

2005

Graduate Catalog, 2005-2006

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University of Connecticut

GRADUATE CATALOG 2005 - 2006

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UNIVERSITY ACCREDITATION

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

AFFIRMATIVE ACTION POLICY

The University of Connecticut policy prohibits discrimination in education, employment, and in the provision of services on account of race, ethnicity, religion, sex, age, marital status, national origin, ancestry, sexual orientation, disabled veteran status, physical or mental disability, mental retardation, and other specifically covered mental disabilities.

GRADUATE SCHOOL CALENDAR

SUMMER SESSIONS 2005

The calendar and detailed information concerning the Summer Sessions may be obtained from the College of Continuing Studies. Consult the *Summer Sessions 2005 Catalog* or the Website of the College of Continuing Studies at <http://continuingstudies.uconn.edu> for course offerings, registration procedures, fees, and deadlines.

The conferral date for Summer 2005 degrees is August 24, 2005 (Wednesday).

FALL SEMESTER 2005

Mon.	Aug.	29	Fall semester classes begin
Mon.	Sept.	5	Labor Day (no classes)
Mon.	Sept.	12	Last day to complete course registration without penalty fee(s) Last day to drop a course without "W" (Withdrawal) Course registration via the Student Administration System closes
Mon.	Oct.	31	Last day for graduate students to drop a course without major advisor's written recommendation and Graduate School permission Course registration via the Student Administration System begins on the Storrs campus for Spring semester 2006
Sun.	Nov.	20	Thanksgiving recess begins
Sun.	Nov.	27	Thanksgiving recess ends
Fri.	Dec.	9	Last day of Fall semester classes
Mon.	Dec.	12	Final examinations begin
Sat.	Dec.	17	Final examinations end
Sun.	Dec.	18	Conferral date for Fall 2005 degrees

SPRING SEMESTER 2006

Tues.	Jan.	17	Spring semester classes begin
Mon.	Jan.	30	Last day to complete course registration without penalty fee(s) Last day to drop a course without "W" (Withdrawal) PeopleSoft course registration system closes
Sun.	March	5	Spring recess begins
Sun.	March	12	Spring recess ends
Mon.	March	27	Last day for graduate students to drop a course without major advisor's written recommendation and Graduate School permission
Fri.	April	28	Last day of Spring semester classes
Mon.	May	1	Final examinations begin
Sat.	May	6	Final examinations end
	TBA		Graduate Commencement Ceremony 2006

Faculty members should construct course syllabi with awareness of religious holidays.

<http://www.registrar.uconn.edu>

BOARD OF TRUSTEES*

Where appropriate, the end of a member's term is indicated by the year which follows his or her name.

The Honorable M. Jodi Rell, Governor of the State of Connecticut
president ex officio Hartford
 The Honorable Betty J. Sternberg, Commissioner of Education
member ex officio Hartford
 The Honorable F. Philip Prelli, Commissioner of Agriculture
member ex officio Hartford

Appointed by the Governor

James F. Abromaitis, 2007 Unionville
 Louise M. Bailey, *Secretary*, 2009 West Hartford
 William R. Berkley, 2005 Greenwich
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 Lenworth M. Jacobs, 2007 West Hartford
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 John W. Rowe, *Chairman*, 2009 Hartford
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Elected by the Alumni

Philip P. Barry, 2005 Storrs
 Andrea Dennis-LaVigne, 2007 Simsbury

Elected by the Students

Stephen A. Kuchta, 2006 Storrs
 Michael J. Nichols, 2005 Storrs

OFFICERS OF ADMINISTRATION*

Philip E. Austin, Ph.D., *President of the University*
 Peter J. Nicholls, Ph.D., *Provost and Executive Vice President for Academic Affairs*
 Peter J. Deckers, M.D., *Executive Vice President for Health Affairs*

THE GRADUATE SCHOOL

Gregory J. Anderson, Ph.D., *Interim Vice Provost for Research and Graduate Education, and Interim Dean of the Graduate School*
 James G. Henkel, Ph.D., *Associate Vice Provost for Research and Graduate Education, and Associate Dean of the Graduate School*
 Gerald D. Maxwell, Ph.D., *Associate Dean of the Graduate School (Health Center)*
 Thomas B. Peters, Ph.D., *Program Director*
 Anne Lanzit, B.S., *Program Administrator*
 Rande-Jeanne Clark, *Administrative Services Specialist*



GRADUATE FACULTY COUNCIL

The Graduate Faculty Council is the legislative body of the Graduate School. It establishes academic policy for graduate education, except for those areas reserved to the Board of Trustees, to the University Senate, or to the faculties of other colleges and schools. The 60 members, representing specific content areas derived from constituent Fields of Study, are elected to serve three-year terms. The membership includes two voting student members chosen by the Graduate Student Senate. The President, the Provost, the Vice Provost and Dean of the Graduate School, and certain other administrative officers of the Graduate School are nonvoting ex officio members. The Council, representing the Graduate Faculty at large, exercises legislative authority in such areas as admissions criteria, curricular and degree requirements, new course approval, academic program review, and the like.

The Executive Committee

The Executive Committee has both executive and advisory responsibilities to the Graduate Faculty Council and to the vice provost. Its membership is drawn from the Graduate Faculty Council and from the Graduate Faculty at large. The dean serves as chair. The Executive Committee is the steering committee for the Graduate Faculty Council. It advises the vice provost on matters of policy and regulatory interpretation, approves plans of study and dissertation prospectuses, and considers on the basis of academic merit proposals to modify or to create fields of study and areas of concentration. Members include:

Gregory J. Anderson, Ph.D., *Professor of Ecology and Evolutionary Biology*
 J. Garry Clifford, Ph.D., *Professor of Political Science*
 David E. Cournoyer, Ph.D., *Associate Professor of Social Work*
 David K. Herzberger, Ph.D., *Professor of Spanish*
 Diane C. Lillo-Martin, Ph.D., *Professor of Linguistics*
 Jean I. Marsden, Ph.D., *Professor of English*
 Emilio Pagoulatos, Ph.D., *Professor of Agricultural and Resource Economics*
 Erling A. Smith, Ph.D., *Professor of Civil Engineering*
 Linda D. Strausbaugh, Ph.D., *Professor of Molecular and Cell Biology*

Gregory J. Anderson, Ph.D., *Interim Vice Provost for Research and Graduate Education, and Interim Dean of the Graduate School (ex officio)*, *Chair*
 James G. Henkel, Ph.D., *Associate Vice Provost for Research and Graduate Education and Associate Dean of the Graduate School (ex officio)*
 Gerald D. Maxwell, Ph.D., *Associate Dean of the Graduate School – Health Center (ex officio)*

ADMISSION

To study for a graduate degree, a student must be admitted by the Dean of the Graduate School. No course work taken before the date of admission to the Graduate School may be included on a plan of study for a graduate degree unless specific approval has been granted by the Dean of the Graduate School.

Unless students complete appropriate course work for credit in the semester or summer for which they have been admitted, or a written request for a limited postponement has been submitted to and approved by the Graduate School before the end of that semester or summer, the admission becomes invalid. If this occurs, the student must apply for readmission with no certainty of being accepted.

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

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

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

Applicants to most programs are encouraged to submit test scores from the General Test of the Graduate Record Examinations to the department or program to which they are applying.

Many departments or programs require or recommend that test scores be submitted for the Graduate Record Examinations and/or the Miller Analogies Test. Letters of recommendation, usually three, preferably from members of the academic profession, are required by all departments.

Meeting the minimum requirements does not guarantee admission. Applicants must show promise of superior achievement and must have specific preparation for the course of study they wish to undertake. If their records indicate deficiencies, they may be refused admission or required either to take background courses without graduate credit or to demonstrate by examination that they have acquired the requisite knowledge or skills for graduate study. In addition, since each graduate program has a limited number of places, the successful applicant must have a record competitive with those of other applicants in the same field.

Regular and Provisional Status. Application procedures and required credentials for admission to Regular status are specified above. Occasionally students who hold the baccalaureate but do not qualify fully for admission to Regular status may give evidence of ability in their chosen field sufficiently convincing to warrant their provisional admission to a master's degree program only. (Applicants are not admitted provisionally to a doctoral program.) If a Provisional student's initial twelve credits of completed course work (excluding 100's-level courses) meets the minimum scholastic requirement of the Graduate School, he or she is accorded Regular status. Otherwise, he or she is subject to dismissal. In situations where special consideration is warranted, and only upon the specific request of the major advisor, the dean may approve changing a student to Regular status if at least nine credits of advanced course work have been completed with superior grades. Regular, not Provisional, status is required for degree conferral.

Language-Conditional Status. International graduate applicants whose English language proficiency does not meet the minimum standard to qualify for Regular admission (a computer-based score of 213 or greater, or a written test score of at least 550, on the Test of English as a Foreign Language, or an overall band score of 6.5 on the IELTS (International Language Testing System) may be admitted at the master's level as Language-Conditional Students. Those admitted on F-1 visas must be fully academically admissible as a Regular student (see above). Those admitted on J-1 student visas may be academically admissible as a Provisional student (see above).

Integrated B.S./M.S. Degree Program in Physical Therapy. The Department of Physical Therapy offers an Integrated Bachelor's/Master's Program leading ultimately to the Master of Science in Physical Therapy degree. While initial application is made to the Undergraduate Admissions Office, successful completion of the baccalaureate portion of the program is an absolute prerequisite for admission to the Graduate School for completion of the master's degree.

The Sixth-Year Diploma in Professional Education. This post-master's diploma program is offered by the School of Education. It is not administered by the Graduate School. Inquiries regarding the Sixth-Year Diploma in Professional Education should be addressed to the Office of the Dean, School of Education, 249 Glenbrook Road, Unit 2064-C, Room 227, Storrs, Connecticut 06269-2064.

Admission to the D.M.A. Program. Applicants are expected to demonstrate outstanding musical ability and to have a superior record of previous performance and scholarship. A completed master's degree is required for admission. Holding a master's degree from this or from any other institution, however, does not render the applicant automatically admissible to the D.M.A. program. Areas of Concentration offered are Conducting and Performance (specifically cello, piano, trumpet, violin, viola, and voice). A personal audition is required as part of the application process. Inquiries should be addressed to: Director of Graduate Studies, Department of Music, 876 Coventry Road, Unit 1012, Storrs, Connecticut 06269-1012.

Admission to Ph.D. Programs. Applicants to Ph.D. programs are expected to demonstrate outstanding ability and to show on the record of previous scholarship and experience that they are likely to do superior creative work in their respective fields. Holding a master's degree from this or any other institution does not render the applicant automatically admissible to a doctoral program. Certain master's programs, on the other hand, are open only to applicants likely to qualify for doctoral study. In general, doctoral applicants must meet all admission requirements for the master's degree as Regular graduate students and must present evidence that they are capable of doing independent work of distinction.

Visiting Students. Individuals who otherwise would qualify for admission with Regular status but who do not seek a degree from this University may be permitted to take courses for an unspecified time if their work here meets Graduate School standards. Special students may be working toward an advanced degree at another institution, in which case they are presumed to be fully qualified to pursue degree work at this University. Others may wish to take courses as Special students for personal enrichment.

Graduate Certificate Programs. An earned baccalaureate degree (or its equivalent) is required for admission. Each certificate program sets specific admissions criteria, including minimum grade point average and standardized test scores (including the Test of English as a Foreign Language, if required). Detailed information concerning admissions criteria and procedures can be obtained from the coordinator of the specific graduate certificate program or from the Graduate Admissions Office.

Other Non-Degree Categories. Individuals with appropriate preparation who have not been admitted to any of the admissions categories described above may take courses as non-degree

students. All non-degree students are presumed to be taking courses for reasons other than earning a certificate, sixth-year diploma in professional education, or a graduate degree at this institution. Should they later be admitted to a graduate degree program at this University, usually not more than six credits will be acceptable toward the master's degree. In any event, such credits accepted toward a graduate degree must be of B (not B-) quality or higher. For further information, contact the College of Continuing Studies, One Bishop Circle, Unit 4056, Storrs, Connecticut 06269-4056.

Admission of University Faculty and Staff. University of Connecticut faculty members who hold tenure or a rank higher than instructor leading to tenure ordinarily may not earn a graduate degree at this institution. Exceptions to this policy may be made by the Dean of the Graduate School, with the advice of the Executive Committee of the Graduate Faculty Council, who must be satisfied that the intended program is in the best interest of the University.

New England Regional Student Program. The University of Connecticut participates in a regional program administered by the New England Board of Higher Education. This program, known as the New England Regional Student Program, permits qualified residents of the New England states to study with in-state tuition privileges or by paying an amount fifty percent above in-state tuition (depending on the institution in which the student enrolls), in certain programs at any of the state universities and the public four-year colleges.*

The purpose of the program is to expand opportunities in higher education for New England residents by making available on a substantially equal basis to all students those programs not commonly offered at every institution. This practice tends to reduce duplication of courses and thus to utilize most efficiently the higher educational facilities in each state.

Detailed information about this program can be obtained from the Graduate School, 438 Whitney Road Extension, Unit 1006, Storrs, Connecticut 06269-1006, or from the New England Board of Higher Education, 45 Temple Place, Boston, Massachusetts 02111.

