

Candidates for admission to the Management of Sports Industries program are required to hold a four-year baccalaureate degree (or equivalent) from an accredited institution. An undergraduate degree in business is not a requirement; qualified students from all backgrounds are encouraged to submit applications. An admission decision is based on a combination of a student's undergraduate and/or graduate academic performance, professional experience, letters of recommendation, and scores on the Graduate Management Admissions Test (GMAT). An interview may be arranged at the request of the applicant.

If the required GMAT score is not submitted before the desired start date, a student may be accepted provisionally (based on prior academic and professional performance) for a maximum of one term. Students accepted provisionally will receive a letter stipulating the terms of their acceptance, including the required GMAT score. Receipt of the GMAT score is required for full acceptance and continuation in the program. GMAT may be waived for students who have a graduate degree from an accredited instution. For detailed information, please contact the Director of the Management of Sports Industries Programs.

M.S., Management of Sports Industries

A total of 36 credit hours is required for completion of the master of science degree in management of sports industries. The program consists of four business core courses, four sports/facility management core courses, and four sports management elective courses or four facility management concentration courses.

Business Core (12 credits)

The following required foundation business courses may be waived based on appropriate graduate or undergraduate courses

completed with a grade of "B" or better at an accredited institution. (See waiver criteria under M.B.A. program.) If all four business courses are waived, students are required to take two additional elective courses to meet the minimum 30-credit residency requirement for the awarding of the master's degree.

A 620 Financial Accounting for Managers
EC 601 Macroeconomics and Microeconomics
MG 637 Management Process
MK 609 Marketing

Sports/Facility Management Core (12 credits)
MG 611 Sport Industry Marketing, Promotion and Public Relations
MG 612 Sports Law
MG 617 Applied Fiscal Management for Sports and Facility Managers
MG 645 Management of Human Resources
Electives or Concentration (12 credits)
Total credits: 36

Electives

Within the elective sector of the program, students must enroll in a required internship (MG 694) designed to provide appropriate work experience in a sports/sport-related industry. Students are required to produce a comprehensive, analytic report documenting the internship experience. In special cases requiring written approval of the program coordinator, students who already have extensive field/work experience may replace the internship with an appropriate, approved research project (MG 690).

Any of the following (totaling 12 credits)
E 659 Writing and Speaking for Professionals
IE 661 Facility Infrastructure
MG 610 The Sports Industry
MG 613 Sports Facility Management
MG 618 College Sports Administration
MG 694 Internship (3-6 credits)
SH 602 Safety Organization and Administration
HT 920 Strategies for Event Planning
Total credits: 12

Concentration in Facility Management (12 credits)

For students who choose to complete the master's program with a concentration in facility management, the program includes the four business core courses, the four sports/facility management core courses and four of the concentration courses listed below, including MG 613 and a required internship (MG 694) designed to provide appropriate work experience in facility management. Students are required to produce a comprehensive, analytic report documenting the internship experience. In special cases requiring written approval of the program coordinator, students who already have extensive field/work experience may replace the internship with an appropriate, approved research project (MG 690).

MG 613 Sports Facility Management
MG 694 Internship (3-6 credits)

Plus two of the following:

E 659 Writing and Speaking for Professionals
IE 661 Facility Infrastructure
MG 610 The Sports Industry
MG 618 College Sports Administration
SH 602 Safety Organization and Administration
HT 920 Strategies for Event Planning
Total credits: 12

See the Table of Contents for the M.B.A. concentration in management of sports industries and the certificate in management of sports industries.

Graduate Certificates

The School of Business offers the following graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Persons who may not yet be ready to commit themselves to a full-

length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate must complete the Graduate School application form, submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Table of Contents for the Academic Policies section of the catalog for a complete description of the options, regulations and requirements for study and completion of a Graduate Certificate.

Accounting Certificate

Adviser: Robert E. Wnek, Professor of Tax Law, Accounting and Business Law, L.L.M., Boston University School of Law; CPA

A certificate in accounting is recommended to students and professionals whose education already includes an accounting degree and who wish to pursue accounting at an advanced level without necessarily enrolling in the full graduate program. An accounting certificate is especially recommended to certified public accountants who wish to obtain continuing professional education credits in an academic environment.

Any four of the following:

A 616 Taxation for Management
A 630 Topics in Corporate Financial Reporting
A 641 Accounting Information Systems
A 642 Operational Auditing
A 650 Advanced Accounting Theory*
A 652 Auditing and Assurance Services Seminar
A 654 Financial Statements: Reporting and Analysis
A 661 Managerial Accounting Seminar
Total credits: 12

**Prerequisite is A630 or two undergraduate intermediate accounting courses.*

Other courses may be substituted with consent of the adviser.

Business Management Certificate

Adviser: Abbas Nadim, Professor of Management, Ph.D., University of Pennsylvania

This certificate is designed to develop students' conceptual knowledge and skills in formulating corporate strategy and in determining structural and resource requirements. The courses focus on concepts and processes useful in relation to general management and on functional responsibilities in coordinating and directing the organizational effort in our ever-changing economic environment. Prerequisites are also required for some of the courses in the certificate; consult course descriptions elsewhere in this catalog.*

MG 637 Management Process

Plus three of the following:

MG 645 Management of Human Resources
MG 655 Corporate Governance and Business Strategy
MG 664 Organizational Effectiveness
MG 670 Selected Topics
(with permission of the certificate adviser)
Total credits: 12

Other management courses may be permitted as substitutions with approval of the adviser.

**M.P.A. students should complete 12 credits of the core curriculum in the M.P.A. program, including PA 601 and PA 625, as the prerequisite for this certificate.*

Finance Certificate

Adviser: Steven J. Shapiro, Associate Professor of Economics and Finance, Ph.D., Georgetown University

The goal of the finance certificate is to prepare individuals for careers in the financial services sector as well as modern corpo-

rate financial management. Certificate study stresses the understanding of the conceptual foundations of finance and the use of analytic techniques. Certificate candidates **are required** to meet the prerequisites for FI 601.

Students should contact the finance adviser as soon as possible to plan course selection.

FI 601 Finance
FI 602 Corporate Valuation and Business Strategy
Plus two finance electives
Total credits: 12

Health Care Management Certificate

Adviser: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

This certificate will be useful for professionals and decision makers employed in the public, private or nonprofit sectors of the health care field. Coursework will provide students with background and skills to enhance personal and professional development as well as the opportunity for organizational advancement.

MG 640 Management of Health Care Organizations
PA 641 Financial Management of Health Care Organizations
PA 643 Health and Institutional Planning

Plus one of the following:

MG 630 Management Information Systems in Health Care
PA 642 Health Care Delivery Systems
PA 644 Administration of Programs and Services for the Aged
PA 645 Health Care Economics and Finance
PA 646 Organization and Management of Long-Term Care Facilities
PA 647 Alternative Health Care Delivery Systems
PA 648 Contemporary Issues in Health Care
PA 649 History and Development of Health Care Institutions
PA 651 Health Care Ethics
PA 652 Introduction to Managed Care
PA 653 Cost Containment in Health Care
PA 657 Health Care Reimbursements
PA 659 Human Resource Planning in Health Care
PA 662 Recruitment and Retention of Health Care Professionals
PA 664 Survey of Medical Group Management
PA 670 Selected Topics
PS 635 Law and Public Health
Total credits: 12

The certificate in long-term health care, leading to eligibility for the State of Connecticut licensing examination in long-term care administration, is described on the opposite of this page.

Human Resources Management Certificate

Adviser: Robert Metchick, Assistant Professor of Management, Ph.D., Rensselaer Polytechnic Institute

This certificate is designed for the human resources professional or the individual in an allied field who aspires to increase his/her proficiency in human resources management. The Human Resources Management Certificate program provides an overview of the field and an opportunity to study various subfunctions (such as training, compensation and benefits, or industrial relations) in greater depth.

MG 645 Management of Human Resources

Plus three of the following electives:

EC 625 Industrial Relations
EC 679 Industrial Relations Seminar
EC 687 Collective Bargaining
MG 637 Management Process
MG 663 Leadership and Team Building
MG 664 Organizational Effectiveness
MG 665 Compensation Administration
MG 667 Multicultural Issues in the Workplace
MG 678 Personnel Management Seminar
P 619 Organizational Behavior

P 628 The Interview
P 641 Personnel Development and Training
P 642 Organizational Change and Development
P 643 The Psychology of Conflict Management I
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
SH 602 Safety Organization and Administration
Total credits: 12

Selection of electives must have the approval of the program adviser.

International Business Certificate

Adviser: Ben B. Judd, Professor of Marketing, Ph.D., University of Texas at Arlington

This certificate is designed to prepare managers to deal with the current problems and methods of analysis related to international business. This includes basic techniques and skills, such as adapting to new political and cultural environments, which are not normally covered by traditional courses.

IB 643 International Business

Plus three of the following:

EC 641 International Economics, *or* FI 632 International Financial Management
IB 645 Comparative International Business Environments
IB 650 International Business Negotiating
IB 651 International Marketing
IB 652 Multinational Business Management
IB 660 East and Southeast Asian Business Systems
IB 670 Selected Topics
IB 693 Internship
MK 639 Marketing Research and Information Systems
Total credits: 12

Long-Term Health Care Certificate

Adviser: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

This certificate is approved by the Department of Health Services, State of Connecticut, as a course of study in long-term health care. Students who complete this 12-credit course of study are eligible to take the state licensing examination for long-term care administration, preparing individuals for participation in this area of expanding opportunities for health care practitioners.

The Long-Term Care Certificate is available in two options as shown below. Please contact the Program Coordinator prior to selecting an option as the State of Connecticut has different requirements for each option.

PA 641 Financial Management of Health Care Organizations
PA 646 Organization and Management of Long-Term Care Facilities
PA 681 Long-Term Health Care Internship I (450 Hours)
PA 682 Long-Term Health Care Internship II (450 Hours)
Total credits: 12

Management of Sports Industries Certificate

Adviser: Gil B. Fried, Associate Professor of Sports Management, J.D., Ohio State University

This certificate is designed for individuals contemplating a career in some segment of the sports industry or for those who already work in the field and are interested in advancing their careers. Courses are designed to enhance knowledge and skills in sports marketing and public relations as well as the management of professional and school-based sports, facilities, and fitness and wellness programs.

MG 610 The Sports Industry

Plus three of the following:

MG 611 Sports Industry Marketing, Promotion and Public Relations
MG 612 Sports Law
MG 613 Sports Facility Management
MG 694 Internship
Total credits: 12

Other courses may be substituted with the consent of the certificate adviser.

Marketing Certificate

Adviser: Ben B. Judd, Professor of Marketing, Ph.D., University of Texas at Arlington

The certificate in marketing allows the student to acquire a deeper understanding of marketing phenomena and to develop analytic skills. Special emphasis is given to the development of content knowledge and skills necessary for operating managers of the marketing function. It is suggested that Marketing Management and Marketing Research and Information Systems, if taken, be preceded by other courses in the program. Note that MK 609 and MG 637 are prerequisites for the certificate. Also note that QA 604 is prerequisite for QA 675.

MK 641 Marketing Management

Plus three of the following:

MK 616 Buyer Behavior
MK 632 Nonprofit and Services Marketing
MK 638 Competitive Marketing Strategy
MK 639 Marketing Research and Information Systems
MK 643 Product Management
MK 645 Distribution Strategy
QA 675 Computer-Aided Multivariate Analysis
Total credits: 12

Public Administration Certificate

Adviser: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

This certificate is designed to provide training at the graduate level for people in public service. Coursework focuses on the analytic, quantitative, administrative and managerial knowledge and skills needed to meet the complex problems and responsibilities of government agencies and organizations.

PA 601 Principles of Public Administration
PA 602 Public Policy Formulation and Implementation
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 630 Fiscal Management for Local Government, *or*
PA 632 Public Finance and Budgeting
Total credits: 12

Public Management Certificate

Adviser: Charles N. Coleman, Assistant Professor of Public Management, M.P.A., West Virginia University

This certificate in public management is designed to provide a broad overview of the most current thinking in public management. Courses emphasize conceptual and analytic skill building. Students may select either a survey of the field or public personnel management.

Option I: Survey of the Field

Any four of the following:

EC 665 Urban and Regional Economic Development
PA 611 Research Methods in Public Administration
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 625 Administrative Behavior
PA 630 Fiscal Management for Local Government
PA 632 Public Finance and Budgeting
PS 608 The Legislative Process
Total credits: 12

Option II: Public Personnel Management

EC 625 Industrial Relations
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 625 Administrative Behavior

Plus one of the following:
MG 645 Management of Human Resources
MG 665 Compensation Administration
P 643 The Psychology of Conflict Management I
P 646 The Psychology of Conflict Management II
SH 602 Safety Organization and Administration
Total credits: 12

Taxation Certificate

Adviser: Robert E. Wnek, Professor of Tax Law, Accounting and Business Law; LL.M., Boston University School of Law; CPA

This certificate is for practitioners who wish to improve or update their tax skills, including practicing CPAs needing continuing education credits and others seeking to expand their tax backgrounds.

Any four of the following:

A 601 Federal Income Taxation I
A 602 Federal Income Taxation II
A 603 Qualified Retirement Plans
A 604 Corporate Income Taxation I
A 605 Corporate Income Taxation II
A 606 Advanced Topics in Corporate Income Taxation
A 607 International Taxation
A 608 Estate and Gift Taxation
A 610 Estate Planning
A 611 State and Local Taxation
A 613 Taxation of Limited Liability Companies, Partnerships and Partners
A 614 Federal Tax Practice and Procedure
Total credits: 12

Other courses may be substituted with consent of the adviser.

Telecommunication Management Certificate

Adviser: Jerry L. Allen, Professor of Communication, Ph.D., Southern Illinois University at Carbondale

This certificate is designed to prepare telecommunication managers to deal with the current problems and methods of analysis pertinent to this fast-changing field and to end users, suppliers and common carriers of telecommunication services and facilities.

CO 640 Communication Technologies*
CO 641 Competition and Regulation in Telecommunication
CO 642 Management of Telecommunication Organizations
CO 643 Telecommunication Policy and Strategy
Total credits: 12

**Students who have had the equivalent of CO 640, either through work experience or educational courses given by a common carrier, may substitute another course with the consent of the adviser.*

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Zulma R. Toro-Ramos, Ph.D., Dean

Few professions can match engineering for challenge and excitement, and the changing face of engineering will shape the world in the twenty-first century—a world of exotic materials, new sources of energy, staggering telecommunications and computing capabilities, cybernetic factories and public works needed by society. The mission of the School of Engineering and Applied Science (SEAS) is to prepare individuals for the professional practice of engineering and science, and for continual life-long education to keep abreast of new developments.

Master of science degree programs are offered by the School of Engineering and Applied Science—through the Graduate School—in computer science, electrical engineering, environmental engineering, industrial engineering, mechanical engineering, operations research and an executive master of science in engineering management (EMSEM).

A dual degree program combines the master's in business administration (M.B.A.) with the master of science degree in industrial engineering. Graduate certificates are offered in civil engineering design, computer applications, computer programming, computing, logistics and quality engineering.

At the undergraduate level, SEAS offers bachelor's degrees in chemistry, computer engineering and general engineering along with its five bachelor's degrees in chemical, civil, electrical, industrial and mechanical engineering which are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Also offered is a bachelor's degree program in computer science which is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (CAC/ABET).

Computer Science

Coordinator/Graduate Adviser:

Tahany Fergany, Associate Professor of Computer Science, Ph.D., University of Connecticut

This program provides advanced professional training in computer science, and provides students a diversity of experience and subject matter through its core, distribution, concentration, elective and project requirements. Its broad scope recognizes the continuing development of computing disciplines and applications, and allows students to prepare for this. The program can be used to enter, or advance in, the computing profession or an allied field, along a variety of career paths. It may also be used to prepare for further graduate study.

Computing facilities are available for use by our students. In addition to the resources of the University's Department of Information Services, students in our program and courses may use the computing facilities of the School of Engineering, and those of the Department of Computer Science.

Admission Policy

This program is designed to accommodate students with no prior programming experience as well as those students who already hold an undergraduate degree in computer science. All applicants will be expected to demonstrate that they have completed a baccalaureate degree and a course in college algebra (comparable to M 109 or equivalent) prior to enrolling in the program. Submission of GRE scores is not required.

M.S., Computer Science

The program consists of 48 credit hours of coursework: 18 credit hours of core courses, 9 credit hours of distribution courses, 9 credit hours of concentration courses and 12 credit hours of elective courses. In addition, within these 48 credit hours of coursework, students must satisfy a project requirement and a programming language requirement. Core courses are eligible for waivers; courses not in the core may not be waived, but transfer credit and substitutions may apply. Students are expected to complete the core courses soon after joining the program; until all core courses have been either waived or completed successfully, a student is not allowed to enroll in more than three non-core courses. The M.S. program curriculum is being updated constantly. The most current version of the program will always appear on our website at http://newton.newhaven.edu/seas/cs/.

Waiver Policy

Any of the six required Core Courses may be waived on the basis of appropriate undergraduate or graduate courses, subject to the approval of the Computer Science graduate adviser. Waivers reduce the student's required program credit hours by the number of credit hours waived. Students who seek a waiver must submit a petition form along with supporting documentation to the Computer Science graduate adviser before or during the first trimester the student attends the program. Only courses with grades of "B-" or better may be used for waiver purposes. Only required Core Courses may be waived.

Placement Policy

Students will be placed in the programming sequence by the graduate adviser. Those with sufficient prior experience in C programming might start in CS 610 or CS 620. A beginning programmer must start with CS 604, which is a prerequisite to the core and can be counted as the student's single free elective.

Additionally, new students should take CS 630 and CS 640 at the start of the program, since these are core courses with no prerequisites.

Before enrolling in any course, students must make sure that they meet all the prerequisites for that course (as specified in the course description), either by courses taken as part of the program or by work done outside the program. Only courses with grades of "B-" or better may be used for prerequisite purposes. Credit may be denied for a course taken without first satisfying all of its prerequisites unless prior written approval has been obtained.

Required Courses

Core Courses (18 credits; waivable)

CS 610 Intermediate Programming / C
CS 620 Data Structures
CS 630 Introduction to Computing Theory
CS 632 Algorithm Design and Analysis
CS 640 Computer Organization
CS 644 Operating Systems

Distribution Courses (9 credits)

Each student will select one course from each of the following three categories:

Software Design Methodology Distribution Courses (choose one)

CS 623 Rapid Software Development / Visual Basic
CS 626 Object-Oriented Principles and Practice/C++
CS 628 Object-Oriented Design and Analysis

Theory and Analysis Distribution Courses (choose one)

CS 633 Topics in Algorithms
CS 634 Cryptography and Data Security
CS 636 Structure of Programming Languages
CS 660 Artificial Intelligence

Computer Systems Distribution Courses (choose one)

CS 616 Assembly Language
CS 640B Parallel Computer Architectures
CS 642 Computer Networks and Data Communication
CS 644B Advanced Operating Systems
CS 647 Systems Programming

Concentration Courses and Project Requirement (9 credits)

There are five possible concentration areas. Each student must pick one of these and complete three courses in that concentration. Some courses belong to the list of both distribution and concentration courses, but one course cannot be used to satisfy both requirements.

There are two different ways to satisfy the project requirement: (1) by extending and completing a significant project begun within a regular concentration course, or (2) by completing a separate CS 690 Project course. In either case, the project content must be in the student's concentration area.

If a student is doing a project within a course, no additional tuition payment is due for that project and no additional credit is given for it. The instructor for the project course must agree, at the beginning of the trimester, to accept the project in fulfillment of degree requirements. Suggested courses for this purpose include: CS 617, CS 622B, CS 623, CS 626, CS 628, CS 640B, CS 642, CS 644B, CS 647, CS 650, CS 651, CS 655, CS 657, CS 660, CS 665.

If a student is doing the CS 690 Project course, it will count as a concentration course in addition to satisfying the project requirement. Students who plan to do the CS 690 Project must find a project adviser, prepare a project proposal and obtain written approval for the project prior to registration. Guidelines for format and schedule are available from the Graduate Adviser.

Concentration Course Areas

Software Development Concentration

CS 617 Java Applet Programming
CS 623 Rapid Software Development/ Visual Basic
CS 625 Software Project Management
CS 626 Object-Oriented Principles and Practice/C++
CS 628 Object-Oriented Design and Analysis
CS 657 Programming Window Systems
CS 690 Project

Database and Information Systems Concentration

CS 622 Database Systems
CS 622B Advanced Database Systems
CS 623 Rapid Software Development/ Visual Basic
CS 625 Software Project Management
CS 645 Network Administration
CS 655 Internet Applications with Java
CS 690 Project

Computer Systems Concentration

CS 616 Assembly Language
CS 640B Parallel Computer Architectures

CS 642 Computer Networks and Data Communication
CS 644B Advanced Operating Systems
CS 647 Systems Programming
CS 690 Project
EE 615 Introduction to Computer Logic
EE 658 Microcontroller Applications

Advanced Applications Concentration

CS 650 Computer Graphics
CS 651 Topics in Computer Graphics
CS 660 Artificial Intelligence
CS 663 Mobile Robotics
CS 664 Neural Networks
CS 665 Digital Image Processing
CS 690 Project
IE 681 System Simulation
IE 682 Advanced System Simulation

Network Systems Concentration

CS 617 Java Applet Programming,
CS 634 Security and Cryptography
CS 642 Computer Networks and Data Communication
CS 645 Network Administration
CS 646 Introduction to Computer Security
CS 649 Network Analysis
CS 655 Internet Applications with Java
CS 690 Project

Electives (12 credits)

At least three of the elective courses must be chosen from the list of Restricted Elective courses. The fourth elective course may be either a Restricted Elective or a Free Elective.

Restricted Electives

The Restricted Elective courses include all the Distribution courses and all the Concentration courses. Some CS 670 Selected Topics courses may also be designated to be Restricted Electives on a case-by-case basis.

Important Note: The Core courses are not Restricted Electives. In addition, CS 604, CS 618, and Internships are not Restricted Electives, but they may be counted as a student's one Free Elective.

The following are also Restricted Electives:
IE 601 Introduction to Operations Research/ Management Science
IE 607 Probability Theory
IE 609 Descriptive and Inferential Statistics
IE 621 Linear Programming
IE 622 Queueing Theory
IE 623 Decision Analysis
IE 625 Advanced Mathematical Programming
IE 685 Theory of Optimization
IE 687 Stochastic Processes
IE 688 Design of Experiments
M 611 Matrix Theory and Its Applications
M 615 Linear Mathematics and Combinatorics
M 620 Numerical Analysis
M 624 Applied Mathematics

Free Elective

A Free Elective may be any CS graduate course or any relevant course listed by Criminal Justice/Forensic Science, Mathematics, Molecular Biology, or a department in the School of Engineering and Applied Science or in the School of Business. A student who wants to take a Free Elective course other than those indicated here must obtain prior written approval from the Graduate Adviser.

Programming Language Requirement

Each student must demonstrate mastery of a programming language other than C or C++. This may be accomplished in one of two ways: (1) by completing, within the above program requirements, at least one of the courses in the Programming Languages group listed below; or (2) by submitting prior work (subject to the approval of the Graduate Adviser) which demonstrates that the student knows a programming language other than C or C++.

Programming Language Courses

CS 616 Assembly Language
CS 617 Java Applet Programming
CS 623 Rapid Software Development/ Visual Basic

Total credits: 48

Electrical Engineering

Coordinator: Bijan Karimi, Associate Professor of Electrical Engineering, Ph.D., Oklahoma State University.

The master's program in electrical engineering allows students to advance their knowledge beyond the baccalaureate degree in communications systems, computer engineering, control systems, digital signal processing, fiber optics or power systems engineering. Beyond the set of required courses listed in the following program description, students plan an individual program of study with a faculty adviser whose professional interests match those of the student.

Currently, faculty research interests include analog and digital communication systems, control systems, digital design, digital signal processing, electrical machines, electrical power distribution, power systems, electrical power transmission, electronic circuit design, fiber optics, analog and digital filters, fuzzy systems, discrete and continuous linear and nonlinear systems, microprocessor-based design and optical sensors.

Admission Policy

Candidates for admission to the electrical engineering program are expected to have an undergraduate degree from a program accredited by the Accreditation Board for Engineering Technology, or demonstrated equivalent, showing a strong record with a "B" average or better. In some instances, students who do not meet the above criteria may be considered for admission on the basis of evaluation of their current status, goals and potential for success in the program. Such students may be required to undertake additional coursework in order to complete the degree requirements. Applicants are urged to submit Graduate Record Examination (GRE) scores to provide additional information for the admissions decision. Two letters of recommendation from individuals familiar with the applicant's potential for graduate study are also required.

A student need not be admitted to the program in order to enroll in an individual course; however, approval should be obtained from the course instructor. Courses completed prior to achieving official admission to the program may be applied to the degree requirements with the approval of the program coordinator.

Transfer Credit

The transfer of graduate credit from other institutions may be permitted with the approval of the program coordinator and subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

Research Project/ Thesis Requirement

Students may elect to undertake a thesis for partial fulfillment (six or nine credits) of the requirements for the degree provided they have at least a 3.2 QPR or a strong endorsement from their adviser. The thesis must show ability to organize materials in a clear and original manner and present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as specific department requirements. Detailed information concerning these requirements is available from the department office.

Students who do not elect to undertake thesis work must complete a research project (EE 690) within the elective portion of the program.

M.S., Electrical Engineering

A total of 36 graduate credit hours is required for completion of the degree of master of science in electrical engineering. The M.S. in electrical engineering is structured into two options, namely, electrical engineering and computer engineering. Candidates must complete the specific require-

ments for the degree/option selected by the student. Students may be required to take additional courses if, in the adviser's opinion, their background is not appropriate for the curriculum or option selected.

Option I: Electrical Engineering

This option is designed for students who wish to focus their study in communication systems, control systems, digital signal processing, fiber optics or power systems. In addition to the four required courses, eight electives are chosen in consultation with the student's adviser or program coordinator.

Required Courses

One mathematics course*

Plus the following:

EE 603 Discrete and Continuous Systems I
EE 604 Discrete and Continuous Systems II
EE 650 Random Signal Analysis
Approved Electives (eight courses)
Total credits: 36

**Selection of the required mathematics course must be made with the approval of the program coordinator. M 611 Matrix Theory and Its Applications is strongly recommended. Students may not take M 610 or M 616 for credit in this degree option.*

Elective Courses

EE 605 Computer Controlled Systems
EE 606 Robot Control
EE 634/635 Digital Signal Processing I/II
EE 637/638 Power Systems Engineering I/II
EE 645 Introduction to Communication Systems
EE 646/647 Digital Communications I/II
EE 652 Design of Digital Filters
EE 658 Microcontroller Applications
EE 670 Selected Topics
EE 680 Fiber Optic Communications
EE 681 Lightwave Technology
EE 685 Optimization of Engineering Systems
EE 690 Research Project
EE 695 Independent Study
EE 697/698/699 Thesis I, II and III

With the approval of the program coordinator or the academic adviser, two of the elective courses may be taken in other disciplines of mathematics, engineering, physics or computer science. Other EE courses may be taken as elective courses with the approval of program coordinator or academic adviser.

Option II: Computer Engineering

Working electrical engineers with B.S.E.E. degrees find an increasing amount of their job time devoted to projects related to computer engineering. Almost any system or instrument now contains an embedded computer along with its own operating system and software, which in many cases are written and maintained by electrical engineers. This option seeks to help these engineers cope with this shift by offering more graduate work in the computer engineering area under the M.S.E.E. degree program.

Required Courses*

CS 620 Data Structures
CS 644 Operating Systems
EE 610 Networking I
EE 656 Hardware Description Language
EE 657 VLSI Design
EE 658 Microcontroller Applications
EE 682 Computer Architecture
EE 690 Research Project** *or*
Thesis EE 697 and EE 698

Elective Courses***

Four electives from ECE or CS Department
Total credits: 36

**Required courses may be replaced by other courses if a student can demonstrate the equivalent knowledge of the subject.*

***Students who elect to write a thesis will register for EE 697 and 698 Thesis I and II in lieu of EE 690 and one of the elective courses in the program.*

****Elective courses must be taken with the approval of the program coordinator or the academic adviser. Elective courses may be taken from other departments with the approval of the MSEE coordinator or the academic adviser. CS 610 or any other introductory course on C cannot be used as an elective. Students with deficiency in this area must take CS 610 in addition to the regular course work for Computer Engineering option in MSEE.*

Elective Courses

CS 640B Parallel Computer Architectures
CS 650 Computer Graphics

CS 664 Neural Networks
EE 604 Discrete and Continuous Systems II
EE 605 Computer Controlled Systems
EE 606 Robot Control
EE 620 Fuzzy Logic and Control
EE 630/631 Electronic Instrumentation I/II
EE 634/635 Digital Signal Processing I/II
EE 637/638 Power Systems Engineering I/II
EE 639 Electric Power Distribution
EE 645 Introduction to Communication Systems
EE 646/647 Digital Communications I/II
EE 652 Design of Digital Filters
EE 670 Selected Topics
EE 680 Fiber Optic Communications
EE 681 Lightwave Technology
EE 685 Optimization of Engineering Systems
EE 695 Independent Study
EE 697/698/699 Thesis I, II and III
M 611 Matrix Theory and Its Applications
M 615 Linear Mathematics and Combinatorics

With the approval of the program coordinator or academic adviser, students may select other courses in mathematics, engineering, physics or computer science.

Environmental Engineering

Coordinator: Agamemnon D. Koutsospyros, Associate Professor of Civil and Environmental Engineering, Ph.D., Polytechnic University

The program in environmental engineering is designed to prepare engineers for successful and dynamic careers in the contin ously expanding field of environmental engineering. Due to its interdisciplinary nature, the program allows students to take a combination of courses in related areas.

In a rapidly changing and increasingly interconnected world, pollution problems have brought about increased individual and public awareness. Environmental engineering has expanded rapidly to include areas such as water and air pollution, groundwater contamination, solid and hazardous waste management, and industrial waste treatment. A wide array of employment opportunities exists for environmental engineers in federal, state and local government as well as in the industrial and private sectors.

This program provides the advanced educational skills necessary to meet the ever-changing needs and challenges of the field. It is designed to offer vigorous, professionally oriented courses, case studies, new technology and research developments.

Admission Policy

Candidates for admission to the master's degree program in environmental engineering are expected to have a grade point average of 3.0 or better (on a 4.0 scale) in their undergraduate major coursework and hold a baccalaureate degree in civil or environmental engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET), or from a program with a demonstrated equivalent accreditation. Applications from candidates with an ABET or equivalent engineering degree in an area of study outside of civil/environmental engineering with a minimum undergraduate grade point average of 3.0 will be considered. However, such students may be required to complete certain undergraduate civil/environmental engineering courses as a condition of acceptance. Applicants are urged to submit scores from the Graduate Record Examination (GRE) general test to aid in the evaluation process.

In general, engineering students who do not meet the above criteria and students with nonengineering undergraduate degrees will not be considered candidates for admission. However, a potential candidate who does not meet the admission criteria may, in consultation with and with the approval of the department chairperson, pursue a program of study which may include a sequence of undergraduate courses to satisfy deficiencies. Only after the completion of such a program of study will the student be considered for admission

to the graduate program in environmental engineering.

M.S., Environmental Engineering

A total of 39 credit hours, 12 three-credit courses plus a three-credit research project, must be completed to earn the master of science degree in environmental engineering. Nine courses, exclusive of the research project, must be selected from courses designated as environmental engineering. Three courses may be selected from outside the environmental engineering department. Enrollment in non-environmental engineering courses, other than those listed below as approved non-environmental engineering electives, requires approval of the program coordinator. Transfer credit from other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

Required Courses

Approved Environmental Engineering Courses (9 courses)
CE 690 Research Project
Approved Electives (3 courses)
Total credits: 39

Concentrations in Environmental Engineering

Students may elect to pursue a sequence of courses in one of three areas of concentration, or they may tailor a program of study to meet the individual's specific needs or objectives within the constraints of the program. At the time of admission to the program, each student is assigned a faculty adviser who will assist the student in formulating a program of study and identifying an appropriate research project.

Concentration in Water Resources

Concentration Adviser: Jean Nocito-Gobel, Assistant Professor of Civil and Environmental Engineering, Ph.D., University of Massachusetts

Suggested Courses

CE 603 Contaminant Fate and Transport in the Environment
CE 606 Environmental Law and Legislation
CE 614 Surface Water Quality Management
CE 615 Groundwater Hydrology
CE 616 Contaminant Hydrology
CE 620 Engineering Hydrology
CE 621 Advanced Hydrology
CE 623 Open Channel Hydraulics
CE 624 Computer Applications in Hydrology/Hydraulics
CE 690 Research Project
Approved Electives (three courses)
Total credits: 39

Concentration in Water and Wastewater Treatment

Concentration Adviser: Agamemnon D. Koutsospyros, Associate Professor of Civil and Environmental Engineering, Ph.D., Polytechnic University

Suggested Courses

CE 601 Physical-Chemical Treatment of Aqueous Wastes
CE 602 Biological Treatment of Aqueous Wastes
CE 603 Contaminant Fate and Transport in the Environment
CE 606 Environmental Law and Legislation
CE 610 Pollution Prevention Management Technologies
CE 612 Advanced Wastewater Treatment
CE 613 Industrial Wastewater Control
CE 617 Wastewater Residuals Management
CE 690 Research Project
CH 601 Environmental Chemistry
Approved Electives (three courses)
Total credits: 39

Concentration in Industrial and Hazardous Wastes

Concentration Adviser: Agamemnon D. Koutsospyros, Associate Professor of Civil and Environmental Engineering, Ph.D., Polytechnic University

Suggested Courses

CE 601 Physical-Chemical Treatment of Aqueous Wastes

CE 602 Biological Treatment of Aqueous Wastes
CE 603 Contaminant Fate and Transport in the Environment
CE 605 Solid Waste Management
CE 606 Environmental Law and Legislation
CE 610 Pollution Prevention Management Technologies
CE 613 Industrial Wastewater Control
CE 618 Hazardous Waste Treatment
CE 661 Air Pollution Fundamentals
CE 690 Research Project
CM 622 Air Pollution Control
Approved Electives (three courses)
Total credits: 39

Non-Environmental Engineering Electives*

E 659 Writing and Speaking for Professionals
EN 600 Environmental Geoscience
EN 602 Environmental Effects of Pollutants
EN 607 Environmental Reports and Impact Assessment
EN 618 Hazardous Materials Management
EN 640 Introduction to Geographical Information Systems
EN 641 Geographical Information System Techniques and Applications I
EN 642 Geographical Information System Techniques and Applications II
M 620 Numerical Analysis

**Other courses may be taken as electives with the written approval of the program coordinator.*

See the Table of Contents for the certificate in civil engineering design.

Executive Master of Science in Engineering Management (EMSEM)

Coordinator: Zulma R. Toro-Ramos, Professor of Industrial Engineering and Dean, School of Engineering & Applied Science, Ph.D., Georgia Institute of Technology

The Executive Master of Science in Engineering Management (EMSEM) at the University of New Haven provides technical professionals with the knowledge and skills they need to be successful in today's world. Created specifically for individuals directly and indirectly involved in managing technology or engineering, the program integrates courses on the latest technical developments with business-related studies such as marketing and accounting. Taught in a cohort format by exceptional leaders in their fields, EMSEM is designed for busy adults and is the only graduate program of its kind in Connecticut.

The EMSEM program includes advanced learning in quality assurance, resource use optimization, modern production scheduling and control, supply chain management, and system simulation and project management. Additional topics include: organizational development, financial management, marketing management, and leadership.

The experienced engineering manager, typically not holding a graduate degree, requires state-of-the-art educational exposure to information directly related to his or her technical work environment that goes beyond the traditional M.B.A. program. The Executive M.S. in Engineering Management is specifically designed to provide this graduate education.

Admission Policy

Application for admission may be made to the UNH Graduate School. Qualified applicants should hold a bachelor's degree from an accredited institution, or a foreign equivalent. Five or more years of experience in a supervisory role in engineering, technical staff support, engineering or systems management, project management, systems engineering, manufacturing, logistics, industrial engineering, military operations, or quality assurance is viewed as a minimal requirement for admission.

An applicant should be sponsored or nominated by his/her employer. Individuals with unique or extraordinary qualifications and bona fide reason to enroll in the program are encouraged to apply and to

present their cases for admission. The Department of Industrial Engineering in consultation with the Graduate School and the dean of the School of Engineering & Applied Science makes final decisions on admission.

Applicants to the program must be suitably qualified for both the EMSEM courses (EXIE) and the five Executive M.B.A. courses (EXID). In cases where deficiencies exist that are likely to impede success in a given course, students may be required to seek prerequisite education and/or meet certain academic conditions before enrollment in that course is permitted. The nature of an executive program requires that all participants, even if drawn from highly diverse backgrounds and occupations, share common skills and abilities that permit teamwork and successful learning in any given module.

Executive M.S., Engineering Management

The EMSEM program consists of 18 modules scheduled into consecutive academic years. The modules are sequenced for prerequisite purposes, and students are expected to follow the entire sequence with their entering class. Nine modules will be scheduled each academic year, each module running for five consecutive weeks on a given weekday for six hours, usually from 2:30 - 8:30 p.m. An EMSEM class will generally meet on the same weekday afternoon for the entire two-year program period.

A research paper is required, and in the final module presented to the class and properly defended. All papers must receive approval by the EMSEM program coordinator or academic adviser for program completion.

Modules

EXIE 901 Engineering Management Concepts
EXIE 902 Managing Uncertainty
EXIE 903 Statistics for Quality and Engineering Management
EXIE 957 Organizational Change & Development
EXIE 914 Achieving Optimal Operations
EXID 912 Financial Accounting
EXIE 926 Constraint Assessment
EXIE 930 Project Management
EXIE 948 Queuing Theory and Applications
EXIE 950 Simulation of Processing Systems
EXID 921 Executive Management & Leadership
EXIE 940 Supply Chain Management
EXID 924 Financial Management I
EXIE 960 E-Solutions in Engineering Management
EXID 930 Marketing Practice
EXIE 956 Managing Quality Assurance
EXIE 970 Current Topics in Engineering Management
EXIE 999 Research Topic
Total credits: 54

Industrial Engineering

Coordinator: Ronald N. Wentworth, Professor of Industrial Engineering, Ph.D., Purdue University

This program is intended to meet the needs of professionally employed engineers working in an environment where cost effectiveness, high productivity and effective use of resources is crucial. It has been designed to give the student an advanced level of training beyond the baccalaureate, sufficient to prepare for a leadership role in industry, insofar as the practice of industrial engineering is concerned.

The program centers on a core sequence required of all students. It contains courses in analysis and design considered to be of common interest to all industrial engineers of advanced professional standing. (See the notes which follow regarding waivers related to these core courses.) Students complete the program by choosing elective courses in operations research, human factors, manufacturing engineering, computer science or others that are particularly suited to their professional interests. Electives should be chosen so

as to provide a coherent selection meeting the student's needs. Once the student and the student's adviser have agreed on these electives, they shall become part of the student's program of study. All subsequent changes in electives must be made with the adviser's advance written consent.