Application Processing Fee.* A non-refundable fee of \$55 for electronic submission or \$75 for paper submission must accompany the application. It may not be applied toward other charges. This fee must accompany every application submitted except for a doctoral degree program to follow immediately a master's degree program in the same field at this University, or for re-application requested by the Dean.

Application Deadlines. Students are advised to file the application for admission several months in advance of the first semester of course work. Because many programs are filled far in advance of

application deadlines, prospective students are encouraged to submit their applications for admission as early as possible. Applicants should check with appropriate academic departments concerning deadlines. All credentials, including official transcripts covering all undergraduate and graduate work taken up to the time of application, as well as the non-refundable processing fee, must also have been received by deadline dates.

International Applicants. Students who are not United States citizens or permanent resident aliens must meet additional requirements before their admission is finalized. They must present documentary evidence of their ability to meet all expenses for at least the first year of study and an acceptable plan for financing the remainder of their program. Students whose native language is not English must show evidence of proficiency in the English language by having earned either a computer-based score of at least 213 or a written score of at least 550 on the TOEFL (Test of English as a Foreign Language), or an overall band score of 6.5 on the IELTS (International Language Testing System). Some departments require the Test of Spoken English (TSE) or the Test of Written English (TWE). All graduate students who will be serving as teaching assistants will be required to present evidence of competence in spoken English. This may take the form of a score of 50 or higher on the Test of Spoken English if the student's native language is not English and if the student does not hold a degree from an anglophone college or university. Further information is available from the Graduate Admissions Office.

Application Forms and Instructions. With the exception of the programs listed below, application materials may be obtained by writing to the Graduate School, 438 Whitney Road Extension, Unit 1006, Storrs, Connecticut 06269-1006. The application may also be completed and filed electronically from the Graduate School's Web site at <<http://www.grad.uconn.edu>>.

Inquiries regarding the Master of Business Administration should be addressed to the director of that program, School of Business, 2100 Hillside Road, Suite 238, Unit 1041-MBA, Storrs, Connecticut 06269-1041. Inquiries regarding graduate degree programs located at the

University of Connecticut Health Center should be addressed to: University of Connecticut Health Center, Graduate Student Affairs Office, Room MC 3906, Farmington, Connecticut 06030. Inquiries regarding the Master of Social Work, should be directed to the School of Social Work, University of Connecticut, 1798 Asylum Avenue, West Hartford, Connecticut 06117-2698. Inquiries regarding study in Law should be directed to the School of Law, 55 Elizabeth Street, Hartford, Connecticut 06105-2296.

Supplementary and Departmental Transcripts. If a student is admitted before completing a baccalaureate or graduate degree or additional non-degree course work which is in progress at the time of application, admission is conditional on the completion of the degree or course work and the submission to the Graduate School by the end of the first semester of study of a satisfactory supplemental official transcript. A duplicate set of official transcripts of all work taken prior to the commencement of work in the Graduate School should be sent to the student's major advisor. Until all transcripts have been received, the plan of study will not be approved. All transcripts submitted, including test scores, become the property of the Graduate School and are not returnable.

* Fees are subject to change without notice.

ADVISORY SYSTEM

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

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

If a change of major advisor becomes necessary for any reason, the student must file a special form, bearing the signatures of the former advisor and the new advisor, with the Graduate School. The signature of the former major advisor is requested for informational purposes only. It does not, in any way, signify permission or consent on the part of the former major advisor.

If a major advisor decides that it is not possible to continue as a student's major advisor and wishes to resign, the Graduate School must be notified in writing as soon as possible. The student is then provided with a reasonable opportunity to arrange for a new major advisor. If a new major advisor is not identified within six weeks of the resignation of the former major advisor, the student's graduate degree program status is terminated. A student whose status has been terminated may request a hearing before the Associate Dean by filing a written request within 30 days of receipt of the letter of termination.

The advisory committee of a master's degree program student is formed after consultation between the major advisor and the student and must include at least two associate advisors, at least one of whom must hold a current appointment to the graduate faculty of the University of Connecticut. An associate advisor must possess suitable academic or scientific credentials in the field of study of the degree. The advisory committee

should be formed before the student has completed twelve credits of degree program course work and shall then supervise the remainder of the student's degree program.

The advisory committee of a doctoral degree program student is formed after consultation between the student and the major advisor and shall include at least two associate advisors with suitable academic or scientific credentials. The major advisor and at least one associate advisor shall be members of the graduate faculty appointed to advise doctoral students in the student's field of study and area of concentration, if applicable. In addition to the three or more members chosen in the usual way, another member, ordinarily a member of the graduate faculty outside the student's field of study but in a related field, may be appointed by the Dean of the Graduate School. If the committee consists of three members, committee decisions must be unanimous. If the committee consists of four or more members, committee decisions are considered adopted if there be no more than one negative vote, although the major advisor must always vote in the affirmative. Committee decisions involving the outcome of the General Examination, approval of the dissertation proposal, oral defense of the dissertation, or approval of the dissertation itself, however, must be unanimous in any event.

A member of the University of Connecticut Graduate Faculty who has retired from active service may be considered for appointment as Major Advisor for a newly-admitted master's or doctoral student. Application is made to the Executive Committee of the Graduate Faculty Council and requires submission of a curriculum vita and letters of support as well as the endorsement of the appropriate department or program head. The retired faculty member must present substantial evidence of ongoing research and scholarly activity in the field. Separate application is required for each newly-admitted student for whom a retired faculty member wishes to serve as Major Advisor. Such appointments are made by the Dean with the advice of the Executive Committee.

A current graduate student may *not* serve as a member of another graduate student's advisory committee.

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

advisor and at least one associate advisor on any doctoral student's advisory committee must be members of the University of Connecticut Graduate Faculty.

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

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

FEES AND EXPENSES

The schedule of fees contained in this section is expected to prevail during the 2005-2006 academic year, but the Board of Trustees and the Board of Governors for Higher Education reserve the right, at any time, to authorize changes in fees and to establish new fees applicable to all currently enrolled students.

All fees are collected by the Office of the University Bursar in the Wilbur Cross Building. Fees pertaining to off-campus programs in social work and business administration are payable at those locations. (See applicable brochures for fees, billings, and payment procedures.)

Fee bills are mailed by the Office of the University Bursar soon after registration (July-August for the fall semester and December-January for the spring semester). These bills, covering the semester's charges payable in advance, must be paid by the tenth day of the semester (see "Graduate School Calendar"). Failure to make payment on time will result in cancellation of registration and any residence hall assignment. A graduate student may apply for a limited deferment of the payment date for a semester fee bill at the Deferment Office in the Wilbur Cross Building. Partial payment of fees is not accepted by the Bursar. A receipt for payment or evidence of an approved deferment is necessary to complete registration.

Financial Responsibility

Failure to receive a bill does not relieve a student of responsibility for payment of fees by the specified due date. A student who fails to make timely payment of an outstanding balance may be barred from all privileges normally accorded to a student in good standing. These include but are not limited to: advance registration (which if already completed will be subject to cancellation), registration, class attendance, advisement, dormitory room (for which any assignment will be cancelled), dining hall, library, infirmary, certification-of-status, and academic transcript privileges. Additionally, any pending University of Connecticut employment authorization may not receive approval or may be subject to cancellation. If there is a question concerning a bill, it is the student's responsibility to contact directly the Office of the University Bursar for clarification and resolution.

If a graduate student does not meet his or her financial obligations to the University by the tenth day of a given semester or by the expiration date of an approved deferment, cancellation of the student's registration and student privileges will result.

Application Processing Fee

A non-refundable fee of \$55 for electronic submission or \$75 for paper submission must accompany an application to the Graduate School. It may not be applied toward other charges. This fee must accompany every application submitted except for a doctoral degree program to follow immediately on a completed master's degree program in the same field at this University, or for re-application requested by the Dean.

In-State and Out-of-State Status

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

Questions concerning the classification of graduate students as resident (in-state) or non-resident (out-of-state) are resolved by the Graduate School. In the event that a student believes that he or she has been incorrectly classified, a request for a review, along with supporting documentary evidence, should be directed to the Graduate School.

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

Tuition

All graduate students – except in Summer Sessions programs (College of Continuing Studies) and those business administration programs conducted at centers away from Storrs – are subject to a tuition charge in addition to the other fees charged Connecticut, New England Regional Student Program, and out-of-state students.

Students who are classified as Connecticut residents pay tuition of \$3,762 per semester if registering for nine or more credits. Students eligible for the New England Regional Student Program pay tuition of \$5,661 per semester at the nine or more credit level. Students who are classified as out-of-State students pay tuition of \$9,792 per semester for nine or more credits.

Tuition is pro-rated for students registering for fewer than nine credits per semester, according to the accompanying schedule.

Tuition (but not the associated fees) is waived for graduate assistants. If an assistantship begins or terminates during the course of a semester, tuition will be prorated on a weekly schedule – charged for that portion of the semester when the assistantship is not in force, and waived when it is in force. This can result in either a partial tuition assessment (if the student is registered throughout the semester for tuition-bearing course work) or a partial refund (if tuition has been paid).

Additionally, tuition (but not the associated fees) is waived for certain groups of individuals. One of these groups includes any dependent child of a person whom the U.S. armed forces has declared either to be missing in action or to have been a prisoner of war while serving in the armed forces after January 1, 1960, provided that person was a resident of Connecticut at the time of entering the service of the armed forces of the United States or was a resident of Connecticut while so serving.

A second group includes any veteran having served in time of war, as defined in subsection (a) of section 27-103, or who served in either a combat or combat support role in the invasion of Grenada (from October 25, 1983 to December 15, 1983), the invasion of Panama (from December 20, 1989 to January 31, 1990), the peace-keeping mission in Lebanon (from September 29, 1982 to March 30, 1984), or Operation Earnest Will (escort of Kuwaiti oil tankers) (from February 1, 1987 to July 23, 1987), and is a *resident of Connecticut at the time of acceptance for admission or readmission to the University*. Eligible individuals should contact the Office of Student Financial Aid Services in the Wilbur Cross Building, Room 25, phone (860) 486-2819, for an application for the tuition waiver. Additional information on the *Veterans Administration Educational Assistance and Training Waiver* is located in the Financial Aid section of this Catalog.

The third group of individuals includes any person sixty-two years of age or older who has been admitted into a degree-granting program or who wishes to take courses on a space available basis as a non-degree student. If any person who receives a tuition waiver in accordance with the provisions of this subsection also receives educational reimbursement from an employer, the waiver is reduced by the amount of the educational reimbursement.

General University Fee

The General University Fee is assessed each semester on the basis of the student's course load status (part-time, half-time, or full-time) as determined by Graduate School policies. Students who are part-time are charged \$156, while students who are half-time are charged \$312, and full-time students are charged \$468 per semester. Students paying this fee at any level have access to the Student Health Service.

Audit Fees

Students auditing courses pay the same tuition and fees as those students who have enrolled for course credit. Tuition is charged on the basis of course credit hours, while the charge for the other fees (e.g., the General University Fee), is dependent on the student's total course load (part-time, half-time or full-time), as determined by Graduate School policies. (See "General University Fee.")

Graduate Matriculation Fee

Each degree-seeking student under the jurisdiction of the Graduate School pays a Graduate Matriculation Fee of \$42 per semester. This fee is payable regardless of the credit load or the campus of registration, and applies to students registering for Continuing Registration or other zero-credit courses as well. Graduate students who enter graduate school with more than six credits of advanced course work and apply it to their degree requirements are responsible for payment of the Graduate Matriculation Fee for those semester(s) in which the excess non-degree work was taken, unless the fee is waived by the Dean of the Graduate School.

Infrastructure Maintenance Fee

All full-time registered students are subject to an Infrastructure Maintenance Fee of \$162 each semester, used to defray the operating and maintenance costs related to new capital projects funded by the UConn 2000 initiative. This fee is prorated for half-time and part-time students, as presented in the accompanying chart.

Graduate Activity Fee

A non-refundable fee of \$13 per semester is

charged all students taking courses at the Storrs campus. The proceeds from this fee are used by the Graduate Student Senate for its programs for graduate student welfare and recreation.

Student Transit Fee

Graduate students on the Storrs campus are charged a Transit Fee of \$25 per semester. This fee supports the campus shuttle bus service.

Student Union Building Fee

Students pay a nonrefundable fee of \$13 each semester to support the ongoing expansion and renovation of the Student Union.

International Sponsored Student Fee

A fee of \$300 per semester is charged all international students who apply through, and are funded by, governmental, quasi-governmental, private, or public organizations.

Non-Credit Continuing Registration

Students not registering with the University for credit-bearing course work or other curricular offering in a given semester are required to maintain a continuing registration in the Graduate School by registering for one of the Graduate

School's zero-credit Continuing Registration courses. These courses include GRAD 398 for non-thesis master's degree students, GRAD 399 for thesis master's degree students, GRAD 498 for doctoral students not yet engaged in dissertation research or writing, and GRAD 499 for doctoral students currently engaged in dissertation research or writing (see "Continuous Registration" under Registration). Students who register for the zero-credit Continuing Registration courses are considered to be part-time students. They pay the Graduate Matriculation Fee as well as the General University Fee and other fees at the part-time level, but they are ineligible for need-based or merit-based financial aid.

If a graduate student does not complete payment for his or her Continuing Registration course to the Office of the University Bursar by the first day of the semester, the registration is cancelled and a reinstatement fee of \$65 may be assessed when the student is reactivated.

Deposit Account

A deposit of \$50 must be maintained by every registered student. This deposit, less deductions for breakage, fines, medicines charged at the pharmacy of the Infirmary, and any other

Semester Tuition and Fee Schedule for Graduate Students

Course Credits	Tuition			Fees				Totals		
	In-State	New England Regional	Out-of-State	General University	Infrastructure Maintenance	Graduate Matriculation	Activity, Transit, and Student Union	In-State	New England Regional	Out-of-State
Part-time										
0*	\$ 0	\$ 0	\$ 0	\$ 156	\$ 41	\$ 42	\$ 13	\$ 252	\$ 252	\$ 252
1	418	629	1,088	156	41	42	51	708	919	1,378
2	836	1,258	2,176	156	41	42	51	1,126	1,548	2,466
3	1,254	1,887	3,264	156	41	42	51	1,544	2,177	3,554
4	1,672	2,516	4,352	156	41	42	51	1,962	2,806	4,642
Half-time										
5	2,090	3,145	5,440	312	81	42	51	2,576	3,631	5,926
6	2,508	3,774	6,528	312	81	42	51	2,994	4,260	7,014
7	2,926	4,403	7,616	312	81	42	51	3,412	4,889	8,102
8	3,344	5,032	8,704	312	81	42	51	3,830	5,518	9,190
Full-time										
9 or more	3,762	5,661	9,792	468	162	42	51	4,485	6,384	10,515

* Graduate non-credit registration only.

Important Notes:

1. Tuition (but *not* fees) for Graduate Assistants is waived, if the appointment is at the level of 50%-time (i.e., 10 hours per week) or greater.
2. All Graduate Assistants must pay the associated fees at the full-time rate and must register for a minimum of six credits of course work.
3. Students registered *only* for non-credit Continuing Registration (i.e., GRAD 398, 399, 498, or 499) or certain other zero-credit courses pay the General University Fee at the part-time rate of \$156/semester. Students also pay the \$13 Student Union Fee.
4. Other applicable fees and required deposits are added to student fee bills as appropriate.

Fees are subject to change at any time without notice.

outstanding charges, will be refunded after the student leaves the University, either through graduation or other action.

Cooperative Bookstore Account

A one-time, refundable Cooperative Bookstore payment of \$25 is required of all students, with the exception of Health Center students at Farmington, M.B.A. students at Hartford or Stamford, students registered solely for Summer Sessions, non-degree students, and students engaged exclusively in non-credit extension work. When students terminate their association with the University, the \$25 Cooperative Bookstore Account will be refunded.

Residence Hall Fee and Room Deposit

In 2005-2006, the fee charged all students living in a graduate residence hall is \$2,334 per semester or approximately \$6,500 per calendar year. Information about other on-campus housing options is available at <<http://www.reslife.uconn.edu/>>. Any student who has contracted for a room for the coming semester and then cancels the reservation prior to August 1 for the fall semester or January 2 for the spring semester will be held responsible for payment of a \$60 room cancellation charge.

A room deposit of \$140 is required to reserve a room in a graduate residence hall for the fall semester. A refund of \$80 may be paid if the student cancels the reservation by the above deadlines. The room deposit will be applied toward the room fee or the room cancellation charge only. Failure to remit this payment will result in cancellation of the room assignment.

Newly entering students applying for a room must pay the \$140 room deposit within fifteen days of the date stamped at the top of the room application form enclosed with the notification of admission.

Board Fee

Graduate students living in a graduate residence hall may purchase meals on a cash basis at Jonathan's (a campus restaurant located in the Student Union) or at the guest rate in a University dining hall, or may choose to subscribe to the board plan in a University dining hall. This plan provides three meals a day, seven days per week, while classes are in session, at a cost of \$1,872 per semester.

Failure to pay the board fee as billed does not relieve the student of the financial obligation. If a student gives notice of cancellation to the Department of Residential Life, the student will be held responsible for payment of the board fee as indicated under "Refunds and Cancellations of Charges."

Late Registration/Payment Fee

An accumulating penalty fee is charged students registering for credit courses through the University Registrar at the Storrs campus, the regional campus at Avery Point, and at the Health Center in Farmington who fail to complete initial course registration and to pay all due fees on or

before the tenth day of classes of any semester (additions to and deletions from a student's initial registration and payment of the resulting adjusted fee bill can occur freely through the end of the tenth business day of the semester).

This fee is \$6 for each weekday (excluding Saturdays, Sundays, and legal State holidays) occurring after the tenth day of the semester that registration and payment have not been completed. Students granted a limited deferment by the Deferment Office (in the Wilbur Cross Building) are charged the late fee if they fail to meet any of the terms of the deferment. For these students, the fee begins to accumulate on the first business day following a deferment date. Students whose semester bills are only for Continuing Registration courses (GRAD 398, 399, 498, or 499) are not eligible for a deferment.

This fee will accumulate to a maximum of \$60, at which point the student's registration may be cancelled. To become reinstated, the student must apply for reinstatement and pay a reinstatement fee of \$65. (See "Reinstatement Fee.") The registration process has not been completed unless the student has either received a fee bill receipt from the Bursar or has been granted a limited deferment of the payment date of the semester fee bill by the Deferment Office.

Reinstatement Fee

Graduate School regulations require registration in each semester by all graduate degree program students. (See "Continuing Registration.") Students at the Storrs campus, at the Avery Point regional campus, the M.B.A. programs in Hartford and Stamford, or at the Health Center in Farmington who fail to complete initial course registration by the end of the tenth day of classes of any semester may be dropped from active status and will be required to pay a penalty fee of \$65. (Additions to and deletions from a student's initial registration and payment of the resulting adjusted fee bill can occur freely through the end of the tenth business day of the semester.) The reinstatement fee is added to a student's bill along with any late registration/payment fee that has accrued.

A student who has an unpaid reinstatement fee is not allowed to register, have an official transcript issued by the Registrar's Office, obtain a deferment of any fee payment date, retain a key to a room in the Graduate Center, or use the services of the Babbidge Library. A student with an unpaid reinstatement fee is not considered to be in good standing by the Graduate School. (See "Financial Responsibility.")

Off-Campus M.B.A. and M.S. in Accounting Course Fee

Students registering through the off-campus Master of Business Administration programs at Hartford and Stamford do not pay a tuition fee, but do pay a per-credit fee, with no maximum for the semester. Information concerning this fee is available from the M.B.A. Program Director at each of the locations.

Stamford Ed.D. in Educational Leadership Program Fees

Students enrolled in the Ed.D. program in Educational Leadership at the Stamford campus should obtain fee information from administrators of that program.

Applied Music Fee

Information concerning non-refundable fees for applied music instruction can be obtained from the Department of Music.

Summer Sessions Fees

The bulletin published by the College of Continuing Studies, One Bishop Circle, Unit 4056, Storrs, Connecticut 06269-4056, should be consulted for information on these fees and payment.

Extension Fees

The bulletin published each semester by the College of Continuing Studies, One Bishop Circle, Unit 4056, Storrs, Connecticut 06269-4056, should be consulted regarding fees and payment.

Refunds and Cancellations of Charges

In order to be eligible for a refund or cancellation of charges, a student must officially drop *all* courses currently being taken. (See "Dropping all Courses; Withdrawal from the Program.")

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

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

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

- | | |
|-------------------------------|-----|
| a) 1st week* | 90% |
| b) 2nd week* | 60% |
| c) 3rd and 4th week* | 50% |
| d) 5th week through 8th week* | 25% |

* Calendar weeks run Monday through Sunday; regardless of the day of the week that the semester begins, the following Sunday ends the first calendar week.

For graduate degree-seeking students who paid fees to the Office of Credit Programs, College of Continuing Studies, refunds are governed by the above schedule.

Summary of Nonrefundable and Refundable Fees

Nonrefundable fees:

- Application Processing
- International Sponsored Student Fee
- Late Registration/Payment
- Reinstatement
- Room Deposit**
- Student Union

Refundable fees:

- Tuition
- General University
- Graduate Activities
- Graduate Matriculation
- Infrastructure Maintenance
- Applied Music
- Audit
- Deposit Account balance
- Cooperative Bookstore Account balance
- Board
- Residence Hall
- Room Deposit**
- Transit

Student Identification Card

Each newly entering student is furnished with a personal identification card which is revalidated each semester upon full payment of applicable fees. Should the student's card become lost or destroyed, a replacement fee of \$15 is charged.

Students Attending Under Public Laws

Students attending the University for the first time under the auspices of the Veterans Administration must have a Certificate of Eligibility, which must be presented at the Office of Student Affairs prior to registration.

Completion Fees

The Graduate School requires submission of two copies of a master's thesis or doctoral dissertation which become the property of the Homer Babbidge Library. Binding of these two copies is arranged by the Library. There is no charge to the student for the binding of the two final copies of a thesis or dissertation.

All doctoral dissertations are sent to ProQuest for microfilming. This is a requirement of the Graduate School. The student is required to pay ProQuest's charge for the service, which was \$55 at press time. This fee is subject to change at any time without notice. The master's thesis is *not* microfilmed.

There is an additional and separate charge (\$45 at press time; subject to change without notice) for the optional copyright of a doctoral dissertation.

Student Parking Fee

A parking fee is assessed to each student who has permission to park in University parking areas during the two semesters of the academic year. The fee is \$40 per semester for commuting students and \$51 per semester for students residing on-campus. (See "Parking of Student Cars") The fee for graduate assistants is \$41 per semester. In all cases, the parking fee is paid directly to Parking Services.

Bad Checks

A \$25 fee is charged on any check returned by the bank for any reason.

Mandatory Student Health Insurance

All full-time students must have adequate insurance coverage for accidents and illnesses. Students who currently are covered by personal or family health insurance must present evidence of such coverage to the Student Health Service by filling out a waiver card. Students who fail to provide proof of coverage via submission of a waiver card will be enrolled automatically in the University sponsored plan and will be charged a premium on their student fee bills.

Full-time students should inform the Student Health Service whenever a change occurs in their health insurance coverage, including any termination of health insurance benefits provided to graduate assistants.

All non-immigrant international students will be required, at the time of registration, to show evidence of adequate insurance coverage for basic medical, major medical, and repatriation expenses. This requirement is a condition of admission and registration. International students should consult the Division of International Affairs, Department of International Services and Programs, regarding compliance with this requirement and assistance in enrolling in an approved insurance program, if necessary.

Study Abroad Supplemental Health Insurance

Students choosing to study abroad through the University's Office of Study Abroad may also be assessed an international health insurance premium that will cover them for the time period that they are abroad. This insurance is in addition to any other health insurance coverage that a student may have, including the university sponsored health insurance plan. Please call 486-5022 for further information or visit this website: <www.studyabroad.uconn.edu>.

Telephone Service

All student rooms have been provided with telephone jacks. Students are encouraged to bring touch tone telephones to campus. Students who desire local and/or long distance services must register with UConnect, the University Telephone Service. UConnect will bill each student directly for the installation, monthly service charge, and toll calls.

Coin telephones and campus restricted phones can be found throughout the residential facilities.

**See "Residence Hall Fee and Room Deposit" for explanation.

ASSISTANTSHIPS, FELLOWSHIPS, AND OTHER Aid

The University of Connecticut has agreed to abide by the following resolution of the Council of Graduate Schools:

Acceptance of an offer of financial support (such as a graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by a prospective or enrolled graduate student completes an agreement that both student and graduate school expect to honor. In that context, the conditions affecting such offers and their acceptance must be defined carefully and understood by all parties.

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

Support for graduate students engaged in full-time degree study at the University comes from a wide variety of sources. More than 1,500 graduate students hold graduate assistantships for teaching or research, and more than 1,000 fellowships and traineeships are available to properly qualified students. Any employment within the University is subject to terms of the funding source and to approval by the Dean.

All students holding fellowships awarded by the University are expected to maintain their enrollment in the program to which the fellowship applies. Transfer from one program to another or

withdrawal from the University terminates the fellowship.

The general University fee and the graduate matriculation fee as well as the Connecticut resident tuition fee or the nonresident tuition fee must be paid by holders of University Predoctoral Fellowships, if applicable, but these fees are paid for holders of certain Federal fellowships and traineeships, according to the terms of the grant.

TYPES OF FINANCIAL AID

Two general types of financial aid are available: (1) aid based on academic merit and (2) aid based on demonstrated financial need. The student is advised to apply for both types simultaneously in order not to delay consideration for an award.

Awards based on academic merit include: Graduate Assistantships (for teaching or research), University Predoctoral Fellowships, Dissertation Fellowships, and Summer Fellowships. Assistantships, fellowships and other awards from University sources are used in combination with need-based aid to calculate final financial aid amounts offered either for a semester or an academic year. Application for merit aid should be made directly to the academic department. Continuing University of Connecticut graduate students should apply early in the spring semester. New applicants for admission to the Graduate School should apply as early as possible and not later than the deadline imposed by the appropriate academic department. (See the Graduate Application form for merit aid deadlines.)