Admission Policy

Candidates for admission to the program are expected to hold an undergraduate degree in engineering from a program accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. In some cases, an applicant with a degree in a related field may be considered for admission. Students entering this program are expected to be competent in mathematics through calculus. Those with insufficient mathematics background will be required to take approved mathematics courses (e.g., M 610 Fundamentals of Calculus) outside/in addition to the program requirements. Applicants with degrees in fields other than industrial engineering will be required to take a number of undergraduate courses or otherwise demonstrate proficiency in several areas normally included in an undergraduate industrial engineering program.

Though admission decisions are based primarily on an applicant's undergraduate record, the promise of academic success is the essential factor for admission.

M.S.I.E.

The program consists of 45 credit hours. The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. Required courses may be waived on the basis of undergraduate courses taken at accredited institutions. All waivers must be approved in writing by the department of industrial engineering and are conditional upon subsequent academic performance. In some cases, the program coordinator may permit substitution of relevant courses in place of the required courses.

Research Project/ Thesis Requirement

All students in the program will complete a thesis or an appropriate special project which will partially fulfill the elective requirements for the degree. The special project requirement will usually be satisfied by taking a research project course in a group setting. A designated area of study may be indicated for each such research project course; in these cases, the instructor will offer direction in the area and will assist students in the development of substantial individual projects. Particular requirements or prerequisites may be set for the course or for those individuals intending to complete a project. In appropriate cases having special approval, a student may elect to write a thesis or take a research project course (as listed in the catalog) on an individual basis.

Required Courses

IE 601 Introduction to Operations Research/Management Science
IE 607 Probability Theory
IE 609 Descriptive and Inferential Statistics
IE 623 Decision Analysis
IE 624 Quality Analysis
IE 651 Human Engineering I
IE 655 Manufacturing Analysis
IE 681 System Simulation
IE 686 Production and Inventory Analysis
IE 688 Design of Experiments
Approved Electives (five courses, including project/thesis)
Total credits: 45

Industrial Engineering Dual Degree Program (M.B.A./M.S.I.E)

Coordinator: Ronald N. Wentworth, Professor of Industrial Engineering, Ph.D., Purdue University

The Graduate School has always encouraged interdisciplinary studies. To foster a broader expertise in the areas of business administration and industrial engineering, a student can earn degrees in both fields by successfully completing this dual degree program.

The program is intended for students with undergraduate engineering or technical degrees from programs accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. Students entering this program are expected to be competent in mathematics through calculus. Those with insufficient mathematics background will be required to take approved mathematics courses (e.g., M 610 Fundamentals of Calculus) outside/in addition to the program requirements.

Applicants with degrees in fields other than industrial engineering will be required to take a number of undergraduate courses or otherwise demonstrate proficiency in several areas normally included in an industrial engineering program.

Applicants to the dual degree program are required to meet the requirements outlined in the admissions policy sections of each of the relevant degree programs, including submission of scores from the Graduate Management Admissions Test (GMAT) as specified in the M.B.A. program description.

M.B.A./M.S.I.E. Dual Degree

The M.B.A./M.S.I.E. program consists of 69 credit hours. Up to 9 of these credit hours may be waived on the basis of undergraduate coursework, leaving a minimum requirement of 60 credit hours. Any waiver(s) of coursework from the M.B.A. side of the curriculum must meet the waiver guidelines of the M.B.A. program. All waivers must be approved in writing by the appropriate department and are conditional upon subsequent academic performance. Graduate credit may be transferred from other accredited institutions subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

In all cases, the residency requirement for the two degrees shall be 60 credit hours completed at the University of New Haven.

Project/Thesis Requirement

All students in the dual degree program must complete the required business administration capstone course MG 669 Strategic Management. In addition, all dual degree students must complete an industrial engineering special project or thesis within the elective portion of the program. The industrial engineering special project requirement may be satisfied by taking a project course in a group setting when these are offered. A designated area of study may be indicated for each such industrial engineering project course; in these cases, the instructor will offer direction in the area and will assist students in the development of substantial individual projects. Particular requirements or prerequisites may be set for the course or for those individuals intending to complete a project. In appropriate cases having special approval, a student may take a Research Project or Thesis (as listed in the catalog) on an individual basis.

Required Courses

Business Core Courses (waivable)*

A 620 Financial Accounting for Managers
EC 601 Macroeconomics and Microeconomics
FI 601 Finance
MG 637 Management Process
MK 609 Marketing

Advanced Business Courses (not waivable)

CO 621 Managerial Communication, *or* MG 663 Leadership and Team Building
A 621 Managerial Accounting, *or* FI 602 Corporate Valuation and Strategy
EC 641 International Economics, *or* IB 643 International Business
MG 667 Multicultural Issues in the Workplace, *or*

P 642 Organizational Change and Development
EC 629 Business and Society
MG 669 Strategic Management

Industrial Engineering Courses:

IE 601 Introduction to Operations Research/Management Science
IE 607 Probability Theory
IE 609 Descriptive and Inferential Statistics
IE 623 Decision Analysis
IE 624 Quality Analysis
IE 651 Human Engineering I
IE 655 Manufacturing Analysis
IE 681 System Simulation
IE 686 Production and Inventory Analysis
IE 688 Design of Experiments
Approved IE Electives (two courses, including IE thesis/project)
Total credits: 69

**Up to three of the five Business Core Courses (not more than 9 credits) may be waived by students who meet the waiver guidelines established for these courses within the M.B.A. program.*

Mechanical Engineering

Coordinator: Konstantine C. Lambrakis, Professor of Mechanical Engineering, Ph.D., Rensselaer Polytechnic Institute

This program is intended to meet the needs of professionally employed engineers and scientists for academic work beyond the baccalaureate level. Its purpose is to increase competence in modern analysis and synthesis techniques as they apply to engineering design.

The program centers on a core sequence which all students are expected to take. The core courses contain advanced methods of analysis and design which are of common interest in engineering work. Students complete the program by electing a series of courses in mechanical engineering particularly suited to their current professional interests. Early in the program, students, with the approval of the adviser, prepare a detailed plan ensuring an overall educational experience that is integrated and logical.

All decisions regarding both core and elective requirements are subject to final approval by the student's adviser.

Admission Policy

Candidates for admission to the master's program in mechanical engineering are normally expected to have a grade average of "B" or better in their undergraduate coursework and to hold a bachelor's degree in mechanical engineering from a program accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. In some cases, applicants with a bachelor's degree in a field closely related to mechanical engineering may be considered for admission. It is strongly recommended that applicants submit scores from the Graduate Record Examination (GRE). Two letters of recommendation from individuals familiar with the applicant's potential for graduate study are also required. Students accepted on a provisional basis may by required to complete certain additional undergraduate mechanical engineering courses prior to enrolling in the graduate courses.

The department is planning to offer courses as follows: Fall and Spring on the undergraduate semester schedule; late spring on the trimester graduate schedule.

M.S.M.E.

A minimum of 33 credits must be completed to earn the master of science degree in mechanical engineering. Depending on a student's academic background, one of the five required courses may be waived.

Transfer of credit from other institutions is subject to the Graduate School policy on transfer credit. A thesis is optional but highly recommended for students wishing to study in depth particular areas of interest under the guidance of a faculty member. Thesis topics should be approved by the faculty adviser when the student has completed 18 graduate credits. Students should contact

the coordinator for thesis advisers in these specialized areas: acoustics/aerodynamics, fluids/biomechanics, gas dynamics, heat transfer/thermodynamics, applied mechanics/optics, systems analysis/machine design/random vibrations/numerical analysis, solid mechanics/computer-aided design. Thesis preparation and submission must comply with the Graduate School policy on theses as well as with all specific department requirements.

If a thesis is not chosen, and unless a major special project approved by the graduate program coordinator is completed within the scope of other mechanical engineering courses, a student will be required to undertake a three- or six-credit project, on an independent study basis, supervised by a full-time faculty member in the department of mechanical engineering.

Required Courses*

ME 602 Mechanical Engineering Analysis
ME 610 Advanced Dynamics
ME 615 Theory of Elasticity
ME 620 Classical Thermodynamics
ME 630 Advanced Fluid Mechanics
Electives (six courses)**
Total credits: 33

Elective Courses**

ME 604 Numerical Techniques in Mechanical Engineering
ME 605 Finite Element Methods in Engineering
ME 611 System Vibrations
ME 613 Fundamentals of Acoustics
ME 625 Mechanics of Continua
ME 627 Computer-Aided Engineering
ME 632 Advanced Heat Transfer
ME 635 Dynamic Systems and Control
ME 645 Computational Fluid Dynamics and Heat Transfer
ME 655 Interfacing Mechanical Devices
ME 670 Selected Topics
ME 690 Research Project
ME 695/696 Independent Study I and II
ME 698/699 Thesis I and II

**With the coordinator's written approval, one of the required courses may be waived depending on the student's academic background.*

***With the coordinator's written approval, three of the elective courses may be taken in departments other than mechanical engineering.*

Operations Research

Coordinator: Ronald N. Wentworth, Professor of Industrial Engineering, Ph.D., Purdue University

Operations research has become an important professional discipline in recent years. Complex technical problems have been examined and solved using advanced mathematical techniques and computers. The master of science in operations research curriculum provides thorough coverage of the theory, methodology and application of these techniques. The program is designed to prepare qualified applicants with solid mathematics training—but from otherwise diverse backgrounds—to deal with important industrial, business, commercial and governmental problems.

The program centers on a sequence of core courses recognized to be of common interest to all operations research practitioners of advanced professional standing. Students complete the program by choosing elective courses in operations research, computer science, mathematics or other courses that are particularly suited to their professional interests. Electives should be chosen so as to provide a coherent selection meeting the student's needs. Once the student and an adviser have agreed to these electives, they shall become a part of the student's program of study. All subsequent changes in electives must be made with the adviser's advance written consent.

M.S., Operations Research

The program consists of 42 credit hours. Students entering this program are expected to be competent in mathematics through calculus. Those with insufficient mathematics background will be required to take approved mathematics courses (e.g., M 610

Fundamentals of Calculus) outside/in addition to the program requirements. The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. Required courses may be waived on the basis of undergraduate courses taken at accredited institutions. All waivers must be approved in writing by the program coordinator and are contingent upon subsequent academic performance. In some cases, the coordinator may permit substitution of relevant courses in place of required courses.

Research Project/ Thesis Requirement

All students in the program will complete a thesis or an appropriate special project which will partially fulfill the elective requirements for the degree. The special project requirement will usually be satisfied by taking a research project course in a group setting. A designated area of study may be indicated for each such research project course; in these cases, the instructor will offer direction in the area and will assist students in the development of substantial individual projects. Particular requirements or prerequisites may be set for the course or for those individuals intending to complete a project. In appropriate cases having special approval, a student may elect to write a thesis or take a research project course (as listed in the catalog) on an individual basis.

Required Courses

IE 601 Introduction to Operations Research/Management Science
IE 607 Probability Theory
IE 609 Descriptive and Inferential Statistics
IE 621 Linear Programming
IE 622 Queueing Theory
IE 625 Advanced Mathematical Programming
IE 681 System Simulation
IE 685 Theory of Optimization
IE 687 Stochastic Processes
IE 688 Design of Experiments
Approved Electives (four courses, including project/thesis)
Total credits: 42

Graduate Certificates

The School of Engineering and Applied Science offers the following graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Persons who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate must complete the Graduate School application form, submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Table of Contents for the Academic Policies section of the catalog to find a complete description of the options, regulations and requirements for study and completion of a Graduate Certificate.

Civil Engineering Design Certificate

Adviser: Agamemnon D. Koutsospyrous, Associate Professor of Civil and Environmental Engineering, Ph.D., Polytechnic University

The certificate in civil engineering design provides professional studies beyond the baccalaureate level in the major disciplines within civil engineering. The student, with the adviser, selects courses that best satisfy the student's professional interests. Areas of specialization are construction, geotechnical engineering, hydraulics and hydrology, and structural engineering.

Candidates for admission will be

expected to have an engineering degree from a program accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. Engineering degrees presented from foreign institutions will be evaluated individually. Candidates are required to complete four courses or a total of 12 credits for the certificate. Courses must be selected, with the adviser's approval, from the following:

CE 615 Groundwater Hydrology
CE 620 Engineering Hydrology
CE 621 Advanced Hydrology
CE 623 Open Channel Hydraulics
CE 624 Computer Applications in Hydrology/Hydraulics
CE 629 Wood Engineering I
CE 630 Reinforced Concrete Design
CE 631 Structural Steel Design
CE 633 Wood Engineering II
CE 634 Prestressed Concrete Design
CE 640 Structural Analysis
CE 650 Soil Mechanics I
CE 651 Soil Mechanics II
CE 652 Foundation Engineering I
CE 653 Foundation Engineering II
CE 660 Project Planning
CE 678 Computer Applications in Civil Engineering
Total credits: 12

Computer Applications Certificate

Adviser: Tahany Fergany, Associate Professor of Computer Science, Ph.D., University of Connecticut

CS 610 Intermediate Programming/C*
CS 620 Data Structures

Plus two of the following:

CS 617 Java Applet Programming
CS 622 Database Systems
CS 622B Advanced Database Systems
CS 623 Rapid Software Development/ Visual Basic
CS 634 Cryptography and Data Security
CS 650 Computer Graphics
CS 651 Topics in Computer Graphics
CS 655 Internet Applications with Java
CS 657 Programming Window Systems
CS 660 Artificial Intelligence
CS 663 Mobile Robotics
CS 665 Digital Image Processing
Total credits: 12

** Certificate candidates are expected to meet the prerequisite requirements of CS 610 and all other courses.*

Computer Programming Certificate

Adviser: Tahany Fergany, Associate Professor of Computer Science, Ph.D., University of Connecticut

CS 610 Intermediate Programming/C*
CS 620 Data Structures

Plus one of the following:

CS 617 Java Applet Programming
CS 623 Rapid Software Development/ Visual Basic
CS 626 Object-Oriented Principles and Practice/C++

Plus one of the following:

CS 616 Assembly Language
CS 617 Java Applet Programming
CS 623 Rapid Software Development/ Visual Basic
CS 626 Object-Oriented Principles and Practice/C++
CS 647 Systems Programming
Total credits: 12

** Certificate candidates are expected to meet the prerequisite requirements of CS 610 and all other courses.*

Computing Certificate

Adviser: Tahany Fergany, Associate Professor of Computer Science, Ph.D., University of Connecticut

CS 610 Intermediate Programming/C*
CS 620 Data Structures

Plus any two Computer Science Restricted Electives from the list in the description of the M.S. Computer Science program.

Total credits: 12

**Certificate candidates are expected to meet the prerequisite requirement(s) for CS 610 and all other courses.*

Logistics Certificate

Adviser: Ronald N. Wentworth, Professor of Industrial Engineering, Ph.D., Purdue University

This certificate provides a basic working knowledge of logistics in all sectors, and it gives students a background for certification in one of the professional societies serving the discipline. Although an old field of study historically associated with the military, logistics has emerged as a key element in world commerce–including e-commerce and integrated manufacturing.

Modern logistics makes sure that needs are met on demanding timetables, creating effective customer supply chains that reach around the globe and effective customer support mechanisms that keep people and machines working productively under both benign and hostile environmental conditions. From Mexican product assembly centers to Pacific Rim manufacturers, from New York copier repairmen to engineers repairing rigs in the North Sea–logistics systems function to get the job done right, on time and at lowest cost.

Logistics involves product planning, synchronous manufacturing, quality assurance, life cycle cost analysis, transportation and distribution: ERP and JIT, CRM and MRO, and the deployment of educated and experienced logisticians. World class corporations as well as government agencies and military units require well-designed, effective, efficient logistics systems to achieve their goals and objectives. Career professionals generally acquire a certificate in logistics or a specialized graduate degree.

LG 660 Logistics Technology and Management

Plus three of the following:

IE 615 Transportation and Distribution
LG 663 Logistics in Acquisition and Manufacturing
LG 665 Integrated Logistics Support Analysis
LG 669 Life Cycle Cost Analysis
Total credits: 12

Other logistics/related courses may be substituted with the approval of the certificate adviser.

Quality Engineering Certificate

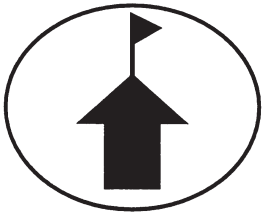
Adviser: Ronald N. Wentworth, Professor of Industrial Engineering, Ph.D., Purdue University

This certificate is designed to provide quality and reliability professionals who are interested in advancing their knowledge and skills with the most up-to-date analytic techniques and standards in the area of quality assurance and control, reliability engineering and experimental design. The program provides a solid foundation in probability and statistical methods, followed by specialized courses in quality including the ISO standards, in reliability including reliability algorithms and models, and in experimental design covering factorial and Taguchi methods. The courses taken for this certificate are applicable toward the M.S. in Industrial Engineering and the M.S. in Operations Research programs.

IE 607 Probability Theory
IE 609 Descriptive and Inferential Statistics
IE 624 Quality Analysis

Plus one of the following:

IE 643 Reliability and Maintainability
IE 688 Design of Experiments
Total credits: 12



TAGLIATELA SCHOOL OF HOSPITALITY AND TOURISM

William H. Williams III, B.S., M.S., Associate Dean

An executive master of science degree in tourism and hospitality management is offered through the Graduate School by the School of Hospitality and Tourism.

The graduate curriculum is designed for persons who have acquired significant managerial or operational experience in the tourism/hospitality industry. One goal of the program is to provide an avenue for students with industry experience to further their education at the graduate level, while remaining on the job. Alternatively, applicants may enroll in the program as full-time or part-time students.

Courses focus on leadership, communication, customer service, marketing and operations issues unique to tourism/hospitality organizations. The content of the courses stresses managing change within a global context and recognizing the needs of operating with a workforce that is culturally diverse, in an increasingly technology-driven environment.

Undergraduate degree programs are offered by the School of Hospitality and Tourism in hotel/restaurant management, with an optional concentration in tourism, and in tourism administration.

The School of Hospitality and Tourism is also home to the Institute of Gastronomy and Food Studies. Under the direction of a professional chef-in-residence, the institute prepares students for national certification in food handling. In addition, courses are offered in basic techniques and theories of cooking.

Executive Tourism and Hospitality Management (Executive M.S.)

Coordinator: Constantine E. Vlisides, Associate Professor, Hotel and Restaurant Management, Ph.D., University of North Texas

The executive master of science program in tourism and hospitality management offered by the School of Hospitality and Tourism is a fully accredited, graduate-level degree program designed for full-time or part-time study. The master of science degree is a graduate program with courses scheduled in a manner to suit the time constraints and responsibilities imposed by students' careers.

Key issues facing the hospitality industry include increasing global competition, changing markets, rising costs, and the transformation of traditional labor sources. As a result, the need for accomplished managers is greater than ever before.

Tourism is an integral economic, social and cultural component of global, national and community development. The rise of tourism as an activity and economic force has caused an increase in the demand by the private sector for highly educated executives. In recognition of the importance of tourism and the need for advanced study in the field, the master's program provides courses in resource development and management at travel destinations and in business and leisure travel markets, philosophy of service, human resource management, marketing and financial issue. These and other courses measure the needs and wants of different travel markets; explore the dimensions of international tourism; and consider the impacts of tourism and hospitality. This master's degree program is currently under review for possible curriculum revision. Current information is available from the program coordinator at 203-932-7412 or 1-800-Dial-UNH, ext. 7412.

Program Goals

The goal of the program is to provide students with tools that enable them to manage change. Structural changes in society demand that hospitality and tourism executives be able to manage successfully in a workplace that is culturally diverse and technologically advanced. Graduates of this program are capable of translating theory into reality, of creating an atmosphere where employees are motivated to provide the highest levels of quality service in a professional manner, and of communicating with a diverse workforce and a demanding clientele.

Individual participation is emphasized through class discussions, interaction and cooperation with other executives in the class. Each class progresses through the program as a group, thus providing an opportunity for the continuing exchange of ideas and information. Prospective candidates are encouraged to apply as early as possible due to enrollment limitations. New classes begin in September and January of each year.

Admission Policy

Applicants are required to hold a four-year baccalaureate degree, or the equivalent, from an accredited institution. No transfer credit is accepted to the executive master's program. Corporate-sponsored applicants are required to provide an organizational letter of support.

The faculty of the School of Hospitality and Tourism seeks applicants with strong academic ability, high motivation, professional experience and an aptitude to do graduate-level work. Admission decisions are based on an evaluation of all material submitted in support of the application: two letters of recommendation, official transcripts of all previous undergraduate and graduate coursework and official test scores on either the Graduate Record Examination (GRE) General Test, the Graduate Management Admissions Test (GMAT) or the Miller Analogies Test (MAT).

In addition to the previously listed criteria for admission, international students from countries where English is not the official language must demonstrate proof of English proficiency as described elsewhere in this catalog.

Documentation of relevant professional experience and other supporting information may be required before a final admission decision is made.

Program Requirements

All students without an appropriate undergraduate degree (i.e., hotel, restaurant, travel, tourism, recreation, leisure, hospitality) may be required to take additional undergraduate courses in order to satisfy prerequisite requirements.

Internships

There are many opportunities in the Connecticut/New York area for intern experiences in government agencies, private-sector firms and the quasi-public sector. Internships are provided through the assistance and guidance of the school's internship coordinator. The intern experience is directly related to the student's academic program and of an appropriate professional level. Internships may be paid or unpaid, and are expected to be 300 hours in length.

Executive M.S., Tourism and Hospitality Management

The program consists of two options: an 18-month, part-time, 30-credit program consisting of 10 three-credit modules and a final, comprehensive examination; or a 24-month, full-time, 48-credit program that includes a research component and comprehensive examination. Each tourism and hospitality module is seven sessions in length. All classes meet one afternoon/early evening per week. Participants must agree in advance to attend all classes except for emergencies. Students must be prepared to devote significant additional time for class preparation and reading assignments.

Required Courses

HT 901 Orientation and Communication
HT 902 Philosophy of Service and Operations Strategy
HT 903 Organizational Development and Human Resource Strategies
HT 904 Dimensions of Tourism in the Global Marketplace
HT 905 National and International Strategic Marketing for Senior-Level Management
HT 906 Financial Resource Development and Preservation
HT 907 Law and Taxation for Profit/Non-Profit Organizations
HT 908 Government-Business Relations and Ethics
HT 909 Leadership and Problem Solving
HT 910 Special Topics: Current Issues/Future Trends

Total credits: 30

Research Concentration

The master's program in executive tourism and hospitality management with research concentration is designed for persons who have acquired significant managerial or operational experience in the tourism/hospitality industry and who desire full-time graduate study with the more traditional research requirements. Students who enroll for full-time study with the research concentration will take the 10 three-credit modules along with their cohort group, plus an additional 18 credits of research and elective courses selected from the graduate curricula. A total of 48 credits plus a comprehensive examination is required for completion of the master of science in executive tourism and hospitality management with research concentration.

Required Courses

HT 901 Orientation and Communication
HT 902 Philosophy of Service and Operations Strategy
HT 903 Organizational Development and Human Resource Strategies
HT 904 Dimensions of Tourism in the Global Marketplace

HT 905 National and International Strategic Marketing for Senior-Level Management
HT 906 Financial Resource Development and Preservation
HT 907 Law and Taxation for Profit/Non-Profit Organizations
HT 908 Government-Business Relations and Ethics
HT 909 Leadership and Problem Solving
HT 910 Special Topics: Current Issues/Future Trends
QA 604 Probability and Statistics
Research Methodology Course
Elective (3 credits)
Elective/ or Internship
HT 912/HT 913 Research Project I & II
Total credits: 48

**With approval of the program coordinator, three credits of electives may be taken as internship.*

Institute of Gastronomy and Food Studies

Director: Patrick Boisjot, professional baccalaureate, Lycée Hotelier de Thonon-les-Bains, France; B.S., State University of New York Empire State College

A recent addition to the University of New Haven, the Institute of Gastronomy and Culinary Arts is housed in the School of Hospitality and Tourism. Featured among its offerings is a program leading to national certification in food handling recognized by the State of Connecticut as well as a certificate of mastery in basic techniques and theories of cooking. The institute serves as a focal point for programs designed not only for undergraduate UNH students earning academic credits, but also for food writers, restaurant owners and hobbyist cooks. Additional information is available from the director's office in Harugari Hall on the main campus at (203) 932-7362 or 1-800-DIAL-UNH, ext. 7362; or via the university's website: www.newhaven.edu.

Masters of Science, Hospitality and Tourism

Coordinator: Constantine E. Vlisides, Professor, Hotel and Restaurant Management, Ph.D., University of North Texas

Program Goals

The Masters of Science of Hospitality and Tourism s designed for the serious minded student who desires an in-depth look at the Hospitality and Tourism industries. This course of study allows for the students a broader opportunity for employment and career related goals. The matriculation through this program allows the student to gain the knowledge from industry-tested professionals as well as networking possibilities.

Individual participation within the courses is essential so that each student can gain the maximum benefit from the offered courses. There is an opportunity to obtain a concentration in a related filed should the student choose that option. The research component offered in this program strengthens the student's overall view of the Hospitality and Tourism professions. Furthermore, this degree allows the student the opportunity to teach at a Community College or pursue a terminal degree. The research and concentration option differentiates the two Masters programs. It is noteworthy that these are the only Master degree options offered in the State of Connecticut for hospitality and tourism.

The content of the body of courses provides managing techniques that the student currently encounters in their careers including hospitality organizational change within the global context while recognizing the needs of a culturally diverse workforce, in an increasingly technological environment that requires simultaneous human interaction.

Admission Policy

Currently the same admission policy is in place as in the Executive Master's degree program. Applicants are required to hold a four-year baccalaureate degree, or equivalent, from an accredited institution. No transfer credit is accepted to this masters program. Corporate sponsored applicants are required to provide an organizational letter of support.

The faculty of the Tagliatela School of Hospitality and Tourism seeks applicants with strong academic ability, high motivation and an aptitude for graduate study. Professional experience is a preferred. The Graduate Coordinator will determine if an internship is required prior to full admittance. Admission decisions are based on an evaluation of all material submitted in support of the applicant: two letters of recommendation, official transcripts of al previous undergraduate and graduate coursework and official test scores on either the GMAT, GRE or Miller's Analogy. The Graduate Coordinator reserves the right to waive any of the admission requirements.

In addition to the previously listed criteria for admission, an international student from countries where English is not the official language must demonstrate proof of English proficiency as described elsewhere in this catalog. The Tagliatela School of Hospitality and Tourism requires a minimum TOEFL score of 600 (220 computer generated) for admittance in this degree program.

Program Requirements

All students without an appropriate undergraduate degree (i.e. hotel, restaurant, travel, tourism, recreation, leisure, hospitality) may be required to take additional undergraduate courses in order to satisfy prerequisite requirements. All students with a bona fide graduate degree from a duly accredited institution acceptable for admission into this program.

Required Courses

HT 903 Organizational Development and Human Resource Strategies
HT 904 Dimension of Tourism in the Global Marketplace
HT 905 National and International Strategic marketing for Senior–Level Management
HT 906 Financial Resource Development and Preservation
HT 907 Law and Taxation for Profit/ Nonprofit Organizations
HT 908 Government-Business Relations and Ethics
HT 909 Leadership and Problem Solving
QA 604 Probability and Statistics
Research Methodology course
HT 912 Research Project I *or*
HT 916/HT 917 Thesis I and II
Elective (3 credits)

Total credits: 33 or 36

The Tagliatela School of Hospitality and Tourism is seeking permission to introduce this program shortly. Our application for licensure by the State of Connecticut Department of Higher Education is currently under review. Please consult the University's website at http/: www.newhaven.edu/ gradinfo.html for information on when applications will be accepted for entry into the program.

SCHOOL OF PUBLIC SAFETY AND PROFESSIONAL STUDIES

Thomas A. Johnson, D.Crim., Dean

Through the Graduate School, the School of Public Safety and Professional Studies offers career-oriented, graduate degree programs in criminal justice, fire science, forensic science (including the criminalistics laboratory program), industrial hygiene, occupational safety and health management, national security and public safety, and professional counseling. In addition, a wide range of graduate certificates are available in the same fields for students seeking shorter study in specific subcategories of these disciplines.

Broad professional education is provided, often incorporating classroom learning with laboratory and field experience. The programs attract students of varied ages and levels of expertise, from persons new in the field to seasoned professionals seeking national and/or regional accreditation and licensure.

In addition to the graduate programs at the main campus in West Haven, the university is authorized to offer master of science degrees in national security and public safety, forensic science with a concentration in advanced investigation and fire science at its California locations in Sacramento, and UNH Sandia Laboratory Campus in Livermore. Graduate certificates in these two areas, plus a certificate in forensic computer investigation, are also available at the California sites. Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education Code and is the students' primary advocate in matters of consumer protection.

Safety and professional degree programs and certificates also are offered at the undergraduate level in most of the same fields, along with a program in legal studies.

Criminal Justice

Coordinator: William M. Norton, Professor of Criminal Justice; Ph.D., Florida State University; J.D., University of Connecticut Law School

A key objective of the master of science in criminal justice program is the education of men and women planning careers in the field of criminal justice as well as the advanced training and education of those who staff the agencies and institutions of the criminal justice system.

The program stresses a broad understanding of the social and behavioral sciences, the institutions of the criminal justice system and the development of methodological tools and skills.

The courses in the area of social and behavioral science stress the theories of the behavior of man in a social order and the sanctions imposed by different societies to control the social behavior of their members. Courses in the area of criminal justice institutions stress the study of the existing system from the police through the courts, the penitentiaries and the system of probation and parole. The methodological courses expose students to the tools of research and analysis and the contribution of systems analysis to the efficient administration of the criminal justice system.

M.S., Criminal Justice

A total of 39 credit hours is required of candidates for the degree of master of science in criminal justice.

Candidates must complete the core curriculum. After consultation with an adviser, students select electives from approved courses.

The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

Thesis or Comprehensive Examination

Students may elect to undertake a thesis project for partial fulfillment of the requirements for the degree. Registration for a minimum of six thesis credits (CJ 697 and CJ 698) would be required. The thesis must show ability to organize materials in a clear and original manner and present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements. Detailed information concerning these requirements is available from the department office.

Students who do not elect to undertake thesis work must pass a comprehensive final examination. This examination may be oral, written or both and will be based on the program of study that the student has completed for the degree. Additional information about the comprehensive examination is available from the academic adviser.

Required Courses*

CJ 601 Mental Health, Law and Criminal Justice
CJ 605 Social Deviance
CJ 610 Administration of Justice
CJ 611 Research Methods and Statistics in Criminal Justice
CJ 637 Contemporary Issues in Criminal Justice
CJ 651 Criminal Procedure
Approved Electives (seven courses)
Total credits: 39

**As an alternative to the program listed above a student may select one of the following four concentrations.*

Concentrations

There are four optional concentrations — correctional counseling, criminal justice management, forensic computer investigation and victimology — from which students may choose more specialized programs.

Concentration in Correctional Counseling

This program, offered jointly between the criminal justice program and the department of psychology, is designed for those individuals currently in correctional counseling positions or those who anticipate a career in correctional counseling.

CJ 601 Mental Health, Law and Criminal Justice
CJ 610 Administration of Justice
CJ 611 Research Methods and Statistics in Criminal Justice
CJ 624 Group Process in Criminal Justice
CJ 693 Criminal Justice Internship I*
P 605 Survey of Community Psychology
P 611 Individual Intervention Seminar*
P 628 The Interview
P 629 Introduction to Psychotherapy and Counseling
Criminal Justice Electives* (two courses)
Psychology Electives* (two courses)
Total credits: 39

**CJ 693 Criminal Justice Internship I is to be taken prior to or in the same term as P 611 Individual Intervention Seminar. Electives will be selected with approval of adviser. Students may be required to take CJ 694 Criminal Justice Internship II, based on experience, ability and background.*

Concentration in Criminal Justice Management

This concentration is designed for those individuals wishing to pursue a career in the management of a criminal justice agency. Courses are offered jointly between the criminal justice and the public administration programs.

CJ 601 Mental Health, Law and Criminal Justice
CJ 605 Social Deviance
CJ 610 Administration of Justice
CJ 612 Criminal Justice Management
CJ 651 Criminal Procedure
PA 602 Public Policy Formulation and Implementation, *or*
PA 604 Communities and Social Change
PA 611 Research Methods in Public Administration
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 630 Fiscal Management for Local Government, *or*
PA 632 Public Finance and Budgeting
Approved Electives (four courses)
Total credits: 39

Concentration in Forensic Computer Investigation

This concentration is designed for those individuals who wish to enhance their knowledge and prepare for careers in computer and electronic investigation areas within federal, state, local governmental and corporate organizations

CJ 600 Computer Crime: Legal Issues and Investigative Procedures
CJ 601 Mental Health, Law and Criminal Justice
CJ 603 Internet Vulnerabilities and Criminal Activity
CJ 606 Domestic and Sexual Violence
CJ 611 Research Methods and Statistics in Criminal Justice
CJ 604 Network Security, Data Protection and Telecommunications
Criminal Justice Electives (four courses)

Plus three of the following:

CJ 605 Social Deviance
CJ 608 Law and Evidence
CJ 614 Survey of Forensic Science
CJ 616 Advanced Crime Scene Investigation
CJ 632 Advanced Investigation I
CJ 633 Advanced Investigation II
CJ 651 Criminal Procedure
CJ 657 Crime Mapping and Analysis
CJ 670M Selected Topic: Investigation of Financial Crimes
Total credits: 39

Concentration in Victimology

This concentration provides students with an interdisciplinary, practice-oriented educational program. It is designed to prepare graduates for entry into a wide variety of positions in law enforcement, criminal

justice, the courts, corrections and victim services programs as well as professional settings involving work with victims of crime, their families and the community at large. The curriculum encourages a broad-based training experience focusing on the enhancement of the appropriate involvement of victims in the justice system and the provision of services to victims and survivors.

CJ 606 Domestic and Sexual Violence
CJ 611 Research Methods and Statistics in Criminal Justice
CJ 617 Advanced Victimology
CJ 618 Crime Victims' Rights and Services
CJ 693 Criminal Justice Internship*
P 611 Individual Intervention Seminar*
Approved Restricted Electives (four courses)
Approved Free Electives (three courses)*
Total credits: 39

**CJ 693 Criminal Justice Internship I is to be taken prior to or in the same term as P 611 Individual Intervention Seminar. Students may be required and/or approved to take CJ 694 Criminal Justice Internship II based on experience, ability and background. With the approval of the adviser, students choosing the Thesis Option will utilize CJ 698/699 Thesis I/II for two courses (6 credits) of the Free Elective portion of the program.*

Restricted Electives

All electives must be selected with the approval of the student's adviser. Students will select (with the adviser's approval) four courses (12 credits) from the following list of Restricted Electives:

CJ 601 Mental Health, Law and Criminal Justice
CJ 605 Social Deviance
CJ 624 Group Process in Criminal Justice
P 610 Program Evaluation
P 625 Life Span Developmental Psychology
P 628 The Interview
P 629 Introduction to Psychotherapy and Counseling
P 632 Group Treatment and Family Therapy
P 636 Abnormal Psychology
PA 601 Principles of Public Administration
PA 604 Communities and Social Change
PA 630 Fiscal Management for Local Government

See the Table of Contents for related certificates in fields of criminal justice and public safety.

Fire Science

Director: Robert E. Massicotte, Jr., Assistant Professor of Fire Science, M.S., University of New Haven

Fire science is an interdisciplinary master's program designed to provide an advanced technical background for fire service, fire safety, occupational safety and security professionals who are involved with fire protection and investigation.

Fire protection specialists require knowledge of the science and methodology for preserving lives and property by preventing or minimizing losses resulting from fires, explosions, accidents and other related hazards.

Current national needs indicate that trained fire protection specialists are in extremely limited supply. Initial job opportunities in the insurance field, industry and government service may involve applications engineering, research and product design, building and systems design, fire hazard analysis, marketing of equipment or insurance.

The fire science program and courses cover a wide range of topics including the proper design, arrangement and use of building materials; analysis of fire and explosion hazards; safe design of industrial processes; management of property loss control and insurance programs; investigation of fires; management in the public sector; and safe design, selection and handling of equipment and materials. Updated skills are provided in the application of fire protection principles to fire department, water supply and building code aspects of community planning.

In addition to the graduate fire science

program at the main campus in West Haven, the university is authorized to offer the master of science in fire science at its California location in Riverside. Graduate certificates in fire science are also available at the California site. Authorization for UNH to operate in California is granted through the Bureau for Private Post-secondary and Vocational Education, which oversees and monitors the university's com-pliance with regulations set forth in the California Education Code and is the students' primary advocate in matters of consumer protection.

M.S., Fire Science

Candidates are required to complete a minimum of 39 credit hours of graduate work, which may include an internship in fire science. Transfer credit from other institutions may be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

Students in the fire science degree program are required to complete the required core courses, a concentration in either fire administration, fire/arson investigation, fire science technology or public safety management and 18 credits of electives. Students must take either FS 690 Research Seminar or FS 693 Internship. A six-credit thesis may replace one elective and the research seminar or internship requirement.

Students electing to write a thesis must register for thesis credit with the department. The thesis must show the ability to organize material in a clear and original manner and present well-reasoned conclusions. Thesis preparation and submission must comply with Graduate School policy on theses as well as specific department requirements.

Required Courses

FS 625 Chemistry of Fires and Explosions
FS 669 Dynamics, Evaluation and Prevention of Structural Fires
FS 690 Research Project, *or*
FS 693 Internship
Concentration (12-13 credits)
Approved Electives (18 credits)
Total credits: 39-40

Concentration in Fire Administration

One Computer Science (CS) Elective
MG 637 Management Process
Two Public Administration (PA) Electives
Total credits: 12

Concentration in Fire/ Arson Investigation

CJ 614 Survey of Forensic Science
FS 649 Fire Scene Investigation and Arson Analysis (4 credits)
FS 650 Arson for Profit
FS 665 Legal Aspects of Fire/Arson Investigation
Total credits: 13

Concentration in Fire Science Technology

FS 661 Systems Approach to Fire Safety
FS 663 Fire Protection Systems Application
FS 666 Industrial Fire Protection
One Occupational Safety and Health (SH) Elective
Total credits: 12

Concentration in Public Safety Management

FS 631 Organization and Management of Public Fire Protection
FS 632 Strategic Planning for the Fire Service
FS 633 Issues in Public Safety Professional Responsibility
FS 634 Issues in Public Safety Management
Total credits: 12

Elective Courses

FS 649 Fire Scene Investigation and Arson Analysis (4 credits)
FS 650 Arson for Profit
FS 661 Systems Approach to Fire Safety
FS 663 Fire Protection Systems Application
FS 664 Terrorism
FS 665 Legal Aspects of Fire/Arson Investigation

FS 666 Industrial Fire Protection
FS 667 Fire and Building Codes, Standards and Practices
FS 668 Fire and Casualty Insurance Practices
FS 684 Fire/Accident Scene Reconstruction

In addition to the above, approved courses from other departments may be taken as electives with the consent of the director of the program.