General Need-Based Financial Aid Information

United States citizens or permanent residents of the United States may apply for need-based financial aid, which includes Federal Stafford Loans (FSL), Federal Work-Study (FWS), and University of Connecticut tuition remission grants, by completing the **Free Application for Federal Student Aid (FAFSA)** or Renewal FAFSA. With Internet access, you can file a FAFSA on the Web (or a Renewal FAFSA, if you still reside at your previous year's address) at <www.fafsa.ed.gov>.

For more information, you can access the student financial aid web site at <www.financialaid.uconn.edu>.

Need-Based Financial Aid Deadlines

Deadlines are March 1 each year for continuing graduate students and May 1 for entering University of Connecticut graduate students.

The FAFSA or Renewal FAFSA must be received and logged in at the federal processing center on or before the published deadline dates. List the University of Connecticut Federal School Code, 001417, on the FAFSA, Step 6. Use 233 Glenbrook Road, Storrs, CT as the college address. Do not wait for final income figures. Use the previous year's estimated income figures, if necessary, to meet the on-time application deadline.

On-time status will not be determined by postmark dates or postage receipts. Priority for

the awarding of Federal Work-Study as well as University of Connecticut Tuition Remission Grant funds will be considered for applicants who comply with the above deadlines. Applications received after the deadline will be considered for Federal Stafford Loan eligibility only.

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

An **award notification** is e-mailed to each student after all required documents have been received. It indicates the types and amounts of aid offered. Students must either accept or decline each award offer and return the **reply copy** to the Office of Student Financial Aid Services. Finalized financial aid awards (loans, grants, work-study) are based on the student's registration status (number of credits) as of the tenth day of classes in each semester.

All need-based financial aid recipients and University funded and merit scholarship recipients must meet **Satisfactory Academic Progress (SAP)** requirements, which are based on federal regulations. These requirements include maintenance of an appropriate grade point average and satisfactory completion of a percentage of the number of credit hours attempted in each award year. A complete text of this policy is available from the Office of Student Financial Aid Services.

The following list of assistantships, fellowships, and other forms of aid includes only the major sources of support available to students at this University. Other sources may be available upon further inquiry.

Graduate Assistantships

Graduate School degree-seeking students and students in the program leading to the Sixth Year Diploma in Professional Education, who meet the criteria listed below, are eligible. Appointments ordinarily are made for the nine-month period, August 23 through May 22, but may be of shorter duration for a variety of reasons. Recipients usually serve the University as teaching assistants, readers, or laboratory and research assistants. They may take fewer than the usual number of courses per year because of this added workload. To be appointed, to retain an appointment, or to be reappointed, a student must have been accorded Regular (not Provisional) status, must have been maintaining a cumulative average of at least B (3.00) in any course work taken, must be eligible to register (i.e., must not have more than three viable grades of Incomplete on his or her academic record), must be enrolled in a graduate degree program scheduled to extend through the entire period of the appointment or reappointment, and must be a full-time student, counting course work and/or its equivalent together with assistantship duties (see "Course Loads"), throughout the period.

The holder of a full assistantship devotes one-half of available time to studies and one-half (approximately 20 hours per week) to

assistantship duties, while the holder of a half assistantship ordinarily devotes three-quarters of available time to studies and one-quarter (approximately 10 hours per week) to assistantship duties. Assistantships are not available for less than 10 hours per week.

Ordinarily, a graduate student is not permitted to earn more in a given academic year than the applicable maximum stipend rate indicated below. With the written recommendation of the student's advisory committee and the consent of the Dean of the Graduate School, however, approval may be granted for a student's earnings from University sources to exceed the maximum stipend rate by a limited and specified amount.

Stipend rates for graduate assistants are graduated in terms of progress toward the advanced degree and experience. Ordinarily, a graduate assistant may not exclude any part of the stipend from U.S. taxable federal gross income. The rates for nine months for the 2005-2006 academic year are as follows:

- I. \$17,737 for graduate assistants with at least the baccalaureate.
- II. \$18,667 for experienced graduate assistants in a doctoral program with at least the master's degree or its equivalent in the field of graduate study. Equivalency consists of twenty-four credits of appropriate course work beyond the baccalaureate, together with admission to a doctoral program.
- III. \$20,748 for students with experience as graduate assistants who have at least the master's degree or its equivalent and who have passed the doctoral general examination.

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

A graduate assistant is eligible for health insurance. Graduate assistants should be aware that it is necessary to complete the proper forms to activate the health insurance. The health insurance does not take effect automatically.

In exceptional cases a graduate assistant may be appointed on a twelve-month basis, with the stipend being increased proportionately. There are, however, no additional benefits or waiver of tuition in the summer months.

When students become eligible for the Level II or Level III stipend rate, it is the responsibility of their department to request such an increase promptly, by filing a new employment authorization effective the first day of the biweekly payroll period following the date on which the student

completes master's degree requirements (or satisfies master's degree equivalency) or the date on which the student passes the doctoral General Examination in its entirety. Students are responsible for ascertaining that any required documentation – such as a report of a master's final or doctoral general examination, a transcript, or a report of a pertinent Incomplete grade made up – is promptly filed with the Graduate School and that their current stipend conforms with their eligibility.

Tuition Assistance Program for Out-of-State Master's Degree Students

This program provides tuition assistance for selected students, who are classified as out-of-state for tuition purposes, in terminal master's degree tracks. A limited number of tuition grants are awarded each year on a competitive basis to out-of-state master's students. These grants permit the selected students, in effect, to pay tuition at the in-state rate. The selection criteria for these grants include: full-time matriculation in a master's degree program that ordinarily does not lead to the doctorate, absence of graduate assistantship support (which carries with it a tuition waiver), out-of-state residency status, evidence of academic excellence (based on grade point averages, test scores, etc.), and U.S. citizen or permanent resident status. Each student chosen for participation in this program is eligible for a maximum of four semesters of support. This program is administered by the Graduate School. Students are nominated by faculty members in terminal-track master's degree programs.

University Predoctoral Fellowships

These are awarded by the Graduate School on the recommendation of the graduate faculty in the degree program concerned. Students who intend to earn the D.M.A. or Ph.D. and who have demonstrated capability for completing a doctoral program may apply to their academic departments for such fellowships at any stage of their graduate career. Award amounts range from small amounts to full fellowships and/or tuition equivalency. Fellowship awards do not include the requirement of teaching, research, or any other service duties and are not considered to be employment. Predoctoral Fellows must be Regular (not Provisional), full-time students, regardless of the amount of the fellowship. Recipients must present evidence of such registration and payment or deferment of appropriate fees upon receipt of fellowship checks. The Dean of the Graduate School may cancel or reduce an individual award if the student fails to maintain satisfactory academic and financial standing.

Doctoral Dissertation Fellowships

Funding may be available during the academic year to support the Doctoral Dissertation Fellowship program, which is designed to assist advanced Ph.D. students to complete their dissertations. Minimum eligibility requirements include having

passed the doctoral general examination, having a fully approved dissertation proposal on file with the Graduate School, and not exceeding certain annual income limits. The amount of the fellowship is \$2,000, and the fellowships are "one-time only" awards. Awards are made via announced competitions having specific application deadlines. The number of fellowships and the frequency of competitions are limited and contingent upon the availability of funding. Inquiries may be directed to Thomas Peters, Program Director, Unit 1006, Whetten Graduate Center, room 208, Storrs, Connecticut 06269-1006; telephone (860) 486-0977; e-mail <thomas.b.peters@uconn.edu>.

Doctoral Dissertation Extraordinary Expense Award

Ph.D. students who have passed the general examination and whose dissertation proposal has been fully and officially approved may apply for up to \$500 for certain non-routine expenses directly related to data collection for the dissertation. Application may be made at any time. Awards are contingent upon the availability of funding. Inquiries may be directed to Thomas Peters, Program Director, Unit 1006, Whetten Graduate Center, room 208, Storrs, Connecticut 06269-1006; telephone (860) 486-0977; e-mail <thomas.b.peters@uconn.edu>.

Summer Fellowships for Doctoral and Pre-Doctoral Students

Students pursuing the D.M.A. or Ph.D. degree are eligible, upon nomination by department heads, for up to \$1,500 during the summer for the general examination or dissertation research. Information is available from department and program heads in March of each year.

Part-time Employment

Federal Work-Study (FWS) is a federally funded financial aid work program for students with a demonstrated financial need, as determined by information submitted on the FAFSA. Unlike other forms of aid, a Federal Work-Study award is not applied to a student's fee bill. Students receive bi-weekly paychecks for hours worked.

The **Student Labor Program** is a work program open to all University of Connecticut students and designed to supplement regular staff with students seeking part-time employment.

The Office of Student Financial Aid Services advertises available positions on their website: <www.studentjobs.uconn.edu>. Students are prompted to select the category their job choice(s) and are provided with a list of supervisors seeking candidates for those jobs. Students then arrange interviews with prospective employers to discuss the details of the job.

Federal Loan Programs

Federal Stafford Loans (FSLs) are offered to students attending the University at least half-time. Subsidized FSLs are based on financial need; the interest on these loans is subsidized by the federal government. If a student does not qualify for a subsidized FSL, he or she may borrow an

unsubsidized FSL. The student is responsible for the interest which accrues on the loan, and has the option to either pay the interest while in school or defer payment of the interest until repayment begins, six months following graduation.

Annual loan limits for eligible graduate students are: \$8,500 in Subsidized FSL and \$10,000 in Unsubsidized FSL per academic year. The maximum aggregate FSL (Subsidized and Unsubsidized) amount a graduate student may hold is \$138,500.

An excellent, detailed source of information regarding federal aid programs and the financial aid process is *The Student Guide*, available at college and university financial aid offices.

Graduate Student Senate Short-Term Loan Fund

This fund is administered by the Graduate Student Senate (GSS), and is generated by graduate student activities fees. It provides loans of up to \$500 to assist graduate students in dealing with financial emergencies. Loans are issued for 60-day periods and are interest free. Borrowers are urged to repay these loans on time so that other students in need can be accommodated. Applications are available in the Graduate Student Senate Office, Room 318, Whetten Graduate Center and online at the GSS Web site <<http://www.grad.uconn.edu/~wwwgss>>.

International Students

Before their admission is complete and a student visa can be issued, non-immigrant international students must present documentary evidence of their ability to meet all expenses for at least the first year of study, together with an acceptable plan for financing the remainder of their program. International applicants are not eligible for need-based financial aid.

Grants providing tuition and the general University fee are available to a small number of international students who are sponsored by certain organizations [e.g., ATLAS and LASPAU] recognized by the Graduate School as being devoted to the promotion of advanced education programs and with which the University has a standing agreement.

Veterans Administration Educational Assistance & Tuition Waiver Program

The Office of Student Financial Aid Services provides information concerning benefits under the various educational assistance programs provided by the Veterans Administration. Students who attend the University and receive educational assistance under the following chapters must contact the Office of Student Financial Aid Services prior to the beginning of each semester: Chapter 31 (Vocational Rehabilitation Training Act for Disabled Veterans); Chapter 32 (Post-Vietnam Veterans Educational Assistance); Chapter 35 (Dependents Educational Assistance Act: children, wives, and widows of totally disabled and deceased veterans - service connected deaths); Chapter 1606 (Montgomery G.I. Bill - Selected Reserve); Chapter 30

(Montgomery G.I. Bill - Active Duty). Veterans must notify the University every semester of their registration for certification of enrollment. Any changes in veteran status (credit load, withdrawal, etc.) must also be reported promptly to the University.

Additionally, veterans may qualify for a tuition waiver under the State of Connecticut tuition waiver program. Veterans must provide a form DD214 (separation of service) and must be recognized as a resident of Connecticut at the time of admission or readmission to the University. Please see the tuition waiver criteria in the "Fees and Expenses" section of the catalog.

Veterans seeking tuition waiver applications or assistance should contact the Office of Student Financial Aid Services, 233 Glenbrook Rd., U-4116, Wilbur Cross Building room 102, Storrs, Connecticut 06269-4116 or call (860) 486-2442.