See the Table of Contents for the certificates in fire science and public safety management.

Forensic Science

Director: Howard A. Harris, Associate Professor of Forensic Science, Ph.D., Yale University; J.D., St. Louis University

Forensic science is a broad, interdisciplinary field in which the natural sciences are employed to analyze and evaluate physical evidence in matters of the law. The interdisciplinary forensic science program has three concentrations: criminalistics, fire science and advanced investigation. In addition to the M.S. degree programs, professional certificates are offered in all the specialties for those who want certification in a second track or who require only the specialized courses.

The criminalistics concentration provides the advanced technical background for those wishing to enter the criminalistics field as professional laboratory examiners. The fire science concentration provides advanced training in arson scene investigation, laboratory analysis of arson-related evidence and related aspects of arson and fire investigation. The advanced investigation concentration provides advanced training in the forensic sciences and in investigation techniques, and is designed for students interested in applying forensic science to investigations, forensic identification, crime scene processing and other related work.

The program and courses stress not only up-to-date analytical and scientific methods, but also a broad understanding of the concepts underlying the forensic sciences. Degree programs in forensic science require a sequence of core courses, followed by concentration requirement courses and a flexible offering of electives designed to meet individual interests.

In addition to the graduate forensic science program at the main campus in West Haven, the University offers the Master of Science in forensic science with a concentration in advanced investigation at its California location in Sacramento. Graduate certificates in advanced investigation and in forensic computer investigation are also available at the California site. Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education code and is the students' primary advocate in matters of consumer protection.

Admission Policy

Because the admissions criteria differ, at the time of initial application students must specify which one of the three concentrations they plan to pursue.

For admission to the *criminalistics* concentration in the M.S. in forensic science program, students must have an undergraduate degree in a natural science (chemistry, biology or physics) or forensic science from an accredited institution. Applicants should have taken at least one year of general chemistry with lab, one year of organic chemistry with lab and one semester of instrumental analysis or analytical chemistry with lab. A semester of biochemistry with lab and a year of physics with lab are highly recommended. Applications will be strengthened by an overall undergraduate grade average of at least 3.0 (on a 4.0 scale) and grades of "B" or

better in science and mathematics courses. Applicants for the criminalistics concentration are required to take the Graduate Record Examination (GRE) General Test and submit their scores to Graduate Admissions as part of their application. Applications will be strengthened by verbal scores falling at or above the 50th percentile and by quantitative/analytical scores falling at or above the 70th percentile.

For admission to the *advanced investigation or fire science* concentrations in the M.S. in forensic science program, students must have earned a baccalaureate degree from an accredited institution. The degree need not be in the natural sciences, and the GRE is not required. Applications will be strengthened by natural science coursework and by an overall undergraduate average of at least 3.0 (on a 4.0 scale).

All applications must be accompanied by two letters of recommendation. Letters should come from persons familiar with the applicant's academic skills, performance and promise. Typically, such recommenders will be either current or former professors and/or employers.

All applications should be accompanied by a short (no more than one page) statement that addresses the basis of the applicant's interest in forensic science as well as personal and professional goals and how completion of this degree program is expected to further those goals.

Admission to the forensic science program will be granted for the fall trimester only. The application deadline for the forensic science program will be February 15 for the following fall trimester. Applicants may expect an admissions decision about the middle of March in the year for which they have applied.

M.S., Forensic Science

Candidates are required to complete 40 credit hours of graduate work. Transfer of credit from other institutions may be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. *At the time of application to the forensic science program, applicants must specify one of the three areas of concentration.*

Thesis

Students may elect to write a thesis in lieu of CJ 686 Forensic Science Research Project I/ CJ 688 Forensic Science Internship I and three credits of elective coursework. Registration for a minimum of six thesis credits (CJ 697, CJ 698) would be required, the thesis must show an ability to organize material in a clear and original manner and present well reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements.

Required Courses

CJ 614 Survey of Forensic Science
CJ 620 Advanced Criminahstics I
CJ 640 Advanced Criminalistics II
CJ 653 Physical Analysis in Forensic Science
CJ 686 Forensic Science Research Project I, or
CJ 688 Forensic Science Internship I

Plus required concentration courses (see below)

Total credits: 40

Elective Courses

CJ 600 Computer Crime: Legal Issues and Investigative Procedures
CJ 602 Computers, Technology and National Security Information Management Systems
CJ 603 Internet Vulnerabilities and Criminal Activity
CJ 604 Network Security, Data Protection and Telecommunication
CJ 606 Domestic and Sexual Violence
CJ 607 Psychological Applications in Criminal Justice
CJ 608 Law and Evidence
CJ 610 Administration of Justice
CJ 645 Drug Chemistry and Identification
CJ 670 Selected Topics (many different courses offered)

CJ 695 Independent Study
SH 602 Safety Organizations and Administration
SH 615 Toxicology
SH 620 Occupational Safety and Health Law
SH 630 Product Safety and Liability

In addition, other concentration courses (in lists from which one, two or more must be taken) may be taken as electives. Courses listed as requirements for one of the concentrations may be taken as electives for other concentrations with the permission of the students faculty advisor.

Concentration in Criminalistics

CJ 621 Advanced Criminalistics I Laboratory (1 credit)
CJ 641 Advanced Criminalistics 11 Laboratory (1 credit)
CJ 654 Physical Analysis in Forensic Science Laboratory (1 credit)
CJ 673 Biomedical Methods in Forensic Science
CJ 674 Biomedical Methods in Forensic Science Laboratory (1 credit)

Plus two of the following -

CH 621 Chemical Forensic Analysis with Laboratory (4 credits)
CH 631 Advances in Analytic Chemistry
CJ 645 Drug Chemistry and Identification
CJ 660 Forensic Microscopy (4 credits)
CJ 661 Medicolegal Investigation and Identification
CJ 662 Forensic Toxicology (4 credits)

Concentration in Advanced Investigation

CJ 616 Advanced Crime Scene Investigation
CJ 632 Advanced Investigation I
CJ 633 Advanced Investigation II
CJ 661 Medicolegal Investigation and Identification

Plus one of the following:

CJ 608 Law and Evidence
CJ 651 Criminal Procedure
PS 605 Criminal Law

Concentration in Fire Science

CH 625 Chemistry of Fires and Explosions
CJ 649 Fire Scene Investigation and Arson Analysis (4 credits)
CJ 608 Law and Evidence, or CJ 651 Criminal Procedure, or FS 665 Legal Aspects of Fire and Arson Investigation, or PS 605 Criminal Law

Plus one of the following:

CJ 667 Fire and Building Codes, Standards, and Practices
CJ 668 Fire and Casualty Insurance Practices
CJ 669 Dynamics, Evaluation and Prevention of Structural Fires
CJ 684 Fire/Accident Scene Reconstruction

See the Table of Contents for certificates in forensic science

Industrial Hygiene

Coordinator: Brad T. Garber, Professor of Occupational Safety and Health, Ph.D., University of California, Berkeley

Industrial hygiene is that aspect of occupational safety and health concerned with preventing illness or disease caused by exposure to hazardous agents in the workplace. Professionals in this field are in demand to lead the effort to meet societal needs for safe and healthful places of employment. The current trend toward increasing concern about workplace environmental issues is one that is likely to continue for the foreseeable future.

Objectives

The M.S. program is designed to provide a comprehensive education in the technical and managerial aspects of industrial hygiene. Both practicing professionals and persons aspiring to enter the field will find their educational needs accommodated. Graduates will be prepared to fill upper-level positions in industry, government and labor unions.

Admission Requirements

Candidates for admission to the M.S. in industrial hygiene are required to hold a baccalaureate degree, from an accredited institution, based on a minimum of 120 semester hours or the equivalent that includes 60 or more, and preferably 68 or more, semester-hour credits in undergraduate or graduate level courses in science, mathematics, engineering and technology, with at least 15 of those hours at the upper (junior, senior or graduate) level and a minimum of 21 semester-hour credits, or the equivalent, in communications, humanities and social sciences.

M.S., Industrial Hygiene

Completion of 48 credit hours of graduate study is required for the master of science in industrial hygiene degree. The transfer of graduate credits from other institutions and/or the waiver of some courses, based on undergraduate study, is permitted subject to the policies detailed in the Graduate Catalog. Flexibility in the choice of electives makes it possible for students to tailor the program to their individual interests and needs.

Students may elect to write a thesis, in which case they would register for six credits of SH 698/699 Thesis I and II in lieu of the three-credit research project course and one elective.

Required Courses

EN 610 Environmental Health
EN 612 Epidemiology
M 605 Biostatistics
SH 602 Safety Organization and Administration
SH 608 Industrial Hygiene Practices
SH 615 Toxicology
SH 620 Occupational Safety and Health Law
SH 630 Product Safety and Liability
SH 660 Industrial Ventilation
SH 665 Industrial Hygiene Measurements
SH 667 Control of Occupational Health Hazards
SH 690 Research Project I
Electives (four courses)
Total credits: 48

Elective Courses*

CE 605 Solid Waste Management
CE 606 Environmental Law and Legislation
CH 601 Environmental Chemistry
CH 602 Environmental Chemical Analysis
EN 600 Environmental Geoscience
EN 601 Principles of Ecology with Laboratory (4 credits)
EN 606 Environmental Data Analysis
EN 607 Environmental Reports and Impact Assessment
EN 613 Radioactivity and Radiation in the Environment
EN 618 Hazardous Materials Management
FS 625 Chemistry of Fires and Explosions
IE 651/652 Human Engineering I and II
IE 688 Design of Experiments
SH 605 Industrial Safety Engineering
SH 611 OSH Research Methods and Techniques
SH 661 Microcomputers in Occupational Safety and Health
SH 691 Research Project II
SH 698/699 Thesis I and II

**Other courses may be selected with the approval of the coordinator.*

In addition to the master of science program, an industrial hygiene concentration is available in the M.S. program in occupational safety and health management along with graduate certificates in the field; see below.

National Security and Public Safety

Director: Dean Thomas A. Johnson, Professor of Criminal Justice, D.Crim., University of California, Berkeley

The National Security and Public Safety program is the result of the collaborative efforts of the Criminal Justice and Political Science Departments at the University of New Haven. The program is administered by

the Dean's Office of the School of Public Safety and Professional Studies and operates both at our main campus in West Haven, Connecticut, as well as, being hosted by Sandia National Laboratories in Livermore, California. Students applying to the program should therefore designate the campus to which they are applying.

The National Security Program provides students with an understanding of the fundamental principles of the legal charter; presidential executive orders and the framework, which guides the operation of national security agencies. Specifically, the role and function of the U.S. agencies comprising the intelligence community will be analyzed with emphasis upon Information Protection and Security. The concentration in Information Protection and Security will provide a unique approach to addressing the issue of cyberterrorism and providing assurance of our information management systems within our national security agencies. Research issues in public safety emergency management and homeland security will be emphasized. Finally, corporate security and its new relationship to the role of homeland and national security will comprise a rich element of the research inquiry.

M.S., National Security and Public Safety

Candidates are required to complete a minimum of 36 credit hours of graduate work, which may include an internship in National Security. Transfer credit from other institutions may be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

Students in the National Security and Public Safety degree program are required to complete 15 credit hours from required core courses, 9 credit hours of restricted elective credits from the list below, and 12 credits of general delectives with advisor approval. Students must complete a capstone requirement of either NSP 690 Research Project or NSP 693 National Security Internship as part of the program.

Required Courses (15 Credits)

NSP 601 National Security Programs Architecture and Mission
NSP 602 Personnel Security Programs
NSP 603 National Security Charter, Legal Issues and Executive Orders
NSP 604 Securing National Security Information Systems
NSP 690 Research Project I, *or*
NSP 693 National Security Internship I

Plus three of the following:

CJ 602 Computers, Technology & National Security Information Management Systems
NSP 606 Contemporary Issues in National Security Programs
NSP 610 NSP Cost Modeling & Contract Administration
NSP 611 NSP Situational Evaluation & Failure Analysis Models
NSP 612 Interated Studies in Safeguards & Countermeasure Designs
NSP 613 NSP Issues in Research & Policy Analysis
NSP 641 NS World & National Threat Modeling
NSP 642 Integrated Studies of the Intelligence & Counter-Intelligence Communities
NSP 643 Seminar in Sensitive Evaluation Techniques, Safeguards & Countermeasures
NSP 691 Research Project II
NSP 694 National Security Internship II
NSP 695 Independent Study

Approved Electives (12 Credits)
Total Credits: 36

Concentration in Information Protection and Security

This concentration will provide a unique approach to addressing the issue of cyberterrorism and providing assurance of our information management systems within our national security agencies. Students will be

prepared for assuming the responsibilities of protecting agency or corporate information systems. The basics of information systems security as well as the legal issues and cyber response strategies will be reviewed. Computer gaming simulations as well as on-line attack and defense techniques will be presented for student assignments.

Required Courses: (15 Credits)

NSP 601 National Security Programs Architecture and Mission
NSP 602 Personnel Security Programs
NSP 603 National Security Charter, Legal Issues and Executive Orders
NSP 604 Securing National Security Information Systems
NSP 690 Research Project I, *or*
NSP 693 National Security Internship I

Plus four of the following:

CJ 625 Information Systems, Threats, Attacks & Defenses
CJ 626 Firewalls and Secure Enterprise Computing
CJ 627 Internet and Audit Based Computer Forensics
CJ 628 Computer Viruses & Malicious Code
CJ 629 Introduction to Practical Issues in Cryptography
CJ 680 Research Issues in Cyberterrorism

Approved Electives (9 Credits)

Occupational Safety and Health Management

Coordinator: Brad T. Garber, Professor of Occupational Safety and Health, Ph.D., University of California, Berkeley

The M.S. program is designed to develop the skills required to manage a comprehensive safety and health program. It will accommodate both active practitioners and persons who wish to enter this dynamic field. An in-depth education is provided through a program of 27 credit hours of required courses and 21 credit hours of electives. The courses provide training in both the technical and management areas.

Specifically, the graduates of the program will have received extensive instruction in how to:

- evaluate the quality and effectiveness of existing safety programs;
- conduct surveys for health and safety hazards;
- institute programs to improve safety and health performance;
- establish accident prevention procedures;
- implement control measures to eliminate or reduce hazards;
- recommend methods of compliance with local, state and federal regulations and with voluntary standards; and
- manage occupational safety and health programs in industry, government and labor unions.

Admission Policy

Candidates for admission to the master of science in occupational safety and health management program are required to hold a baccalaureate degree from an accredited institution. Undergraduate courses in general chemistry, general physics and biology are required. Students who do not meet all requirements will be evaluated on an individual basis.

M.S., Occupational Safety and Health Management

Candidates are required to complete 48 credit hours of graduate work. Transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer credit noted elsewhere in this catalog. Consideration for waiver of core courses on the basis of undergraduate studies is at the discretion of the program coordinator.

The student will choose 18 credit hours of electives in consultation with the adviser. In addition, students must take three credit hours of SH 693 Internship, SH 695 Independent Study or SH 690 Research Project, in order to complete the 21-credit elective por-

tion of the program and satisfy the degree/project requirements. Students may elect to write a thesis, in which case they would register for six credits of SH 698/699 in addition to 15 credit hours of other electives.

Students electing to write a thesis must register for thesis credit with the department. The thesis must show the ability to organize material in a clear and original manner and present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as specific department requirements.

Required Courses

MG 637 Management Process
P 619 Organizational Behavior
QA 604 Probability and Statistics, *or*
M 605 Biostatistics
SH 602 Safety Organization and Administration
SH 605 Industrial Safety Engineering
SH 608 Industrial Hygiene Practices
SH 615 Toxicology
SH 620 Occupational Safety and Health Law
SH 630 Product Safety and Liability
Electives (seven courses)
Total credits: 48

Elective Courses*

CE 602 Biological Treatment of Aqueous Wastes
CE 607 Water Pollution Control Processes
CH 601 Environmental Chemistry
EN 602 Environmental Effects of Pollutants
EN 610 Environmental Health
EN 612 Epidemiology
EN 613 Radioactivity and Radiation in the Environment
FS 666 Industrial Fire Protection
IE 651 Human Engineering I
MG 645 Management of Human Resources
MG 664 Organizational Effectiveness
P 640 Industrial Motivation and Morale
SH 611 OSH Research Methods and Techniques
SH 660 Industrial Ventilation
SH 661 Microcomputers in Occupational Safety and Health
SH 665 Industrial Hygiene Measurements
SH 667 Control of Occupational Health Hazards
SH 670 Selected Topics
SH 690/691 Research Project I and II
SH 693/694 OSH Internship I and II
SH 695/696 Independent Study I and II
SH 698/699 Thesis I and II

**Other courses may be substituted with the consent of the program coordinator.*

Concentration in Industrial Hygiene

Within the master of science program in occupational safety and health management, students may use their electives to fulfill the requirements for a concentration in industrial hygiene. The coursework is designed to meet the needs of both practicing industrial hygienists and those aspiring to enter this profession. Development of skills in the recognition, evaluation and control of occupational health hazards is the focus of this concentration.

Students pursuing this concentration will take the required core curriculum; the three required credits of internship/research project/independent study or six credits of thesis; and these electives:

EN 610 Environmental Health
EN 612 Epidemiology
SH 660 Industrial Ventilation
SH 665 Industrial Hygiene Measurements
Electives (two courses)
Total credits: 18

See previous pages for the M.S. degree program in industrial hygiene.

Professional Counseling

Coordinator: Mario T. Gaboury, Associate Professor of Criminal Justice, J.D., Georgetown Universtiy Law Center, Ph.D., Pennsylvania State University

M.S., Professional Counseling

A total of 48 credit hours are required for the Master of Science degree in professional counseling. Graduate study in professional counseling is intended to prepare students to work in a variety of settings including community counseling and mental health centers, career and vocational programs, substance abuse treatment centers, correctional facilities, crime victim services programs, crisis counseling services, social services and health services agencies, community-based and governmental counseling and human services programs, as well as in business. The curriculum focuses on the master of counseling skills emphasizing healthy life adjustment and development across the lifespan.

The objective of the program is to prepare graduates to intervene at the individual, family, small group or community levels helping clients to achieve their human potential, while coping with the increasing stress of contemporary life, and to attain their maximum psychological, inter-personal, social, academic, and vocational functioning. The 48 credit hour master's program is designed to meet the academic and degree-based clinical training guidelines of the Council for the Accreditation of Counseling and Related Educational Programs (CACREP); and the university intends to seek program accreditation from this organization.

Professional Counselors also need to fulfill state licensing requirements. Students wishing to apply for Licensure in Professional Counseling in Connecticut are advised of the requirement that, in addition to an appropriate Master's degree, applicants must complete a minimum of 60 graduate credits "deemed to be in or related to the discipline of professional counseling." Therefore, students wishing to pursue licensure in Connecticut will select an appropriate, additional 12 graduate credit hours, in consultation with their Advisor, in order to fulfill this requirement. Ultimately it is the responsibility of each student to secure licensure and the university cannot guarantee that any individual will obtain any particular state license. We strongly urge students to research state licensing requirements relevant to their studies.

Required Courses (42 Credits):

HMS 601 Counseling Foundations and Professional Orientation (3 credits)
HMS 605 Social/Cultural Foundations of Counseling (3 credits)
HMS 607 Psychological Applications in Counseling Settings (3 credits)
HMS 610 Research Methods & Statistics in Counseling (3 credits)
HMS 611 Individual Counseling Seminar (3 credits)
HMS 613 Group Dynamics in Counseling Settings (3 credits)
HMS 614 Counseling Practicum (3 credits)
HMS 625 Lifespan Development & Counseling (3 credits)
HMS 627 Career & Lifestyle Development (3 credits)
HMS 632 Group Treatment & Family Therapy (3 credits)
HMS 634 Personality Assessment (3 credits)
HMS 635 Appraisal & Testing In Counseling (3 credits)
HMS 693 Counseling Internship I (3 credits)
HMS 694 Counseling Internship II (3 credits)

Elective Courses (6 Credits)

HMS 606 Domestic & Sexual Violence (3 credits)
HMS 617 Advanced Victimology (3 credits)
HMS 636 Abnormal Psychology & Counseling (3 credits)

HMS 624 Experimental Self Analytic Group (3 credits)
HMS 628 Interview Skills for Counselors (3 credits)
Total Credits=48

Additional Coursework Required for Connecticut Licensure:

The State of Connecticut requires that, in addition to an appropriate Master's degree, applicants for licensure as Professional Counselor must "successfully complete sixty (60) graduate semester hours deemed to be in or related to the discipline of professional counseling…" Therefore, in addition to the 48 Credit Hours required to complete the M.S. in Professional Counseling, students wishing to apply for Connecticut licensure will, in consultation with their advisor, select an additional 12 Graduate Credit Hours from the Elective Courses, listed above, and from the additional Psychology courses listed below. Students wishing to apply for licensure in Connecticut or any other state are strongly encourages to research relevant licensing requirement, as it ultimately the student's responsibility to obtain the necessary elements of training and supervision and the university cannot ensure success in seeking licensure.

P 607 Special Problems in Community Psychology
P 610 Program Evaluation
P 612 Consultation Seminar
P 623 Psychology of the Small Group

Graduate Certificates

The School of Public Safety and Professional Studies offers the following graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Persons who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate must complete the Graduate School application form, submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Academic Policies section of the catalog for a complete description of the options, regulations and requirements for study and completion of a Graduate Certificate.

Fire/Arson Investigation Certificate

Adviser: Robert E. Massicotte, Jr., Assistant Professor of Fire Science, M.S., University of New Haven

The certificate in Fire/Arson Investigation is designed to assist professionals who wish to acquire specific skills in this specialized field. The following four courses, or substitutions approved by the adviser, are required for completion of this certificate.

FS 625 Chemistry of Fires and Explosions
FS 649 Fire Scene Investigation and Arson Analysis (4 credits)
FS 650 Arson for Profit
FS 665 Legal Aspects of Fire/Arson Investigation
Total credits: 12-13

Fire Science Technology Certificate

Adviser: Robert E. Massicotte, Jr., Assistant Professor of Fire Science, M.S., University of New Haven

The certificate in fire science technology is designed to assist professionals who wish to acquire specific skills related to this specialized field. This certificate is appropriate for

those in both the public and private sectors who are involved in fire/life safety and property protection. The following four courses, or substitutions approved by the adviser, are required for completion of this certificate.

FS 625 Chemistry of Fires and Explosions
FS 666 Industrial Fire Protection
FS 667 Fire and Building Codes, Standards and Practices
FS 669 Dynamics, Evaluation and Prevention of Structural Fires
Total credits: 12

Forensic Computer Investigation Certificate

Adviser: Dean Thomas A. Johnson, Professor of Criminal Justice, D. Crim., University of California, Berkeley

This certificate is designed for those professionals who wish to enhance their knowledge and skills in forensic computer investigation. Courses will be selected with the adviser to satisfy best the student's professional interests.

CJ 600 Computer Crime: Legal Issues and Investigative Procedures
CJ 604 Network Security, Data Protection and Telecommunication

Plus six credits from the following:

CJ 602 Computers, Technology and National Security Information Management Systems
CJ 603 Internet Vulnerabilities and Criminal Activity
CJ 608 Law and Evidence
CJ 616 Advanced Crime Scene Investigation
CJ 632 Advanced Investigation I
CJ 633 Advanced Investigation II
CJ 651 Criminal Procedure
CJ 670 Selected Topics
Total credits: 12

In addition to the main campus in West Haven, study for the graduate certificate in Forensic Computer Investigation is available at a UNH site in Sacramento, California.

Forensic Science/Advanced Investigation Certificate

Adviser: Howard A. Harris, Associate Professor of Forensic Science, Ph.D., Yale University; J.D., St. Louis University

CJ 614 Survey of Forensic Science
CJ 616 Advanced Crime Scene Investigation
CJ 632 Advanced Investigation I
CJ 633 Advanced Investigation II

Plus two of the following:

CJ 608 Law and Evidence
CJ 610 Administration of Justice
CJ 620 Advanced Criminalistics I
CJ 640 Advanced Criminalistics II
CJ 653 Physical Analysis in Forensic Science
CJ 661 Medicolegal Investigation and Identification
CJ 673 Biomedical Methods in Forensic Science
PS 605 Criminal Law
Total credits: 18

Forensic Science/ Criminalistics Certificate

Adviser: Howard A. Harris, Associate Professor of Forensic Science, Ph.D., Yale University; J.D., St. Louis University

CJ 620 Advanced Criminalistics I
CJ 621 Advanced Criminalistics I Laboratory (1 credit)
CJ 640 Advanced Criminalistics II
CJ 641 Advanced Criminalistics II Laboratory (1 credit)
CJ 653 Physical Analysis in Forensic Science
CJ 654 Physical Analysis in Forensic Science Laboratory (1 credit)
CJ 673 Biomedical Methods in Forensic Science
CJ 674 Biomedical Methods in Forensic Science Laboratory (1 credit)

Plus one of the following:

CH 621 Chemical Forensic Analysis with Laboratory (4 credits)
CH 631 Advances in Analytic Chemistry
CJ 610 Administration of Justice
CJ 614 Survey of Forensic Science
CJ 645 Drug Chemistry and Identification
Total credits: 19-20

Forensic Science/ Fire Science Certificate

Adviser: Howard A. Harris, Associate Professor of Forensic Science, Ph.D. , Yale University; J.D., St. Louis University

CJ 640 Advanced Criminalistics II
CJ 649 Fire Science Investigation and Arson Analysis (4 credits)
CJ 653 Physical Analysis in Forensic Science
FS 665 Legal Aspects of Fire and Arson Investigation

Plus any two of the following:

CH 625 Chemistry of Fires and Explosions
CJ 614 Survey of Forensic Science
CJ 667 Fire and Building Codes, Standards and Practices
CJ 668 Fire and Casualty Insurance Practices
CJ 669 Dynamics, Evaluation and Prevention of Structural Fires
CJ 684 Fire/Accident Scene Reconstruction
CJ 693 Criminal Justice Internship I
Total credits: 19

Industrial Hygiene Certificate

Adviser: Brad T. Garber, Professor of Occupational Safety and Health, Ph.D., University of California, Berkeley

This certificate is designed for practicing professionals who wish to increase their knowledge and skills in industrial hygiene as well as for persons who wish to enter this field. Courses of study are individually tailored to the specific occupational needs of each applicant.

A total of 15 credits in industrial hygiene, toxicology and related fields must be completed. Students, in consultation with the adviser, will design a course of study consisting of the following offerings or approved substitutes.

Any five of the following:

SH 602 Safety Organization and Administration
SH 608 Industrial Hygiene Practices
SH 611 OSH Research Methods and Techniques
SH 615 Toxicology
SH 660 Industrial Ventilation
SH 661 Microcomputers in Occupational Safety and Health
SH 665 Industrial Hygiene Measurements
SH 667 Control of Occupational Health Hazards
Total credits: 15

Information Protection and Security Certificate

Adviser: Dean Thomas A. Johnson, Professor of Criminal Justice, D.Crim., University of California, Berkeley

This certificate is designed to prepare individuals for assuming the responsibilities of protecting their agency or corporate information systems. The basics of information systems security as well as the legal issues and cyber response strategies will be reviewed. Computer gaming simulations as well as on-line attack and defense techniques will be presented for student assignments. A selection of these certificate courses are offered on-line, with instruction delivered over the Internet. Appropriate computer competency is assumed as prerequisite to these courses.

CJ 625 Information Systems Threats, Attacks and Defense
CJ 626 Firewall and Secure Enterprise Computing

Plus two of the following, subject to approval of the adviser:

CJ 602 Computers, Technology and National Security Information Management Systems

CJ 604 Network Security, Data Protection and Telecommunication
CJ 608 Law and Evidence
CJ 627 Internet Investigations and Audit-Based Computer Forensics
CJ 628 Computer Viruses and Malicious Code
CJ 629 Practical Issues in Cryptography
CJ 651 Criminal Procedure
Total credits: 12

National Security Certificate

(12 Credits)

Advisor: Thomas A. Johnson, Dean

National Security

For students who may not be ready to commit to a full length graduate program, or for those who already hold a master's degree but wish to pursue additional work in the area of National Security, the Graduate Certificate provides such as alternative. Application for the Graduate Certificate requires the Dean's approval.

Required Courses

NSP 601 National Security Programs Architecture and Mission
NSP 602 Personnel Security Programs
NSP 604 Securing National Security Information Systems
NSP 612 Interated Studies in Safeguards & Countermeasure Designs

Occupational Safety Certificate

Adviser: Brad T. Garber, Professor of Occupational Safety and Health, Ph.D., University of California, Berkeley

This certificate is designed to fit the needs of professionals with or without an advanced degree who wish to increase their knowledge and skills in the dynamic field of occupational safety as well as to offer training to persons who wish to enter the field. The wide variety of courses allows students to tailor their study to meet individual needs.

Students will select 15 credits in the safety and health field in consultation with the adviser, designing a course of study consisting of the following offerings or approved substitutes.

Any five of the following:

SH 602 Safety Organization and Administration
SH 605 Industrial Safety Engineering
SH 608 Industrial Hygiene Practices
SH 611 OSH Research Methods and Techniques
SH 615 Toxicology
SH 620 Occupational Safety and Health Law
SH 630 Product Safety and Liability
SH 660 Industrial Ventilation
SH 661 Microcomputers in Occupational Safety and Health
SH 665 Industrial Hygiene Measurements
Total credits: 15

Public Safety Management Certificate

Adviser: Robert E. Massicotte, Jr., Assistant Professor of Fire Science, M.S., University of New Haven

This certificate in public safety management is designed to assist professionals who wish to acquire specific skills related to this field. Courses emphasize the application of modern management principles and practices to the field of public safety. The following four courses, or substitutions approved by the adviser, are required for completion of this certificate.

FS 631 Organization and Management of Public Fire Protection
FS 632 Strategic Planning for the Fire Service
FS 633 Issues in Public Safety Professional Responsibility
FS 634 Issues in Public Safety Management
Total credits: 12

One of the following electives may be substituted for one of the above required courses with the approval of the adviser.

CO 631 Public Information Dynamics
EC 665 Urban and Regional Economic Development
FS 681 Seminar/Research Project in Public Safety Management I
FS 682 Seminar/Research Project in Public Safety Management II
FS 683 Seminar/Research Project on Comparative Public Safety Systems
PA 620 Personnel Administration and Collective Bargaining in the Public Sector
PA 630 Fiscal Management for Local Government
PS 635 Law and Public Health
SH 602 Safety Organization and Administration
SH 620 Occupational Safety and Health Law

Victim Advocacy and Services Management Certificate

Adviser: Mario T. Gaboury, Associate Professor of Criminal Justice, Ph.D., Pennsylvania State University, J.D., Georgetown University Law Center

This certificate is designed for professionals who work with crime victims. Students will develop advanced knowledge and skill in working as victim advocates and as victim services managers.

CJ 617 Advanced Victimology
CJ 618 Crime Victims' Rights and Services

Plus two of the following:

CJ 601 Mental Health, Law and Criminal Justice
CJ 605 Social Deviance
CJ 606 Domestic and Sexual Violence
CJ 624 Group Process in Criminal Justice
P 605 Survey of Community Psychology
P 610 Program Evaluation
P 611 Individual Intervention Seminar
P 625 Life Span Developmental Psychology
P 628 The Interview
P 629 Introduction to Psychotherapy and Counseling
P 632 Group Treatment and Family Therapy
P 636 Abnormal Psychology
PA 601 Principles of Public Administration
PA 604 Communities and Social Change
PA 630 Fiscal Management for Local Government
Total credits: 12

COURSE DESCRIPTIONS

Course descriptions are arranged alphabetically by the course prefix code letters, as listed below. For the purpose of brevity, course descriptions may consist of sentence fragments. Unless otherwise specified, all graduate courses carry three credit hours.

A

A Accounting and Taxation

B

BI Biology

C

CE Civil and Environmental Engineering
CH Chemistry
CJ Criminal Justice
CM Chemical Engineering
CO Communication
CS Computer Science

E

E English
EC Economics
ED Education
EE Electrical and Computer Engineering
EN Environmental Science
ES Engineering Science
EXID Executive M.B.A.
EXIE Executive Engineering Management

F

FI Finance
FS Fire Science

H

HMS Human Services and Professional Counseling
HS History
HT Hospitality and Tourism
HU Humanities

I

IB International Business
IE Industrial Engineering

L

LG Logistics

M

M Mathematics
MB Molecular Biology
ME Mechanical Engineering
MG Management
MK Marketing

N

NSP National Security & Public Safety
NU Nutrition

P

P Psychology
PA Public Administration/ Health Care
PH Physics
PL Philosophy
PS Political Science

Q

QA Quantitative Analysis

S

SH Occupational Safety and Health
SO Sociology

Accounting and Taxation

A 601 Federal Income Taxation I
A study of tax policy and the fundamental principles of the federal income tax law taught at an advanced level of inquiry. Coverage entails the key concepts of gross income, adjusted gross income, deductions, exemptions, credits and special tax computations, with attention given to the provisions of the Internal Revenue Code affecting individual taxpayers.

A 602 Federal Income Taxation II
Prerequisite: A 601. A continuation of Federal Income Taxation I emphasizing the fundamental principles concerning dispositions of property: analysis of basis, recognition of gain or loss, capital asset transactions, nonrecognition exchanges and depreciation recapture; inventory methods, changes in accounting periods and accounting methods.

A 603 Qualified Retirement Plans
Prerequisite: A 602. An examination of the fundamentals of the federal taxation of deferred compensation. The course will focus on qualified retirement plans and individual and self-employed retirement plans as developed by the Employment Retirement Income Security Act of 1974 and subsequent legislation. Deferred executive compensation arrangements, stock options, restricted property, tax deferred annuities and various employee benefit plans will also be reviewed.

A 604 Corporate Income Taxation I
Prerequisite: A 602. A foundation course analyzing the basic federal income tax provisions regarding the definition of corporation vs. association and limited liability company issues and how they affect corporations and shareholders. Course coverage includes organization of the corporation, corporate capital structure, corporate distributions, stock redemptions, bail-out techniques and liquidations.

A 605 Corporate Income Taxation II
Prerequisite: A 604. Advanced study in the corporate tax area including Subchapter S corporations, collapsible corporations, accumulated earnings, personal holding company taxes, and taxable corporate acquisitions.

A 606 Advanced Topics in Corporate Income Taxation
Prerequisite: A 604. Advanced study in the corporate tax area including affiliated corporations, carryover of corporate tax attributes, corporate reorganizations and divisions, intercompany transactions and consolidated returns.

A 607 International Taxation
Prerequisite: A 604. Consideration of the federal income tax treatment of nonresident aliens and foreign corporations, and the foreign income of U.S. residents and domestic corporations; comparison of alternative methods of engaging in operations abroad; foreign tax credit; allocations under code Section 482; Section 367 rulings; effect of tax treaties.

A 608 Estate and Gift Taxation
A comprehensive introduction to, and analysis of, the federal estate and gift tax laws including basic principles of estate planning. Topics also include income taxation, simple and complex trusts, throwback rules, taxable and distributable net income and income in respect of a decedent.

A 610 Estate Planning
Prerequisite: A 608. The essential elements of estate planning under current law. Includes gift planning as well as death transfers in the general context of family financial planning; also, personal planning considerations, as well as tax savings. State succession taxes will be reviewed.

A 611 State and Local Taxation
Tax problems encountered at the state and local level by businesses engaged in interstate commerce. Federal limitations on the taxation of multistate enterprises and jurisdictional problems are examined. Specific areas covered are: license to do business, net income, franchise, gross receipts, property, and sales and use taxes. Apportionment problems are examined in detail.

A 613 Taxation of Limited Liability Companies, Partnerships and Partners
Prerequisites: A 602. A study of the federal income tax problems encountered in the formation and operation of partnerships and limited liability companies, including computations of taxable income, sale of a partnership interest, withdrawal of a partner, death or retirement of a partner, distribution of partnership assets and basis adjustments.

A 614 Federal Tax Practice and Procedure
Prerequisite: A 601. A study of the history and organization of the Internal Revenue Service, the selection of returns for audit and the review steps at the administrative level. Code provisions covered will include: filing requirements, statutory notices, restriction on assessment, statute of limitations, refund procedures,

waivers, closing agreements, protests and rulings.

A 615 Research Project in Federal Income Taxation
Prerequisite: 15 graduate hours in taxation. A study of the techniques and tools of tax research. Reference sources include: tax loose-leaf services, I.R.S. cumulative bulletins, court cases, congressional committee reports, textbooks, published articles. Research projects will be assigned for written submission.

A 616 Taxation for Management
Introduction to federal taxation and its impact on business decision making. Overview of the basics of federal taxation, its traps and tax planning opportunities. Complete overview of all areas of federal taxation to understand the tax planning for personal and business situations and the interrelationship of tax planning decisions. Areas of federal taxation covered are: individual income taxes, corporation income taxes, S corporations, partnerships, income taxation of estates and trusts, estate and gift taxes. *Not open to M.S. in taxation program students.*

A 620 Financial Accounting for Managers
An examination of financial accounting reports, standards, practices and procedures from a user's perspective, emphasizing the understanding and use of accounting reports rather than their preparation. Basic terms, concepts, reports and underlying theories are covered. A review of the effects of choosing certain accounting methods, policies and procedures is intended to enhance the manager's comprehension of financial statement presentation.

A 621 Managerial Accounting
Prerequisite: A 620. Accounting analysis for the managerial functions of planning, controlling and evaluating the performance of the business firm.

A 630 Topics in Corporate Financial Reporting
Prerequisite: A 620 or equivalent. A selected examination of corporate financial accounting topics including revenue recognition, current assets, investments, leases, pensions, earnings per share, foreign currency translation and business combinations.

A 641 Accounting Information Systems
Prerequisite: A 621. An examination of the function and limitations of internal accounting information systems and their relationship to other decision-oriented business information systems.

A 642 Internal Auditing Seminar
Prerequisite: A 621. Analysis of the principles underlying the functions of auditing within a firm. Will impart a working knowledge of techniques used in business audits.

A 650 Advanced Accounting Theory
Prerequisite: A 630 or six hours of intermediate accounting. Theoretical aspects of accepted accounting principles and their significance as a frame of reference for the valuation of accounting practices. Major focus on the role of regulatory agencies and professional accounting organizations with regard to their influences on accounting theory and practice.

A 652 Auditing and Assurance Services Seminar
An analysis of the contemporary problems surrounding the attest function performed by the professional independent auditor.

A 654 Financial Statements: Reporting and Analysis
Prerequisite: A 621. Techniques in analyzing financial statements by creditors and equity investors for the short and long term. Review of accounting principles as reflected in the financial statements.

A 661 Managerial Accounting Seminar
Prerequisite: A 621. Case course covering advanced issues of management accounting. Develops topics introduced in A 621.

A 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. Course may be taken more than once.

A 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an adviser.

A 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

A 696 Independent Study II
A continuation of Independent Study I.

Biology

BI 605 Biostatistics
A non-calculus-based course which includes basic concepts of probability and statistics. These concepts are applied to problems in human biology, industrial/occupational health and epidemiology. Introduction to and use of the computer package SPSSx for data analysis. (See also M 605.)

Civil and Environmental Engineering

CE 601 Physical-Chemical Treatment of Aqueous Wastes

Analysis of physical and chemical processes in natural and engineered systems for water pollution control. Unit processes covered include, but are not limited to: aeration and gas transfer, sedimentation, filtration, coagulation/flocculation, adsorption, chemical stabilization, ion exchange, disinfection. Design methodologies and operational aspects of treatment are also considered.

CE 602 Biological Treatment of Aqueous Wastes

This course provides an in-depth study of principles of biological treatment of aquatic wastes (municipal, industrial and/or hazardous). Suspended and attached growth processes commonly in use are covered. Emphasis is given to design and operational aspects of activated sludge, trickling filters and rotating biocontactors. On-site treatment processes are also covered.

CE 603 Contaminant Fate and Transport in the Environment

This course covers the fundamental principles of contaminant behavior in the environment. Contaminant physical-chemical properties, transport and transformation mechanisms affecting contaminant distribution among air, water and solid domains are studied in depth. Topics covered include, but are not limited to: environmental interface equilibria; advective and diffusional transport; biochemical exchange in atmospheric, aquatic and terrestrial domains. Environmental modeling is also considered.

CE 605 Solid Waste Management

Characteristics, volumes, collection and disposal of solid waste and refuse. Design of processing, recycling and recovery equipment; landfill design and operation; resource recovery; incineration.

CE 606 Environmental Law and Legislation

Review; techniques of enforcement of state and federal pollution control laws and regulations; effects on waste treatment criteria and design and evaluation of municipal ordinances; preparation of environmental assessments and impact statements.

CE 607 Water Pollution Control Processes

Prerequisite: CH 601. *This course is open to non-engineering students only.* Study of physical, chemical and biological processes employed for pollution control. Processes cover the removal of suspended, colloidal and dissolved phases of pollution.

CE 610 Pollution Prevention Management Technologies

The first half of this course focuses on methods to implement a pollution prevention hierarchy, developing management support, identifying pollution prevention opportunities, assembling a pollution prevention team and developing economic justification for potential opportunities. The second half of the course focuses on various technologies available for a wide variety of pollutants, including a review of methods that can be used to integrate the technologies within processes of existing facilities.

CE 612 Advanced Wastewater Treatment

Prerequisite: CE 602. Theories and principles of advanced sewage treatment including nutrient removal, demineralization, distillation, ozonization, carbon filtration, ion exchange, nitrification; design of facilities; upgrading secondary plants.

CE 613 Industrial Wastewater Control

Prerequisites: CE 601, CE 602. Characteristics of industrial wastes–volumes, sources, types; methods of volume reduction, waste segregation, recovery, recycling and waste treatment.

CE 614 Surface Water Quality Management

Prerequisite: CE 620. Determination of controls that must be instituted to achieve specific water quality objectives. Waste load allocation as principal management tool, requiring knowledge of response of a system to waste load inputs. Input/response relationships for three different surface water systems: rivers and streams; lakes; estuaries. Related topics: dissolved oxygen analysis, indicator bacteria and eutrophication.

CE 615 Groundwater Hydrology

Prerequisite: undergraduate courses in fluid mechanics and soil mechanics. Study of fundamental principles governing fluid flow in porous and fractured media, provides necessary foundation for advanced studies in hydrogeology and contaminant hydrology. Includes Darcy's law, the continuity equation, aquifers, flow in the saturated zone, flow nets, wells and well hydraulics, flow in fractures, flow in the unsaturated zone, groundwater modeling.

CE 616 Contaminant Hydrology

Prerequisite: CE 615. Behavior of contaminants in the subsurface. Emphasis on physical, chemical and biological processes that determine fate of a contaminant: advection, diffusion, adsorption,

mechanical dispersion, biochemical reactions. Quantitative relationships for predictive framework. Applications including site characterization, remediation, wellhead protection, flow and transport modeling, groundwater waste disposal.

CE 617 Wastewater Residuals Management
Prerequisites: CE 601 and CE 602, or permission of instructor. An overview of rules and regulations affecting treatment and disposal of wastewater residuals. Quantitative and qualitative characteristics are considered. Treatment processes for preliminary operations, thickening, chemical/biological stabilization, conditioning, disinfection, dewatering, drying, thermal reduction and ultimate disposal are covered extensively and design procedures are outlined. Case studies address beneficial use of wastewater residuals.

CE 618 Hazardous Waste Treatment
Prerequisites: CE 601 and 602, or permission of instructor. A review of the historical, legislative and social framework of hazardous waste issues. Physical, chemical, biological and thermal processes used for decontamination of hazardous wastes and hazardous waste sites are studied extensively. Specific remedial in-situ/ex-situ technologies such as soil vapor extraction, soil washing, incineration, bioremediation, immobilization and chemical extraction are covered. Includes various laboratory and field case studies.

CE 620 Engineering Hydrology
Prerequisites: undergraduate course in hydraulics; computer literacy. Theory, methods and applications of hydrology to contemporary engineering problems. Methods of data collection and analysis as well as design procedures are presented for typical engineering problems. Specific topics to be considered within this framework include the rainfall/runoff process, hydrograph analysis, hydrologic routing, urban runoff, storm water models and flood frequency analysis.

CE 621 Advanced Hydrology
Prerequisite: CE 620. Examination of water sources and losses; the evaporation and infiltration processes and their effects on stream flow hydrographs. Deterministic and stochastic methods of reservoir analysis and design for purposes of flood protection and water conservation will be investigated, as well as problems in urban hydrology.

CE 623 Open Channel Hydraulics
Prerequisite: undergraduate course in hydraulics. Basic theories of open channel flow will be presented and corresponding equations developed. Methods of calculating uniform/steady flow; gradually varied flow; and rapid, spatially varied, unsteady flow will be investigated. Flow through bridge piers, transitions and culverts; backwater curves and the design of open channels.

CE 624 Computer Applications in Hydrology/Hydraulics
Prerequisite: CE 620 and CE 623. Investigation of widely used computer software in the areas of hydrology and hydraulics. The theory underlying the programs as well as application and evaluation of software will be stressed.

CE 629 Wood Engineering I
Prerequisites: a structural analysis course and a structural design course. Course may not be taken for credit by students who have completed the undergraduate equivalent of this course. Study of the growth and structure of wood and how these influence wood strength, durability, preservation and fire protection. Analysis and design of structural members of wood using Allowable Stress Design (ASD) method including beams, columns and connections; design of wood structures. Laboratory experiments included.

CE 630 Reinforced Concrete Design
Prerequisite: undergraduate course in concrete design and construction. Advanced topics including deep beams, slabs, composite beams, beam columns, stability, connections, creep and deflection control.

CE 631 Structural Steel Design
Prerequisite: undergraduate course in steel design and construction. Advanced topics related to the behavior and design of rigid frames (single and multistory), plate girders and connections.

CE 633 Wood Engineering II
Prerequisite: CE 629, or undergraduate course in wood engineering. Wood properties and determination of allowable stresses. Laminated, built-up and composite sections. Wood framing systems and connections to resist gravity and lateral loads.

CE 634 Prestressed Concrete Design
Prerequisite: undergraduate course in concrete design and construction. Analysis and design of pretensioned and posttensioned concrete structures. Beams, columns, connections, partial prestressing, deflections, anchorage.

CE 640 Structural Analysis
Prerequisite: undergraduate course in indeterminate structures. Analysis of structures having members with variable cross sec-

tions, secondary stresses, shear walls and semirigid connections. Influence lines for statically indeterminate structures.

CE 650 Soil Mechanics I
Prerequisites: undergraduate course in soil mechanics; computer literacy. The first in a series of courses dealing with soil mechanics and foundation engineering. Will give the student a better understanding of the basic principles of geomechanics. Includes: the nature of soil; soil formation; phase relationships and classification; stress, strain and strength analysis; flow analysis; and consolidation theory.

CE 651 Soil Mechanics II
Prerequisite: CE 650. Second course in the soil mechanics series. Includes: consolidation theory, settlement analysis, soil modification, compaction, lateral earth pressure, slope stability and soil exploration.

CE 652 Foundation Engineering I
Prerequisite: CE 651. Deals primarily with shallow foundations. Includes: types of foundations, site exploration, shear strength, bearing capacity, limit states, settlement, allowable pressure, and rafts and mats.

CE 653 Foundation Engineering II
Prerequisite: CE 652. Deals primarily with deep foundations. Topics include pile foundations, pile types, pile driving, load testing, design of individual piles, group action, drilled pier foundations, construction methods and capacity in sand and clay.

CE 660 Project Planning
Application of network analogy to project planning and scheduling; resource, time and financial management. Computer applications will be included.

CE 661 Air Pollution Fundamentals
An introduction to the sources of air pollution, transport of gaseous and particulate pollutants in the atmosphere on local and global scales, transformations of pollutants by atmospheric processes, impact of airborn pollutants on the environment, control of sources of air pollution and legislative mandates. Introduction to meteorological concepts and computer transport models. Current issues such as ozone depletion and global warming will also be discussed. (See also CM 621.)

CE 670 Selected Topics
A study of related topics of particular interest to students and instructor. Course may be taken more than once.

CE 678 Computer Applications in Civil Engineering
Prerequisite: introductory course in computer fundamentals. The design and analysis of software and hardware systems for the solution of civil engineering problems. Includes: software engineering, software coding, evaluation of hardware and software.

CE 690 Research Project
Prerequisite: 18 graduate hours or permission of the department chair and program coordinator. Independent study under the guidance of an adviser into an area of mutual interest, each study terminating in a technical report of academic merit. Research may be in such environmental areas as water resources, stream pollution, solid waste management or air pollution.

CE 695 Independent Study I
Prerequisite: permission of program coordinator. Independent study under the guidance of an adviser into an area designated by the program coordinator.

CE 696 Independent Study II
A continuation of Independent Study I.

CE 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

CE 699 Thesis II
A continuation of Thesis I.

Chemistry

CH 600 Introduction to Environmental Chemistry
Prerequisite: one year of undergraduate general chemistry. Designed as a prerequisite for CH 601 for students with one year of undergraduate general chemistry, but who lack organic chemistry. Review of general and introduction to organic chemistry, with examples taken from topics of environmental concern including discussion of pollutants, toxicology and some environmental analytic methods.

CH 601 Environmental Chemistry
Prerequisite: one year of undergraduate general chemistry, plus one semester of organic chemistry or CH 600. Areas of consideration: the sources, reactions, transport, effects and fates of chemical species in the water, soil and air environments, as well as the influence of human activities on these processes.

CH 602 Environmental Chemical Analysis
Prerequisite: CH 601 or equivalent. Theory and laboratory training in the applications of instrumental methods in the analysis of environmental sam-

ples. Topics include sampling techniques; chromatography; ultraviolet-visible, infrared and atomic absorption spectroscopy; mass spectrometry; nuclear magnetic resonance spectrometry; biochemical methods and use of radioisotopes.

CH 605 Organic Reaction Mechanisms
This course deals with the structure and mechanisms of organic reactions, including stereochemistry and conformational analysis, acid-base catalysis, substitution, addition, and elimination reactions, as well as concerted reactions. Prerequisite: one year of undergraduate organic chemistry.

CH 606 Modern Organic Synthetic Methods
A survey and discussion of methods are considered. Some of the topics covered are synthetic strategies, including computer-generated strategies, asymmetric syntheses, oxidation, reduction, stereocontrol and ring formation, protecting groups, nucleophlic and electrophilic species that form carbon-carbon bonds, and some complex molecules. Prerequisite: CH 605 or equivalent, or consent of instructor.

CH 611 Special Topics in Advanced Organic Chemistry
Advanced course dealing with topics such as stereochemistry, photochemistry, natural products and mechanisms of organic reactions.

CH 621 Chemical Forensic Analysis with Laboratory
Advanced techniques and new developments in the identification of various materials such as pigments, dyestuffs, food additives, pharmaceutical preparations, polymers, synthetic fibers and inorganic material products. 4 credits.

CH 625 Chemistry of Fires and Explosions
An examination of the basic organic chemistry and combustion and explosive properties of flammable materials. The chemical principles underlying fires and explosions. Chemical properties of various synthetic materials and the products of their combustion. Fire retardant materials and chemicals used in fire extinguishment. (See also FS 625.)

CH 631 Advances in Analytic Chemistry
Provides background for the recent advances made in instrumentation and current analytic techniques.

CH 650 Medicinal Chemistry I
Medicinal chemistry is the investigation, discovery, and development of therapeutic agents. A key concept is the understanding of the relationship between chemical structure and drug activity. It is interdisciplinary in its approach, with the goal of understanding drug action and designing new drugs. Medicinal chemistry incorporates knowledge of a wide scope of disciplines, such as chemistry, biology, and pharmacology. This course emphasizes the fundamental principles of medicinal chemistry and surveys major classes of drugs. Prerequisite: one year of undergraduate organic chemistry. Recommended: an advanced undergraduate organic chemistry course.

CH 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

CH 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

CH 696 Independent Study II
A continuation of Independent Study I.

CH 698 Thesis I
Prerequisite: completion of 15 credits of graduate work. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

CH 699 Thesis II
A continuation of Thesis I.

Criminal Justice

CJ 600 Computer Crime: Legal Issues and Investigation Procedures
An overview of computer crime and the procedures forensic computing specialists, law enforcement investigators and prosecutors must invoke to prosecute computer criminals successfully.

CJ 601 Mental Health, Law and Criminal Justice
Basic psychological theory and specific applications in the criminal justice system will be explored. Particular emphasis is placed on mental health issues as they affect the criminal justice system.

CJ 602 Computers, Technology and National Security Information Management Systems
An introduction to information systems used within our national security system. A framework is provided for understanding the needs, types, capabilities and applications of management information systems. An overview of existing national security information systems is presented with implications for the future needs. Finally, the impact of science and technology upon our national security agencies and how information management systems will prepare us

for 21st century challenges will also be analyzed.

CJ 603 Internet Vulnerabilities and Criminal Activity

This course provides appropriate strategies for the proper documentation, preparation and presentation of investigations involving the Internet and familiarizes students with legal information which impacts Internet investigations.

CJ 604 Network Security, Data Protection and Telecommunications

A comprehensive introduction to network security issues, concepts and technologies. The core technologies of access control, cryptography, digital signatures, authentication, network firewalls and network security services are reviewed. Issues of security policy and risk management are considered. 3 credits.

CJ 605 Social Deviance

A survey of theories relating to the scope and nature of the crime problem. Consideration of the problems of deviancy including social norms deviancy, mental disturbances, juvenile crime and the various possible and actual responses to deviancy. Various approaches to the problem of rehabilitation. (See also HMS 605)

CJ 606 Domestic and Sexual Violence

An in-depth analysis of the typologies, causes, correlates, dynamics and effects of domestic and sexual violence and victimization. A review of treatment practices in these areas will be provided. (See also HMS 606)

CJ 607 Psychological Applications in Criminal Justice

Prerequisite: CJ 601 or permission of instructor. This course will explore psychological theory and research in relation to specific problems in criminal justice. Assumptions underlying behavior analysis in criminal investigation and profiling, eyewitness testimony, jury selection, violence prediction, risk assessment, personnel screening and children as victims will be examined. Students will be expected to develop an application in a specific area of expertise using class and textual content as a base. (See also HMS 607)

CJ 608 Law and Evidence

Comprehensive study of the rules of evidence, particularly as applied to physical evidence. Includes judicial notice, presumptions, hearsay rules, confessions, admissions, scientific evidence and expert testimony. Emphasis on criminal law applications.

CJ 610 Administration of Justice

A study of all the steps of the criminal justice system from the time the accused is arrested until sentencing to a correctional facility. The objective will be to review all the problems which arise during this process and to consider some possible solutions which will benefit the individual being processed without subverting the purposes of the process.

CJ 611 Research Methods and Statistics in Criminal Justice

An introduction to quantitative and qualitative methods used in criminal justice for research and policy analysis purposes. Students will become familiar with basic types of research designs, survey research methods, evaluation methods, descriptive statistics and inferential statistics. (See also HMS 610)

CJ 612 Criminal Justice Management

The development of the theory and practice of criminal justice management in the United States. Significant developments and ideas of those who have made major contributions to American criminal justice management.

CJ 614 Survey of Forensic Science

An introductory survey of forensic sciences and criminalistics, crime scene procedures and documentation, and methods of laboratory analysis for all forensic science students.

CJ 616 Advanced Crime Scene Investigation

An in-depth study of crime scene procedures including recognition, protection, documentation, and collection of physical evidence; scene documentation, scene search procedures; and reconstructions from evidence and scene patterns.

CJ 617 Advanced Victimology

An in-depth analysis of the causes, correlates, dynamics and aftereffects of criminal victimization on victims of crime and a review of current practices in the area of crime victim assistance. (See also HMS 617)

CJ 618 Crime Victims' Rights and Services

An analysis of the legal rights of victims of crime at both the state and federal levels and how these laws relate to specific victim advocacy and service-providing programs is presented, with an in-depth treatment of the management and administration of crime victim programs.

CJ 620 Advanced Criminalistics I

The comparison and individualization of physical evidence by biological and chemical properties is presented in lectures and carried out in the laboratory. The theories and practice of microscopic, biological, immunological and chemical analysis are applied

to the examination of blood, saliva, seminal fluid, hair, tissues, botanical evidence and other material of forensic interest.

CJ 621 Advanced Criminalistics I Laboratory
Laboratory fee required. 1 credit.

CJ 624 Group Process in Criminal Justice
Small group interaction; both theoretical and experimental facets of group process are presented. Group counseling and encounter groups. (See also HMS 624)

CJ 625 Information Systems Threats, Attacks and Defenses
This course provides an overview of the actors, motives and methods used in the commission of computer-related crimes and describes the methods used by organizations to prevent, detect and respond to these crimes.

CJ 626 Firewall and Secure Enterprise Computing
This course covers theory and practices of Internet firewalls and many of the details and vulnerabilities of the IP and embedded protocol sites. In the laboratory and on-line portion of the course students will construct, deploy and test a real firewall against common Internet attacks.

CJ 627 Internet Investigations and Audit-Based Computer Forensics
Theory and techniques for tracking attackers across the Internet and gaining forensic information from computer systems. The course includes case studies of Internet-based crimes and addresses limits of forensic techniques.

CJ 628 Computer Viruses and Malicious Code
This course addresses theoretical and practical issues surrounding computer viruses.

CJ 629 Practical Issues in Cryptography
Practical issues in cryptography, including examples of current historical cryptography and stegonagraphic systems; major types of cryptosystems and cryptanalytic techniques, and how they operate; hands-on experience with current crypto-graphic technology.

CJ 632 Advanced Investigation I
An in-depth study of modern principles and techniques of criminal and civil investigations. Management of investigations, use of witnesses, interviewing, polygraph, backgrounds, establishment of MO, missing persons, surveillance and investigation of questioned deaths and death scenes.

CJ 633 Advanced Investigation II
An in-depth study of the principles and techniques of criminal and civil investigations. Investigation of fraud, embezzlement, white-collar crime, property crimes, sexual assaults and other crimes against persons; extortion; kidnapping; drug trades; and traffic accidents.

CJ 637 Contemporary Issues in Criminal Justice
Topics selected by students relating to current issues and concerns in the field of criminal justice. Each student will be required to write a paper and deliver an oral presentation on a selected topic.

CJ 640 Advanced Criminalistics II
Introduction of advanced microscopic, chemical and instrumental methods with extensive hands-on experience provided by a laboratory section. Principles and methods of analysis of microscopic and macroscopic evidence such as glass, soil, papers, inks, dyes, paints, varnishes, explosives, fibers, drugs and other potential physical traces will be discussed in class.

CJ 641 Advanced Criminalistics II Laboratory
Laboratory fee required. 1 credit.

CJ 645 Drug Chemistry and Identification
Introduction to licit and illicit drugs as evidence, followed by an overview of chemical, microscopical and instrumental techniques used for their identification; discussion of sampling, separation and quantitation of evidence specimens; presentation of drug chemistry expert testimony in courts of law.

CJ 649 Fire Scene Investigation and Arson Analysis
The techniques of crime scene documentation and investigation as they relate to fire and explosion scenes. Evidence recognition and collection. Laboratory analysis of fire scene, arson accelerant and explosion scene residues. Scientific proof of arson. Laboratory fee required. 4 credits. (See also FS 649.)

CJ 650 Death Investigation —Scene to Court
An in-depth study of the principles and techniques associated with investigating homicides, suicides and accidental, natural or equivocal deaths. While considering the sociological, psychological and legal aspects typically found in these cases, the process will take students from the scene to the court, criminal or civil. *Enrollment restricted to fully matriculated graduate students in criminal justice and forensic science only.*

CJ 651 Criminal Procedure
An inquiry into the nature and scope of the U.S. Constitution as it relates to criminal procedures. Areas covered include the law of search and seizure, arrests and the right to counsel.

CJ 653 Physical Analysis in Forensic Science
The classic firearms examination, classification and comparison of bullets and cartridges, toolmarks comparison and striation analysis, serial number restoration, document examination, voiceprint identification, fingerprints and polygraphy examination.

CJ 654 Physical Analysis in Forensic Science Laboratory
Laboratory fee required. 1 credit.

CJ 655 Crime Prevention Through Environmental Design
Analysis of theory and applied methods of crime prevention using environmental design methods. Experiential exercises are included.

CJ 656 Problem-Oriented Policing
In-depth examination of problem-oriented policing including examination of SARA model, specialized tactics and methods of community analyses.

CJ 657 Crime Mapping and Analysis
Survey of Geographical Information Systems (GIS) research and applications in the field of public safety, including analysis of hot spots, density patterns and forecasts of crime patterns.

CJ 658 Leadership Issues in Policing
Study of leadership within modern police organizations. Experiential exercises will be included.

CJ 660 Forensic Microscopy
Basic techniques of optical microscopy and the development of operational skills for the use of the microscope as a tool of evidence detection and evaluation. Microscopical measurements and analytic methods will be covered. Laboratory fee required. 4 credits.

CJ 661 Medicolegal Investigation and Identification
An introduction to procedures and techniques for medicolegal investigation of questioned death and identification of deceased persons, including autopsy technique, odontological procedures and anthropological approaches.

CJ 662 Forensic Toxicology
An in-depth analysis of forensic toxicological procedures and methods; determinations of metallic, volatile and soluble poisons; analysis for narcotic drugs and other drugs of abuse and dosage form drugs that are commonly abused or found contributing to cause of death. Laboratory fee required. 4 credits.

CJ 663 Advanced Forensic Serology I
A comprehensive study of the theory and practice of isoenzyme, serum protein and immunoglobulin genetic markers in human blood and body fluids. Electrophoretic and isoelectric focusing techniques. Interpretation of genetic marker results in blood individualization. Laboratory fee required. 4 credits.

CJ 664 Advanced Forensic Serology II
A comprehensive study of the theory and practice of biochemical and immunologic procedures for blood and body fluid identification; typing of Rh, MNSs and other red cell antigens in blood and blood stains; antiserum selection and evaluation; ELISA techniques; DNA polymorphism analysis. Laboratory fee required. 4 credits.

CJ 667 Fire and Building Codes, Standards and Practices
The study of building and fire codes and regulations as they relate to the prevention and incidence of structural fires. Contemporary building and fire codes and practices and their enforcement. Model building codes. Fire prevention and control through building design. (See also FS 667.)

CJ 668 Fire and Casualty Insurance Practices
A study of financial risk and decision making. Insurance rate making and relation to risk and other factors. Insurance adjustment and economic factors that must be considered in fire and accident investigations. (See also FS 668.)

CJ 669 Dynamics, Evaluation and Prevention of Structural Fires
A detailed analysis of the evolution of modern structures and the mechanical systems necessary to provide safety and comfort. The effect of the nature of structures and their mechanical systems on fire behavior. Structural basis and mechanical systems for fire protection and fire prevention. (See also FS 669.)

CJ 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

CJ 673 Biomedical Methods in Forensic Science
Methods and application of modern toxicology, biochemistry, molecular biology, pathology, dentistry and medicine in forensic science.

CJ 674 Biomedical Methods in Forensic Science Laboratory
Laboratory fee required. 1 credit.

CJ 675 Private Security Law
A review and examination of currently applicable federal and state administrative, civil, criminal and constitutional laws as they relate to the private security industry.

The framework of the course will include sources of authority and common law.

CJ 676 Security Management Seminar
Current problems, concerns, issues and legislation affecting the private security industry as they relate to and are of interest to the students and instructor.

CJ 677 Private Security in Modern Society
An introduction to current thinking and problems relating to the private security industry. The course will examine such issues as historical growth, role, mission and future of the industry. Other topics will include professionalization and ethics in the private security field.

CJ 680 Research Issues in Cyberterrorism
This course will consist of lectures, discussions and empirical research into issues in cyberterrorism, its causes, its limitations, and its implications. It will focus largely on the thresholds and factors that drive terrorist groups into the information arena, the use of information technology by terrorist groups, and the emergence of new terrorist groups which use the information arena as their primary terrorism mechanism.

CJ 684 Fire/Accident Scene Reconstruction
Application of principles of reconstruction of the scene of a fire or accident, including proper procedure for examining physical evidence to determine cause. Emphasis on preparation of reports, testimony for hearings and trials, rendering of advisory opinions to assist in resolution of disputes affecting life and property. (See also FS 684.)

CJ 686 Forensic Science Research Project I
Individual guidance on a research endeavor. 1-3 credits.

CJ 687 Forensic Science Research Project II
Prerequisite: CJ 686. 1-3 credits.

CJ 688 Forensic Science Internship I
Formal educational development is complemented by field placement experience in a forensic science laboratory or identification unit. Field experience is supervised by designated agency and department personnel. Students must complete a project in connection with the internship placement and experience; an appropriate work product must be provided to the instructor.

CJ 689 Forensic Science Internship II
Prerequisite: CJ 688.

CJ 690 Research Project I
Individual guidance on a research endeavor. 1-3 credits.

CJ 691 Research Project II
Prerequisite: CJ 690. 1-3 credits.

CJ 693 Criminal Justice Internship I
The student's formal educational development will be complemented by field placement experience in various criminal justice settings or agencies. Field experience will be supervised by designated agency and department personnel. (See also HMS 693)

CJ 694 Criminal Justice Internship II
Prerequisite: CJ 693. (See also HMS 694)

CJ 695 Independent Study
A directed independent learning experience, the topic and format to be agreed upon by the student and supervising faculty. 1-3 credits.

CJ 697 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress toward the completion of the thesis.

CJ 698 Thesis II
A continuation of Thesis I.

CJ 699 Thesis III
A continuation of Thesis II.

Chemical Engineering

CM 621 Air Pollution Fundamentals
Prerequisite: CH 601 or permission of instructor. An introduction to the sources of air pollution, transport of gaseous and particulate pollutants in the atmosphere on local and global scales, transformations of pollutants by atmospheric processes, impact of airborn pollutants on the environment, control of sources of air pollution and legislative mandates. Introduction to meteorological concepts and computer transport models. Current issues such as ozone depletion and global warming will also be discussed. (See also CE 661.)

CM 622 Air Pollution Control
Prerequisite: CM 621 or permission of instructor. Covers conventional and emerging air pollution control technologies. Conventional technologies include cyclone separators, baghouse filters, wet scrubbers, electrostatic precipitators, thermal and catalytic incineration, absorbers and adsorption systems. Emerging technologies will vary with new developments. Legislative mandates related to control technologies and emission limits will be discussed.

CM 624 Chemical Process Safety
Prerequisite: undergraduate degree in engineering, chemistry or physics, or permission of instructor. Methods of analysis and design for the control of hazards as applied to a chemical process environment. Emphasis on applications and current industrial practices. Topics include: characterization of chemical hazards, toxic release modeling, fires and explosion prevention, pressure relief equipment design, hazard identification/risk assessment techniques and accident investigation.

CM 670 Selected Topics
A study of selected issues of particular interest to the students and the instructor. May be taken more than once.

CM 690 Project
Prerequisite: 15 graduate hours or permission of the department chair and program coordinator. Independent work under the guidance of an adviser into an area of mutual interest, each study terminating in a technical report of academic merit. May involve research or design activity to solve a significant technical problem which utilizes chemical engineering concepts.

CM 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

CM 696 Independent Study II
A continuation of Independent Study I.

CM 698 Thesis I
Prerequisite: completion of 15 credits of graduate work. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

CM 699 Thesis II
A continuation of Thesis I.

Communication

CO 621 Managerial Communication
Prerequisite: MG 637 or MG 640 or P 619 or PA 601. Major emphasis on the role of communication in a democracy and the effects of communication content. Brief treatment of content analysis techniques, person-to-person communication and barriers to the flow of communication.

CO 623 Communication in Health Care
Examination of the diversity of communication encounters and contexts in which allied health professionals may be involved; emphasis on development of competencies and skills necessary to communicate effectively with staff, patients and the community. Influence of interpersonal communication and mass media in staff development, patient care and the marketing of health care. Students will develop a communication campaign aimed at internal and external audiences.

CO 631 Public Information Dynamics
How the executive can best present the organization in an accurate and favorable light to the news media. Training techniques for the public relations person who will work with executives giving corporate messages internally and press statements externally.

CO 632 Contemporary Public Relations Issues
Using the case-study approach, concentrates on the problems facing management and public relations executives in businesses and other institutions. The problems change from year to year, in tune with developments in society.

CO 640 Communication Technologies
An in-depth examination for nontechnical students of technologies used with visual, voice data and character information for communicating at a distance, for storing and subsequently retrieving information, and for processing information to improve communication efficiency.

CO 641 Competition and Regulation in Telecommunication
A study of proceedings before state public utility commissions and the Federal Communications Commission delineating the boundaries between those activities in the telecommunication field subject to regulation, those open to competition with restrictions and those cleared to be fully competitive. The course will include discussion and analysis of contemporary legal proceedings affecting this topic.

CO 642 Management of Telecommunication Organizations
A study and comparison of managerial systems and practices in users, manufacturers, distributors and common carriers of telecommunication facilities. Identification of criteria necessary for developing and maintaining effective telecommunication organizations. Case problems will relate largely to specific instances from this field.

CO 643 Telecommunication Policy and Strategy
Examination of management policies and strategies for the complex telecommunication organization operating in a dynamic environment, from the viewpoint of the top-level executives of the organization. Development of analytic frameworks for the management of numerous elements involved in assuring the fulfillment of the

goals of the total organization. Integration of the student's general business knowledge with the content of the course. Emphasis is placed on the examination and discussion of cases drawn largely from the telecommunication industry.

CO 670 Selected Topics
Prerequisite: permission of adviser. An in-depth examination of a topic in the field of communication which reflects the special research of a faculty member or the special interest of a group of students. May be taken more than once.

CO 693 Internship
A program of field experience, approved by the program adviser, under the tutelage of a professional in the field of communication.

CO 695 Independent Study I
A planned program of individual study or research in communication under the supervision of a member of the faculty.

CO 696 Independent Study II
A continuation of Independent Study I.

CO 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings with the adviser for discussion of the individual student's progress in the preparation of a thesis.

CO 699 Thesis II
A continuation of Thesis I.

Computer Science

CS 604 Introduction to Programming/C
Prerequisite: College Algebra (M 109 or equivalent). A first course in computer programming using the C language, for those with little or no experience with programming. Problem solving methods, program planning, development, and testing. Sound programming practices and good style. Simple preprocessor usage, objects, expressions, functions, libraries, basic types, arrays, and pointers. Extensive programming will be required.

CS 610 Intermediate Programming/C
Prerequisite: College Algebra (M 109 or equivalent) and CS 604 or permission of instructor. An intermediate-level programming course covering all aspects of the ANSI C language, its preprocessor, syntax and semantics, modern usage, design and solution techniques, as well as elements of data structures, algorithms, and analysis of programs. Emphasis is on construction of portable, modular programs.

CS 616 Assembly Language
Prerequisites: CS 610 and CS 640. Introduction to assembly language programming, including study of instruction types and operation, assembly language syntax and features, explicit use of memory, macros, subprograms, interrupts, I/O conversions, linking with higher-level programs.

CS 617 Java Applet Programming
Prerequisite: CS 620. A study of object-oriented programming in an Internet environment using the Java Abstract Windows Toolkit. Also covers concurrency and synchronization with threads.

CS 618 Legal, Ethical and Social Issues in Computing
A broad-ranging examination of the effects of computers on our society, our understanding of ethics and our laws. Software patents, copyrights and other forms of protection. Computer crime and its repercussions. Privacy, responsibility and liability. The risks inherent in large systems and the increasing complexity of issues due to wide-spread networking.

CS 620 Data Structures
Prerequisite: CS 610. An examination of data structures, their function and uses. Topics will include basic data representations, arrays, linked structures, stacks, queues, trees, graphs, hashing. Study of relation between data structures and algorithms, with sorting and searching, elements of complexity analysis. Recursion and other solution techniques. Students will develop and run several programs in a high-level language.

CS 622 Database Systems
Prerequisite: CS 604 or knowledge of a programming language. A survey of database systems, their purpose, structure, function and use. Topics will include an overview of DB systems, major DB models, design and implementation methods in DB models, introduction to typical DB systems and internal operation of DB systems.

CS 622B Advanced Database Systems
Prerequisites: CS 620, CS 622, and CS 644. A second course in database systems covering advanced topics and new developments in the database field. Topics from: database design methodologies and evaluation, embedded SQL, concurrency control, recovery schemes, security, query processing and optimization, and an introduction to object-oriented databases.

CS 623 Rapid Software Development/Visual Basic
Prerequisites: CS 620, CS 622. A course for experienced programming students in rapid software development within the environment of Visual Basic. Topics include the VB IDE (Integrated Development Environment),

human-computer interaction, GUI interface development, legacy remote-database connectivity using ODBC, as well as Data Access Object (DAO), Remote Data Object (RDO), and ActiveX Data Object (ADO) methods. Students will conceive, design, code, implement, document, and present a substantial programming project, as the final product of this course.

CS 625 Software Project Management

Prerequisite: CS 628. A course for software professionals who are interested in expanding their knowledge of software project management. Topics include project management and roles, project planning including software and estimation, software quality, industry standards, technical staff evaluation, team management, project recovery and risk management.

CS 626 Object-Oriented Principles and Practice/C++

Prerequisite: CS 620. An advanced programming course taught in the C++ language. Objects, methods, abstract data types, data hiding, templates, inheritance, polymorphism, exception handling. Students will design and code several modular projects using C++.

CS 628 Object-Oriented Analysis and Design

Prerequisite: CS 617 or CS 626 or permission of instructor. An object-oriented design methodology course. Topics include system analysis, design and implementation. Primary emphasis on the Unified Modeling Language (UML) methodology and its importance in developing a software project. Students will design a major group project and implement portions using C++ or Java.

CS 630 Introduction to Computing Theory

Introduction to the theory of computers and computation including study of formal systems and methods; regular expressions, formal languages and grammars, elements of parsing theory, and the Chomsky hierarchy; finite automata and pushdown automata; decidability; Turing machines, Post machines and other formal computer models; and elements of complexity theory.

CS 632 Algorithm Design and Analysis

Prerequisite: CS 620. Study of the time and space complexity of algorithms and of efficient algorithm design. Topics include amortized analysis, advanced data structures, greedy algorithms, divide-and-conquer, dynamic programming, randomized algorithms, NP-Completeness.

CS 633 Topics in Algorithms

Prerequisite: CS 632. Important algorithms usually omitted in earlier courses. Topics to be selected at the instructor's discretion from, but not limited to: measuring performance of algorithms, graph algorithms, string searching, range searching, red-black trees, B-trees, splay trees, random number generators, computational geometry, the fast Fourier transform, number theoretic algorithms, parallel algorithms, randomized algorithms.

CS 634 Cryptography and Data Security

Prerequisite: CS 620. A survey of cryptographic concepts and algorithms and their application to data security. Techniques studied will include private key cryptosystems, public key cryptosystems, and hash functions. Commonly used algorithms will also be studied, including DES, 3DES, IDEA, RSA, Diffie-Hellman, MD5, SHA, and DSS. Other algorithms examined will be those used to provide confidentiality, message authentication, key exchange and digital signatures in applications such as client-server authentication, email security, and web security.

CS 636 Structure of Programming Languages

Prerequisites: CS 620, CS 630 and knowledge of at least two high-level computer languages. The structure, syntax and semantic aspects of computer languages will be studied. Programs will be written in the FORTH language.

CS 640 Computer Organization

The structure and the function of computers. The nature and the characteristics of modern computer systems and the operation of individual components: CPU, control unit, memory units and I/O devices. Topics include addressing methods, machine-program sequencing, microprogramming, complex I/O organization, interrupt systems, multiple-module memory systems and caches, peripheral devices, microprocessors, pipeline organization and memory interleaving.

CS 640B Parallel Computer Architectures

Prerequisites: CS 610, CS 640. Parallel and other high-performance architectures and their implications for system software, including three structural classes: pipelined computers, array processors and multiprocessor systems. Topics include the memory, the I/O subsystems, and the interconnection network needed in parallel computers, the design principles and applications of pipelined super-computers, the interconnection structure of array processors, operating system controls, coordination of parallel activity and performance of parallel systems.

CS 642 Computer Networks and Data Communication

Prerequisites: CS 610, CS 644. The ISO 7-level model, network

topology, communications theory, protocols, virtual circuits and packet switching, local networks (CSMA/CD, token ring), error detection and correction. Additional topics may include security (Data Encryption Standard, public-key crypto-systems), TCP/IP, sockets.

CS 644 Operating Systems

Prerequisites: CS 620 as a pre- or corequisite, and CS 640 (or EE 682). Study of the function, structure and design of computer operating systems, principally multiprogramming systems. Topics include management of processes and processor resources, of data and memory and of peripheral devices; concurrent processes; system protection; scheduling; paging and virtual systems.

CS 644B Advanced Operating Systems

Prerequisite: CS 644. A second course in operating systems and system architecture covering advanced topics, and new hardware/software developments. Includes: interprocess communication, design issues, special-purpose and multiprocessor operating systems, concurrency and access control, user interfaces, I/O devices and management, parallel architecture, fault tolerance and new developments.

CS 645 Network Administration

Prerequisite: CS 644. Fundamentals of administration of a networked computer. Topics include basic duties of a system administrator, overview of TCP/IP networking, file system layouts, user management, network services such as DNS, NIS, DHCP, file sharing, printing, mail, ftp, web, interfacing different operating systems on one network, and general security issues including prevention through firewalls and secure shells. Lab exercises will use both Unix and Windows systems.

CS 646 Introduction to Computer Security

Prerequisite: CS 644. Knowledge of networks is desirable. A survey of computer and network security issues including types of network attacks, viruses, intrusion detection and tracking, firewalls, trust relationships and authentication, secure connections, cryptography, and recent security policy and legislation.