Named Graduate School Fellowships

These fellowships are awarded annually by the Graduate School, in cooperation with academic departments, to outstanding graduate degree students. Annual remuneration consists of a service-free stipend of \$6,000 from The Graduate School and a 50% appointment as a graduate assistant from a participating academic department. Pertaining to the latter, there is a service requirement not to exceed ten hours per week of instructional or other duties ordinarily assigned to a graduate assistant. Only newly admitted doctoral students are eligible for appointment to the first year of a fellowship. An initial appointment (of a first-year fellow) may be renewed once with the recommendation of the fellow's advisory committee and the approval of the Dean of the Graduate School. No student may hold a Named Graduate School Fellowship for more than two years. Eligible students must meet the conditions established for appointment as a graduate assistant, but approval by the Dean of the Graduate School ordinarily is contingent upon academic credentials indicative of truly outstanding quality. Named Graduate School Fellowships currently offered include:

Anthropology - The Edward Grant Burrows Graduate School Fellowship
Biomedical Science - The Irwin H. Lepow Graduate School Fellowship
Cell Biology (Storrs) - The Heinz Hermann Graduate School Fellowship
Chemical Engineering - The Leroy F. Stutzman Graduate School Fellowship
Chemistry - The Harvey S. Sadow Graduate School Fellowship
Communication Science - The Homer D. Babbidge, Jr. Graduate School Fellowship
History - The Robert W. Lougee Graduate School Fellowship
Linguistics - The Roman Jakobson Graduate School Fellowship
Metallurgy - The James A. Ruppen Graduate School Fellowship

Nutritional Science - The Hamilton D. Eaton Graduate School Fellowship
Pharmaceutical Science - The P. Brian Stuart Graduate School Fellowship
Physics - The Charles A. Reynolds Graduate School Fellowship
Physiology - The Edward G. Boettiger Graduate School Fellowship
Political Science - The G. Lowell Field Graduate School Fellowship
Polymer Science - The Julian F. Johnson Graduate School Fellowship
Psychology - The David Zeaman Graduate School Fellowship

The Graduate School offers two other fellowships, in cooperation with participating academic departments, which are available to eligible students.

These fellowships are supported jointly by Special Graduate Student Fellowship funds from the Graduate School and a 50% Graduate Assistantship from the department with which the recipient is affiliated. Only one student holds each fellowship at any given time, renewable annually, and the fellowship may not be held by the same person for more than two years. Candidates for these fellowships may be recommended to the Dean of the Graduate School by any graduate faculty member. These recommendations must be endorsed by the appropriate department head.

1) The Prudence Crandall Graduate School Fellowship honors Miss Crandall's contributions to the education of African-American youth in nineteenth century America.

2) The Rafael Cordero Graduate School Fellowship honors Maestro Cordero's contributions to education in nineteenth century Puerto Rico.

Multicultural Scholars Program

The Graduate School and the Chancellor's Office have established a fund for the promotion of diversity within graduate education. This program functions to promote the recruitment and retention of diverse populations of graduate students by matching the funding support provided by schools, departments, or fields of study. Students are nominated by the graduate program to which they are applying. There is no application form. Eligibility for support is based on the student's academic qualifications, U.S. citizen or permanent resident status, and the demonstrated need for increased cultural diversity within the field of study.

Outstanding Scholars Program

The Graduate School and participating academic departments and programs offer a number of fellowships for new outstanding graduate students pursuing study at (or through) the doctoral level. Each award includes a stipend of \$7,000 for the academic year, provided by The Graduate School, and a half graduate assistantship for each of the fall and spring semesters, which is provided by the department or program. The award is renewable for two additional years (a total period of three years). There is no application form. Each doctoral

field of study should recommend as early in the recruiting year as possible applicants who intend to commence graduate study in the following Fall semester.



Aid for Graduate Students in Specific Disciplines or Areas

Awards are available in the areas of study listed alphabetically below. Availability and terms of the following awards are subject to change at any time without notice.

Agricultural and Resource Economics

Several graduate research assistantships in food marketing, resource economics, and international agricultural development are available. Application is made to the Department of Agricultural and Resource Economics, Unit 4021, Storrs, Connecticut 06269-4021.

Allied Health

The Frederick G. Adams Scholarship was established by the faculty of the School of Allied Health to honor their first Dean, Frederick G. Adams, D.D.S., with continuing support from his family and friends as a memorial. Awards in varying amounts are made to undergraduate and graduate students enrolled in the School of Allied Health who have emergency needs which can be met in no other way. Application is made to the School of Allied Health Academic Advisory Center.

The Dr. James P. Cornish Scholarship was established by the Cornish family in memory of the late Dr. Cornish. The \$500 scholarship is awarded annually to a graduate student in the School of Allied Health who demonstrates leadership potential, warmth and humor, creativity and innovation, commitment to lifelong learning and service, and dedication to the values of multiculturalism and diversity. Application is made to the School of Allied Health Academic Advisory Center.

The Leslie Finney Laughlin Scholarship provides support for students in Physical Therapy.

Animal Science

Graduate research assistantships from various sources, including federal grants as well as business and industry, are available. There is no application. Requests for financial aid upon admission are considered during the review of applications. Ordinarily, students are nominated for support by their major advisors. Assistantships and scholarships are awarded competitively on the basis of academic and scholarly achievement as well as the potential for future academic and professional accomplishments.

Art

(See "Fine Arts.")

Biomedical Sciences

Graduate assistantship awards for qualified incoming and current students are available. Recipients must be full-time students and work with faculty advisors at the Health Center. Awards include as-

sistantship stipend, waiver of tuition, and health insurance. Current students apply to the Graduate Programs Committee at the Health Center. Incoming students are recommended for this award by the Biomedical Admissions Committee. Students applying for admission and assistantship consideration to commence study in the following fall semester should apply by January 1.

Business Administration

The T. K. Lindsay Scholarship is an annual award established by the Connecticut Bank and Trust Company in honor of Professor Tamlin K. Lindsay to be given to an outstanding undergraduate or graduate student in the School of Business. Criteria for selection include high scholastic achievement, professional promise, participation in University activities, and financial need. Candidates are chosen by a Scholarship Committee chaired by the dean of the School of Business.

Chemical Engineering

Various fellowships are available to qualified graduate students enrolled in the M.S. and Ph.D. programs in chemical engineering. Prospective graduate students are considered automatically for this aid by the graduate admissions committee in chemical engineering.

Chemistry

The Charles E. Waring Memorial Scholarship is awarded each year to an outstanding graduate student in chemistry. The recipient is selected from among those students who have completed two or three semesters of graduate study and who have qualified for admission to the Ph.D. program. This \$250 award is given on the basis of progress in course work and research. There is no application.

Civil Engineering

The Narasimha Rao Adidam Memorial Scholarship was established by Dr. and Mrs. Adidam S. R. Sai of Kanpur, India in memory of their son, Naren. The award is presented annually to a full-time graduate student in Civil Engineering who is pursuing studies related to structures/applied mechanics. Preference is given to students with financial need who best exhibit the qualities of personal integrity and intelligence, the research aptitude, the academic performance and the understanding of multicultural values as personified by Narasimha Rao Adidam. Nominations are solicited from faculty members by the Civil Engineering Awards Committee in March.

The Edson B. Gerks Award recognizes an undergraduate or graduate student interested in Transportation Engineering who shows outstanding promise. The award is administered through the Department of Civil and Environmental Engineering.

The University Transportation Center Fellowship for Transportation Studies offers a stipend of up to \$5,000 per semester (in addition to a 50%-time graduate assistantship) for full-time graduate study in Civil Engineering with emphasis in one or more of the following areas: transportation management, policy, or operations. Expressions of interest should be forwarded to Unit

2037, Storrs, Connecticut 06269-2037 as soon as possible after admission to graduate study.

Communication Sciences

The Department of Communication Sciences has a number of stipends available to qualified graduate students enrolling in the Master's programs in Communication and in Speech, Language, and Hearing. In addition, aid is available to students enrolling in the Ph.D. programs in Communication Processes and Marketing Communication and in Speech, Language, and Hearing. Application is made to Head of the Department, Department of Communication Sciences, Unit 1085, Storrs, Connecticut 06269-1085.

Computer Applications and Research

The Taylor L. Booth Engineering Center for Advanced Technology (BECAT) provides a limited number of graduate assistantships. The major responsibilities for these positions are: assisting the technical staff in setting up and maintaining networked research laboratories with PCs and workstations; providing support for technical seminars and short courses on available facilities and software systems; and assisting users with system usage and software problems. Application is made to the BECAT, Unit 2031, Storrs, Connecticut 06269-2031.

Computer Science and Engineering

The Taylor L. Booth Graduate Fellowship is awarded on the basis of annual competitions to qualified graduate students in Computer Science and Engineering who intend to pursue a faculty career at an American university upon completion of the Ph.D. at the University of Connecticut. Interested students should submit a letter of application which details career goals and emphasizes experience and contributions as a teacher. Additionally, letters of support, including one from the applicant's major advisor, should be sent to the Chair of the Graduate Admissions Committee, Department of Computer Science and Engineering, Unit 2155, Storrs, Connecticut 06269-2155. Application deadlines and information can be obtained by writing to the same address.

Dental Science

A limited number of graduate assistantships are available to students in the Master of Dental Science and the combined Ph.D. /resident programs and are awarded on a competitive basis. Training fellowships for research and clinical programs also are available. Application is made to the Office of Dental Academic Affairs, Room AG036, University of Connecticut Health Center, Farmington, Connecticut 06030-3905.

Dramatic Arts

(See also "Fine Arts.") Information, including application procedures, can be obtained from the Department of Dramatic Arts, Unit 1127, Storrs, Connecticut 06269-1127.

The Ballard Institute and Museum of Puppetry Award is given to an undergraduate or to a graduate student in puppetry who has maintained an excellent scholastic record and who has demonstrated exceptional talent in puppetry.

The Frank W. Ballard – UConn League Scholarship is awarded annually to an undergraduate and/or to a graduate student majoring in Puppetry in the Department of Dramatic Arts. The award is given on the basis of demonstrated talent, contribution to department productions, and professional promise.

The Victor Borge Scholarship is awarded to a current or to an incoming M.F.A. student in acting.

The Connecticut Repertory Theatre Patrons' Award was established through the generosity of patrons of the Connecticut Repertory Theatre. The award is made to undergraduate or graduate students in Dramatic Arts on the basis of outstanding academic and artistic accomplishment.

The Cecil E. Hinkel Department of Theatre Award is given to a graduate student who preferably has excelled in either dramatic form and structure or in the history of theatre. Secondary preference would be given to an outstanding graduate student in directing.

The Nafe E. Katter-Ron Palillo Scholarship in Acting is awarded to an undergraduate or to a graduate student majoring in acting. The award is made on the basis of demonstrated talent, contributions to departmental productions, and professional promise.

The Valerie M. Schor Memorial Scholarship is in memory of Professor Schor, who taught Dramatic Arts from 1970-1993. Awarded annually to undergraduate or graduate students majoring in acting.

The Special Dramatic Arts Award for Excellence is given to an undergraduate or graduate student in Dramatic Arts on the basis of outstanding academic and artistic accomplishment.

The United Bank and Trust Company Scholarship is awarded on the recommendation of the faculty of the department to a talented student in either the design/technical or performance areas.

The George B. Wallis III Award is presented at the end of the theatre season to a student judged by the faculty of the department to be the best actor or actress, with emphasis on talent and dramatic ability.

Ecology and Evolutionary Biology

The Ronald Bamford Fund provides a small research grant in the area of botany to be awarded to graduate students in the Department of Ecology and Evolutionary Biology for visits to collections, field work, supplies, or other expenses directly related to research. Application is made to the Department Head, Ecology and Evolutionary Biology, Unit 3043, Storrs, Connecticut 06269-3043.

Several endowed funds provide small research grants in various research areas that are awarded to graduate students in the Department of Ecology and Evolutionary Biology for travel to scientific meetings, visits to collections, field work, supplies, or other expenses directly related to research. The endowed funds and research areas are: Henry N. Andrews Fund (botany), Alfred Hunyadi Fund (forestry), Jerauld Manter Fund (ornithology), Lawrence R. Penner Fund (parasitology and

invertebrate zoology), James A. Slater Fund (entomology), Francis R. Trainor Fund (aquatic ecology), and the Ralph M. Wetzel Fund (vertebrate biology). Application is made to the Department Head, Ecology and Evolutionary Biology, Unit 3043, Storrs, Connecticut 06269-3043. Deadlines are variable but often have been April 15.

Economics

The Audrey P. Beck Scholarship is shared between Economics and Political Science. A stipend of \$500 (or more, depending on endowment return) is awarded to a student with an interest in a career in public policy. Criteria for the award include career potential, academic achievement, character, breadth of interests, and need.

The W. Harrison Carter Award is given each fall to a graduate student judged to be the best teaching assistant in the Department of Economics. The award was established in memory of W. Harrison Carter, Professor of Economics from 1931 to 1966 and former Dean of the College of Liberal Arts and Sciences.

The Abraham Ribicoff Graduate Fellowship for the Study of Economic Policy is awarded to an outstanding graduate student in Economics. The student must be a Connecticut resident with a strong academic record and must have a primary interest in the application of economic analysis to the formulation and implementation of state and national economic policies. Students are nominated by members of the faculty.

The Albert E. Waugh Scholarship in Economics provides an annual award to a graduate student interested in pursuing a career in teaching economics. This award was established in memory of a former professor of economics, Dean and Provost at the University from 1924 to 1965.

Education

The Neag School of Education has numerous scholarships available. Information regarding these scholarships can be found on the Internet at the following website: <www.education.uconn.edu/students/scholarships>.

Engineering

The Al Geib Graduate Fellowship is a supplemental fellowship to encourage top entering graduate students to conduct research on an environmental, sustained development topic. Preference is given to University of Connecticut graduates and to Connecticut residents. One or two awards may be given each year. Nominations are made through department heads and graduate field of study coordinators to the Dean of Engineering. The deadline for nominations is mid-February.