CS 647 Systems Programming

Prerequisite: CS 644. Techniques for systems programming using the C language and libraries. Topics include data structures for system implementation, string processing, macro preprocessors, conditional compilation, UNIX system calls including file operations and process control, interprocess communication, client-server routines.

CS 649 Network Analysis

Prerequisite: EE 610 or CS 642. Building on a foundation knowledge of local area networks (LANs), wide area networks (WANs), and the OSI model, both large and small network designs are explored through lectures, labs, and an individual and a major group project. Topics and labs include Windows server administration, UNIX connectivity, Ethernet and Token Ring networks, implementing WANs using a simulated T1 environment, wireless LAN environments, configuring DSL routers, multi-vendor routers, managed switches and network packet examination.

CS 650 Computer Graphics

Prerequisites: CS 620, M 610 or equivalent. The mathematical foundations for computer graphics and introduction to the current state of the art of graphics programming. Includes: 2-D and 3-D viewing, geometric transformations, clipping, segmentation, user interaction, curves, surfaces, color, modeling and object hierarchy.

CS 651 Topics in Computer Graphics

Prerequisite: CS 650. Course topics include advanced concepts such as perspective depth, hidden-surface elimination, surface fitting and surface displaying, light, shading, fractals, and geometric models.

CS 655 Internet Applications with Java

Prerequisite: CS 617 or permission of the instructor. A second course in Java surveying many techniques for communicating information over the Internet. Topics include establishing network connections, remote method invocation, database connectivity, servlets, JavaServer Pages, JavaBeans, XML, and internationalization.

CS 657 Programming Window Systems

Prerequisite: CS 626. A survey of facilities found in all window operating systems including the window manager, the event queue, icons and fonts. Other topics include bitmap display, use of resources in a dialog editor, preserving state information in a registry and providing context-sensitive help. Programming assignments will use a package such as Microsoft Foundation Classes.

CS 660 Artificial Intelligence

Prerequisite: CS 620. Principal techniques of a functional programming language, and the fundamental goals and methods of artificial intelligence (or AI)-a field which attempts to simulate intelligent behavior by computer. Includes the design and implementation of AI programs.

CS 663 Mobile Robotics
Prerequisites: CS 620 and CS 644. Principles of construction and navigation of mobile robots. Topics include locomotion mechanisms, sensor types and usage, reactive behavior, tracking, obstacle avoidance, path planning, and communication schemes for remote control. Students will work both individually and in groups to construct and program small mobile robots using Lego Mindstorms kits.

CS 664 Neural Networks
Prerequisite: CS 620. Examines various connection topologies between the many, simple parallel processing elements of neural networks; the learning algorithms which train the networks; and the computational capabilities of these various configurations. Independent literature research, class presentations and software simulations of neural networks required.

CS 665 Digital Image Processing
Prerequisites: CS 620, M 610 or equivalent. Theoretical and mathematical basis of techniques of digital image processing and programming methodologies necessary to implement such techniques. Introduction to current capabilities of digital image acquisition hardware. Implementation of standard procedures for image enhancement, morphology, compression and storage. Image transforms and information extraction techniques in both the spatial and Fourier frequency domains.

CS 670 Selected Topics
Prerequisite: The nature of any prerequisites will depend on the topic. An examination of new developments or current practices in computer science. Topics will vary from trimester to trimester.

CS 690 Project
Prerequisite: 15 credit hours and completion of all core courses. Petition to register must be approved by a supervising faculty member, the program coordinator, and the department chair. Completion of a significant project in the student's concentration area under the guidance of an adviser, such study terminating in a technical report of academic merit. For example, the project may be a survey of a technical area in computer science or may involve the solution of an actual or hypothetical technical problem.

CS 692 Internship I
Prerequisites: CS 620, 18 graduate credit hours, QPR of 3.0 or better and permission of graduate coordinator and adviser. An on-the-job learning experience with a selected organization, taken for academic credit under the supervision of a faculty internship adviser. This is a Free Elective course only and may not be counted as a Restricted Elective. 1 credit.

CS 693 Internship II
A continuation of Internship I. 1 credit.

CS 694 Internship III
A continuation of Internship II. 1 credit.

CS 695 Independent Study I
Prerequisite: Petition to register must be approved by a supervising faculty member, the program coordinator, and the department chair. Independent study under the guidance of an adviser in an area designated by the program coordinator in consultation with the student.

CS 696 Independent Study II
A continuation of Independent Study I.

CS 698 Thesis I
Prerequisite: 15 credit hours and completion of all core courses. Petition to register must be approved by a supervising faculty member, the program coordinator, and the department chair. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

CS 699 Thesis II
A continuation of Thesis I.

English

E 600 English Language Workshop
Enrollment in this course is limited to and required of students who are not native speakers of English and who lack adequate background in English instruction. Students whose TOEFL scores are less than 560 (220 on the computer-based test) and/or students who enter the Graduate School following completion of an intensive English language program are required to take and pass this training course in the first term of enrollment at the Graduate School. The course emphasizes development of conversation, pronunciation and composition skills and includes orientation to the Peterson Library and instruction in writing a research paper. No credit.

E 659 Writing and Speaking for Professionals
A practical, tool-oriented approach for professionals who need to perfect writing and speaking skills for career advancement or presentations in graduate courses. Students generate work-related writing/speaking assignments and negotiate learning contracts based on editing, writing and speaking methods related to individual needs and objectives. (See also HU 659.)

Economics

EC 601 Macroeconomics and Microeconomics
A basic theoretical foundation for students who lack adequate background in economics. An introduction to and review of basic economic principles.

EC 603 Microeconomic Analysis
Prerequisites: EC 601, QA 604. Survey of the behavior and decision choices of individual economic agents (e.g., consumers, firms and resource owners) under alternative market conditions, time horizons and uncertainty.

EC 604 Macroeconomic Analysis
Prerequisites: EC 601, QA 604. Study of the performance and fluctuations of the economy, focusing on economic policies that affect performance. Topics include consumption and investment, the determinants of changes in wages and prices, monetary and fiscal policies, money, interest rates, the federal budget, the national debt, and interdependence and policy between countries.

EC 625 Industrial Relations
Survey of problems, strategies and policies of management interactions with formal and informal labor organizations. Labor legislation, collective bargaining, productivity analysis and arbitration are stressed, with emphasis on negotiating strategies and techniques.

EC 627 Economics of Labor Relations
Survey of labor economics using the tools of economic and institutional analysis. Emphasis on human resources and demographics pertaining to labor markets.

EC 629 Business and Society
Prerequisite: EC 601. Topics include forces shaping business institutions through emerging social, legal, ethical and political issues such as pollution control, workplace issues, equal employment opportunity, product safety and relations with external stakeholders. Also addressed, using lectures and cases, will be laws and regulations that govern and restrict business activities.

EC 633 Managerial Economics
Prerequisites: EC 601, FI 601. Application of the major tools of economic analysis to problems encountered by management presented using lectures and case studies. Topics include measurement of market demand, cost analysis, expenditure and production decisions, price determination in competitive markets which include the entrepreneurial enterprise as well as the allocation of capital and investment.

EC 641 International Economics
Prerequisite: EC 601. Examination of international trade, foreign exchange and capital markets. Topics include national policy in an open economy, international policy coordination and globalization.

EC 665 Urban and Regional Economic Development
Prerequisite: EC 601. Techniques, methods of analysis and models utilized in the development process. Emphasis on job creation, manufacturing assistance, free enterprise zones and regional planning.

EC 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

EC 679 Industrial Relations Seminar
Prerequisites: EC 625, EC 687, MG 637 and P 619, or permission of instructor. A seminar in industrial relations and the labor-management relations function of the modern work organization. The use of an integrated behavioral, economic and legal approach permits an applied multidisciplinary synthesis of the employee relations function required in either nonunionized or unionized work organizations.

EC 687 Collective Bargaining
Recommended prerequisite: EC 625. Emphasis on contract negotiation, whether in a formal or informal bargaining scenario. Contract development covers wages, benefits, job security, management's rights, equal opportunity and grievance procedures. Additional time devoted to third-party settlements—the arbitration process.

EC 690 Research Project
Prerequisite: permission of the instructor. A major independent research study/project carried out under faculty supervision.

EC 693 Internship
Prerequisite: 15 graduate hours and permission of program coordinator. A supervised work experience in a selected organization, arranged for course credit and directed by a faculty adviser.

EC 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

EC 696 Independent Study II
A continuation of Independent Study I.

EC 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

EC 699 Thesis II
A continuation of Thesis I.

Education

Some course numbers in this field are followed by the suffixes "E" for elementary, "M" for middle grades/middle school and "S" for secondary.

ED 600 Student Teaching
This practicum satisfies the requirement of the State of Connecticut for teacher candidates to demonstrate attainment of the appropriate Connecticut Teaching Competencies in a culminating clinical activity of supervised student teaching. 6 credits.

ED 601 Introduction to Education
This course introduces students to the field of education. Students will learn about the CT Teaching Competencies, classroom management techniques and will be given a broad overview of school-related issues. 1 credit to be taken in advance of first trimester of study.

ED 603 E/M/S Human Growth and Development
A study of the major aspects of human development from conception through adolescence, presenting the important theories and research methods of the field and tracing the physical, cognitive psychological and social development of each chronological division. 2 credits.

ED 604 Educational Psychology
Content emphasizes the application of psychological principles and research results to the teaching-learning process. Includes learning principles, development, planning instruction, evaluating student performance, classroom management and motivation.

ED 605 Students with Special Needs
Provides prospective educators with an understanding of methods used to identify, diagnose and teach exceptional students in regular and special classrooms. Describes the developmental and learning characteristics of exceptional students, reviews educational and supportive services, and examines laws impacting on the education of students with special needs.

ED 606 History of American Education
Survey of the relationship between education and American culture through a focused study of the history of public schooling in the United States. Study of events, developments and moods that have shaped American education through Colonial times, the first century of American independence, the Progressive reform era and the Depression era to the current day. 2 credits.

ED 608 Child Development
A study of the physical, cognitive, and social development of children, with special emphasis on major theories and research methods.

ED 609 Adolescent Development
A study of the physical, cognitive, and social development of adolescents, with special emphasis on major theories and research methods.

ED 611 Learning and Intelligence
Examination of the dynamics of the major explanations of learning and intelligence; learning as the core of behavior.

ED 612 Curriculum Design
Application of theoretical knowledge of curriculum to real course planning. Investigation and analysis of current educational programs in terms of curricular theory as well as training for teachers in basic curriculum development techniques.

ED 614 Philosophy of Education
A critical analysis of education in contemporary society as reflected in the thinking of modern and early philosophers. (See also PL 614.)

ED 615A/B/C/D/E Strategies in Mathematics Content
Provides specialized training in teaching specific content areas of mathematics to current and future teachers. 1 credit for each content area.
ED 615A Geometry I
ED 615B Geometry II
ED 615C Graphing Calculators
ED 615D Discrete Methods
ED 615E Remedial Mathematics

ED 616A/B/C/D/E Strategies in Science Content
Provides specialized training in teaching specific content areas of science to current and future teachers. 1 credit for each content area.
ED 616A Chemistry
ED 616B Physics
ED 616C Earth Science
ED 616D Biology
ED 616E Integrating Mathematics and Science

ED 617A/B/C/D/E Strategies in Social Science Content
Provides specialized training in teaching specific content areas of the social sciences to current and future teachers. 1 credit for each content area.
ED 617A Constitutional Law
ED 617B Political Science
ED 617C Governance
ED 617D Local History and Historical Methods
ED 617E Geography

ED 618A/B/C/D/E Strategies in Business Content
Provides specialized training in

teaching specific content areas of business to current and future teachers. 1 credit for each area.
ED 618A Computer Technology
ED 618B Software Applications
ED 618C International Business
ED 618D Economics
ED 618E Marketing and Advertising

ED 619A/B/C/D/E Strategies in English Language
Provides specialized training in teaching specific content areas of the English language to current and future teachers. 1 credit for each content area.
ED 619A Humanities
ED 619B Research Writing
ED 619C Journalism
ED 619D Poetry
ED 619E Drama

ED 620 Seminar in Multicultural Issues
A series of lectures, dialogues and discussions to promote understanding of the diverse ethnic, cultural and economic groups composing American society as they interact in the schools. 1-3 credits.

ED 621E Teaching Strategies in Mathematics
Introduction to current concepts and trends in the field of mathematics instruction with particular focus on new materials, methods and teaching strategies that will assist prospective teachers as they plan, present and evaluate mathematics education. 2 credits

ED 621M/S Teaching Strategies in Mathematics
Introduction to current concepts and trends in the field of mathematics instruction with particular focus on new materials, methods and teaching strategies that will assist prospective teachers as they plan, present and evaluate mathematics education.

ED 622E Teaching Strategies in Science
Introduction to current concepts and instructional techniques in the field of science teaching; focuses on providing teachers with the skills, knowledge and methodologies for teaching science. 2 credits

ED 622M/S Teaching Strategies in Science
Introduction to current concepts and instructional techniques in the field of science teaching; focuses on providing teachers with the skills, knowledge and methodologies for teaching science.

ED 623E Teaching Strategies in Social Studies
Introduction to current concepts and trends in the field of social studies instruction with particular focus on new materials, methods and teaching strategies that will assist prospective teachers as they plan, present and evaluate social studies education. 2 credits

ED 623M/S Teaching Strategies in Social Studies
Introduction to current concepts and trends in the field of social studies instruction with particular focus on new materials, methods and teaching strategies that will assist prospective teachers as they plan, present and evaluate social studies education.

ED 624 Teaching Strategies in Business
Focus is on the strategies for teaching business concepts and practices to preuniversity students.

ED 625E Teaching Strategies in Children's Literature and Language Arts/Elementary
Introduction to materials and methodologies used to develop the reading, writing, listening and speaking skills of students with special emphasis on the wealth of literature available for elementary school students.

ED 625M Teaching Strategies in Literature and Language Arts/Middle School
Introduction to materials and methodologies used to develop the reading, writing, listening and speaking skills of students with special emphasis on the wealth of literature available for middle school students.

ED 625S Teaching Strategies in Language Arts/Secondary School
Introduction to the materials and methodologies used to develop the reading, writing, listening and speaking skills of secondary school students.

ED 626E Strategies for Teaching Reading and Language Arts in Elementary School
Introduction to current concepts and trends in reading instruction in the elementary school, including authentic reading and writing assessment techniques. Special emphasis on the literacy-based development of beginning and skilled readers and the diversity of student abilities, cultural backgrounds and language.

ED 626M Reading in the Content Areas
Introduction to current concepts and trends in content area reading in the middle school. Students will appreciate a wide range of print and nonprint texts that can be used to build an under-standing of the cultures of the United States and the world. Fiction, nonfiction, classic and contemporary works will be studied.

ED 626S Reading in the Content Areas
Introduction to current concepts and trends in content area reading in the secondary school. Students will appreciate a wide range of print and nonprint texts

that can be used to build an understanding of the cultures of the United States and the world. Fiction, nonfiction, classic and contemporary works will be studied. 2 credits.

ED 627 Writing in the Content Areas
Designed for teachers in the middle school and high school content areas. Focuses on training teachers to implement a variety of instructional methods related to developing writing skills across disciplines. 2 credits.

ED 628 Reading Diagnosis and Remediation
Examines both traditional and innovative means of assessing reading strengths and needs as well as corrective instruction. Fundamental principles of diagnosis and instruction in reading are presented, providing a philosophical basis for working with all reading students, whether in regular classrooms, special education settings, remedial reading classes or reading clinics.

ED 630E Children's Literature
Provides knowledge of children's and young adults' publications; introduces students to the wealth of literature available for young readers and its potential for enhancing classroom instruction. Selection of interesting and well-written materials based on knowledge of human development to motivate, expand and diversify instruction. 2 credits.

ED 630M/S Literature for Elementary/Middle/ Secondary School
Provides knowledge of children's and young adults' publications; introduces students to the wealth of literature available for young readers and its potential for enhancing classroom instruction. Selection of interesting and well-written materials based on knowledge of human development to motivate, expand and diversify instruction. 2 credits.

ED 632 Content Updates
Focuses on the knowledge bases required for teaching in the specific content areas and major disciplines (1-3 credits; may be taken more than once, limited to six credits in any one content area.)

ED 633 Visual and Performing Arts in the Elementary Classroom
Introduction to current ideas and instructional techniques for the visual and performing arts as they pertain to an elementary school classroom; focuses on providing teachers with skills, knowledge and methodologies for teaching art, music and theater. Students will be asked to attend a series of lectures or performances at local theaters, concert halls or museums. 1-3 credits

ED 635 History of Science
This course introduces students to the history of science from the Scientific Revolution to the present. It will deal with the development of new ideas and the contexts in which they are constructed. It will assist students to understand how people developed ideas to interpret nature and why they changed those ideas.

ED 642E/M/S Current Instructional Trends
Course designed to update classroom teachers' knowledge of instructional methodologies in particular content areas. Topics vary depending on the content area and major disciplines (2 credits; may be taken more than once; limited to six credits in any one content area).

ED 654E/M/S Organization and Structure in the Schools
Study of the structural arrangements and organizational practices in the classroom and in the school unit at the different levels of education: elementary, middle school and secondary.

ED 670/671 Selected Topics
Study of selected and timely issues of particular interest to the student.

ED 680 Contemporary Issues
Seminar course on current issues surrounding American education and the differing viewpoints expressed. While the exact content is expected to vary from year to year, in accordance with the varied interests of educators and the general public, the basic theme is the exposition of the fundamental and present concerns in education.

ED 681 Principles of Classroom Management
This course introduces students to the basic principles of effective classroom and behavior management. The course will examine historical and contemporary theories, classroom models and case study analyses. The importance of contextual variables such as instructional goals, socioeconomic levels, cultural imperatives, and students' cognitive skills will also be examined. No prerequisite course is required.

ED 682 Measurement, Assessment and Evaluation
Trains teachers and other educators to construct reliable and valid measurements for a variety of pedagogical situations, to identify major standardized testing instruments, to use test results efficiently and effectively, and to design a variety of assessment strategies appropriate to students, staff and functions.

ED 683 Computer Applications for Teachers
Provides or enhances a working knowledge of educational computing in order to evaluate educational software and create new

instructional materials for the classroom. Relates students' know-ledge of pedagogy and curriculum to the creative use of instructional technology. 1-3 credits.

ED 685 Research in the Schools
An in-depth analysis of research on teaching practices, including the study of quantitative and qualitative research techniques. Students are required to conduct mini research projects and to design a research proposal for a final project.

ED 687 Field Project I
An individualized project related to the classroom, to the curriculum or to school methodology. 1-3 credits.

ED 688 Field Project II
An individualized project related to the classroom, to the curriculum or to school methodology. 1-3 credits.

ED 689 Research Design
This course introduces students to the techniques of educational research. Students will learn how to design a research project, how to read and critique professional journal articles and how to design a research project appropriate for elementary, middle or secondary students. 2 credits.

ED 690 Research Project
Prerequisite: ED 689. Independent study under the supervision of an adviser for completion of a significant school-based project designed in ED 689 which satisfies the requirement of a final project for obtaining the graduate degree. 1-3 credits.

ED 691 Capstone Project
This course is required for those students who do not serve as an intern. Students will research and prepare a teaching portfolio. Noninterns must show evidence of having served 100 hours of participation in a child-centered activity. Students will not receive credit for both ED 691 and ED 694. 2-3 credits.

ED 692 Internship I
Practicum intended to provide paraprofessional services in a cooperative arrangement with area school districts. Under university supervision, interns will work in a specific school as substitute teachers, classroom aides, assistants in resource centers and/or in other capacities as required by the principals in particular placements. This is the first trimester of a full-year school experience. At the end of the third trimester, students are expected to complete a teaching portfolio. 1 credit.

ED 693 Internship II
Continuation of ED 692. 1 credit.

ED 694 Internship III
Continuation of ED 693. At the end of this course, students are expected to complete a teaching portfolio. Students will not receive credit for both ED 691 and ED 694. 2 credits.

ED 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty. 1-3 credits.

ED 696 Independent Study II
A continuation of Independent Study I. 1-3 credits.

ED 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

ED 699 Thesis II
A continuation of Thesis I.

Electrical and Computer Engineering

EE 603 Discrete and Continuous Systems I
Prerequisite: computer programming competence. Continuous and discrete linear systems, system function. Z transforms, Fourier transforms, periodic functions, discrete Fourier series, fast Fourier transforms, Hilbert transforms. Digital processing of analog signals, sampling theorems.

EE 604 Discrete and Continuous Systems II
Prerequisites: EE 603 and M 611, or consent of instructor. Review of linear vector spaces, bases, Hilbert spaces. Introduction to the similarity transformation, diagonalization of the A matrix, properties of similarity transformations, Jordan forms, quadratic forms, matrix norms, functions of A matrix, Caley-Hamilton theorem, pseudoinverse. Mathematical modeling of physical systems, state space representation of dynamical systems, computer-oriented mathematical models. State space and linear systems, meaning of state, methods of obtaining state equations. Stability of physical systems and linear systems, linearization and stability in the small, equivalent linearization and the describing function, stability in the large and the second method of Liapunov, exact frequency domain stability criteria — Popov's method and its extension.

EE 605 Computer Controlled Systems
Prerequisites: EE 604 and EE 650. Disturbance models, design, analog design, state space design methods, pole placement design based on input-output models, optimal design methods (state space approach), optimal design

methods (input-output approach), identification, adaptive control, implementation of digital controllers, reduction of the effects of disturbances, stochastic models of disturbances, continuous time stochastic differential equation.

EE 606 Robot Control

Prerequisite: EE 605. Orientation coordinate transformations, configuration coordinate transformations, Denavit-Hartenberg coordinate transformations, D-H matrix composition, inverse configuration kinematics, motion kinematics, force and torque relationships, force and moment translation, trajectories, coordinated motion, inverse dynamics, position control, feedback systems, performance measures, PID control, inverse dynamic feedforward control, nonlinear control.

EE 610 Networking I

Reference models TCP/IP and OSI, Transmission media, Data Link Layer issues, the Medium Access Control Sublayer, Networking devices and topologies, LANS, WANS, lab experiments.

EE 611 Networking II

Prerequisite: EE 610. Network layer design, Routing Algorithms, congestion control algorithms, transport layer issues, application layer, network security, lab experiments.

EE 615 Introduction to Computer Logic

Prerequisite: any one of CS 604 through CS 610 (or equivalent). Introduction to logic elements and to their application in digital networks for processing numerical data. The course deals with analysis and design techniques of combinational and sequential networks and includes a discussion of logic variables, switching functions, optimal realizations, multivariable systems. Design examples will include logic circuits for addition, multiplication, counting, parity generation and detection.

EE 620 Fuzzy Logic and Control

Prerequisites: basic linear algebra, probability, systems theory. Introduction to fuzzy logic and fuzzy control systems. Basic fuzzy logic concepts will be covered, followed by a selection of fuzzy applications from the literature. Topics include fuzzy sets, fuzzy numbers, fuzzy relations, fuzzy logic and appropriate reasoning, fuzzy rule-based systems, fuzzy control, fuzzy classification, fuzzy pattern recognition. Homework will consist of computer exercises and simulations; a final project is required.

EE 630 Electronic Instrumentation I

Prerequisite: permission of instructor. Design of modern electronic instrumentation. Circuit and system examples, evaluation and design techniques. Emphasis on practical applications including design theory and the circuit techniques used in linear integrated devices. Variety of electronic instrumentation including computer interfaces, signal conditioners, waveform generators and shapers, filters, V/F, A/D, D/A converters and other special-purpose circuits.

EE 631 Electronic Instrumentation II

Prerequisite: EE 630.

EE 634 Digital Signal Processing I

Prerequisite: EE 603. A study of the theories of digital signal processing and their applications. Topics include discrete time signals, the Z transform, the discrete Fourier transform, the FFT, homomorphic signal processing and applications of digital signal processing.

EE 635 Digital Signal Processing II

Prerequisite: EE 634 and knowledge of programming in MATLAB or other high-level language. Wiener filter theory, linear prediction, adaptive linear filters using gradient estimation, Least Mean Squares (LMS) algorithm, least squares formulation and the Recursive Least Squares (RLS) algorithm, fast implementations, recursive adaptive filters, lattice structures, eigenstructure methods for spectral estimation elements of adaptive nonlinear filtering, and applications.

EE 637 Power Systems Engineering I

Prerequisite: permission of instructor. Concepts and methods of analysis and design of modern power systems. Includes the network representation of power systems, matrix methods, symmetrical components and the use of the computer in the solution of problems such as short circuit fault calculations, load flow study, economic load dispatching and stability. Other topics may include protection, relaying or transmission system design.

EE 638 Power Systems Engineering II

Prerequisite: EE 637.

EE 639 Electric Power Distribution

Prerequisite: EE 637 or equivalent. Structure of electric power distribution, distribution transformers, subtransmission lines, substations, bus schemes, primary and secondary systems, radial and loop feeder designs, voltage drop and regulation, capacitors, power factor correction and voltage regulation, protection, buses, automatic reclosures and coordination.

EE 645 Introduction to Communication Systems

The analysis and design of com-

munication systems. Includes analog and digital signals, sampling, quantization, signal representation. Analog and digital modulation, pulse code modulation, delta modulation, time and frequency multiplexing. Noise in communication systems.

EE 646 Digital Communications I
Prerequisite: EE 645. Formatting and baseband transmission, bandpass modulation and demodulation, communication link analysis, channel coding synchronization.

EE 647 Digital Communications II
Prerequisite: EE 646. Multiplexing and multiple access, spread spectrum techniques, source coding and encoding, encryption and decryption.

EE 650 Random Signal Analysis
A study of the theory of random signals and processes. Includes correlations, spectra, stationarity, ergodicity and systems with random inputs. Hilbert's transforms, shot noise, thermal noise, Markoff processes, mean square estimation, spectral estimation and entropy.

EE 652 Design of Digital Filters
Techniques in the analysis and design of digital filters. Digital filter terminology and frequency responses. FIR filter design. IIR digital filter design including Butterworth and Chebyshev lowpass, highpass, bandpass and bandstop filters. The DFT and IDFT; FFT algorithms.

EE 656 Hardware Description Language
General structure of VHSIC (Very High Speed Integrated Circuit) Hardware Description Language (VHDL) code; entities and architecture in VHDL; signals, variables, data types; concurrent signal assignment statements; processes; if, case and loop statements; components; package; functions and procedures; slices; attributes; generate statement; blocks; projects on design of combinational and sequential circuits using VHDL.

EE 657 VLSI Design
Complex logic gates, flip-flop, cascade voltage switch logic, differential split level logic, Schmitt trigger, dynamic logic gates, clocked CMOS logic, Dominio logic, SRAM and DRAM, VCO, Voltage generator, lab activities.

EE 658 Microcontroller Applications
Design of advanced embedded, microcontroller applications. Interface and control of several devices and buses. Class work will focus on laboratory exercises and projects.

EE 670 Selected Topics
Prerequisite: permission of instructor. A study of selected topics of particular interest to students and instructor. Course may be taken more than once.

EE 680 Fiber Optic Communications
The fundamentals of lightwave technology, optical fibers, LEDs and lasers, signal degradation in optical fibers, photodetectors, power launching and coupling, connectors and splicing techniques, transmission link analysis. Includes selected laboratory experiments.

EE 681 Lightwave Technology
Prerequisite: EE 680. Advanced topics in lightwave technology. Optical fiber waveguides, transmission characteristics of optical fibers, ray theory and electromagnetic mode theories are considered. Forms of communication systems and distribution networks. Optical sources, detectors and receivers are discussed in conjunction with modulation formats and system design.

EE 682 Computer Architecture
Review of design of large systems, arithmetic and logical operations, design of ALU, design of control unit, microprogramming, RISC architecture, memory organization, design of cache memory, system organization, design of a processor using bit-slice ALU.

EE 685 Optimization of Engineering Systems
Prerequisite: EE 604. The calculus of variations, functionals, linearity of functionals, closeness of functions, the increment of a functional, maxima and minima of functionals, the fundamental theorem of the calculus of variations, the variational problem, Euler-Lagrange equations, boundary conditions, the transversality conditions, piece-wise-smooth extremals, the first and second carrier conditions, Lagrange multiples, the Hamiltonian canonical equations, the control problem, the problems of Lagrange and Mayer, Strong's variation, Legendre conditions, Weierstrass excess function, Pontryagin's minimal principle.

EE 690 Research Project
Prerequisite: 15 graduate hours and written permission of program coordinator. Independent study under the guidance of a faculty adviser, such study terminating in a technical report of academic merit. Research may constitute a survey of a technical area in electrical engineering, or may involve the solution of an actual or hypothetical technical problem.

EE 695 Independent Study I
Prerequisite: permission of instructor. A planned program of individual study or research under supervision of a faculty member.

EE 696 Independent Study II
A continuation of Independent Study I.

EE 697 Thesis I
Prerequisite: completion of 15 credits of graduate work; student must have submitted a thesis proposal and performed a literature search in the preceding trimester. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

EE 698 Thesis II
A continuation of Thesis I.

EE 699 Thesis III
A continuation of Thesis II.

Environmental Science

EN 600 Environmental Geoscience
Study of the systems of hydrosphere and lithosphere important in the understanding of the causes of and solutions to environmental problems, including natural hazards as well as energy, mineral and water resources. Course covers material from geology and engineering geology, geophysics, geomorphology and hydrology.

EN 601 Principles of Ecology with Laboratory
Presentation of current topics in the various fields of ecology including community, population, ecosystem and landscape ecology. Particular emphasis on those areas related to applied ecology. Field trips and laboratory sessions will focus on a quantitative evaluation of various ecological systems in terrestrial and aquatic habitats, and on methods used in ecological assessment. Laboratory fee; 4 credits.

EN 602 Environmental Effects of Pollutants
Prerequisites: EN 600, EN 601 and undergraduate organic chemistry or graduate introduction to environmental chemistry. A survey of the demonstrated and suspected effects of air, water and other pollutants on natural systems and on human welfare. Methods of studying and assessing effects are also presented.

EN 603 Wetlands Ecology with Laboratory
Prerequisites: EN 600, EN 601. This course covers the ecology of saltwater and freshwater wetland systems. Linkages between the biotic, hydrologic and chemical components of various wetland types will be emphasized. Wetland delineation, functional assessment of wetlands, and wetland creation and restoration will be among the topics discussed. Field trips and laboratory sessions will focus on a quantitative evaluation of the hydrology, soils and biotic communities of various wetland types. Laboratory fee; 4 credits.

EN 604 Ecology of Inland Waters
Prerequisites: EN 600, EN 601. Advanced study of ecological processes of inland waters, both lotic and lentic. Some weekend field trips, or acceptable alternative, required.

EN 605 Marine and Estuarine Ecology
Prerequisites: EN 600, EN 601. Advanced study of ecological processes of estuaries and marine habitats. Some weekend field trips, or acceptable alternative, required.

EN 606 Environmental Data Analysis
Prerequisites: 15 graduate hours and a previous course in statistics, or permission of instructor. The application of analytic techniques to environmental data in the areas of applied ecology, environmental geology and chemistry. These include: applied univariate and multivariate statistics as well as geostatistical methods. Introduction to microcomputer software available for environmental analyses.

EN 607 Environmental Reports and Impact Assessment
Prerequisites: 21 graduate hours including EN 600, EN 601 and CE 606. A study of the EIS/EIA process including the regulatory framework, how to prepare environmental reports and impact assessments, formats required for EIS and other common reports, data collection and presentation, planning and carrying out assessments, and text preparation. Some fieldwork may be required.

EN 608 Landscape Ecology
Prerequisites: EN 600, EN 601. In-depth study of the characteristics and dynamics of terrestrial and aquatic ecosystems on a regional scale. Spatial relationships between ecosystems are examined with regard to natural ecologic and geologic functions and alterations due to human activities. Applications to land-use planning, resource management, conservation and other environmental concerns are addressed via class projects.

EN 610 Environmental Health
Prerequisite: EN 601 or undergraduate biology major. Principles of public health with general emphasis given to environmental factors such as air and water pollutants, legal standards and preventive measures and their relationships to public health.

EN 612 Epidemiology
An introduction to the principles and methods of epidemiology. Concepts of disease, analysis of morbidity and mortality as well as observational and experimen-

tal techniques considered. Illustrative examples concentrate on environmental issues.

EN 613 Radioactivity and Radiation in the Environment

Prerequisites: EN 600 and CH 601, or permission of instructor. Basic principles of nuclear structure and radioactivity; the interaction of radiation with matter and biological effects of radiation; natural and man-made sources of radiation in the environment. The second half of the course will focus on long-term environmental effects of radiation accidents (e.g., Chernobyl and others) and the problems of nuclear waste disposal, plutonium inventories from nuclear weapons, natural radon in buildings and similar concerns. (See also PH 613.)

EN 615 Toxicology

Prerequisite: introductory chemistry. Introduction to environmental and industrial toxicology; toxicologic evaluation; the mode of entry, absorption and distribution of toxicants; the metabolism and excretion of toxic substances; interactions between substances in toxicology; toxicologic data extrapolation; particulates; solvents and metals; agricultural chemicals—insecticides and pesticides; toxicology of plastics; gases; food additives; plant and animal toxins; carcinogens, mutagens and teratogens. (See also SH 615.)

EN 616 Human Health and Environmental Risk Assessment

Prerequisites: EN 601, CE 606 and EN 615. Introduction to application of human health and environmental risk assessment by environmental agencies. Principles of environmental risk assessment, legislative mandates for risk assessment, guidance documents, case studies, analysis and assessment procedures. Emerging developments in the field reviewed through class projects.

EN 617 Subsurface Assessment

Prerequisites: EN 600, CH 601 and CE 606. Introduction to conducting subsurface contamination assessments. Includes related environmental regulations and liabilities, site hydrogeology, chemical characterization of contaminants, field methodologies, risk assessments and site contamination remediation. Some fieldwork required.

EN 618 Hazardous Materials Management

Prerequisites: CE 606 and undergraduate organic chemistry or graduate introduction to environmental chemistry (CH 600). The multidisciplinary facets of managing hazardous materials and wastes. Integrates specialized knowledge from the fields of environmental biology, chemistry, engineering, hydrogeology and public health in the techniques used to maintain compliance with environmental standards. Includes regulatory framework, practical exercises and concepts of sound practices of hazardous waste management.

EN 620 Advanced Environmental Geology

Prerequisite: EN 600, or undergraduate course in geology, or permission of instructor. Qualitative and quantitative examination of the application of geology to environmental problems including natural hazards and their remediation, site selection for various types of land uses, geology of waste disposal sites and natural resource evaluation. A class project for a local government or environmental agency will demonstrate practical application of these principles and will be used to examine the process of project planning and management, generation and use of geologic data, report preparation and presentation. Laboratories and some weekend fieldwork required. 4 credits.

EN 621 Hydrology

Prerequisite: undergraduate course in physics, geology, hydraulics or limnology; or permission of instructor. Lectures cover basic hydrologic theory including nature and chemical behavior of water, precipitation and evapotranspiration, interception, surface water, groundwater supply and treatment, and water law. Other topics may include irrigation, flood control, karst hydrology and water chemistry. Required laboratories cover field measurement, sampling and problem- solving techniques. Some weekend fieldwork required. 4 credits.

EN 622 Groundwater Geology

Prerequisite: EN 600, or EN 621, or CE 620, or permission of instructor. Physical and chemical behavior of water occurring in rock and soil (groundwater). Covers the geologic environments in which groundwater exists, groundwater movement and chemistry, Karsthydrology use of groundwater as a water supply, groundwater field investigations and testing, contaminant transport in groundwater, and the nature and use of groundwater flow and contaminant models. Laboratories will include practical experience in field techniques (drilling, geophysical, well, logging, etc.), modeling and data analysis. 4 credits.

EN 625 Geomorphology

Prerequisite: EN 600, or a previous college-level course in physical geology or geography, or permission of instructor. Study of landforms and the processes that produce them including the oper-

ation of erosional and depositional processes in a variety of geologic settings (fluvial, coastal, glacial, periglacial, karst and arid). Also covers the relationship of landforms and processes to the solution of environmental problems. Lectures cover processes; required laboratories focus on landform recognition and geomorphic process interpretation using maps and aerial photographs. Two required field trips (one 2-day and one 3-day) with shared transportation and costs. 4 credits.

EN 626 Glacial Geology

Prerequisite: EN 600 or EN 625, or a previous college-level course in physical geology or geography, or permission of instructor. Glacial processes, landforms, materials and history. Relationships between various glacial landforms (identifiable on topographic maps) and the materials that comprise them. Two required field trips in New England (one 1-day and one 2 1/2-day) with shared transportation and costs.

EN 627 Soil Science

Prerequisite: EN 600, or a previous college-level course in physical geology or geography, or permission of instructor. Properties, occurrence and management of soil as a natural resource. Covers the chemistry, physics, morphology and mineralogy of soils, and their genesis and classification. Soil properties will be related to their role in environmental problem solving and decision making.

EN 632 Field Geology of the Northeast

Prerequisite: EN 600, or a previous college-level course in geology, or permission of instructor. Intensive training in geological field observation and interpretation in a variety of geologic settings. Weekly class meetings cover field techniques and localities. Five required field trips (three 1-day, one 3-day, one 4-day) will focus on site geology, geomorphology and environmental problems as well as field observation and interpretation. Transportation and costs will be shared. 4 credits.

EN 633 Selected Topics in Field Geology

Prerequisite(s): EN 600, or undergraduate course in geology; other prerequisite(s) depend on specific course topic. Selected field studies and trips of special interest. Credit varies depending on length of trip or investigation. May be taken more than once. 1-4 credits.

EN 640 Introduction to Geographical Information Systems

Survey of GIS technology, research and applications in natural resource management, environmental assessment, urban planning, business, marketing and real estate, law enforcement, public administration and emergency preparedness. Includes critical evaluation, case studies and computer demonstrations.

EN 641 Geographical Information System Techniques and Applications I

Prerequisites: working knowledge of PC-based computing and consent of instructor/program coordinator. First of a two-course sequence on GIS technology and applications. Laboratory exercises using both raster- and vector-based GIS systems. Hardware and software components of GIS; data acquisition, input and manipulation; cartographic output; report generation.

EN 642 Geographical Information System Techniques and Applications II

Prerequisite: EN 641 or consent of instructor. Second of a two-course sequence on GIS technology and applications. Laboratory exercises using both raster- and vector-based GIS systems. Advanced GIS techniques; spatial analysis and modeling for a variety of applications (e.g., environmental science, business, planning); development of GIS systems.

EN 643 Application of GIS in Environmental Science

Prerequisite: EN 642 or consent of instructor. Application of advanced GIS techniques to environmental assessment and management constructed around a real world project from a government agency or nonprofit organization. Students will collaborate to design and implement the complete GIS application. Definition of project goals, special project needs and steps necessary for successful completion.

EN 650 Environmental Microbiology

Prerequisite: undergraduate biology major, or a course in biology and a course in organic chemistry. Interaction of microorganisms (principally bacteria and fungi) and their environments, stressing transformations they may accomplish depending on physical and chemical circumstances. Practical application of microbes in sewage and other soil/wastewater cleanup, biodeterioration, pest control and production of useful products. Laboratory microcosm projects required. 4 credits.

EN 651 Bioremediation Science

Prerequisite: EN 650 or permission of instructor. Study of the use of microorganisms to decontaminate/remediate soil, groundwater and air emissions containing various organic compounds. Includes survey of applicable microbial activities and growth parameters, classes of organic

compounds that can be degraded/modified and application of latest bioremediation technologies for cleanup. Laboratory involves review of site/hydrogeological plans for efficacy of bioremediation, visitation of available bioremediation sites (biopiles, bioventing, biosparging, etc.) and group projects involving a site(s) currently undergoing bioremediation. 4 credits.

EN 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

EN 690 Research Project
Prerequisite: permission of the instructor. Independent study under the supervision of an adviser.

EN 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

EN 696 Independent Study II
A continuation of Independent Study I.

EN 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

EN 699 Thesis II
A continuation of Thesis I.

Engineering Science

ES 605 Introduction to Digital Electronics
Prerequisites: College Physics, including electricity and magnetism. An introductory course in digital electronics intended for K-14 teachers based on "Project Lead the Way" curriculum. Both theoretical and practical skills in the pedagogical and content-domain needed to teach classes in this field are addressed. Laboratory assignments will include computer simulation of circuits and the wiring of prototype circuits. The lecture will touch on printed circuit board design and implementation of digital circuits. Development of attitudes, procedures, and skills related to safety will be addressed. This course may not be taken by engineering students for graduate credit. 3 credits Lecture, 1 credit Lab.

ES 610 Engineering Graphics with Solid Modeling
Prerequisites: Modern Algebra with Trigonometry. An introduction to computer aided design with solid modeling intended for K-14 teachers based on the "Project Lead the Way" curriculum. Both theoretical and practical skills in the pedagogical and content-domain needed to teach classes in this field are addressed. Emphasis is on advanced 2-D construction, 3-D solid modeling and design drawing generation. A PC based CAD package is used for all coursework. Development of attitudes, procedures, and skills related to safety is addressed. This course may not be taken by engineering students for graduate credit. Lecture: 3 credits, Lab: 1 credit.

Executive M.B.A.

EXID 903 The Communication Process
A survey of communication theory as applied to the organizational environment. Special attention will be directed toward management communication styles, conflict, disagreement, change in organizations, formal versus informal power and communication, people in organizations, structure of organizations, motivation, barriers to effective communication and communication competencies in organizations. 2 credits.

EXID 909 Business and Government Relations
An analysis of the impact of the major regulatory agencies of the federal government upon business. Specific attention given to the legal and economic impacts of the agencies; their independence of action vis-a-vis Congress, the judiciary and each other.

EXID 912 Financial Accounting
An understanding of information in financial reports and how managers use this information in decision making. Includes financial accounting standards, methods of financial statement analysis and current developments in financial reporting.

EXID 915 Quantitative Decision Making
Probability and financial analysis techniques within the framework of the randomness encountered in the real world. Includes practical applications of expected values, value of information, Markov systems, game theory and decision theory.

EXID 918 Managerial Economics
Application of economic analysis to business forecasting, planning and policy formulation. Includes cost-benefit analysis, cost estimation and break-even analysis.

EXID 921 Executive Management and Leadership
The role of managers in globally competitive organizations. Topics include the nature of management and leadership, managing ethically in a global economy, basic management skill sets and motivational theories.

EXID 924 Financial Management I
Analysis of financial decision models for investment, financing and dividend decisions of the profit-oriented firm. Includes capital budgeting, capital structures and the cost of capital and dividend policy.

EXID 927 Financial Management II
Analysis of financial decision models for the management of working capital. The management of current assets and the related financing mixture.

EXID 930 Marketing Practice
The new marketing concept and its application in the modern corporation. Organizational aspects and environmental determinants of marketing decisions are examined, culminating in a discussion of buyer behavior characteristics. Practical considerations in using the elements of the marketing mix: product, price, channel and promotion policy.

EXID 933 Managing the Global Marketplace
An examination of the theory and practice of a national or international company trading in world markets, focusing on strategic planning for this environment from economic, political, social, regulatory and competitive points of view.

EXID 939 Operations Management
An examination of the best practices used by operations management to achieve competitive advantage. Topics will include: organization, productivity measurement, competitiveness, product and process design, quality management, procurement, JIT, empowerment and change management.

EXID 942 Managerial Accounting
An understanding of the uses of accounting data by managers in directing the affairs of organizations. Includes cost systems, profit planning, standard and relevant costs, and world-class manufacturing concepts.

EXID 948 Business Law
This course provides a framework for considering the respective roles of institutional and individual legal responsibility as it relates to major federal statutes that are commonly invoked in corporate prosecutions. Major emphasis will be placed on employment law, including labor, and white collar prosecutions.

EXID 951 Marketing Management
Strategic considerations and options in managing a firm's marketing function. Scope and methods of marketing research as well as issues involved in new product management. The importance, opportunities and constraints of international marketing. The unique aspects of service marketing.

EXID 954 Organizational Development
Effective management of the aggregate human resource in the modern organization. Analysis of human resource planning, recruitment and selection; training and development; compensation and benefits; other human resource functions. Understanding how to utilize these functions in managing change for organizational effectiveness.

EXID 957 Corporate Policy and Strategy
Examination of the major management issues facing the chief executive with emphasis on resource allocation questions. Includes the strategy development process, supporting organization structure and reward system. Serves as an integrating mechanism for several preceding courses.

EXID 960 Information Management
Analysis of technologies, costs and challenges of integrating computers into the modern business environment.

EXID 997 The Washington Campus—How Washington Works/International Seminar
The seminars at The Washington Campus emphasize governmental process and the range of considerations and constraints which bear upon the decisions of policymakers. Corporate executives and future business leaders examine the working of the legislative, regulatory, judicial and executive functions of government in order to understand more clearly how they, as managers, can build the critical public policy dimension into daily operations and corporate strategy. The faculty of The Washington Campus is drawn from government, business, the press and academia. It includes members of Congress and their staffs, senior administration officials, lobbyists, journalists, noted scholars and corporate executives.

As companies expand their markets abroad they need employees who are globally aware, flexible to changes, and able to understand various social and business cultures…therefore it is important that students are exposed to a variety of perspectives on the real-life issues of doing business in different countries.

EXID 998 Marketplace–Business Simulation
Prerequisites: EXID 912, EXID 924, EXID 930, EXID 942. In this business simulation students will virtually run a new venture firm for two years in compressed time (8 to 12 rounds of decision making). The real challenge in the game, and in real-life ventures, is that managers must continually

make a large number of concurrent strategic and tactical decisions, with no rest from the advertising decision or the market development decision while solving the pricing decision. There is heavy emphasis on the inter-connectiveness of business functions.

EXID 999 Special Research Topics
A seminar in which the culmination of student research will be presented and critiqued, and in which state-of-the-art topics may be examined by nonfaculty guest lecturers.

Executive Engineering Management

EXIE 901 Engineering Management Concepts
Introduction to contemporary engineering management concepts as they appear in manufacturing and related service organizations. Review of the challenges faced by such organizations, and of the various methodologies in use to meet these challenges. Managing the lean enterprise to deliver high quality product in timely fashion within demanding customer-supplier relationships.

EXIE 902 Managing Uncertainty
Probability models, stochastic processes and descriptive statistic approaches applicable to managing engineering and technology projects. Topics include random variables, probability functions, expectations, discrete and continuous distribution, probability computation, summary measures, data presentation schemes and their applications in process control, forecasting, lead time estimation, queues and customer demand functions. Excel and other software will be used.

EXIE 903 Statistics for Quality and Engineering Management
Comprehensive survey of the many roles of statistics in TQM, quality assurance, simulation, experimentation, risk assessment and performance evaluation. Deming, Juran, Taguchi and ASQ contributions are presented as engineering management resources.

EXIE 914 Achieving Optimal Operations
Concepts of lean production, Japanese production systems, push vs. pull production systems, benchmarking and evaluation schemes, schedule management, overcoming bottlenecks, and performance and productivity improvement techniques applicable to service and manufacturing systems. Workforce issues (affairs) including union acceptance, productivity, and workforce education, training and compensation.

EXIE 926 Constraint Assessment
Achieving effectiveness, productivity and profitability through management of constraints. Automation issues, off-shore production, union reactions and access to capital. Strategic planning for optimality.

EXIE 930 Project Management
Review of CPM-PERT methodologies and use in managing complex engineering-related projects. Analysis of bias in estimating and in forecast preparation. Strategies for achieving on-time task completion and minimizing critical chains.

EXIE 940 Supply Chain Management
The process of planning, implementing and controlling flow and storage of goods, services, and related information from point to point of consumption with the customer requirements in mind is presented. Topics include fundamentals of logistics, logistics information systems, inventory concepts and management, material flow and transportation management, warehousing and material handling, and global logistics.

EXIE 948 Queueing Theory and Applications
Survey of queueing problems met in both manufacturing and service organizations, and a description of queueing theory applicable to such problems. Roles of analysis and simulation are discussed in the context of managing queues and solving queueing problems.

EXIE 950 Simulation of Processing Systems
Review of the role of simulation in analyzing complex manufacturing and nonmanufacturing systems, and an introduction to typical simulation software. Case studies of successful implementations are presented together with guidelines for using simulation to solve system problems.

EXIE 956 Managing Quality Assurance
Review of the complex and dominant role that quality plays in creating excellent customer-supplier relationships. Discussion of quality goals and management strategies to achieve them.

EXIE 957 Organizational Change and Development
This course addresses the nature of organization development, intervention by third-party consultation, change in organization structure and role relationships, evaluation of change efforts, participation, conformity, and deviation. This course focuses on real organizations, not hypothetical constructs; on actual human performance challenges, not theoretical issues; and on typical operational problems, not experimental design concerns. Emphasis is on practical application.

EXIE 960 E-Solutions in Engineering Management
The current and emerging internet technology as they relate to engineering management, in particular, e-supply, e-logistics, e-commerce, and the rapid increase in the type and use of electronic media in the daily functions of engineering managers are presented. Topics will also include basics of the Internet and multimedia technologies, products and vendors, and critical management and policy issues such as access, risk assessment, reliability, security, and privacy.

EXIE 970 Current Topics in Engineering Management
Current topics relevant to engineering management but focusing on specific themes such as environmental laws on regulations, security and protection technologies, new engineering approaches to product and process management, new process and quality improvement practices, to name a few.

EXIE 999 Research Topic
Independent study and research focused on a problem of interest, either in a work environment or in a community/nonprofit organization. Guided by a faculty adviser, a project report is written that describes the problem, outlines a scope of work, and presents recommendations and solutions in a professional manner. An oral presentation is made to program colleagues of this capstone experience ending the program of study.

Finance

FI 601 Finance
Prerequisites: A 620, EC 601 and QA 604. An examination of the valuation, investment and financing of the firm and its business activities. Includes: valuation of investment under uncertainty and its implications on investment strategy; the cost of capital and capital structure and its implications on financing strategy; leasing; dividend policy; fundamental risk management concepts and implications; and (if time is available) mergers, acquisitions, divestiture, the market for corporate control and the hedging of corporate risk exposure.

FI 602 Corporate Valuation and Business Strategy
Prerequisite: A 620, EC 601 or EC 604, FI 601 and QA 604. Examination of valuation, investment and financing of the firm and their implications for strategic decision making. Topics include: objective of the firm and agency theory; strategies for the investment decision; short-term financial management strategies; theories of choice and decision making; state preference theory and its implications for planning and strategy; risk measurement and decision making; derivatives and their applications to corporate risk management and planning; efficient capital markets and value creation; capital structure; valuation models and dividend policy; merger and acquisition strategies; the leasing decision and business planning; international financial management strategies.

FI 605 Data Evaluation and Modeling
Prerequisite: FI 601. Introduction to the quantitative models used in finance. Application of statistical and deterministic models to financial decision making. Use of electronic spreadsheets and statistical software.

FI 610 Capital Market Theory
Prerequisite: FI 601. A review of modern portfolio theory. Includes theory of choice under certainty and uncertainty; portfolio analysis; capital asset pricing model; arbitrage pricing model; global investing and portfolio formation; and portfolio performance measurement, evaluation and selection.

FI 611 Equity Market Valuation and Analysis
Prerequisite: FI 601. Integrated review of investment opportunities in the securities markets. Includes capital market efficiency and arbitrage; valuation models and individual security analysis and valuation; aggregate market analysis; capital market theory; global investing and portfolio performance; alternative investments—analysis and valuation; and introduction to regulation and professional standards of ethics.

FI 612 Applied Portfolio Management
Prerequisites: FI 601. Course describes and demonstrates the dynamic decision-making process of portfolio management. The portfolio construction process, including the formulation of objectives, constraints and preferences; the ongoing monitoring process; and conducting a performance evaluation. Special attention to recent developments in dynamic portfolio applications.

FI 613 Derivative Market Analysis and Trading Techniques
Prerequisites: FI 601. An examination of financial futures and options markets; futures and options pricing and hedging; trading techniques.

FI 620 Capital Markets and the Valuation of Fixed Income Securities
Prerequisites: FI 601. The function and structural trends of financial markets. Analysis of the flow of funds; foundation of interest rates; term structure of interest rates; determinants of interest rates; global financial markets.

FI 625 Advanced Capital Market Issues
Prerequisites: FI 605, FI 620. An examination of current practices and new developments in the capital markets. Various topics will be selected that highlight recent developments. The primary areas of selection will be financial and capital market innovations, monetary policy, domestic and international money markets, techniques for analyzing financial markets. Students will be required to complete a major, independent research project.

FI 630 Corporate Financial Analysis and Applications
Prerequisite: FI 601. The examination of short-term financial management, mergers and acquisitions, corporate restructuring, financial distress, corporate risk management, leasing and hybrid corporate securities.

FI 631 Management of Financial Services
Prerequisite: FI 601. An examination of operational techniques and strategies relevant to financial management in the financial services industry.

FI 632 International Financial Management
Prerequisites: FI 601. Focus on international capital markets, determinants of foreign exchange rates and hedging techniques. Major emphasis on managing and measuring accounting, economic and operations exposure; managing political risk; international capital budgeting and short-term financial management; international financing of investment.

FI 635 Advanced Corporate Financial Management Issues
Prerequisites: FI 602, FI 605. An examination of developments and techniques in financial management, highlighting recent developments. The primary area of selection will be value creation, human capital, globalization, risk management and strategic management. Students will be required to complete a major research project.

FI 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

FI 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an adviser.

FI 693 Internship
Prerequisites: six credits of advanced finance coursework and approval of program coordinator/adviser. A program of field experience in a corporate or financial services organization.

FI 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

FI 696 Independent Study II
A continuation of Independent Study I.

FI 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

FI 699 Thesis II
A continuation of Thesis I.

Fire Science

FS 625 Chemistry of Fires and Explosions
An examination of the basic organic chemistry and combustion and explosive properties of flammable materials. The chemical principles underlying fires and explosions. Chemical properties of various synthetic materials and the products of their combustion. Fire retardant materials and chemicals used in fire extinguishment. (See also CH 625.)

FS 631 Organization and Management of Public Fire Protection
A presentation of modern management principles and techniques to the organization and delivery of the array of services that communities have come to expect from the fire service. The traditional and evolving roles of the fire service to protection, prevention, risk analysis and community service are also considered.

FS 632 Strategic Planning for the Fire Service
The application of systematic long range or "master" planning in determining the types and levels of community fire service. As part of this course each student will develop a strategic plan for a public safety organization using one of the commonly accepted approaches to strategic planning in the public domain.

FS 633 Issues in Public Safety Professional Responsibility
This course addresses the unique ethical problems and environments in which public safety services are delivered. Specific issues to be covered include: public safety discretion, codes of conduct and discipline, and the ethical exercise of the "public trust." Investigation of the ways in which organizations can anticipate and plan for ethical problems.

FS 634 Issues in Public Safety Management
Provides public safety professionals with a broad view of current topics in the field. Utilizing lectures, discussions and case studies, the course will consider the results of applying the princi-

ples of modern public management practices and principles in a public safety context.

FS 649 Fire Scene Investigation and Arson Analysis
The techniques of crime scene documentation and investigation as they relate to fire and explosion scenes. Evidence recognition and collection. Laboratory analysis of fire scene, arson accelerant and explosion scene residues. Scientific proof of arson. Laboratory fee required. 4 credits. (See also CJ 649.)

FS 650 Arson for Profit
This course provides an overview of the financial techniques needed to investigate arson-for-profit fires, with an emphasis on sources of information, identification and analysis of financial documents.

FS 661 Systems Approach to Fire Safety
The systems approach to fire safety as used by fire protection engineers, fire science technicians and fire administrators in analyzing and designing fire safety in buildings. Considers the various routes that can be followed to achieve low-budget, logical, cost-effective ways of accomplishing predetermined fire safety goals.

FS 663 Fire Protection Systems Application
A study of the application of various fire protection systems and programs to fire/life safety problems. An in-depth review of certain fire protection codes and standards and the proper interpretation of each will be included. Use of codes and standards to determine specific protection requirements will be emphasized.

FS 664 Terrorism
A detailed discussion and review of the consequences of terrorism and the offensive measures taken by emergency response organizations to prevent, deter and respond to terrorism incidents.

FS 665 Legal Aspects of Fire and Arson Investigation
The legal principles underlying and governing the conduct of criminal investigations, with particular emphasis on arson. The criminal law relating to arson, establishment of the crime, investigation and prosecution procedures in arson cases.

FS 666 Industrial Fire Protection
Prepares fire professionals to make decisions on various fire protection schemes in industry and other commercial property situations. Since fire protection responsibilities are often delegated to the occupational safety or security manager, the course provides background in fire protection for these individuals.

FS 667 Fire and Building Codes, Standards and Practices
The study of building and fire codes and regulations as they relate to the prevention and incidence of structural fires. Contemporary building and fire codes and practices, and their enforcement. Model building codes. Fire prevention and control through building design. (See also CJ 667.)

FS 668 Fire and Casualty Insurance Practices
A study of financial risk and decision making. Insurance rate making and relation to risk and other factors. Insurance adjustment and economic factors that must be considered in fire and accident investigations. (See also CJ 668.)

FS 669 Dynamics, Evaluation and Prevention of Structural Fires
A detailed analysis of the factors and physical processes that govern the growth and spread of fire and its products within a structure. Includes a review and an evaluation of national, state and local fire loss data leading to the development of fire prevention strategies. (See also CJ 669)

FS 670 Selected Topics
An examination and evaluation of the current and future problems faced by today's fire, public safety, insurance and security professionals.

FS 681 Seminar/Research Project in Public Safety Management I
Prerequisite: 18 undergraduate/graduate hours in a public safety discipline or permission of the program coordinator. Problems in public safety management and current techniques being used to deal with these problems. Requires a supervised research project directly related to the topic and weekly meetings with faculty throughout the term. Format for course may vary; a three-day specially scheduled seminar may be included.

FS 682 Seminar/Research Project in Public Safety Management II
A second course in the field of public safety management. See FS 681 for course description.

FS 683 Seminar/Research Project on Comparative Public Safety Systems
Prerequisite: 18 undergraduate/graduate hours in a public safety discipline or permission of the program coordinator. Examination, assessment and comparison of various approaches used in protecting the public's health and safety. Current management approaches to public safety problems. Requires a supervised research project directly related to the topic and weekly meetings with faculty throughout the term. Format for course may vary; a

three-day specially scheduled seminar may be included.

FS 684 Fire/Accident Scene Reconstruction
Application of the principles of reconstruction of the scene of a fire or accident, including proper procedure for examining physical evidence to determine the cause. Emphasis on preparation of reports, testimony for hearings and trials, rendering of advisory opinions to assist in resolution of disputes affecting life and property. (See also CJ 684.)

FS 690 Research Project
Prerequisite: 30 graduate credit hours. A major research project under the supervision of the director of the fire science program.

FS 693 Internship
The student's formal educational development complemented by field experience in various fire science settings or agencies. Under faculty supervision, the student engages in field experience and produces a comprehensive project report analyzing the internship experience.

FS 695 Independent Study
A directed, independent learning experience with the topic and format to be agreed upon by the student and supervising faculty.

FS 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

FS 699 Thesis II
A continuation of Thesis I.

Human Services and Professional Counseling

HMS 601 Counseling Foundations and Professional Orientation
An introduction to the counseling profession and the various roles of professional counselors in different service settings and private practice. Interactions with allied mental health professions, professional responsibility, liability, standards of practice, and licensure issues will be covered.

HMS 605 Social and Cultural Foundations of Counseling
An examination of historical roots and current concepts. A social problems approach to psychological dysfunction. Changing professional roles. Community organization and human service delivery; strategies of intervention and community change. (See also P 605, Survey of Community Psychology.)

HMS 606 Domestic and Sexual Violence
An in-depth analysis of the typologies, causes, correlates, dynamics and effects of domestic and sexual violence and victimization. A review of treatment practices in these areas will be provided. (See also CJ 606, Domestic and Sexual Violence)

HMS 607 Psychological Applications in Counseling Settings
Prerequisite: HMS 601 or permission of instructor. This course will explore psychological theory and research in relation to specific problems in counseling. Assumptions underlying behavior analysis in risk assessment, personnel screening, children as victims, criminal investigation and profiling, eyewitness testimony, jury selection, and violence prediction will be examined. Students will be expected to develop an application in a specific area of expertise using class and textual content as a base. (See also CJ 607, Psychological Applications in Criminal Justice)

HMS 610 Research Methods and Statistics in Counseling
An introduction to quantitative and qualitative methods used in counseling for research and policy analysis purposes. Students will become familiar with basic types of research designs, survey research methods, evaluation methods, descriptive statistics and inferential statistics. (See also CJ 611, Research Methods and Statistics in Criminal Justice)

HMS 611 Individual Counseling Seminar
An examination of strategies for providing direct helping services to individuals in the context of formal and informal networks of social and community support. Includes: the nature of the dyadic relationship, development of therapeutic and case management skills, professional ethics and supervision. Applications to a wide range of problems, populations and settings. (See also P 611, Individual Intervention Seminar)

HMS 613 Group Dynamics in Counseling Settings
Small group interaction; both theoretical and experimental facets of group process are presented. Group counseling and encounter groups. (See also CJ 624, Group Process in Criminal Justice)

HMS 614 Counseling Practicum
Supervised field training in the provision of direct services to individual clients. Supervision is jointly provided by the field setting and the human services and professional counseling department. Students must be available for at

least one day per week. Permission of instructor is required. (See also P 614, Individual Intervention Fieldwork)

HMS 617 Advanced Victimology
An in-depth analysis of the causes, correlates, dynamics and aftereffects of criminal victimization on victims of crime and a review of current practices in the area of crime victim assistance. (See also CJ 617, Advanced Victimology)

HMS 624 Experiential Self-Analytic Group
This experiential group develops understanding of group and interpersonal dynamics through analysis of ongoing interaction and improves participants' interpersonal abilities relevant to organizational consulting and diagnosis. (See also P 624, Experimental Self-Analytic Group)

HMS 625 Life Span Developmental and Counseling
In-depth exploration of normal and abnormal development through the life cycle. Emphasis on childhood, adolescence, adulthood and later years. Developmental impact of family, neighborhood, schooling, work, culture. Issues of class, ethnicity, gender, age, etc. Applications of theory and research to community treatment and prevention. (See also P 625, Life Span Development Psychology)

HMS 627 Career and Lifestyle Development
This course provides an understanding of career development and related life factors that need to be considered by the professional counselor. Major theories of vocational development will be presented with relationships drawn to the practical counseling skills required to effectively counsel the client in career and lifestyle matters.

HMS 628 Interviewing Skills for Counselors
The interview as a tool for information gathering, diagnoses, mutual decision making and behavior change. Use of role playing provides the student with insights into nuances of interpersonal relationships. Applications to selection, counseling and other situations. (See also P 628, The Interview)

HMS 632 Group Treatment and Family Therapy
Introduction to group and family approaches to psychotherapy. Factors important to the successful therapeutic group are discussed. (See also, P 632, Group Treatment and Family Therapy)

HMS 634 Personality Assessment
A critical survey of the theories and issues of personality assessment. Includes: intelligence, achievement and ability assessment. Personality tests and ethical questions associated with psychological testing. Laboratory fee required. (See also P 634, Personality Assessment)

HMS 635 Appraisal and Testing in Counseling
Prerequisite: HMS 610 or permission of instructor. Theories, assumptions and constraints underlying construction and application of psychological tests and measures in industry. Emphasis on selection, validation and interpretation of appropriate standardized tests and surveys for specific applications in organizations such as employment testing and employee attitude assessment. (See also P 635, Psychological Tests and Measures)

HMS 636 Abnormal Psychology and Counseling
Etiological factors in psychopathology dynamics and classification of neuroses, psychophysiologic conditions, psychoses, personality disorders, organic illness, retardation and childhood diseases. (See also P 636, Abnormal Psychology)

HMS 693 Counseling Internship I
The student's formal educational development will be complemented by field placement experience in various criminal justice settings or agencies. Field experience will be supervised by designated agency and department personnel. (See also CJ 693, Criminal Justice Internship I)

HMS 694 Counseling Internship II
Prerequisite: HMS 693. The student's formal educational development will be complemented by field placement experience in various criminal justice settings or agencies. Field experience will be supervised by designated agency and department personnel. (See also CJ 694, Criminal Justice Internship II)

History

HS 607 World History in the Twentieth Century
A survey of major global events and trends since 1900. Advanced industrial societies emphasized, but coverage of major regions of the Third World also studied. Includes: the World Wars, patterns of economic cooperation and competition, decolonization and East-West conflicts.

HS 610 Survey of United States History
Broad-based review of American history from Colonialism to the present. This course is designed specifically for preservice teachers in order to meet Connecticut state certification requirements.

HS 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

HS 695 Independent Study
A planned program of individual study or research under the supervision of a member of the faculty.

Hospitality and Tourism

HT 616 Advanced Financial Management and Policy Analysis for Hospitality and Tourism
This course takes the experienced hospitality student through the certification process for designation as a Certified Hospitality Account Executive (CHAE) and includes the certification exam as a portion of the course and final grading process. Additionally, membership in the Hospitality Financial and Technology Professional (HFTP) is included as a portion of the course. Topics covered include the investment trends and analysis, lease and purchase considerations, working capital finance, audit and financial management, and the CHAE exam preparation.

HT 901 Orientation and Communication
Introduction to the executive tourism and hospitality management program, including instructions on expected standards of written and oral communication in all course modules. Communication skills needed to be successful in a professional tourism and hospitality organization are examined. Communication tactics of persuasion, conflict, perception and change used by management are emphasized. Communication competency is gained through activities and assignments that require interpersonal communication, listening skills, interviewing, speeches, public presentations, negotiations, and meeting communication in hospitality/tourism settings.

HT 902 Philosophy of Service and Operations Strategy
Philosophy of service from management, leadership and marketing perspectives. Theories, concepts and modules as well as industry-based procedures are studied as they relate to successful service-oriented tourism and hospitality businesses. The course provides a solid foundation in the important aspects of hospitality and tourism organization operations including human resources, guest services, marketing, maintenance and industry trends.

HT 903 Organizational Development and Human Resource Strategies
Examination of human resource skills necessary for successful operation of hospitality and tourism facilities. Includes applications of organizational behavior and development, training, supervision, evaluation, motivation and morale, leadership and union-management relations.

HT 904 Dimensions of Tourism in the Global Marketplace
Study of the economic, social, political and environmental impacts of tourism from a global perspective. The roles of transportation, hotels, restaurants, attractions and tourism promotion organizations are investigated, along with planning and development concerns. Fundamental changes and emerging trends; integration of issues is achieved through international and domestic case study analysis.

HT 905 National and International Strategic Marketing for Senior Level Management
Strategic approach to the management of the marketing function in the hospitality/tourism business. The traditional departmental responsibilities of internal and external analysis, operations, strategies, action plans and controls; marketing interaction with the business's strategic plan to produce effective organizational change. Marketing as a set of principles that directs the company in decision making to satisfy customers. Focus on the dramatic and swift changes in international markets and the need for managers to be adaptable and prepared for change.

HT 906 Financial Resource Development and Preservation
Analysis of financial systems and control methodologies. Emphasis on current trends and problems facing the industry. Mergers, acquisitions and profitability are stressed.

HT 907 Law and Taxation for Profit/Non-Profit Organizations
Review of the contemporary legal issues in employee, guest and vendor relations. Examines legal and tax issues for not-for-profit organizations, often found in the tourism sector, and taxation issues of hospitality transactions. Contemporary issues of risk related to hospitality and tourism are examined.

HT 908 Government–Business Relations and Ethics
Impacts of government regulation on the hospitality and tourism sector. Cooperative partnerships forged by governments and the tourism/hospitality industry. Differences in govern-

ment and business relations and regulations from one country to another and their role in destination development. Current ethical issues being debated in the tourism and hospitality arena. Exploration of where ethical decision making responsibility belongs in hospitality and tourism dilemmas.

HT 909 Leadership and Problem Solving
Holistic approach to various leadership styles based on personal value systems. Classical leadership and management models are applied through a problem-solving approach to hospitality and tourism. Current issues, great leaders and global citizenship are examined.

HT 910 Special Topics: Current Issues/Future Trends
An in-depth examination of current issues in tourism and hospitality with a global perspective. Investigation of future trends in the context of finances, operations, management, marketing, regulation and employment. This course is the final module and will build on previous course knowledge, explore areas of interest and prepare students for the comprehensive examination.

HT 911 Tourism and Hospitality Internship
Structured, hands-on, work experience in a tourism or hospitality operation. Students work under the supervision of both a faculty member and personnel at the tourism/hospitality operation.

HT 912 Research Project I
A structured, individual research project under the supervision of a faculty adviser; course may include both classroom presentation/discussion and independent research.

HT 913 Research Project II
A continuation of Research Project I.

HT 914 Independent Study I
A planned program of individual study under the supervision of a faculty member.

HT 915 Independent Study II
A continuation of Independent Study I.

HT 916 Thesis I
Periodic meetings and discussion of the individual student's progress in the preparation of a master's thesis.

HT 917 Thesis II
A continuation of Thesis I.

HT 920 Strategies for Event Planning
Prerequisite: HT 901 or consent of instructor. Strategies necessary for event planning include the management, planning, budgeting, costing, marketing, escorting and evaluation of group tour principles. Group tour principles include the goals and objectives, economic impact, monitoring and control to assure proper plan implementation. Additional related issues will be addressed.

Humanities

HU 651-658 Topics in Humanities
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

HU 659 Writing and Speaking for Professionals
A practical, tool-oriented approach for professionals who need to perfect writing and speaking skills for career advancement or presentations in graduate courses. Students generate work-related writing/speaking assignments and negotiate learning contracts based on editing, writing and speaking methods related to individual needs and objectives. (See also E 659.)

HU 695 Independent Study
A planned program of individual study or research under the supervision of a member of the faculty.

International Business

IB 643 International Business
Prerequisites: EC 601, MK609. An introduction to the political, economic, technological and cultural settings of international business. Examines the problems, policies and operational procedures of the multinational corporation, including the adjustment to foreign cultures and governments. Review of development, organization and structure of the international firm.

IB 645 Comparative International Business Environments
Prerequisites: IB 643, MK 609. A comparative approach to the study of the noneconomic aspects of foreign markets of several representative areas in the world. Focus on the interaction between the sociocultural environment of host nations and the multinational firm.

IB 650 International Business Negotiating
Prerequisite: IB 643. A description and analysis of the various stages involved in the international business negotiating process. Also, a survey of the different types of values and behaviors encountered in business negotiating. Case studies of representative countries are included.

IB 651 International Marketing
Prerequisites: IB 643, MK 609. The application of marketing principles and techniques in a global

environment. A managerial approach to international marketing as it pertains to product policies, market channels, pricing, advertising in a foreign market. Emphasis on marketing in different cultural settings.

IB 652 Multinational Business Management
Prerequisites: IB 643, MK 609. An examination of global strategy, ownership control, organization and resource management. Major attention given to international risk analysis.

IB 660 East and Southeast Asian Business Systems
Prerequisites: IB 643 and MG 637. An analysis of the business systems of selected nations in East and Southeast Asia. Emphasis on the historical, political and cultural underpinnings of business activity. Negotiating strategies and techniques to be used with selected East and Southeast Asian governments and firms.

IB 670 Selected Topics
A study of selected issues of particular interest to the student and instructor. May be taken more than once.

IB 690 Research Project
Prerequisite: 15 graduate hours and permission of the instructor. Independent study under the supervision of an adviser.

IB 693 Internship
Prerequisites: Six credits of IB concentration courses and approval of internship coordinator. A program of field experience in selected organizations in international trade and marketing.

IB 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

IB 696 Independent Study II
A continuation of Independent Study I.

IB 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

IB 699 Thesis II
A continuation of Thesis I.

Industrial Engineering

IE 601 Introduction to Operations Research/ Management Science
Prerequisite: IE 607. Introduction to the techniques and philosophies of management science and operations research. Includes: linear programming, inventory analysis, queueing theory, dynamic programming, decision analysis and other modeling techniques.

IE 604 Management Systems
Techniques of industrial and governmental systems management including general systems and organizational theory.

IE 607 Probability Theory
Prerequisite: M 610 or equivalent. Probability of events. Random variables and expectations; discrete and continuous distributions; important standard distributions and applications; moment generating functions; central limit theorem.

IE 609 Descriptive and Inferential Statistics
Prerequisite: IE 607 or equivalent. Inferential statistical designs, including basic statistical tests and analysis of variance. Statistical theories and application of correlation analysis, multiple linear regression, nonlinear regression and analysis of covariance.

IE 611 Decisions in Operations Management
Prerequisites: MG 637 and QA 604, or equivalents. Study of organizations as systems producing goods and services. Review of concepts, functions and basic techniques as applied to operations management. Examination of new trends and developments such as just-in-time, synchronous manufacturing, quality management, cycle-time reduction and concurrent engineering. Emphasis on interrelations of different operational decisions on the final product and competitive position of the organization.

IE 612 Managerial Interactions I
An interdisciplinary systems approach to human behavior in organizations with emphasis on the impact of industrial engineering methods on organizational performance. Deals with individual motivation and face-to-face interaction in managerial roles.

IE 613 Managerial Interactions II
Prerequisite: IE 612. Continuation of IE 612. Organizational development, job enrichment and modern work attitudes.

IE 614 Data Information Systems
Prerequisites: any one of CS 604 through CS 610 or equivalent, IE 604. Introduction to automated information systems planning and operations and their impact on management decision making, control functions and communication capabilities. An overview of concepts and procedures with applications in urban environments, large organizations and governmental agencies. Techniques presented include PERT/ CPM, Gantt charting, cost-benefit analysis.

IE 615 Transportation and Distribution
Prerequisite: IE 601 or equivalent. Introduction to transportation science with emphasis on physi-

cal distribution problems. Survey of operations research models and optimization strategies and their roles in transportation systems management.

IE 621 Linear Programming
Prerequisite: IE 601 or equivalent. Thorough coverage of the techniques and applications of linear programming. Special simplex forms and optimality conditions, duality and sensitivity are covered. Applications to network flow problems.

IE 622 Queueing Theory
Prerequisite: IE 601 or equivalent. Elements of queueing theory including finite and infinite cases. Single server and multiple server parallel channels/series queues and special cases are analyzed.

IE 623 Decision Analysis
Prerequisite: IE 609 or equivalent. Decision theory, game theory; benefit-cost analyses under uncertainty; advanced engineering economic analysis.

IE 624 Quality Analysis
Prerequisite: IE 609 or equivalent. Concepts of quality and statistical quality analysis. Sampling techniques and decision processes.

IE 625 Advanced Mathematical Programming
Prerequisites: CS 606 or equivalent, IE 621. Advanced mathematical programming techniques. Integer programming, goal programming, and multiple objective linear programming techniques will be covered. Computer applications will be demonstrated.

IE 643 Reliability and Maintainability
Prerequisite: IE 609 or equivalent. The basic theory and methodology of reliability and maintainability, including application of discrete and continuous distributions and statistical designs. Reliability, estimation, structure models and growth models.

IE 651 Human Engineering I
An introduction to the design of machines, jobs and environments with consideration of ergonomic principles. Coverage of behavioral, anatomical, physiological and organizational factors affecting performance, comfort and safety.

IE 652 Human Engineering II
Prerequisite: IE 651 or equivalent. Continuation of IE 651. In-depth analysis of selected topics in ergonomics including work physiology, anthropometry and signal detection theory. Laboratory experiments and reports included.

IE 655 Manufacturing Analysis
Prerequisite: undergraduate courses in manufacturing or manufacturing work experience and consent of instructor. The principles of the theory of metal cutting and metal working for improving the manufacturing operations involving metal machining and metal working. An opportunity for the students to thoroughly understand the experimental approaches used in manufacturing.

IE 661 Facility Infrastructure
An overview of facilities planning and design considerations, with an emphasis on service and nonmanufacturing facilities. Coverage includes facilities planning approaches and procedures, ergonomic considerations, access and accommodation issues, flow of people and materials, facility services, and facility flexibility and adaptability.

IE 671 Current Topics in Operations Research
Prerequisite: IE 601 or permission of instructor. An examination of new developments or current practices in operations research. A topic will be selected for thorough study. Possible subject areas include nonlinear programming, network theory, scheduling techniques, specialized techniques, specialized applications. Content may vary from trimester to trimester.

IE 672 Current Topics in Industrial Engineering
Prerequisite: IE 601 or permission of the instructor. An examination of new developments or current practices in industrial engineering. A topic will be selected for thorough study. Possible subject areas include reliability, production engineering, human factors, specialized applications. Content may vary from trimester to trimester.

IE 681 System Simulation
Prerequisites: IE 601, CS 606 or equivalent, or permission of the instructor. Methods of modeling and simulating man-machine systems. Thorough coverage of discrete event simulation. Random number generators and variate generations discussed. Use of a simulation package and several projects will be required.

IE 682 Advanced System Simulation
Prerequisite: IE 681 or equivalent. Emphasis will be on model building and on design and analysis of simulation experiments for service and manufacturing systems. Student projects in real environments are required.

IE 683 Systems Analysis
Prerequisites: IE 601, IE 609 or equivalent, IE 614. Techniques and philosophies defining the concept of systems analysis presented in detail; illustrated with large-scale case studies. Diverse systems are analyzed covering the social, urban, industrial and military spheres. Techniques include utility theory, decision analysis and technological forecasting.

IE 685 Theory of Optimization
Prerequisites: IE 601; CS 606 or equivalent. Methods of nonlinear optimization and programming. Search methods including golden section and dichotomous; constrained and unconstrained optimization including Rosenbrocks and Fletcher-Powell algorithms. Penalty and barrier function methods.

IE 686 Production and Inventory Analysis
Prerequisites: IE 601, IE 607 or equivalent. Inventory theory and models and their applications to production and operations. Methods of production including Kanban systems, JIT, MRP, and their relations to fundamental inventory techniques with computer applications.