The Harold Torgersen Fellowship provides financial assistance to a graduate student in the engineering fields. Preference is given to B.S. graduates of the University of Connecticut. Nominations are made to the Dean of Engineering by the appropriate Engineering Department Head.

English

The Aetna Graduate Creative Nonfiction Prize provides one or more cash awards from the Aetna Foundation for an outstanding nonfiction essay.

The Aetna Graduate Critical Essay Prize is a \$400 award from the Aetna Foundation. Second, third, and honorable mentions may be awarded. Any essay or dissertation chapter which has not yet been accepted for publication is eligible.

The Kathleen Gibson McPeck Critical Essay Prize is a \$400 award given for an outstanding critical essay written by a graduate student. The award is given by James A. S. McPeck in memory of Kathleen Gibson McPeck. Any essay written for a course which has not yet been accepted for publication is eligible.

The Wallace Stevens Award for Poetry is offered in the spring semester. There are three prize awards. Undergraduate and graduate students are eligible. The award involves a brochure publication and a public reading.

Finance

The Stephen D. Messner/School of Business Administration Scholarship and Fund provide support for undergraduate and graduate students in the areas of real estate and finance. Application is made either through the Real Estate Center or the Head of the Finance Department. There is no application deadline.

The Hartford Society of Financial Analysts' Scholarship is awarded under the auspices of the University of Connecticut Foundation. One or more scholarships of \$200 to \$500 are awarded each Spring semester to outstanding students enrolled in the master's degree program in the School of Business Administration. This scholarship is made available by the Hartford Society of Financial Analysts. Application is made to The Department of Finance, Unit 1041F, Storrs, Connecticut 06269-1041. The application deadline is March 1.

Fine Arts

The Dean Jerome M. Birdman Scholarship is awarded annually to an undergraduate or graduate student in each of the departments of the School of Fine Arts. Criteria include academic distinction and professional promise. Awards are made by the dean of the school in consultation with department heads.

The William Brand Scholarship is awarded to an undergraduate or graduate student in the School of Fine Arts. The scholarship committee selects recipients based on past academic achievement and demonstration of potential for future academic and professional accomplishments. The scholarship is presented alternately to a student from each department.

The Jan Keiley Scottron Scholarship is awarded to an undergraduate or graduate student in the School of Fine Arts. The Scholarship Committee selects recipients who meet the following criteria: (1) senior student or graduate student standing with a major in puppetry or musical stage (e.g., opera), (2) demonstrated financial need, and (3) demonstrated academic achievement.

The Rhoda Shivers Memorial Award in the Arts is awarded to an undergraduate or graduate student in the School of Fine Arts. Departmental Scholarship Committees select recipients based on past academic achievement, demonstration of potential for future academic and professional

accomplishments, and on financial need. The scholarship is presented alternately to a student from each department (Art, Dramatic Arts, and Music).

Geography

Graduate research assistantship awards for qualified incoming and current students are available. Recipients must be full-time students and work with faculty advisors. Awards include assistantship stipend, tuition waiver, and health insurance options. Incoming and current full-time students who request graduate assistantships are considered for the research assistantship awards based on their academic standing and research skills. Several of the research assistantships are based at the University of Connecticut Center for Geographic Information and Analysis housed in the Homer Babbidge Library.

A graduate research assistantship is also supported by the Connecticut Geographic Alliance based in the Department of Geography. The Connecticut Geographic Alliance is an organization designed to advance the status of geography in primary and secondary education in Connecticut. The award includes assistantship stipend, tuition waiver, and health insurance options. Incoming and current full-time students who request graduate assistantships are considered for this award based on their academic standing and interest in geographic education.

A departmental fund provides small grants to graduate students in the Department of Geography for presentations at scholarly meetings. Students in good academic standing who are participating in a scholarly meeting may apply to the Department Head for funding.

Geological Sciences

The Andrew J. Nalwalk Memorial Award is given to a continuing graduate student demonstrating independent scholarship in geology, marine geology, or physical oceanography. Selection of the recipient is coordinated by the Department of Geological Sciences and the Department of Marine Sciences. The award was established by family and friends of the former professor of geology at the Marine Sciences Institute.

Health Care Management

Criteria for selection for any of the following scholarship awards include full-time regular status in the M.B.A. degree program with an area of concentration in Health Care Management, prior academic achievement, perceived potential, and professional interest in health care management. Information and application forms are available through the Center for Health Systems Management, School of Business Administration, Unit 1041-CHSM, Storrs, Connecticut 06269-1041.

The Blue Cross and Blue Shield of Connecticut Healthcare Management Scholarship is awarded annually to a student preparing for a career in health care management. Recipients receive \$6,000 in direct financial assistance for the two years of full-time study. Each recipient also is given full-time employment with the corporate organization during the summer between the first and second years of study and a paid internship during the second year of study. Preference is given to residents of Connecticut.

The Health Care Financial Management Consulting Scholarship is awarded annually to a student preparing for a career in health care financial management consulting. Recipients receive \$5,000 in direct financial assistance for the two years of full-time study. Each recipient also is given full-time employment with the sponsoring organization during the summer between the first and second years of study and a paid internship during the second year of study.

History

The James M. Bozzuto Fellowship has been established in association with the Emiliana Pasca Noether Chair in Modern Italian History. It is named in memory of Mr. Bozzuto, whose family generously contributed to the Chair's endowment. The Fellowship is awarded to a graduate student of exceptional promise to undertake advanced study leading to the Ph.D. with an emphasis in Italian political, social, economic or cultural history since 1750 or with an emphasis in comparative European history in the same period that bears substantially on Italy (including emigration). Recipients of this fellowship shall be selected by the Financial Aid Committee of the Department of History in conjunction with the holder of the Noether Chair. The Fellowship normally is awarded on a triennial rotation. Information is available from the holder of the Noether Chair, Department of History.

The Aldo De Dominicis Graduate Fellowship in Italian American history is attached to the Emiliana Pasca Noether Chair in Modern Italian History and has been established to promote research into all aspects of Italian American history. The Fellowship, normally tenable for up to three years, is awarded to a graduate student of exceptional promise to undertake advanced study leading to a Ph.D. in an aspect of Italian American history. Recipients are selected by the Financial Aid Committee of the Department of History in conjunction with the holder of the Noether Chair. Applications close in January.

The Michael Dunphy Award is given annually to a graduate student with a strong interest in American government, society, history, or culture. Outstanding intellectual ability and financial need must be demonstrated. The History Department shares this award with Sociology and Political Science. The Department of History will name the winner in 1998, 2001, etc. Students are nominated by faculty members.

The Harry J. Marks Fellowship is awarded to a superior graduate student and, when appropriate, with priority given to one with a special interest in European social and intellectual history and who is returning to pursue an advanced degree while on, or after, working assignment as a high school teacher. The fellowship is named in honor of a late colleague who was esteemed for his teaching and intellectual vitality. Recipients of this fellowship shall be selected by the Department of History Prize Committee.

The Roger Sherman Scholarship is awarded, when appropriate, to a distinguished applicant to the Ph.D. program in history. The award consists of a \$2,500 pre-doctoral fellowship, a one-half

graduate assistantship, and a tuition waiver. Recipients are named by the Financial Aid Committee of the Department of History.

The Albert E. and Wilda E. Van Dusen Scholarship has been established through the generous gift of Professor Emeritus Van Dusen and his wife, Wilda. An annual scholarship is awarded to a graduate student in history who has completed at least nine credits of work, has demonstrated financial need, and ranks in the top one-quarter of graduate students in history. The selection of the recipient is made by the Department of History Prize Committee.

Home Economics Education

The Merrillyn Niederwerfer '68 Cummings Award in Home Economics Graduate Education is granted to a graduate student in home economics education who is dedicated to a career in extension, secondary, or university education and who has shown promise and leadership in these fields. The \$400 award is made available by the Frank Niederwerfer Family Fund. For more information contact Dr. Mary Anne Doyle, Unit 2033, 249 Glenbrook Road, Storrs, Connecticut 06269-2033.

Judaic Studies

Students interested in obtaining further scholarship information should contact the Center for Judaic Studies and Contemporary Jewish Life, Unit 1205, (860) 486-2271.

The Harold J. Arkava Scholarship is named in honor of Harold J. Arkava. Awarded to student(s) in the Center for Judaic Studies and Contemporary Jewish Life, with preference given to those students studying the Holocaust. Priority is given to graduate students but undergraduates may apply. Number of awards and amounts to vary.

The Cohen and Henes Scholarship was established by Stephen I. Cohen, Class of 1965, and Robert L. Cohen, Class of 1967, in honor of their late grandparents, Isadore and Dora Cohen, and Samuel and Rebecca Henes of Waterbury, who came to the United States from Czarist Russia in the 1890's and who valued highly the qualities represented by this scholarship. Awarded to one or more students with an academic concentration in Judaic Studies on the basis of scholarship, financial need, high moral and ethical character, demonstrated commitment to community service. Number of awards and amounts to vary.

The Winkler Israel Study Award is awarded to a student attending a college or a university in Israel in a program administered by the Study Abroad Office. Number of awards and amounts to vary.

Latin American and Caribbean Studies

The Center for Latin American and Caribbean Studies has a limited number of graduate assistantships and predoctoral fellowships to award to qualified master's students planning to enter doctoral programs.

The Nathan L. Whetten Fellowship (which carries a small stipend) is awarded to the most outstanding doctoral student in any discipline with a concentration in Latin American Studies.

The Center also awards the Robert G. Mead, Jr. Fellowship to the best first-year M.A. student specializing in Latin America.

All fellowships are awarded on the basis of merit. Deadline for application is March 1st. Financial aid decisions are made only in the spring.

Application forms and further information are available from the Center for Latin American and Caribbean Studies, 843 Bolton Road, Unit 1161, Storrs, Connecticut 06269-1161; telephone (860) 486-4964; e-mail lamsadm2@uconnvm.uconn.edu.

Marine Science

(See also "Andrew J. Nalwalk Memorial Award" under Geology.).

The S.Y. Feng Scholarship Fund provides small research grants which are awarded to graduate students in the Department of Marine Sciences for travel to scientific meetings, field work, supplies and other expenses directly related to research. The award was established by family and friends of the late professor of marine sciences. Selection of recipients is made throughout the year by a committee of faculty members in marine sciences.

Mathematics

Most graduate students receive financial support as teaching assistants. International applicants must have matriculated from an English-speaking university or have taken the IELTS with a score of at least 6.5 or have taken the TOEFL with a score of at least 600 to be eligible for financial aid for the first year of graduate study. In addition, there are a few computer support and several Math Center tutoring positions. Supplemental fellowships are available to qualified applicants. Summer teaching opportunities are frequently available, and advanced students are given research fellowships for one summer.

Under an agreement with Aetna and Hartford Life Insurance Companies, actuarial graduate students are eligible for internships that emphasize both practical experience and more theoretical research.

The Louis J. DeLuca Award was established in memory of the former Associate Dean of the College of Liberal Arts and Sciences and Professor of Mathematics, who was a recipient of the University of Connecticut Alumni Association's Award for Excellence in Teaching. The fellowship is awarded each year to an outstanding graduate teaching assistant on the basis of teaching performance and academic achievement.

Medieval Studies

The Fred Cazel Fellowship is an annual award open to graduate students in Medieval Studies, especially those whose primary field is history.

Modern and Classical Languages

Most graduate students receive financial support in the form of graduate teaching assistantships and graduate fellowships. In addition, research stipends of \$500-\$1,000 sometimes are available to qualified applicants during the summer, along with summer teaching opportunities.

The Jaime Homero Arjona Memorial Fund makes available non-interest-bearing, short-term loans to graduate students in the Department of Modern and Classical Languages. Application forms may be obtained in Room 228, J.H. Arjona Building.

The David Luckey Memorial Fund makes available non-interest-bearing, short-term loans

(usually 60-90 days), with a maximum of \$200, to graduate students in the Department of Modern and Classical Languages. Application forms may be obtained in Room 228, J.H. Arjona Building.

The Josefina Romo-Arregui Memorial Scholarship consists of one or two scholarships of \$500 each to master's or doctoral students of Spanish or Spanish American Poetry or the Golden Age Theater in Spain. Application forms may be obtained in Room 228, J.H. Arjona Building.

Music

(See also "Fine Arts."). The Victor Borge Scholarships are awarded in varying amounts to deserving School of Fine Arts students.

The Annie and Wilma Elias Memorial Scholarship was established through the generosity of Julius Elias in memory of his wife Wilma and his mother Annie. The scholarship is awarded annually to students who have been accepted into a program of study leading to a degree in music. Recipients are chosen based on past academic achievement and demonstration of future academic and professional accomplishments. Financial need may be a criterion but is not a determining factor. Two or more scholarships of a minimum of \$500 are available.

The Herbert A. France Music Scholarship is awarded under the auspices of the University of Connecticut Foundation to a junior, senior, or graduate student whose primary interest is conducting. This fund was established by a gift from Mrs. Olive France.

The Alice Murray Heilig Graduate Assistantship in Piano is offered. To be eligible for this assistantship, candidates must meet the following criteria: (1) full-time enrollment in the M.M., M.A., D.M.A. or Ph.D. program in the Department, (2) demonstrated promise as a pianist, and (3) demonstrated academic excellence. Recipients are selected by the Head of the Department in consultation with the Department's faculty.