IE 687 Stochastic Processes
Prerequisite: IE 601 or equivalent. The theory and application of discrete and continuous-time stochastic processes. Areas of application include queueing, inventory, maintenance and probabilistic dynamic programming models.

IE 688 Design of Experiments
Prerequisite: IE 609 or equivalent. Principles of modern statistical experimentation and practice in use of basic designs for scientific and industrial experiments; single factor experiments, randomized blocks, Latin squares; factorial and fractional factorial experiments, surface fitting designs.

IE 690 Research Project
Prerequisite: 15 graduate hours and permission of the program coordinator. Independent study under the guidance of an adviser into an area of mutual interest, such study terminating in a technical report of academic merit. Research may constitute a survey of a technical area in industrial engineering or operations research, or may involve the solution of an actual or hypothetical technical problem.

IE 695 Independent Study I
Prerequisite: permission of the program coordinator. Independent study under the guidance of an adviser into an area designated by the program coordinator.

IE 696 Independent Study II
A continuation of Independent Study I.

IE 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

IE 699 Thesis II
A continuation of Thesis I.

Logistics

LG 660 Logistics Technology and Management
Survey of modern logistics activities in both the commercial and military sectors. Theory of integrated logistics systems with applications to include customer-supplier relationships, inventory management, just-in-time and related procurement disciplines, spares and customer field support, transportation, warehousing, and physical distribution management. Quantitative and e-commerce tools are described in the context of corporate enterprise resource planning and logistics management.

LG 663 Logistics in Acquisition and Manufacturing
Managing logistics processes in purchasing, acquisition and manufacturing. Optimizing logistics in complex, worldwide supply chains; in distribution systems designed for multiproduct, multiplant organizations; and in single-plant systems producing for the end customer. Designing customer support strategies and multimodal transportation interfaces.

LG 664 Patents and Licensing in the Acquisition Process
Supply chain management, purchasing, and product or service acquisition require a knowledge of patent law, licensing, and related international agreements. Current practice in patent law is described, together with ramifications for various industries including telecommunications and contract manufacturing.

LG 665 Integrated Logistics Support Analysis
Concepts of integrated logistics support in both the commercial and military sectors including logistics specialities, customer support, documentation needs, internet applications, and system management on a worldwide basis. Introduction to reliability, maintainability, life cycle cost analysis, test and support capability, and warranty management.

LG 669 Life Cycle Cost Analysis
Theory and application of life cycle cost analysis applicable to both military and commercial decision support processes. Techniques for forecasting costs in future scenarios including economies of scale, upgrading, recycling, customer relationship support, training, and salvage and exit strategies. Application to new product development. Effectiveness over expected lifetime versus total life cycle cost.

LG 670 Selected Topics
A study of contemporary issues in logistics keyed to student and instructor interests. May be taken more than once.

LG 690 Research Project
Prerequisite: 15 graduate hours or

permission of the instructor. Independent study under the supervision of an adviser.

LG 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

LG 696 Independent Study II
A continuation of Independent Study I.

LG 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

LG 699 Thesis II
A continuation of Thesis I.

Mathematics

M 601 Mathematical Ideas
This course is intended for students in the M.S. Education program. It surveys the development of mathematics through such key topics as geometry, trigonometry, abstract algebra, and the calculus. While topics may vary with individual instructors, all instructors will introduce students to the contributions of mathematics to civilization and give students some understanding of the discipline of mathematics.

M 605 Biostatistics
A non-calculus-based course which includes basic concepts of probability and statistics. These concepts are applied to problems in human biology, industrial/occupational health and epidemiology. Introduction to and use of the computer package SPSS for data analysis. (See also BI 605.)

M 610 Fundamentals of Calculus
Prerequisite: M 115 (pre-calculus mathematics) or equivalent. Review of algebra and trigonometric functions. Topics from calculus, including differentiation and integration methods applied to problems in science, business and the social sciences. A review of series.

M 611 Matrix Theory and Its Applications
Prerequisite: undergraduate linear algebra or permission of instructor. Review of matrix algebra, systems of linear equations and rank; linear algebra in n-dimensions; inner product spaces and orthogonality; eigenvalues and eigenvectors; Hermitian, unitary and normal matrices; quadratic and Hermitian forms. The course covers topics in matrix theory needed for significant applications in engineering and computer science.

M 615 Linear Mathematics and Combinatorics
Prerequisite: M 610 or equivalent. Discrete mathematics topics used extensively in computer science, including linear algebra, graph theory and combinatorics. Emphasis on applications to computer science.

M 616 Applied Modern Algebra for Computer Science
Prerequisite: M 615. Advanced topics in logic and combinatorics as well as an introduction to discrete modern algebra and its applications to computer science.

M 620 Numerical Analysis
Prerequisites: a minimum of 12 credit hours of undergraduate mathematics, including calculus and linear algebra; knowledge of a computer programming language such as Pascal, C programming, FORTRAN or BASIC. Topics include: solution of transcendental equations by iterative methods; solution of systems of linear equations (matrix inversion, etc.); interpolation, numerical differentiation and integration; solution of ordinary differential equations.

M 624 Applied Mathematics
Prerequisite: a minimum of 12 credit hours of undergraduate mathematics, including calculus and differential equations. Special functions; Fourier series and integrals; integral transforms (Fourier, Laplace, etc.) and their use in solution of boundary value problems.

M 632 Methods of Complex Analysis
Prerequisite: graduate standing in engineering or mathematics. A study of the applications of the methods of complex variables to engineering and physical sciences. Includes: analytic function theory, contour integration and conformal mapping.

M 670 Selected Topics
Prerequisite: permission of the instructor. A study of selected topics of particular interest to the students and instructor. May be taken more than once.

M 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an adviser.

M 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

M 696 Independent Study II
A continuation of Independent Study I.

M 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

M 699 Thesis II
A continuation of Thesis I

Molecular Biology

MB 601 Protein Biochemistry and Enzymology

Prerequisites: undergraduate organic chemistry and biochemistry. This course examines the relationship between protein structure and function. Topics included are properties of amino acids, peptides and proteins, peptide synthesis, protein isolation and sequencing, aspects of protein folding, protein-protein and receptor-ligand interactions, enzyme kinetics and enzyme regulation.

MB 602 Biochemistry of Bioenergetics

Prerequisites: undergraduate organic chemistry. This course is strongly recommended for students lacking undergraduate biochemistry. Examination of the major anabolic and catabolic pathways and their regulation. Catabolic pathways for the oxidation of hexoses, lipids and amino acids are considered. These processes lead to the formation of a chemiosmotic gradient capable of driving ATP synthesis. Discussion of the anabolic pathways starts with the generation of a similar chemiosmotic gradient by light absorption or other energy releasing pathways leading to production of carbohydrates, lipids, amino acids and nucleotides.

MB 603 Nucleic Acid Biochemistry

Prerequisites: undergraduate organic chemistry and biochemistry. Examines the biochemistry of nucleic acids, their function as genetic information and control over the expression of that information, nucleic acid-protein interactions, oncogenes and carcinogenesis.

MB 606 Molecular Genetics/ Genomics

Prerequisite: undergraduate molecular biology or biochemistry. The course combines information from the most recent genomic projects with traditional genetic research methods to provide novel understanding of the role of the genome as the blueprint of life. Emphasis is placed on exploring the expression of genes in the context of the activity and function of the whole genome. Topics include genome anatomy, functional genomics, regulation of the activity of genome, genome evolution, poteomics, genome engineering, and computational genomics.

MB 607 Cellular Biology

An introduction to cellular structure and function. Examination of the role of biological membranes in cellular activity and forming functional compartments within organelles. The function of other cellular and extracellular structures, such as cytoskeleton and extracellular matrix. Additional topics include receptor structure and function, cellular signalling, differentiation and motility.

MB 611 Molecular Biology of Proteins with Laboratory

Prerequisites: MB 601 or undergraduate molecular biology and biochemistry. Techniques for working with proteins that are basic to the cell and molecular biologist and extend beyond the understanding of basic protein biochemistry. Course provides a theoretical understanding of methods commonly utilized for protein/peptide analysis. In the laboratory, students will isolate proteins from various tissues or expression systems and analyze them by one- and two-dimensional polyacrylamide gel electrophoresis. 4 credits; laboratory fee.

MB 613 Molecular Biology of Nucleic Acids with Laboratory

Prerequisites: MB 603 or or permission of the instructor. An examination of gene expression and the techniques available for manipulating DNA and RNA. This course utilizes an intense laboratory component to instruct students in the practical and technical aspects of working with nucleic acids. 4 credits; laboratory fee.

MB 617 Cell Culture Techniques with Laboratory

Prerequisites: MB 607. An intensive laboratory course designed to provide the student with basic skills and understanding required for mammalian cell and tissue culture and fundamental techniques in cell biology. Topics will include aseptic technique, the culture environment, primary culture, maintenance of cultures, cloning and selection of cell phenotypes, proliferation and apoptosis assays, tumorigenicity assays and experimental design. 4 credit hours.

MB 620 Bioinformatics

Prerequisites: undergraduate molecular biology or biochemistry; students must have access to e-mail prior to the first class. Students will learn how computers and information technology are changing the way biology is done. After reviewing genome structure, gene expression and the history of the Human Genome Project, the course will cover experimental acquisition of DNA and protein sequence data, DNA sequence and mapping databases, sequence analysis and database searching, gene similarity and homology, protein structure and protein evolution. Students will gain practical experience using computer applications essential to current biological research.

MB 625 Advanced Bioinformatics
Prerequisite: MB 606 Molecular Genetics/Genomics and MB 620 Bioinformatics and CS 622 Database Systems as corequisite. The aim of this course is to provide students with a detailed overview of the latest computational and scientific developments in Bioinformatics. Students will use a broad set of Bioinformatics software tools and will gain a comprehensive introduction to the theory upon which these tools are based. Students will develop new bioinformatics applications by using real biological data and Perl language. Topics include novel data storage and handling techniques, pattern search techniques through GCG package, development and implementation of new bioinformatics applications using Perl language, analysis biomolecular structures, dynamics and functions, and analysis of novel gene expression methods (DNA microarray technology and serial analysis of gene expression= SAGE).

MB 636 Immunology
Study of the immune response in animals including cells and organs of the immune system, immunogens, MHC, cytokines, TCR, antibodies and complement.

MB 644 Cellular Development
Prerequisite: MB 607. The course covers control of differentiation and development at the cellular level. Topics include cell cycle control, embryological development, programmed cell death, wound healing and chronic wounds.

MB 648 Cytoskeleton and Extracellular Matrix
Prerequisite: MB 607. The cytoskeleton provides cues for patterns of division and the molecular motors needed for cell motility. The extracellular matrix also contains cues for the cells that are differentiating, providing highly localized signals and pathways for cellular migration. This course examines the roles of the cytoskeleton and extracellular matrix in cellular movement, differentiation and function.

MB 650 Oncogenes and Cytokines
Prerequisite: MB 607. The products of oncogenes induce cancer in animals and transformed phenotypes in cultured cells. Often the products are analogues of cytokines or cytokine receptors. This course examines oncogenes and their role in transformation, cell cycle control and cellular differentiation.

MB 656 Receptor Effector Systems
Prerequisite: MB 601 or MB 607. Cellular receptors and their effector systems are responsible for the ability of cells to detect and respond to stimuli. These proteins are of critical importance to the development of drugs to control the function of cells. This course examines the structure of receptors from ion channels to DNA binding proteins, followed by an examination of the signalling pathways that propagate the signal through the cell. Also covered, the design and interpretation of binding studies for receptor ligand interactions.

MB 670 Selected Topics
Prerequisite: permission of instructor. An examination of topics of special interest to students and faculty. May be taken more than once.

MB 680 Graduate Seminar
Prerequisite: permission of instructor. Weekly discussions of current scientific literature and student and faculty research projects. May be taken more than once. 1 credit.

MB 688 Internship I
Prerequisite: permission of instructor. Laboratory and research experience will be developed under the supervision of an outside researcher. A portion of the internship must be devoted to the completion of a research report. The instructor will monitor the student's progress through regular meetings and evaluation of the final report.

MB 689 Internship II
A continuation of Internship I.

MB 690 Research Project
Prerequisite: permission of instructor. An independent research project/program under the supervision of a member of the faculty.

MB 695 Independent Study I
Prerequisite: permission of instructor. A planned program of independent study under the supervision of a member of the faculty.

MB 696 Independent Study II
A continuation of Independent Study I.

MB 698 Thesis I
Prerequisite: 15 graduate hours and permission of coordinator. Supervised preparation of a thesis describing the student's research.

MB 699 Thesis II
A continuation of Thesis I.

Mechanical Engineering

ME 602 Mechanical Engineering Analysis
Topics in vector calculus and complex variables. Solution of partial differential equations as applied to mechanical engineering.

ME 604 Numerical Techniques in Mechanical Engineering
Prerequisite: knowledge of C programming or FORTRAN. Review of matrix algebra and simultaneous equations. Numerical integration and differentiation. Numerical methods for differential equations including techniques such as Euler, Runge-Kutta, Milne, shooting, Crank-Nicolson and FEM. Emphasis on numerical solutions to ordinary and partial differential equations relevant to mechanical engineering.

ME 605 Finite Element Methods in Engineering
Prerequisite: ME 604. Basic concepts underlying the FEM. Displacement and weighted residual formulations of the finite element approach to numerical solutions. Applications to one- and two-dimensional problems in areas such as elasticity, heat transfer and fluid mechanics.

ME 610 Advanced Dynamics
Kinematics and dynamics of single particles and systems of particles. Lagrange's equations. Hamilton's principle and canonical transformation theory. The inertia tensor and rigid body motion.

ME 611 System Vibrations
Advanced techniques for analysis of vibrations in mechanical systems. Multiple degrees of freedom and random noise inputs among topics covered.

ME 613 Fundamentals of Acoustics
Basic theory of acoustics in stationary media; plane, cylindrical and spherical waves; reflection, transmission and absorption characteristics; sources of sound; propagation and attenuation in ducts and enclosures.

ME 615 Theory of Elasticity
Index notation; Cartesian tensors and coordinate transformation; stress tensor and field equation; analysis of stress and strain in two and three dimensions; Airy stress function; applications to problems of torsion and bending; experimental methods.

ME 620 Classical Thermodynamics
Phenomenological equilibrium and nonequilibrium thermodynamics. Formulation and application of fundamental laws and concepts; chemical thermodynamics.

ME 625 Mechanics of Continua
Tensor analysis, stress vector and stress tensor, kinematics of deformation, material derivative, fundamental laws of continuum mechanics, conservation theorems, constitutive laws and representative applications.

ME 627 Computer-Aided Engineering
Prerequisite: consent of instructor. Integration of computers into the design cycle. Interactive computer modeling and analysis. Geometrical modeling with wire frame, surface and solid models. Finite element modeling and analysis. Problems solved involving structural, dynamic and thermal characteristics of mechanical devices.

ME 630 Advanced Fluid Mechanics
Advanced topics from among the following areas: perfect fluids, viscous fluids, turbulence, boundary layer theory, surface phenomena, shock waves and gas dynamics.

ME 632 Advanced Heat Transfer
Review of the basic concepts of conduction and radiation. Detailed treatment of laminar, turbulent, free and forced convectional flows. Computer projects.

ME 635 Dynamic Systems and Control
Introduction to the modeling of dynamic systems. Emphasis on the analysis of first and higher order continuous-time linear models. Feedback techniques with examples from various branches of mechanical engineering.

ME 645 Computational Fluid Dynamics and Heat Transfer
Prerequisites: ME 604, ME 630. Current methods of computer solutions of the conservation equations of fluid dynamics. Viscous, incompressible, compressible and shock flows. Real gas equations of state. Computer projects.

ME 655 Interfacing Mechanical Devices
Prerequisite: knowledge of C programming. Interfacing the real world of mechanical devices to a stand-alone PC. How to write C programs for monitoring and control of DC motors, encoders, stepper motors, AC heaters and AC fans. Practical uses of thermal, mechanical, optical and Hall Effect sensors.

ME 670 Selected Topics
Prerequisite: permission of the instructor. A study of selected topics of particular interest to the students and instructor. May be taken more than once.

ME 690 Research Project
Prerequisites: 15 graduate hours and written permission of program coordinator. Independent study under the guidance of a faculty adviser, such study terminating in a technical report of academic merit. Research may constitute a survey of a technical area in mechanical engineering, or may involve the solution of an actual or hypothetical technical problem.

ME 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

ME 696 Independent Study II
A continuation of Independent Study I.

ME 698 Thesis I
Prerequisite: 18 graduate credit hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

ME 699 Thesis II
A continuation of Thesis I.

Management

MG 610 The Sports Industry
Prerequisite: MG 637. Focuses on management concepts and business skills as they relate to the sports industry. An in-depth look at the organizational structure and method of operation of major sectors of the sport enterprise; examination of important contemporary issues in the sports industry.

MG 611 Sport Industry Marketing, Promotion and Public Relations
Prerequisite: MK 609 or permission of instructor. A study of marketing, promotion and public relations strategies utilized in various aspects of the sport industry. Marketing sport as a product and marketing of non-sport products using sport as a promotional tool are examined.

MG 612 Sports Law
An analysis of contract law, tort law, antitrust law, labor law, collective bargaining and administrative law as they apply to sport. Provides sport managers with the fundamental legal knowledge necessary to operate in the increasingly complex sport environment.

MG 613 Sports Facility Management
Prerequisite: MG 637 or permission of instructor. An examination of how sports facilities such as coliseums, municipal and college stadiums, and multipurpose civic centers are managed. Among the topics included: booking and scheduling of events, box office management, staging and event production, personnel management, concessions and merchandising management.

MG 617 Applied Fiscal Management for Sports and Facility Managers
Prerequisite: A 620 or permission of instructor. An examination of legal, managerial, accounting and financial issues confronting sports, fitness and recreation industry managers. Issues covered include tax law, bankruptcy, inventory management, capital instruments, accounting principles, financial statements, industry ratios, securing funds and related concepts that help determine the viability and strength of businesses in the sports industries. The focus of the material is on how to apply basic financial management concepts to managerial decision making.

MG 618 College Sports Administration
The major objective of this course is to provide students with knowledge of the day-to-day operations of a collegiate athletic department. Through case studies, class projects, guest lectures and on-site visits, students will acquire the practical skills needed to manage a staff of coaches, administrators, student athletes and other staff. The activities of facility operations, travel, compliance, eligibility, financial aid, personnel, ticket operations, sports camps and institutional control will be examined.

MG 630 Management Information Systems in Health Care
The use of computers in the health care field. Review of the history of information systems and their application in health care settings. Survey of problems and issues inherent to health care information management.

MG 637 Management Process
A study of the traditional functions of management: planning, organizing, directing, controlling and coordinating along with an analysis of human behavior in organizations and the exploration of new paradigms in business and management systems.

MG 640 Management of Health Care Organizations
Identification of the characteristics of health care organizations and the dimensions of management in such organizations. Examination and application of the principles of management necessary for the successful operation of health care organizations.

MG 645 Management of Human Resources
Prerequisite: MG 637 or P 619 or PA 601. A study of organizational practices in the management of human resources. Manpower planning, recruitment, selection, training, compensation and contemporary problems of the field.

MG 650 Entrepreneurship
Prerequisites: FI 601, MG 637, MK 609. Deals with the establishment of a new business venture, covering such topics as site development, market analysis, staffing, inventory control, personnel relations and funding.

MG 655 Corporate Governance and Business Strategy
Prerequisite: MG 637. The primary participants who determine the direction and performance (i.e., governance) of corporations are the shareholders, the management and the board of directors. The rights, obligations and impacts of these direct participants in corporate governance are explored along with the roles that various corporate constituents can, do and should play in determining corporate direction, strategy and performance.

MG 663 Leadership and Team Building
Prerequisite: MG 637 or P 619 or PA 625. Examination of the impact of theories and research findings that are relevant to leadership and team building in organizations. The role of the leader and teams in organizations; the knowledge and skills required for successful leadership and team building. Assessment of one's own leadership and team-building capabilities.

MG 664 Organizational Effectiveness
Prerequisite: MG 637 or P 619 or PA 625. Identification of the criteria necessary for developing and maintaining effective organizations. A study of the concepts that may be utilized in the management of these criteria. Approaches that may be examined and applied to problem situations through cases and role playing.

MG 665 Compensation Administration
Prerequisites: EC 625; MG 645 or P 620. A study of the compensation function in organizations. Establishing wages and salaries, fringe benefits and incentives.

MG 667 Multicultural Issues in the Workplace
Prerequisite: MG 637 or P 619. Overview of theory and practice of diversity in the workplace; examination of the impact of changing workforce demographics on current and future productivity and competitiveness of organizations. Various forms of bias; methods for overcoming negative impact. Implementation of diversity programs; self-awareness of attitudes and behavior toward diverse groups. Issues addressed include gender, race, age, religion, sexual orientation, physical ability, veteran status.

MG 669 Strategic Management
Prerequisite: completion of all core and at least four of the advanced courses in the M.B.A. curriculum. This course examines management policies and strategies for the complex organization operating in a dynamic environment from the viewpoint of top-level executives of the organization. It also develops analytic and systemic frameworks for the management of numerous elements involved in assuring the fulfillment of the goals of the total organization and integrates the student's general business knowledge with knowledge acquired in the M.B.A. curriculum. Emphasis on development of oral and written skills by examination and discussion of cases and by other appropriate instructional methods. Completion of a significant project is required as part of this course.

MG 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

MG 678 Personnel Management Seminar
Prerequisites: EC 625, MG 637 or P 619, MG 645 or P 620. A seminar in the personnel and manpower management function of the modern work organization. The use of an integrated behavioral, quantitative and systems approach permits an applied multidisciplinary synthesis of the various aggregate manpower management subsystems required in the modern work organization.

MG 680 Current Topics in Business Administration
Prerequisite: 15 graduate hours or permission of the instructor. An integrative course examining the role of business in society and relating the business firm to its social, political, legal and economic environments. While the exact content of this seminar is expected to vary from trimester to trimester in accordance with the varied academic interests and professional backgrounds of different faculty handling the course, the basic theme is the role of the business firm as the "keeper" of the market mechanism and the means for organizing resources in the economy.

MG 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an adviser.

MG 694 Internship
Prerequisite: 24 credits of graduate work. An on-the-job learning experience with a selected organization, arranged for course credit and under the supervision of a faculty adviser.

MG 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

MG 696 Independent Study II
A continuation of Independent Study I.

MG 698 Thesis I
Prerequisite: 15 graduate hours.

Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

MG 699 Thesis II
A continuation of Thesis I.

MG 801 Dissertation I
Enrollment limited to doctoral students only. Prerequisite: successful completion of the written and oral doctoral comprehensive examination. Periodic meetings and discussions of the individual student's progress in the preparation of the doctoral dissertation.

MG 802 Dissertation II
Enrollment limited to doctoral students only. Continuation of Dissertation I.

MG 803 Dissertation III
Enrollment limited to doctoral students only. Continuation of Dissertation II.

MG 804 Dissertation IV
Enrollment limited to doctoral students only. Continuation of Dissertation III.

Marketing

MK 609 Marketing
An intensive study of modern marketing fundamentals in a diverse, global economy; study of the decision-making problems encountered by marketing managers, using lectures and case studies.

MK 616 Buyer Behavior
Prerequisite: MK 609. An examination of the principal comprehensive household and organizational buyer behavior models and the behavioral science theories on which such applied models are based. Analysis of the buyer at the individual level, at the social level and at the organizational level.

MK 632 Nonprofit and Services Marketing
Prerequisite: MK 609. An examination of the service product in for-profit and not-for-profit organizations. Unique tools for analysis of service quality and the service encounter, including the roles of the customer and the service provider in service production, service expectations and scripts, and positioning. Communication and management strategies for service expectations, demand management and organizational flexibility.

MK 638 Competitive Marketing Strategy
Prerequisites: MK 609 plus three additional graduate credits in marketing. Focuses on product, price distribution and promotion strategies that will give a company a competitive advantage. Also, corporate self-appraisal, market segmentation and competitor evaluation.

MK 639 Marketing Research and Information Systems
Prerequisites: MK 609, QA 604. A managerial approach to marketing information flow, including recognition of information needs and an overview of marketing research as part of an information system. Special attention to evaluation of research design and measurement methods, effective utilization of research output and problems encountered in establishing a marketing information system.

MK 641 Marketing Management
Prerequisites: MG 637, MK 609. A case based review of the basic decision-making problems in marketing management, with an emphasis on information gathering and strategy. Topics include both U.S. and international problems in product, promotion, distribution channels, sales management, and pricing. Cases will consider both physical products and services in the consumer and business-to-business environments.

MK 643 Product Management
Prerequisites: MG 637, MK 609. The search for new product ideas and their evaluation; the organization structure necessary to the development and introduction of new products and the management of a product line; the commercial aspects of product design, packaging, labeling and branding; considerations involved in making product deletion decisions; and the social and economic effects of managing product innovation.

MK 645 Distribution Strategy
Prerequisites: MG 637, MK 609. Analysis of channel strategies, theory and economic justification of distribution channels, direct and indirect methods of control, behavioral states of channel members, costing the channel and management of changes in distribution.

MK 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

MK 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an adviser.

MK 693 Internship
Prerequisites: Six credits of MK concentration courses and approval of internship coordinator. A program of field experience in selected organizations in marketing and public relations.

MK 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

MK 696 Independent Study II
A continuation of Independent Study I.

MK 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

MK 699 Thesis II
A continuation of Thesis I.

National Security and Public Safety

NSP 601 National Security Programs Architecture and Mission
An inquiry into the nature and scope of the U.S. National Security Program's Architecture. Areas covered include the current architecture, legal and regulatory basis, integrating national security programs into the agency's missions, developing security policies and strategies and the oversight of the NSP's. 3 credits

NSP 602 NSP Personnel Security Programs
A study of the personnel security programs. Specific analysis of behavioral issues and their impact on loyalty and trustworthiness determinations. Students will study government clearance processes and will be submitted for a clearance at the secret level. 3 credits

NSP 603 National Security Charter, Legal Issues, and Executive Orders
An analysis of the legal framework, charter and executive orders that guide the creation and operations of the U.S. Intelligence Community. 3 credits

NSP 604 Securing National Security Information Systems
A comprehensive introduction to Network Security issues, concepts and technologies. The core technologies of access control, cryptography, digital signatures, authorization, network firewalls, and network security services are reviewed. Issues in security policy, risk management are covered. 3 credits

NSP 606 Contemporary Issues in National Security Programs
Students will select from a range of topics relating to current issues and concerns within the National Security Architecture. Each student will be required to write a paper and deliver an oral presentation on a selected topic. 3 credits

NSP 610 NSP Cost Modeling and Contract Administration
An in-depth analysis of the federal acquisition process, costs of national security programs and their role in meeting federal agencies mission objective. Students will study the relationship between the federal acquisition process, budget planning, and national security programs. 3 credits

NSP 611 NSP Situational Evaluation and Failure Analysis Models
A comprehensive study of evaluation techniques and processes that measures scope and effectiveness of security programs. Students employ the use of situational analysis, failure analysis, case studies and other research oriented approaches. 3 credits

NSP 612 Integrated Studies in Safeguards and Countermeasure Designs
A study of the selection of safeguards and countermeasures in support of National Security Programs. Examine the relationship between protection needs, mission accomplishment, available safeguards, and countermeasures. Analysis of the impact of the protective architecture and reconciliation with the budgetary and human resource realities. 3 credits

NSP 613 NSP Issues in Research and Policy Analysis
An introduction to quantitative and qualitative methods used for research and policy analysis. Students will become familiar with basic types of research designs, survey research methods, evaluation methods, descriptive statistics, and inferential statistics, and their application to National Security Programs. 3 credits

NSP 641 National Security World and National Threat Modeling
An analysis of threats, vulnerabilities, risks, and appropriate countermeasures that must be analyzed to model the United States world and national assessment strategy. 3 credits

NSP 642 Integrated Studies of the Intelligence and Counterintelligence Communities
An introduction to the history, theory, principles, and objective of U.S. Intelligence and Counterintelligence Operations. Analysis of the impact on National Security Programs and objectives. 3 credits

NSP 643 Seminar in Sensitive Evaluation, Techniques, Safeguards, and Countermeasures
Prerequisites: NSP 612. The analysis study of the uses of classified techniques with the principles and techniques of Integrated Studies in Safeguards & Countermeasure Design course in National Security programs. 3 credits

NSP 670 Selected Topics
A study of selected issues of particular interest to the students and instructor.

NSP 690 Research Project I
Individual guidance on a research endeavor. 3 credits

NSP 691 Research Project II
Individual guidance on a research endeavor. 3 credits

NSP 693 National Security Internship I
Candidates that are accepted will be placed on summer assignments within an element (agency or industry) of the U.S. Government's National Security Program. The student's formal educational development will be complemented by field placement experience in various security settings or agencies. Field experience will be supervised by designated agency and department personnel. 3 credits

NSP 694 National Security Internship II
The student's formal education development will be complemented by field placement experience in various security settings or agencies. Field experience will be supervised by designated agency and department personnel. 3 credits

NSP 695 Independent Study
A directed independent learning experience, the topic and format to be agreed upon by the student and supervising faculty. 3 credits

Nutrition

NU 601 Nutritional Biochemistry I—Fundamentals
Prerequisite: undergraduate course in organic chemistry or introductory biochemistry. Lectures examining the structures, properties and metabolism of four major classes of bio-organics (carbohydrates, lipids, proteins/amino acids, nucleic acids/nucleotides) with special attention to their biologic roles and nutritional aspects of their metabolism.

NU 602 Nutritional Biochemistry II—Applications
Prerequisite: NU 601. Lectures emphasize integration and control of metabolic pathways and also survey certain areas of biochemistry and molecular biology with their interconnections with genetics, disease and patient management, including dietary modifications.

NU 603 Nutritional Physiology
Prerequisites: undergraduate course in organic chemistry or introductory biochemistry plus a course in human physiology or cell biology. Selected tissue/organ systems and their specific relation to nutrition. Overview of renal physiology, the endocrine system, essentials of gastrointestinal tract physiology, cardiovascular system, excitable tissues (nerve and muscle), cell physiology, cell membranes and transport functions.

NU 604 Vitamin Metabolism
Prerequisites: NU 601, NU 603. Study and integration of the chemistry, biochemistry, physiology, pharmacology, and nutritional aspects of vitamin metabolism in humans. Chemical nomenclature, structure-function relationships; structural analogs and antagonists; methods and principles of measurement and assessment of status; food sources; digestion; absorption; transport; tissue uptake and distribution; intracellular metabolism; storage; excretion; biochemical function(s); correlation of clinical features of excess and deficiency with metabolic roles; vitamin-nutrient and vitamin-drug interactions; the role of vitamins in therapeutics and prophylaxis.

NU 605 Mineral Metabolism
Prerequisites: NU 602, NU 604. Study and integration of the chemistry, biochemistry, physiology, and nutritional aspects of mineral metabolism in humans. Chemical forms; structural analogs and antagonists; methods and principles of measurement and assessment of status; food sources; digestion; factors influencing bioavailability; absorption; transport; tissue uptake and distribution; intracellular metabolism; storage; excretion; biochemical function(s); correlation of clinical features of excess and deficiency with metabolic roles; mineral-nutrient and mineral-drug interactions; and the role of minerals in therapeutics and prophylaxis.

NU 606 Cell and Molecular Biology of Human Nutrition
Prerequisite: NU 601, or permission of instructor. The relationship of nutritional science to the flow of information from DNA to protein. DNA replication, mutation, control of transcription and translation, signal transduction, the cell cycle and genetic engineering.

NU 609 Research Methodology in Nutrition
The course focuses on understanding the methods of nutrition research. Topics include advantages/disadvantages of various study designs; tools used in dietary assessment; measurement and interpretation; concepts and applications in nutrition from biostatistics and epidemiology.

NU 610 Nutrition and Disease I
Prerequisites: NU 602, NU 604. Discussion of certain disorders having nutritional implications; particular emphasis on the etiology and pathogenesis (including

dietary factors), as well as diagnosis and treatment approaches (past and current). Rationales for inclusion of dietary alterations in the prophylactic and therapeutic approaches. Disorders include renal disease and hypertension; atherosclerosis and cardiovascular disease; energy balance, obesity and eating disorders; metabolic bone disease, osteoporosis; diabetes mellitus.

NU 611 Nutrition and Disease II

Prerequisites: NU 602, NU 604. Continuation of discussion of nutritionally related disorders begun in Nutrition 610: cancer; gastrointestinal disorders, hepatobiliary disease; acquired immune deficiency syndrome (AIDS); connective tissue disorders, arthritis; trauma and infection in the critically ill; other disorders, depending on significance and student interest.

NU 612 Nutrition and Health—Contemporary Issues and Controversies

Prerequisite: NU 605. Application of nutritional science to the maintenance of good health and body function after childhood. Topics will vary with student/faculty interests and current issues in nutritional science.

NU 613 Maternal and Child Nutrition

Prerequisite: NU 605, or permission of program director. Physiology of pregnancy; maternal nutrition and outcomes of pregnancy, at-risk pregnancies: teratogens and teratogenic effect of nutrient deficiency or excess; nutrition and lactation, breast milk vs. formulas; nutrition and fertility; nutrition in growth and development; nutrient needs of infants and children; infant feeding and nutrition.

NU 614 Public Health Nutrition and Assessment

Prerequisite: NU 605. Interface between nutritional science and the broad area known as public health. Quantity, quality and safety of the food supply; food additives and labeling; regulatory agencies; research approaches to food, nutrition, and disease; procedures used in nutritional assessment of individuals.

NU 615 Nutrition and Exercise for Performance and Health

Prerequisites: introductory lecture course in biochemistry plus anatomy and physiology. The role of nutrition and physical activity in health promotion, disease prevention and sports performance. Topics include: exercise energetics, physiological responses and training adaptations; ergogenic aids for performance enhancement; assessment of body composition and physical fitness; behavioral management for exercise adherence; effectiveness of physical activity on chronic disease prevention and treatment; and development of exercise prescriptions for clinical populations.

NU 670 Selected Topics

Prerequisite: 15 graduate hours or permission of program director. A study of selected issues of particular interest to the students and instructor.

NU 690 Research Project

Prerequisite: 15 graduate hours or permission of program director. Independent research/project carried out under the supervision of a faculty adviser and resulting in a written research report in the area of human nutrition.

NU 695 Independent Study

Prerequisite: 15 graduate hours or permission of program director. A planned program of individual study under the supervision of a member of the faculty.

Psychology

P 605 Survey of Community Psychology

An examination of historical roots and current concepts. A social-problems approach to psychological dysfunction. Changing professional roles. Community organization and human service delivery; strategies of intervention and community change.

P 607 Special Problems in Community Psychology

Theory and practice of community psychology with selected problems, populations and settings. Emphasis on community psychology service issues and problems in the Connecticut area.

P 608 Psychometrics and Statistics

Prerequisite: intermediate undergraduate course in statistics. Comprehensive introduction to fundamental conceptual and technical aspects of measurement and psychological description of individuals. In-depth treatment of statistical issues such as advanced correlation and regression techniques using SPSSx statistical software to enhance understanding of key concepts. Emphasis on application of measurement and statistics to psychological assessment in field settings.

P 609 Research Methods

Prerequisite: P 608. Introduction to analytic concepts pertinent to sampling techniques, research design, variable control and criterion definition. Basic problems of measurement, research paradigms, sources of error in research interpretation, problems of variable identification and control, and consideration of the logic of inference.

P 610 Program Evaluation

Prerequisite: P 609. A systematic

study of the processes involved in planning, implementing and evaluating organizational programs. Focus on action research strategies which integrate the entire process from planning to evaluation of the program.

Practicum Seminars and Fieldwork (P 611 - P 616):
An apprenticeship or on-the-job role in an ongoing program or center. Emphasis on developing conceptualizations and insights as a result of involvement in the apprenticeship. Placement at a field site for 8 to 10 hours per week. Weekly class meetings serve two purposes: to present specific theoretical material and research findings appropriate to each seminar and to allow students to discuss their field training experiences. A comprehensive project report is required in which each student will analyze and integrate fieldwork experience with relevant research and coursework.

P 611 Individual Intervention Seminar
An examination of strategies for providing direct helping services to individuals in the context of formal and informal networks of social and community support. Includes: the nature of the dyadic relationship, development of therapeutic and case management skills, professional ethics and supervision. Applications to a wide range of problems, populations and settings. (See also HMS 611)

P 612 Consultation Seminar
An examination of the consultation process. Includes: the role of the consultant, stages of consultation, the development of consulting skills and political/ethical issues. Different approaches to consultation practice are analyzed, along with their associated interventions.

P 613 Systems Intervention Seminar
An examination of the dynamics of planned, system-level change in the field of human services. The distinctive characteristics of human service organizations are analyzed; and an overall intervention model is developed, applied and discussed. Of special interest to those with responsibilities in program planning and implementation.

P 614 Individual Intervention Fieldwork
Supervised field training in the provision of direct services to individual clients. Supervision is jointly provided by the field setting and the psychology department. Students must be available for at least one day per week. Permission of instructor is required. (See also HMS 614)

P 615 Consultation Fieldwork
Supervised field training in the development of consultation skills. Supervision is jointly provided by the field setting and the psychology department. Students must be available for at least one day per week. Permission of instructor is required.

P 616 Systems Intervention Fieldwork
Supervised field training in program planning and development. Supervision is jointly provided by the field setting and the psychology department. Students must be available for at least one day per week. Permission of instructor is required.

P 619 Organizational Behavior
Analysis of various theories of business and managerial behavior emphasizing the business organization and its internal processes. Psychological factors in business and industry, including motivation, incentives and conflict. A study of research findings relevant to an understanding and prediction of human behavior in organizations.

P 620 Industrial Psychology
Prerequisite: P 608 or QA 604, or permission of instructor. Psychological theories and research applied to typical human resource functions in organizations. Topics include selection and placement, job analysis and competency modeling, training and development, performance appraisal, compensation, and human re-source planning.

P 621 Behavior Modification I: Principles, Theories and Applications
Theory and research in behavior modification. Aversive learning, desensitization, operant conditioning. Applications in clinical and nonclinical settings.

P 623 Psychology of the Small Group
Analyses of the behavior and interaction of people in mutual gratification groups, committees, work groups and clubs.

P 624 Experiential Self-Analytic Group
This experiential group develops understanding of group and interpersonal dynamics through analysis of ongoing interaction and improves participants' interpersonal abilities relevant to organizational consulting and diagnosis. (See also HMS 626)

P 625 Life Span Developmental Psychology
In-depth exploration of normal and abnormal development through the life cycle. Emphasis on childhood, adolescence, adulthood and later years. Developmental impact of family, neighborhood, schooling, work, culture. Issues of class, ethnicity, gender, age, etc. Applications of theory and research to community treat-

ment and prevention. (See also HMS 625)

P 628 The Interview
The interview as a tool for information gathering, diagnoses, mutual decision making and behavior change. Use of role playing provides the student with insights into nuances of interpersonal relationships. Applications to selection, counseling and other situations. (See also HMS 628)

P 629 Introduction to Psychotherapy and Counseling
Theory, research and practice of psychotherapy and counseling. Examination of the assumptions, roles and processes of the therapeutic relationship. (See also HMS 629)

P 632 Group Treatment and Family Therapy
Introduction to group and family approaches to psychotherapy. Factors important to the successful therapeutic group are discussed. (See also HMS 632)

P 634 Personality Assessment
A critical survey of the theories and issues of personality assessment. Includes: intelligence, achievement and ability assessment. Personality tests and ethical questions associated with psychological testing. Laboratory fee required. (See also HMS 634)

P 635 Psychological Tests and Measurements in Industry
Prerequisite: P 608 or permission of instructor. Theories, assumptions and constraints underlying construction and application of psychological tests and measures in industry. Emphasis on selection, validation and interpretation of appropriate standardized tests and surveys for specific applications in organizations such as employment testing and employee attitude assessment. (See also HMS 635)

P 636 Abnormal Psychology
Etiological factors in psychopathology dynamics and classification of neuroses, psychophysiologic conditions, psychoses, personality disorders, organic illness, retardation and childhood diseases. (See also HMS 636)

P 638 Psychology of Communication and Opinion Change
Characteristics of the source, the situation and the content of messages, along with other variables influencing attitudinal modification. Cognitive factors and social settings in attitude change.

P 640 Industrial Motivation and Morale
Prerequisite: P 619. The meaning of work, theories of motivation, values and expectations, performance and reinforcement, job satisfaction and motivation, pay as an incentive, interventions to increase work motivation.

P 641 Personnel Development and Training
Identification of skills and developmental needs, both from an organizational and individual perspective. Techniques for assessment and development of skills, especially at the managerial level. Training approaches. Evaluation of training efforts.

P 642 Organizational Change and Development
Prerequisite: P 619 or MG 637. The nature of organization development, intervention by third-party consultation, change in organization structure and role relationships, evaluation of change efforts, participation, conformity and deviation.

P 643 The Psychology of Conflict Management I
The constructive management of conflict at the individual, corporate and multicultural levels. Theories on the etiology of conflict as well as various conflict resolution models. The role of communication and perspective-taking in the constructive resolution of conflict. Students will learn how to manage more constructively their own personal conflicts as well as conflicts occurring at the corporate and multicultural levels. (See also HMS 643)

P 644 Performance Appraisal Systems
Theory and applications associated with performance appraisal systems in organizations. Topics include setting relevant performance goals, the performance review session, coaching and counseling, multisource feedback, and rewards and recognition. Emphasis is on the development and implementation of valid and effective appraisal systems.

P 645 Seminar in Industrial/Organizational Psychology
Prerequisites: P 609 and P 619. An examination of the professional psychologist at work in organizations. Regular subjects include: measurement methods, prediction, validation, selection, training and employee assistance programs, group dynamics, organizational change, stress, performance appraisal. Practitioners in business, industry, research organizations and government will provide insights into the application of psychological principles and methods.

P 646 The Psychology of Conflict Management II
Prerequisite: P 643. Students will be trained in basic negotiation and mediation skills with

supervised practice of these skills. Skill development will enable students to resolve conflicts more effectively as well as help build the tools necessary for those interested in becoming a mediator or organizational consultant specializing in conflict management.

P 647 Industrial and Organizational Psychology in Global Settings
Prerequisites: P 619, P 620 or permission of instructor. Surveys the science and practice of international industrial and organizational psychology. Introduces current perspectives and applications on topics including multinational work teams, selection and training of expatriates, leadership behavior, performance improvement and rewards across cultures, and individual cross-cultural similarities and differences. Focuses on comparisons with corresponding U.S. systems.

P 660 Contemporary Issues in Industrial/Organizational Psychology
Prerequisite: 12 hours in psychology or consent of the instructor. In-depth investigation of topical areas of concern in industrial/organizational psychology. Topics may include, but are not limited to, the impact of EEOC regulations on selection and promotion; assessment centers; the role of the consultant in organizations; flextime, day care and other strategies to accommodate family needs of employees; stress in work settings; women in management. Content will be stated at the time the course is scheduled. Students may petition for a particular topic they feel would fit their academic goals. May be taken twice.

P 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

P 678 Practicum I
For students already employed full time. A job-related research project is carried out under faculty supervision.

P 679 Practicum II
A continuation of Practicum I.

P 693 Organizational Internship I
For students without experience at the managerial or supervisory level. Under faculty supervision, the student engages in field experience in an industrial setting and produces a comprehensive project report analyzing the internship experience.

P 694 Organizational Internship II
A continuation of Organizational Internship I.

P 695 Individual Intensive Study I
Prerequisite: completion of required courses or 24 graduate hours and written approval of department chair. Provides the graduate student with the opportunity to delve more deeply into a particular area of study under faculty supervision.

P 696 Individual Intensive Study II
A continuation of Individual Intensive Study I.

P 698 Thesis I
Prerequisite: completion of all required courses or 24 graduate hours and written approval of department chair. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

P 699 Thesis II
A continuation of Thesis I.

Public Administration/ Health Care

PA 601 Principles of Public Administration
The development, organization, functions and problems of national, state and local governmental administration.

PA 602 Public Policy Formulation and Implementation
The relationship between public administration and the formulation of public policy is studied. The implementation of public policy by administrators based on the politics of the administrator is examined in terms of interaction between various group representatives such as legislators, politicians and pressure-group leaders.

PA 604 Communities and Social Change
Interactions among the community as a social organization and education, police and welfare institutions within it; special attention to conceptual frameworks and current research or action programs that particularly affect minority groups.

PA 611 Research Methods in Public Administration
Recommended prerequisite: undergraduate course in quantitative methods or introductory statistics. Designed to familiarize administrators with the tools and potentialities of social research, and to assist them in the presentation, interpretation and application of research data.

PA 620 Personnel Administration and Collective Bargaining in the Public Sector
Recommended prerequisite: PA 601. Study of the civil service

systems in the United States and the state governments, including a systematic review of the methods of recruitment, promotion, discipline, control and removal. Explores the effects on work relationships of collective bargaining statutes which have been adopted by legislatures. Emphasis is placed on collective bargaining case studies from state and local governments and hospitals.

PA 625 Administrative Behavior

Recommended prerequisite: PA 601. The problems faced by an administrator in dealing with interpersonal relationships and human processes. Analysis of individual and group behavior in various governmental and business settings to determine the administrative action for the promotion of desired work performance. Emphasis given to the public sector. Participation in actual problem situation discussions and case studies.

PA 630 Fiscal Management for Local Government

Recommended prerequisite: PA 601. The problems faced by a survey of the essential principles of governmental accounting, budgeting, cost accounting and financial reporting. The various operating funds, bonded debt, fixed assets, investments, classification of revenue and expenditures, general property taxes and interfund relationships.

PA 632 Public Finance and Budgeting

Recommended prerequisite: PA 601. State and local expenditure patterns, state and local revenue sources, income taxation at the state and local levels, excise taxation, sales taxation, taxation of capital and the property tax. Emphasis on fiscal and economic aspects of federalism and federal/state fiscal coordination. The role of the budget in the determination of policy, in administrative integration and in control of government operations.

PA 640 Epidemiology for Managers

This course exposes students to the basic tools of epidemiology, focusing on their use for making health care management decisions. Students learn to measure the magnitude of problems posed by different diseases, determine who is affected by the problems, identify causes of the problems, and evaluate the efficacy of interventions to prevent and treat the problems.

PA 641 Financial Management of Health Care Organizations

Recommended prerequisite: MG 640. Theory and application of financial planning and management techniques in health care organizations. Emphasis on financial decision making and on preparation of short-term and long-term cash, capital, revenue and expense budgets and financial plans to meet the requirements of HCFA and other third parties.

PA 642 Health Care Delivery Systems

A contemporary analysis of health care delivery systems in the U.S. Financial, cost, economic, political and organizational issues will be discussed.

PA 643 Health and Institutional Planning

Designed to develop skills and understanding of the dynamics of health and social planning processes with respect to consumer demand, national and local health goals and the optimal location of facilities, services and manpower.

PA 644 Administration of Programs and Services for the Aged

The structure, function and properties of publicly and privately funded programs and service organizations providing health services to the aged. The economic, political, legal and social issues which affect the administration of human service organizations will be studied, with emphasis on administration of health care services.

PA 645 Health Care Economics and Finance

Recommended prerequisite: PA 641. Integration of accounting, economics, finance, budgeting and health insurance principles, concepts and analytic tools which are essential to the decision-making processes of health care organizations.

PA 646 Organization and Management of Long-Term Care Facilities

Examines the variety of systems providing long-term care services for the aged. Special concentration on the ways various facilities are managed and on the impact of state bylaws. Case studies illustrate decision making and problem solving within health institutions.

PA 647 Alternative Health Care Delivery Systems

A survey of nontraditional approaches to health care. Includes: cost shifting, cost sharing, the development of outpatient facilities and the impact of cost containment regulation in a systems-oriented framework.

PA 648 Contemporary Issues in Health Care

Gives health care professionals a broad view of current topics in their field. The students will view current videotapes, work on case studies, participate in class exer-

cises and present several reports. Current articles illustrate the issues under discussion.

PA 649 History and Development of Health Care Institutions
Historical development of health care institutions and its effect on the current economic and social status of those institutions.

PA 651 Health Care Ethics
Explores and defines wide spectrum of critical ethical issues; factors that should be considered in resolving these issues; investigation of ways in which organizations can anticipate and plan for future ethical problems.

PA 652 Introduction to Managed Care
Managed care concepts including types, structures, financial incentives, administrative tools and marketing approaches; relationships between provision of medical care and various types of managed care organizations; emphasis on health maintenance organizations (HMOs) and preferred provider organizations. Management structures, quality assurance, utilization management, financial functions and health insurance alternatives.

PA 653 Cost Containment in Health Care
Overview of methods used to attempt to constrain the rise of health care costs; practical approaches to cost containment as well as skills necessary to implement and evaluate cost containment strategies.

PA 657 Health Care Reimbursements
Ways reimbursements are regulated and collected; financial implications of third party reimbursements for all types of health care providers. Focus on history as well as current and future programs related to the most complicated payment methods in any industry.

PA 659 Human Resource Planning in Health Care
Exploration of principles and functions of human resource planning in a health care organization. Topics include legal and public policy parameters, demographics and the health care workforce, disparate employee groups and their special concerns, implementation and evaluation of human resource planning in health care settings.

PA 661 Problems of Metropolitan Areas
Analysis of the problems of government and administration arising from the population patterns and physical and social structures of contemporary metropolitan communities.

PA 662 Recruitment and Retention of Health Care Professionals
The purpose of this course is to provide the health professional with theories and methods to recruit and retain the health care professional in the health care setting. As well as preparing health professionals who actually recruit health care professionals, it will also provide those not in the recruitment role an understanding of various methods and techniques to retain professionals working in their departments.

PA 664 Survey of Medical Group Management
Business management in the physicians' group practice arena. Beginning with the start-up phase, complete coverage of the process. Current as well as future directions in physician group management and ways to enhance its profitability.

PA 670/671 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

PA 680 Seminar in Public Administration
Exact material to be covered will be announced.

PA 681 Long-Term Health Care Internship I
Prerequisites: PA 641, PA 646. First of two state-required internships required to be eligible to take the State of Connecticut licensing examination in long-term care administration. Course is composed of a 450-hour nursing home internship.

PA 682 Long-Term Health Care Internship II
A continuation of Long-Term Health Care Internship I.

PA 690 Research Seminar
Recommended prerequisite: PA 611. Requirements include a major independent research study and participation in an integrative seminar on research and its uses in public administration, health care administration, labor relations and related disciplines.

PA 693 Public Administration Internship
Prerequisites: 15 graduate hours and permission of the public administration graduate program coordinator. A supervised work experience in a cooperating public service agency. Students must be available for at least one day per week.

PA 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

PA 696 Independent Study II
A continuation of Independent Study I.

PA 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discus-

sions of the individual student's progress in the preparation of a thesis.

PA 699 Thesis II
A continuation of Thesis I.

Physics

PH 613 Radioactivity and Radiation in the Environment
Prerequisites: EN 600 and CH 601, or permission of instructor. Basic principles of nuclear structure and radioactivity; the interaction of radiation with matter and biological effects of radiation; natural and man-made sources of radiation in the environment. The second half of the course will focus on long-term environ-mental effects of radiation accidents (e.g., Chernobyl and others) and the problems of nuclear waste disposal, plutonium inventories from nuclear weapons, natural radon in buildings and similar concerns. (See also EN 613.)

PH 670 Selected Topics—Physics
Prerequisite: permission of the instructor. A study of selected topics of particular interest to students and instructor. Course may be taken more than once.

Philosophy

PL 601 Business Ethics
Problems include the nature of the corporation, the values of business activity, corporate social responsibility, the proper relationship between the corporation and government, employee rights and related matters. Problems are analyzed using the most important current theories of social and economic justice.

PL 614 Philosophy of Education
A critical analysis of education in contemporary society as reflected in the thinking of modern and early philosophers. (See also ED 614.)

Political Science

PS 601 Constitutional Law
A study of the judicial process and its relation to the Constitution and the political system in the United States. Examines the role of the Supreme Court in shaping judicial review, federalism, civil rights and liberties, equal protection and due process.

PS 602 Civil Liberties and Rights
An analysis of civil liberties, civil rights, due process and equal protection of the law. An examination of the role of the public official in the protection, denial or abridgment of the constitutional and legal rights of individuals.

PS 603 International Law
A study of the role of international law in the modern state system with particular reference to individuals; territorial jurisdiction; law of the sea, air and space; and the development of law through international organizations.

PS 604 Human Rights and the Law
An examination of the development of the international and national laws establishing human rights, the laws of war, war/criminality, crimes against humanity and the application of the universal declaration of human rights, of the Helsinki Accords, and of the concept of the individual as the basis of law.

PS 605 Criminal Law
Scope, purpose, definition and classification of criminal law. Offense against the person; habitation and occupancy offenses against property and other offenses. Special defenses. Emphasis on the Connecticut penal code.

PS 606 Advanced International Relations
Basic elements of international life relevant to the growth of a stable and peaceful global political-economic system. Includes: power, diplomacy, law, trade, aid, monetary affairs, multinational corporations and differing geographical and cultural characteristics.

PS 608 The Legislative Process
An analysis of the legislative process in the American political system. Stress on legislative politics in state and local government. Includes: legislative functions, selection and recruitment of legislative candidates, legislative role orientations, the legislative socialization process, the committee system, the legislators and their constituencies, legislative lobbyists, legislative decision making, legislative-executive relations and legislative organization and procedures.

PS 610 Legal Methods I
A study of procedure and process of the law as it applies in the American system and an introduction to legal research and writing.

PS 612 Contracts, Torts and the Practice of Law
An introduction to the most important components of private law—contracts, torts and civil procedure and their application to business, government and individuals.

PS 615 Jurisprudence
The general philosophical framework for the law. Includes the background and development of

the common law, sources of the law and the court system. Special problems in Anglo-American jurisprudence are reviewed.

PS 616 Urban Government
An examination of the urban political system. Stress on the political aspects of urban government structures. Includes: formal and informal decision making in urban government, community power structures, types of urban government structures, the politics of intergovernmental relations and the politics of servicing the urban environment (social services, planning agencies, education, housing, transportation, health, pollution control and ecology, revenue sharing, public safety, neighborhood corporations, etc.).

PS 617 Law, Science and Ethics
The intersection of law, science and ethics in a variety of contexts, including experimentation with human subjects, psychosurgery, genetic engineering, organ transplants, abortion and the right to die.

PS 625 Transnational Legal Structures
An introduction to the basic structure of legal systems in other countries, their relationship to Anglo-American law and their contextual development. Special topics include: legal status of foreign and multinational corporations, rights and responsibilities of aliens, protections for investors, expropriation and procedural due process.

PS 626 Decision Making in the Political Process
An in-depth study of decision making in the American system with special emphasis on the various types of mechanisms: executive, legislative, judicial, bureaucratic, organizational and military. The influence of intelligence, economic and psychological factors and social pressure on decisions and decision makers will be examined.

PS 628 Change and Government
A study of the major processes of change and their consequences for the functioning of government. Concentrates on changes that may occur through violence, evolution or technology and which may alter the effective operation of government.

PS 633 The Political Process and the Aged
A study of the political process as it relates to the aged. Governmental decision making on federal, state and local levels including legislation and its implications.

PS 635 Law and Public Health
A course for the civil servant or health professional concerned with the laws relating to the public health at the federal, state and local level as well as the practical administration of those laws.

PS 640 Law and Education
An examination of the legal and educational issues arising from factors such as EEO, students' rights, student financing and the relationships between schools and government.

PS 641 The Politics of the World Economy
An examination of the global politico-economic system and the challenges facing world diplomacy. Multinational corporations and political structures designed to coordinate global policies for the monetary and trade systems, international organizations and their impact on Third World development and problems facing industrialized nations.

PS 645 Government and the Industrial Sector
The various impacts of government regulation on the corporate sector and the major legal and regulatory requirements affecting business and industry.

PS 655 Conflict Resolution
Essential features and methods available within the legal system to resolve disputes, including the uses of law, equity, administrative agencies, bureaucracies, arbitration, mediation, special commissions and private self-help. Applicability of those methods to various types of disputes and the choice of law in instances when no single rule may govern in a federal system.

PS 670 Selected Topics
A study of items of special interest may include: First Amendment problems, energy and the law, law and the environment, labor legislation and the law, law and commercial paper and stock issues. May be taken more than once.

PS 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

PS 696 Independent Study II
A continuation of Independent Study I.

Quantitative Analysis

QA 604 Probability and Statistics
Statistical methods and theories used in solving business problems. Topics include data analysis, discrete and continuous probability distributions, statistical inference and estimation, regression and correlation analysis, the analysis of variance, decision theory and nonparametric

tests including chi-square. Students will use computers to conduct statistical tests using the information presented.

QA 605 Applied Statistics
A continuation of QA 604. Includes: regression and correlation, multiple regression, analysis of variance, the general linear model and an introduction to time series analysis and forecasting techniques.

QA 607 Forecasting
Prerequisite: QA 605. A wide range of forecasting methods useful to students and practitioners of management, economics and other disciplines requiring forecasting. Focus on quantitative techniques of forecasting; will include smoothing and decomposition approaches, multiple regression and econometric models, and autoregressive/moving average methods including generalized adaptive filtering and Box-Jenkins methodology.

QA 614 Decisions in Operations Management
Prerequisites: MG 637 and QA 604, or equivalents. Study of organizations as systems producing goods and services. Review of concepts, functions and basic techniques as applied to operations management. Examination of new trends and developments such as just-in-time, synchronous manufacturing, quality management, cycle-time reduction and concurrent engineering. Emphasis on interrelations of different operational decisions on the final product and competitive position of the organization.

QA 638 Cost Benefit Management
Prerequisites: EC 601, FI 601, and QA 604. An introduction to and overview of the field of cost benefit management. Fundamental theoretical evaluation of cost/benefit of a project. Includes: the selection of the best investment criteria, the external environment spillover effects and the application of cost/benefit management decision making under uncertainty.

QA 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. Courses may cover decision science methods such as experimental design, nonparametrics, data analysis with SPSS, Bayesian decision theory and simulation. May be taken more than once.

QA 675 Computer-Aided Multivariate Analysis
Prerequisite: QA 604 or equivalent. Summary, for students and researchers, of several widely used multivariate statistical analysis techniques and computer packages. Topics include the nature and concept of scientific problem solving, applied regression analysis and its limitations, multiple frequency analysis, profile analysis of repeated measures, canonical correlation analysis, discriminant analysis, cluster analysis, principal components analysis and factor analysis.

QA 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an adviser.

QA 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

QA 696 Independent Study II
A continuation of Independent Study I.

QA 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

QA 699 Thesis II
A continuation of Thesis I.

Occupational Safety and Health

SH 602 Safety Organization and Administration
Intensive study of the occupational safety and health field as it currently exists. History and growth of industrial safety. Motivational and psychological aspects of accident prevention. Legal aspects of safety, including worker compensation and state and federal regulations. Engineering needs. Development of voluntary standard systems. Fire prevention, industrial hygiene and future directions.

SH 605 Industrial Safety Engineering
An analysis of the major physical hazards in industrial work and the attendant safety practices employed to eliminate the hazardous condition or minimize the likelihood and extent of injury. Includes the hazards associated with machinery, combustion, electricity, material handling and fire.

SH 608 Industrial Hygiene Practices
Prerequisite: introductory chemistry. Recognition of the magnitude and extent of the health hazards characteristic of industrial work. An evaluation of the danger, the control of the hazard and the protection of the worker.

SH 611 OSH Research Methods and Techniques
The students and OSH faculty will meet once a week throughout the trimester. The student will select a topic directly related to occupational safety and

health, conduct a literature search, do a research project, and prepare and defend a mini thesis.

SH 615 Toxicology
Prerequisite: introductory chemistry. Introduction to environmental and industrial toxicology; toxicologic evaluation; the mode of entry, absorption and distribution of toxicants; the metabolism and excretion of toxic substances; interactions between substances in toxicology; toxicologic data extrapolation; particulates; solvents and metals; agricultural chemicals—insecticides and pesticides; toxicology of plastics; gases; food additives; plant and animal toxins; carcinogens, mutagens and teratogens. (See also EN 615.)

SH 620 Occupational Safety and Health Law
A survey of the major federal occupational safety and health laws with an emphasis on the Occupational Safety and Health Act of 1970 as well as state workers' compensation laws. Studies focus on the administration of the laws, their major provisions, the enforcement process as well as the federal/state interrelationships in this milieu.

SH 630 Product Safety and Liability
An investigation into the legal pitfalls and the human concerns inherent in the marketing and consumption of goods: sellers responsibility, product liability, insurance, labeling requirements. The Consumer Product Safety Act and related acts, the procedures for minimizing legal risk and maximizing human safety and health.

SH 660 Industrial Ventilation
A thorough study of industrial ventilation systems including theory of design, air pollution control, life-cycle costs, automatic controls, instrumentation, relevant codes and standards, and the evaluation of system performance.

SH 661 Microcomputers in Occupational Safety and Health
Introductory course on using microcomputers in occupational safety and health. Instruction in techniques used for data processing, statistical analysis, interfacing with instrumentation and linking with mini- and mainframe computers.

SH 665 Industrial Hygiene Measurements
Theory and practice of current methods and techniques applicable to industrial hygiene. Experiments in ventilation, nonionizing radiation, measurement of airborne contaminants, noise and heat stress.

SH 667 Control of Occupational Health Hazards
Advanced study of methodologies used to control exposures to those workplace agents which cause illness and/or disease. Primary focus on techniques used to minimize employee exposures; full discussion of personal protective devices.

SH 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

SH 690 Research Project I
Prerequisite: permission of the instructor. Independent study under the supervision of an adviser. 1-3 credits.

SH 691 Research Project II
A continuation of Research Project I. 1-3 credits.

SH 693 OSH Internship I
Coordinated with local industry or governmental agencies. Practical problems in occupational safety or industrial hygiene and approaches to solving these problems under the supervision of a practicing professional. At the end of the project a report will be prepared by the student and will be presented to the OSH faculty for grade evaluation. 1-3 credits.

SH 694 OSH Internship II
A continuation of Internship I. 1-3 credits.

SH 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty. 1-3 credits.

SH 696 Independent Study II
A continuation of Independent Study I. 1-3 credits.

SH 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

SH 699 Thesis II
A continuation of Thesis I.

Sociology

SO 601 Minority Group Relations
An interdisciplinary survey of minority groups in the United States with special reference to ethnic, religious and racial factors that influence interaction.

SO 610 Urban Sociology
Prerequisite: PA 604. The problems of urban growth and development. Residential patterns together with the physical development of cities and their redevelopment. An examination of the people and their relationships to the environment.

SO 620 Sociology of Bureaucracy
A study of some of the classic conceptualizations of bureaucracy and their relevance to the structure and functioning of American economic and governmental institutions. Gives students informational and experiential resources with which they, as planners and managers, can improve their abilities to make effective policy decisions.

SO 641 Death and Suicide
In-depth analysis of suicide. Traditional theories of suicide are analyzed regarding the psychological approach as well as the demographic and group analysis of sociology. The goal of the course is both academic and practical, stressing community application.

SO 649 Seminar in Health and Social Policy
Analysis of the legal, political, social, economic and organizational factors in planning and providing health care services with emphasis on policy formulation and implementation. Current health policy issues.

SO 651 Social Gerontology
Basic introduction to the field of gerontology. Discusses the history and definition of the field, the contributions of academic disciplines to the field, various perceptions of aging; explores the basic theories, problems and prospects of gerontology.

SO 670 Selected Topics
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

SO 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

SO 696 Independent Study II
A continuation of Independent Study I.

SO 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

SO 699 Thesis II
A continuation of Thesis I.

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Bechir, M. Hamdy, Professor Emeritus, Civil Engineering
B.C.E., Cairo University; M.A.Sc., University of Toronto; Sc.D., Massachusetts Institute of Technology
Brody, Robert P., Professor Emeritus, Marketing
B.A., Wesleyan University; M.B.A., University of Chicago; D.B.A., Harvard University
Chandra, Satish, Professor Emeritus, Law and International Business
B.A., University of Delhi; M.A., Delhi School of Economics; L.L.B., Lucknow Law School, India; L.L.M., J.S.D., Yale University
DeMayo, William S., Professor Emeritus, Accounting
B.S., University of Pennsylvania; M.B.A., New York University; CPA
Eikaas, Faith, Professor Emeritus, Sociology
B.A., M.A., Ph.D., Syracuse University
Ellis, Lynn W., Professor Emeritus, Management
B.E.E., Cornell University; M.S., Stevens Institute of Technology; D.P.S., Pace University
Fridshal, Donald, Professor Emeritus, Mathematics
B.E.E., M.S., New York University; Ph.D., University of Connecticut
Gangler, Joseph M., Professor Emeritus, Mathematics
B.S., University of Washington; Ph.D., Columbia University
George, Edward T., Professor Emeritus, Computer Science
B.S., M.S., Worcester Polytechnic Institute; D.Engr., Yale University

Emeritus Faculty (continued from page 196)

Gere, William S., Jr., Professor Emeritus, Industrial Engineering
B.M.E., M.S.I.E., Cornell University; M.S., Ph.D., Carnegie Mellon University

Kirwin, Gerald J., Professor Emeritus, Electrical Engineering
B.S., Northeastern University; M.S.E.E., Massachusetts Institute of Technology; Ph.D., Syracuse University

Martin, John C., Professor Emeritus, Civil Engineering
B.E., M.E., Yale University

Marx, Paul, Professor Emeritus, English
B.A., University of Michigan; M.F.A., University of Iowa; Ph.D., New York University

Maxwell, David A., Professor Emeritus, Criminal Justice
M.A., John Jay College of Criminal Justice; B.B.A., J.D., University of Miami

Moffitt, Elizabeth J., Professor Emeritus, Visual and Performing Arts
B.F.A., Yale University; M.A., Hunter College

Reams, Dinwiddie C., Jr., Professor Emeritus, Science and Humanities *(deceased)*
B.Ch.E., University of Virginia; M.Eng., D.Eng., Yale University

Robillard, Douglas, Professor Emeritus, English
B.S., M.A., Columbia University; Ph.D., Wayne State University

Ross, Bertram, Professor Emeritus, Mathematics *(awarded posthumously)*
M.S., Wilkes College; M.S., Ph.D., New York University

Smith, Warren J., Professor Emeritus, Management and Quantitative Analysis
B.S., University of Connecticut; M.B.A., Northeastern University

Staugaard, Burton C., Professor Emeritus, Science and Biology
A.B., Brown University; M.S., University of Rhode Island; Ph.D., University of Connecticut

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B.E., University of Gujarat, India; M.E.E., University of Delaware; Ph.D., University of Connecticut

Theilman, Ward, Professor Emeritus, Economics
B.A., Ph.D., University of Illinois

Tyndall, Bruce, Professor Emeritus, Mathematics
B.A., M.S., University of Iowa

van Dyke, Elisabeth, Professor Emeritus, Tourism and Travel Administration
B.A., University of California, Los Angeles; M.A., Ph.D., Columbia University

Warner, Thomas C., Jr., Professor Emeritus, Mechanical Engineering
B.E., Yale University; M.S., Massachusetts Institute of Technology

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A.B., Oberlin College; M.S., Ph.D., Cornell University

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M.A., Georgetown University

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Cohen, Howard J., Certified in the Comprehensive Practice of Industrial Hygiene

Gaboury, Mario T., Attorney at Law, Connecticut; Connecticut Bar Association

Garber, Brad T., Certified in General Toxicology, Certified in the Comprehensive Practice of Industrial Hygiene, Certified Safety Professional

Haskins, Mark B., Certified Safety Professional

Massicotte, Robert E., Jr., Certified Hazardous Materials Inspector, Certified Fire Investigator, Certified Fire Code Inspector

Monahan, James, Licensed Psychologist, Connecticut

Monahan, Lynn, Licensed Psychologist, Connecticut, Massachusetts

Norton, William M., Attorney at Law, Connecticut, Georgia; American Bar Association, Connecticut Bar Association

Parker, L. Craig, Jr., Consulting Psychologist, Wisconsin; Certified Psychologist, Province of Alberta, Canada

Practitioners-in-Residence

Carbone, William H., Criminal Justice
B.A., Providence College; M.P.A., University of New Haven
Executive Director, Court Support Services Division, Judicial Branch, State of Connecticut
DeVito, Joseph, Criminal Justice,
B.S., Manhattan College, M.A., Columbia University, Ph.D., Georgia State University
Haskins, Mark B., Occupational Safety and Health
B.S., State University College at Brockport; M.S., University of New Haven
Manager, Safety and Health, Pfizer Groton Production Division
Looney, Martin, Criminal Justice
B.A., Fairfield University; M.A., University of Connecticut; J.D., University of Connecticut School of Law
State Representative, Connecticut
Palmbach, Timothy, Forensic Science
B.S., M.S., University of New Haven, J.D., University of Connecticut School of Law
Wezner, George, Criminal Justice
B.S., University of New Haven, M.S., Rennesalaer Polytechnic Institute

Distinguished Special Lecturers

Elmoznino, Joanne, Forensic Science,
B.S., St. Mary's College—University of Surrey, UK, M.S., University of Birmingham, UK
Vasquez, Lewis, Center for Forensic Computer Investigation
B.A., Norwich University; M.P.A., M.B.A., University of Hartford

California Campus Faculty for the School of Public Safety & Professional Studies

Thomas A. Johnson, B.S., M.S., D.Crim., Dean
Colleen R. Johnson, B.S., Director, Student Enrollment Management

DeHaan, John, Forensic Science
B.S., University of Illinois at Chicago Circle; Ph.D., University of Strathclyde, Scotland
Jarzen, Robert, Coordinator, Forensic Science
B.S., Northern Illinois University; M.S., Arizona State University

California Campus Practitioners-in-Residence

Anthony, Rob, M.D., Forensic Science
Medical Board of California, Physician and Surgeon
Cohen, Fred, Center for Forensic Computer Investigation
B.S., Carnegie Mellon University; M.S., University of Pittsburgh; Ph.D., University of Southern California
Principal Member, Technical Staff, Sandia National Laboratories
Mayfield, Ross, Practitioner-in-Residence
M.B.A., Pepperdine University
Reiber, Gregory, M.D., Forensic Science
Medical Board of California, Physician

California Campus Distinguished Special Lecturers

Cohen, Susan, Forensic Science
M.S., Walden University
Miller, Gary, Forensic Science
B.A., California State University–Sacramento
Electronic Crimes Task Force
O'Maley, Thomas, Forensic Science
B.S., Boston College

Center for Cybercrime and Forensic Computer Investigation

Anderson, Michael, Teaching Affiliate and Professional Practitioner
B.S. Weber State University
President, New Technologies, Inc.
Cotton, Fred, Teaching Affiliate and Professional Practitioner
A.S., Yuba College
Director, Training Services and Technology Program, SEARCH Group: National Consortium for Justice Information and Statistics
Donlon, Matthew, Teaching Affiliate and Professional Practitioner
B.S., Radford University
Former Director, Computer Security, NSA
Giovagnoni, Robert, Teaching Affiliate and Professional Practitioner
Former Chief Counsel; President, Critical Infrastructure Group; Executive Vice President, I-Defense
Kelso, Robert, Teaching Affiliate and Professional Practitioner
Retired Internal Revenue Service, Criminal Investigation Division
Lewis, Glenn, Teaching Affiliate and Professional Practitioner
B.S., California State University–Sacramento
Kroll World-Wide Inc.
Malinowski, Christopher, Teaching Affiliate and Professional Practitioner
B.S., John Jay College of Criminal Justice; M.S., C.W. Post Campus, Long Island University
Commanding Officer, New York City Police Department Computer Crime Unit
Manson, Kevin, Teaching Affiliate and Professional Practitioner
B.A., University of Washington; J.D. University of South Dakota
Computer Crime Instructor, Federal Law Enforcement Training Center
Menz, Mark, Teaching Affiliate and Professional Practitioner
California State University–Sacramento
Kroll World-Wide Inc.
Menz, Michael, Teaching Affiliate and Professional Practitioner
California State University–Sacramento
Sacramento Valley Hi-Tech Crimes Task Force, Sacramento County Sheriff's Department
Schmidt, Howard, Teaching Affiliate and Professional Practitioner
B.S., M.A., University of Phoenix
Director of Global Computer Security, Microsoft Corporation
Schmidt, Raemarie, Teaching Affiliate and Professional Practitioner
B.S., University of Wisconsin
National White Collar Crime Center
Spernow, William, Teaching Affiliate and Professional Practitioner
B.S., M.B.A., California State University–Sacramento
Director, Information Security & Technology Research, Gartner Group

Stippich, Christopher, Teaching Affiliate and Professional Practitioner
B.A., Lawrence University
National White Collar Crime Center
Tafoya, William, Teaching Affiliate and Professional Practitioner
Retired Federal Bureau of Investigation

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Veterans' Affairs Officer: Virginia D. Klump, Graduate Registrar
WNHU Radio Station: W. Vincent Burke, B.S., M.Ed., General Manager

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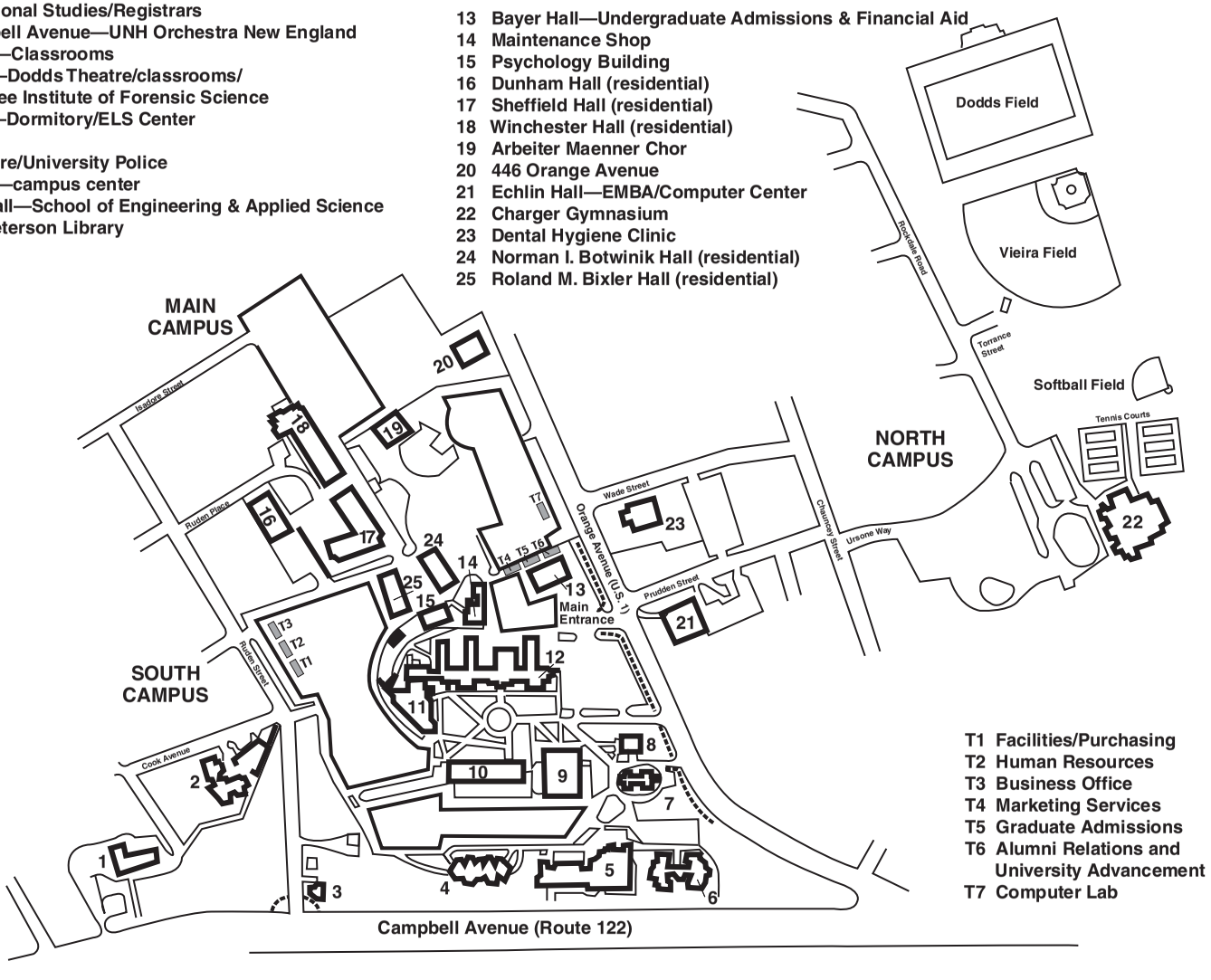
CAMPUS MAP KEY

1 Harugari Hall—The Tagliatela School of Hospitality & Tourism
2 South Campus Hall—School of Public Safety & Professional Studies/Registrars
3 1124 Campbell Avenue—UNH Orchestra New England
4 Kaplan Hall—Classrooms
5 Dodds Hall—Dodds Theatre/classrooms/ Henry Lee Institute of Forensic Science
6 Bethel Hall—Dormitory/ELS Center
7 Gate House
8 Campus Store/University Police
9 Bartels Hall—campus center
10 Buckman Hall—School of Engineering & Applied Science
11 Marvin K. Peterson Library
12 Maxcy Hall—Administration/ Faculty/classrooms College of Arts & Sciences/School of Business
13 Bayer Hall—Undergraduate Admissions & Financial Aid
14 Maintenance Shop
15 Psychology Building
16 Dunham Hall (residential)
17 Sheffield Hall (residential)
18 Winchester Hall (residential)
19 Arbeiter Maenner Chor
20 446 Orange Avenue
21 Echlin Hall—EMBA/Computer Center
22 Charger Gymnasium
23 Dental Hygiene Clinic
24 Norman I. Botwinik Hall (residential)
25 Roland M. Bixler Hall (residential)



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