The Charles, Alice (Murray), and Cheryl A. Heilig Scholarship is awarded annually. Priority is given to undergraduates, but the scholarship may be awarded to a graduate student who meets the standards set by the Scholarship Committee of the Department of Music.

The Minnie Helen Hicks Scholarship is awarded annually to one or more students in Music. Preference is given to residents of Connecticut. The basis for selection includes financial need and musical ability.

The Mae K. Kaplitz Memorial Scholarship Fund was established by Paul Kaplitz in memory of his wife, Mae K. Kaplitz. Awarded annually to students with financial need who are majoring in vocal performance and are outstanding contributors to University choral organizations.

The Musical Club of Hartford, Inc. – Evelyn Bonar Storrs Piano Scholarship is awarded to a talented graduate student of outstanding commitment pursuing study in piano. Student financial need is considered. If no graduate student meets these criteria, the scholarship may be awarded to an undergraduate.

The Walter H. and Rowena R. Tinker Scholarship was established in memory of Walter and Rowena Tinker, devotees of opera and other

vocal music. The award is made to a sophomore, junior, senior, or graduate voice student for outstanding progress.

The Alexander-Hewitt Trust, Vera Jean Berg, Edward Evans, Eugene List/Carrol Glenn, Zara Nelsova, John Poellein, Nadja Salerno-Sonnenberg, Henryk Szeryng, J. Louis von der Mehden, and the Friends of Music Scholarships also are offered. Priority is given to undergraduate students, but graduate students who meet the standards established by the Department of Music Scholarship Committee also are eligible.

Students should contact the Department of Music, Unit 1012, Storrs, Connecticut 06269-1012 for information and application forms.

Natural Resources

Several graduate research assistantships, graduate teaching assistantships, Bishop Carder Scholarships, and scholarships related to natural resources and the environment generally are available. Application is made to the Graduate Program Coordinator, Department of Natural Resources Management and Engineering, Unit 4087, Storrs, Connecticut 06269-4087.

Neurosciences

The Neurosciences Area of Concentration Fellowships up to \$2,000 are awarded periodically to students (selected from those currently enrolled in the Neurosciences area of concentration) who have demonstrated the potential for excellence in research. Application is made to Chair, Neurosciences Committee, Unit 4156, Storrs, Connecticut 06269-4156.

Nursing

In the spring semester, students may apply for funding from several scholarship funds and the Professional Nurse Traineeship Grant.

The Ralph and Ruby Gilman Scholarship honors the Gilmans' 50 years of service to the Mansfield and university communities. Dr. Gilman was hired in 1931 as the University's first full-time physician. Mrs. Gilman helped to establish the Public Health Nursing Association. Undergraduate and graduate students in Nursing are eligible. The scholarship is to be used for tuition and fees.

Newly established funds that can support graduate students include the School of Nursing Endowment Fund for Excellence, and the Mary and Katherine Connelly Nursing Scholarship.

Professional Nurse Traineeships are available for qualified full-time graduate students in Nursing. Based on the availability of funds, traineeships cover student tuition and fees. Interested students should request application materials and information concerning deadlines from the School of Nursing Academic Advising Services, Unit 2026, Storrs, Connecticut 06269-2026. Materials also are available on-line at <http://www.nursing.uconn.edu/MSFINAN.HTML>.

Nutritional Science

The Janina M. Czajkowski Community Nutrition Scholarship is awarded each year to a graduate student in nutritional sciences. The recipient receives a certificate and a monetary award. The award is based on academic excellence in community nutrition, potential for scholarly achievement, and need.

The scholarship was established by the friends of Dr. Janina M. Czajkowski Esselen, a Professor Emerita, who established the department's community nutrition program. The scholarship is awarded by the faculty of the department. There is no application.

The Elna E. Daniels Loan Fund makes available short-term, non-interest-bearing, small loans to graduate students in nutritional science. Application is made to Head of the Department, Department of Nutritional Sciences, Unit 4017, Storrs, Connecticut 06269-4017.

The Kirvin Knox Award is awarded each year to a graduate student in nutritional science. The student receives a certificate and a monetary award. The award is based on research accomplishment and potential for scholarly achievement in an area of nutritional science for students in the final phase of completing the degree program. The scholarship is awarded by the nutritional sciences faculty. No application is made.

Pharmaceutical Science

The American Foundation for Pharmaceutical Education (AFPE) Fellowships are annual awards of approximately \$6,000-\$10,000 for students currently enrolled in graduate study leading to the Ph.D. degree in pharmaceutical science. Application is made to the American Foundation for Pharmaceutical Education, One Church Street, Suite 202, Rockville, Maryland 20850.

The Boehringer Ingelheim Fellowship in Pharmaceutical Sciences supports advanced graduate students in the areas of medicinal and natural products chemistry, pharmaceuticals, or pharmacology (but not toxicology). The recipient must be in at least the third year of graduate study in the department. Application is made to the Pharmaceutical Sciences Graduate Affairs Committee early in the Spring semester. The fellowship is for one year and may be renewed for one additional year.

Boehringer Ingelheim Pharmaceuticals, Inc. makes available a graduate fellowship in toxicology. Application is made to the director of the toxicology program in the School of Pharmacy.

The Gerald J. Jackson Memorial Fellowship in pharmaceuticals is awarded to a deserving graduate student who holds an undergraduate degree in Pharmacy. Application is made to the Graduate Affairs Committee in the School of Pharmacy.

The Richardson-Vicks/A. Francis Summa Memorial Award supports research activity in the School of Pharmacy. Application is made to the Graduate Affairs Committee in the School of Pharmacy.

Physics

Virtually all graduate students accepted into the Ph.D. program, and many accepted into the M.S. program, receive financial support in the form of teaching and research assistantships and fellowships. Special scholarship and fellowship support is available for exceptionally qualified graduate students. The Physics Department has substantial external support for research programs, and funded programs generally provide research assis-

tantships (most with supplementary summer support). Ph.D. students who perform satisfactorily and make good progress receive financial support until they complete requirements for the Ph.D. degree.

The Physics Department annually awards the Charles A. Reynolds Fellowship to an outstanding applicant to its graduate program, and the Marshall J. Walker Outstanding Teaching Assistant Award to the graduate student judged to be the most effective teaching assistant. *Outstanding Scholar* Awards also are available for very exceptional applicants to the Ph.D. program.

Further information about the Physics Department's academic and research programs is available at the Physics Department website at www.phys.uconn.edu and from a brochure that can be found on the website or requested by mail or e-mail at physadm@uconnvm.uconn.edu.

Plant Science

Sources of support for graduate students in all areas of concentration include: (1) Graduate research assistantships, from various sources including government and industry. (2) Teaching assistantships. (3) C. B. Burr Memorial Scholarships. (4) Bishop-Carver Scholarships. (Eligibility for these is restricted to graduate students who are residents of Connecticut.) There is no application for any of these awards. Requests for financial aid on admission are considered during the review of applications. Students are nominated for scholarships generally by the major advisor. Assistantships and scholarships are awarded upon the recommendation of the faculty of the department, on the basis of academic and scholarly achievement, and the potential for future academic and professional accomplishments.

Political Science

The Fund for Legal Studies Fellowship is awarded annually to a graduate student in Political Science who specializes in public law. The recipient is selected by the Department of Political Science.

The Audrey P. Beck Scholarship is shared among Economics, History, and Political Science. A stipend of \$500 (or more, depending on endowment return) is awarded to a nominated student with an interest in pursuing a career in public policy. Criteria for the award include career potential, academic achievement, character, breadth of interests, and need.

The George F. Cole Dissertation Fellowship in Public Law is awarded to a graduate student pursuing a dissertation in Public Law.

The Michael Dunphy Award is given annually to a graduate student with a strong interest in American government, society, history, or culture. Outstanding intellectual ability and financial need must be demonstrated. The Political Science Department shares this award with History and Sociology. The Department of Political Science will name the winner in 1996, 1999, etc. Students are nominated by faculty members.

The Ilpyong Kim Fellowship is awarded annually to a graduate student in political science who is conducting dissertation research related to Asia. The

recipient is selected by the Department of Political Science.

The Norman Kogan Fellowship in Western European Politics is given annually to a graduate student in political science who specializes in the study of Western European politics.

The Everett Ladd Fellowship in American Politics is awarded annually to the graduate student with the highest scholastic standing who intends to pursue American Politics as a doctoral area of study.

The Governor Abraham Ribicoff Fellowship in American Politics is awarded annually to a graduate student in political science who specializes in the study of American politics. Preference is given to residents of Connecticut. The recipient is selected by the Department of Political Science.

Polymer Science

Financial aid is usually offered to those students who are admitted for a Ph.D. Nearly all PhD students receive full financial support. Financial aid may come from one or more of the following sources: graduate assistantships from the program; University Pre-doctoral Fellowships and Julian F. Johnson Named Fellowship. Truly outstanding applicants may also be considered for Outstanding Scholars Program Awards. In addition, the Polymer Program offers several special fellowships for exceptional students. These include: the Stephanie H. Shaw Scholarship, the Andrew Garton Scholarship, and the James P. Bell Scholarship. All scholarship awards are made upon the recommendation of the Polymer faculty. For further information, please contact polymer@ims.uconn.edu.

Psychology

The Isabelle Liberman Scholarship Fund, established by friends and colleagues of the late Professor of educational psychology, provides an annual award given to a graduate student for outstanding research in the psychology of language.

Public Administration

The Karl A. Bosworth Award and the Morton J. Tenzer, the Albert Ilg, and the Phi Alpha Alpha Fellowships are awarded to students in the Master of Public Administration Program. Recipients are selected by the M.P.A. Program from applications submitted by students in the program. For more information, contact the MPA Program Office at (860) 486-4518.

Public Health

A small number of awards are available for qualified full-time students that provide a stipend of up to \$25,000 per year (with the possibility of renewal for a second year), a tuition waiver, and health insurance.

Real Estate

Information concerning each of the scholarships listed below is available from: The Center for Real Estate and Urban Economic Studies ("Real Estate Center"), School of Business, Room 4401, 2100 Hillside Road, Unit 1041RE, Storrs, Connecticut 06269-1041. Scholarship applications are taken at the beginning of the fall and spring semesters. All scholarships are administered through the Real Estate Center.

Byrl N. Boyce Valuation Scholarship is given to a students interested in pursuing careers in real

estate valuation and who have demonstrated potential for future academic and professional accomplishments.

The William N. Kinnard, Jr./CREUES Alumni Scholarship is awarded to students having a strong interest in careers in real estate. Criteria include past academic achievements and demonstrated potential for future academic and professional accomplishments.

The Stephen D. Messner/School of Business Administration Scholarship and Fund provides support for graduate students interested in real estate and finance.

Society of Industrial and Office Realtors/Samuel F. Pierson Scholarship offers a number of awards given to students interested in careers in real estate, preferably sales.

Social Work

The Albert Brown, Jr. Scholarship Fund provides a major award in the form of a graduate assistantship to one or more students in the School of Social Work who undertake a field placement at the University Health Service on the Storrs campus. Field placement is determined by committee. Further information is available from the Director of the Student Mental Health Service at the Storrs campus, (860) 486-4705.

Sociology

The Michael Dunphy Award is given annually to a graduate student with a strong interest in American government, society, history, or culture. Outstanding intellectual ability and financial need must be demonstrated. The Sociology Department shares this award with History and Political Science. The Department of Sociology will name the winner in 1997, 2000, etc. Students are nominated by the Sociology Graduate Admissions and Financial Aid Committee.

The Ronald L. Taylor Award of \$100 is given annually for the best graduate student paper in Sociology. Students are notified by course instructors to apply. The award is available during the spring semester.

Statistics

Graduate student support is available in the form of teaching assistantships, research assistantships, lectureships, and graduate fellowships. Advanced students can apply for summer teaching and research support. Internships with Connecticut firms can often be arranged for graduate students who have completed one year of study. In all cases, application is to the department's director of graduate studies.



Additional Sources of External Support

The Office for Sponsored Programs, located in the Whetten Graduate Center, supplements departmental efforts in locating external sources of support for doctoral dissertation research, as well as general graduate student support. The support offered is usually contingent on professional goals and/or personal qualifications. Most programs have fall deadlines with funding available for the next academic year.

Students are also encouraged to consult the **GrantsNet** searchable database at <<http://www.grantsnet.com/>> or Peterson's **Grants for Graduate Study**, a compilation of federal and nonfederal resources available at the Babbidge Library.

For further information, contact the Office for Sponsored Programs, Unit 1133, Storrs, Connecticut, 06269-1133.

UNIVERSITY PROGRAMS AND SERVICES

Requests for Official University of Connecticut Transcripts

Students at Storrs and the regional campuses can request official transcripts of their academic records by writing to the University of Connecticut, Office of the Registrar, Unit 4077-T, Storrs, Connecticut 06269-4077. Requests can also be transmitted by FAX to the Registrar at (860) 486-4199. All requests should include full name, social security number, UConn ID (PeopleSoft empl ID) if known, dates of attendance, complete and accurate addresses of transcript recipients (including ZIP codes), as well as the requester's mailing and e-mail addresses and telephone number in the event that there is a problem with the request. Requests **must** be signed even if they are faxed.

Request forms can be completed at the Registrar's Office in the Wilbur Cross Building on the Storrs campus. These forms are also available at the regional campus registrars' offices for mailing or faxing to the University Registrar at Storrs or on the Registrar's Website.

Students can request that their transcripts be sent to themselves. Note, however, that such transcripts are stamped "issued to student in a sealed envelope" and the envelope bears a similar stamp and a facsimile signature. Students are cautioned that some recipients will not accept transcripts that have not been sent directly to them.

Transcripts are sent out by U.S. Postal Service first class mail. Priority Mail, or Express Mail. For Priority, Express Mail, UPS, Federal Express, or DHL, the request must be accompanied by a pre-paid and pre-addressed company-specific envelope.

There are other restrictions to this service. Official transcripts may be withheld by appropriate University officials if some financial or other obligation to the University remains unmet. Since official transcripts are issued on security bank paper they **cannot be sent by FAX**. Requests are processed in the order in which they are received in one to five business days. The University cannot honor telephone or e-mail requests for transcripts.

There is no service fee for official transcripts.

Students can obtain an unofficial transcript by presenting a photo I.D. in person at the Registrar's Office at Storrs or at any of the regional campuses; however, students should call the regional campus registrar in advance to make arrangements for transcript pickup.

Housing

The Graduate Residences consist of three buildings in a coeducational complex which contains 440 carpeted single rooms. The residences are open year-round, including the recess periods. The

complex is conveniently located in the center of campus, allowing for easy access to the Graduate Center, the library, and academic facilities. The physical layout of the complex encourages a quiet, studious atmosphere.

There also are a limited number of spaces for graduate students in Hilltop Apartments. This apartment complex houses graduate and undergraduate students. Two or four-person apartments or single efficiencies are available. Every apartment is fully furnished, carpeted, and has air conditioning. All utilities plus cable, local phone, and Ethernet access are also included in a competitively-priced housing package.

Students desiring rooms in University housing facilities should send in the Application for On-Campus Housing and furnish deposits promptly when required. (See "Fees and Expenses.") Housing will be assigned on a priority basis within the limits of available space (some older undergraduates also may reside in the Graduate Residences). See the website noted below for additional information.

International students and others who are not familiar with the region should realize that Storrs is located in a rural area about ten miles from the nearest city. There is limited public transportation. Hence, those coming from a considerable distance usually are well advised to seek housing on campus, at least for the first year of residence. The Housing Contract is for both the fall and the spring semesters. Students should be advised that only extreme situations will warrant a contract release during the academic year so students should plan accordingly. Early application for a room is advisable because there always are more applications filed than rooms available in the Fall semester.

Students who are interested in off-campus housing are advised to come to the area with a car to search for housing. It may take as long as a week to find accommodations. Off-campus housing also fills up quickly, so students should seek and secure housing a few months before the semester begins. See the website noted below for additional information about off-campus housing.

International students, who do not have on-campus housing arrangements, should have confirmed off-campus housing arrangements prior to arrival on campus. Off-campus housing, within walking distance, is especially limited due to the rural location of the campus. Owning a car provides additional access to housing in nearby towns.

Prior arrangements for off-campus housing are essential and should be secured through assistance from the academic department.

Students may access the Department of Residential Life home page at <<http://www.reslife.uconn.edu>>.

Health Services

The Department of Health Services, located in the Hilda M. Williams Building on Glenbrook Road, Storrs, provides primary level health care (medical and mental health). The Department of Health Services is a fully accredited ambulatory health care facility. Students are offered both in- and out-

patient services. Health care treatment for non-life-threatening conditions is available. Because of certain limitations, some medical or psychological problems may be referred to the private sector for diagnosis and/or treatment.

In- and out-patient medical services are provided by the department. These services include outpatient nurse practitioner service, outpatient gynecological service, and outpatient mental health service. Supportive services include laboratory, x-ray, pharmacy, and physical therapy. Nutritional counseling also is available on an appointment basis. Health promotion and outreach programs are offered through the Health Education Office and the Substance Abuse Education Program (HEART). Confidential HIV testing also is available.

The Department of Health Services is open continuously (24 hours a day) from 8:00 A.M. Monday through 4:00 P.M. on Saturday. Hours on Sunday are 8:00 A.M. to 4:00 P.M. There is an on-call telephone advice nurse service and on-call mental health clinician on Saturday and Sunday nights. There is reduced coverage during the semester breaks and the summer sessions. Services are available through appointment clinics and through daily walk-in clinics. The Women's Health Clinic specializes in all aspects of female sexuality and health care. The Women's Clinic also sponsors assault crisis intervention for sexual and physical abuse. Certain supportive services may be restricted when the University is not in full session.

Students who enter the University for the first time must furnish a detailed health history form for medical records purposes as well as documentary proof of adequate immunization against Measles and Rubella prior to registering for classes. Students living in University housing must present evidence of meningitis vaccination. Additionally, students must provide evidence of TB testing and appropriate medical intervention. All medical records are held in strict confidence and can be released only with a signed consent form.

Services are available to all properly registered Storrs students. Most primary care services are prepaid by the general University fee. There are additional charges for services including lab tests, x-rays, physical therapy, certain special procedures, annual gynecological exams, and prescriptions. These charges may be placed on the student's university fee bill. Such bills may be submitted to insurance companies for reimbursement, but remain the financial responsibility of the student. The Health Service is a participating provider with several major insurance plans. All full-time students must provide for their own accident and illness insurance to cover medical care not provided through the Department of Health Services. Students may opt to be covered for accidents and illnesses through a personal insurance policy, a parental insurance policy, or a group policy sponsored by the University. Supplemental Student Health Insurance for accident and sickness is available from a private student medical insurance program.

Students who fail to provide proof of health insurance by filing an insurance waiver card may be charged and automatically enrolled in the university sponsored plan. Insurance information and enrollment for the student insurance program is available at the Department of Health Services. Further information is available at <www.shs.uconn.edu>.

Office of Special Programs

Graduate students may use the services of the Office of Special Programs if they need professional assistance in resolving questions that concern them – their productivity, changing interests, study skills, wellness, and issues related to adjustment and transition. These services supplement counseling provided by Health Services and by faculty advisors. The Office is located in the Wilbur Cross Building, Garden Level, Room 029. The telephone number is (860) 486-4130. Hours are Monday through Friday, 8:00 AM to 5:00 PM. Visit our website at <<http://www.specialprograms.uconn.edu>>.

Center for Students with Disabilities

A complete Statement of the University's *Policies and Procedures Regarding Students with Disabilities* can be accessed at this website: <www.csd.uconn.edu>.

Through the integration of teaching, research and service, it is the mission of the University of Connecticut to provide an outstanding educational experience for each student. The mission of the Center for Students with Disabilities (CSD) is to enhance this experience for students with disabilities. Our goal is to ensure a comprehensively accessible university experience where individuals with disabilities have the same access to programs, opportunities, and activities as all others. The Center is also committed to promoting access and awareness as a resource to all members of the community. While complying with the letter of the law, the CSD also embraces its spirit by providing services to all students with permanent or temporary disabilities to ensure that all University programs and activities are accessible.

Services offered include:

- Pre-admission counseling and new student orientation
- Peer education
- Academic advising and registration assistance
- Individualized academic accommodations
- Assistive technology training
- Residential accommodations
- Personal assistant training and referral
- Referral for accessible van and information regarding parking
- Collaboration with Architectural and Engineering Services and Facilities Operations regarding campus accessibility
- Referral and liaison services to other agencies

- Information and referral source to all University and community programs and services
- Technical assistance and training to all university entities

For more information, contact Donna M. Korbel, Director, CSD, Wilbur Cross Building, Room 201, Unit 4174, Storrs, Connecticut 06269-4174; Voice (860) 486-2020, TDD (860) 486-2077, FAX (860) 486-4412.

Program for Students with Specific Learning Disabilities

Through the University of Connecticut's Program for College Students with Learning Disabilities (UPLD), students with specific learning disabilities may receive support services including direct instruction in learning strategies and assistance in arranging appropriate accommodations. To access services, students must refer themselves to UPLD and provide documentation that meets the University's *Guidelines for Documentation of a Specific Learning Disability* which are available at <<http://www.upld.uconn.edu>> or are available in the University's *Policies and Procedures Regarding Students with Disabilities* at <<http://www.csd.uconn.edu>>. For information about services, students may contact Dr. David R. Parker, Director, University Program for College Students with Learning Disabilities, University of Connecticut, Center on Postsecondary Education and Disability, 249 Glenbrook Road, Unit 2064, Storrs, CT 06269-2064; voice: (860) 486-0178; website <<http://www.upld.uconn.edu>>. Documentation should be current and comprehensive, and clearly indicate a specific learning disability based upon actual test scores and other pertinent data.

Career Services

The needs of graduate students as soon-to-be professionals are unique. The Department of Career Services provides a variety of resources to help graduate students (masters and doctoral) achieve professional career goals. Listed below is an overview of the resources provided for graduate students.

Career Consultation - Professional career consultants are available to assist students with clarification of career goals, development of a resume or curriculum vitae (CV), and preparation for the job search process. Consultation and advising on career issues is available on a walk-in basis Monday through Friday during designated hours. Please see www.career.uconn.edu or call for specific walk-in consultation times.

Career Resource Library (CRL) - The CRL houses many publications of interest to graduate students, including occupational information, job search directories, books on resume and CV development, international resources, and employer information.

Mock Interviewing - These practice sessions offer opportunities to engage in videotaped practice interviews which are constructively critiqued to help graduate students enhance

performance and develop increased confidence for up-coming interviews.

Graduate Student Seminars - Career professionals are available to speak to academic departments, classes or student groups regarding job searches, and career development issues. Individual designed workshops may be arranged by contacting the Department. A series of special topic Lunch and Learn Seminars are offered each semester for graduate students in order to address their unique career development needs. See the Department website for specific dates and times.

Career Services is located in the Center for Undergraduate Education at 368 Fairfield Road (across from Babbidge Library). Please visit <www.career.uconn.edu> or call 486.3013 for additional information.

Graduate Student Senate

The Graduate Student Senate (GSS) was founded in 1966 for the purpose of enriching the lives of graduate students and acting on behalf of their needs and interests. Composed of students who represent all graduate fields of study, the Senate serves as the liaison between graduate students and the university administration and non-university organizations.

The Senate is recognized as one of the five deliberative bodies on campus (the others are the University's Board of Trustees, the University Senate, the Graduate Faculty Council, and the Undergraduate Student Government). The Senate has voting representatives on some of these bodies as well as other university standing committees.

The Senate engages in student advocacy, service, academic, and social activities. Areas of student advocacy in recent years have included:

- a waiver of the general University fee for graduate students not taking courses who are pursuing research, etc. at locations distant from the university;
- cost-of-living adjustment for graduate assistant stipends;
- an earlier issuance of initial graduate assistant pay checks;
- increased graduate student residential options;
- fostering and supporting cooperation between the town and the University, including membership and active participation in the Mansfield Downtown Partnership; and
- the adoption of new guidelines concerning duration and level of support for graduate assistants.

Examples of recent service involvements include:

- the Senate short-term emergency loans for graduate students;
- annual publication of the *Graduate Student Handbook* and *Newsletter*;
- grants to departments and groups planning programs which contribute to the academic and professional development of graduate students;

- the dissemination of information to graduate students concerning university initiatives and policy changes;
- the Graduate Resource Fair, an annual orientation and resources fair for new graduate students; and
- representation on University-wide committees such as the Vice Chancellor's Leadership Committee, University Senate, the Graduate Faculty Council, and the Chancellor's Library Advisory Committee.

Recent academic and social activities have included:

- co-sponsorship of the 2004 Northeast Ecology and Evolution Conference;
- lunches with key university administrators;
- sponsorship and co-sponsorship of departmental lecture series; and
- social events such as weekly coffee nights, theme dinners, trivia tournaments and seasonal gatherings.

Programs and activities such as those listed above are funded largely by the graduate student Activity Fee with additional program support provided by the Graduate School. The Senate encourages all graduate students to participate in campus as well as university and student governance activities. Additional information concerning Senate programs and meetings is available from the Senate office, room 213 in the Student Union [phone (860) 486-3907, e-mail <gss@huskymail.uconn.edu>, Web <http://www.gss.uconn.edu>].

Transportation

Parking of Student Cars. Parking on campus is in high demand and it is suggested that students who can avoid bringing a vehicle to campus should do so. The number of parking spaces available makes it impossible to give all students permission to register motor vehicles at the University. It is therefore necessary to establish guidelines for the allotment of motor vehicle permits. Those guidelines are as follows:

- Commuter students may purchase parking, regardless of semester standing.
- Resident students living on campus must have successfully completed 54 or more credits to be eligible for parking.

Qualified individuals are required to register their vehicles with Parking Services, pay a registration fee, and to display their valid permit. Photo identification or a valid UConn I.D. must be presented when purchasing a permit.

In order to purchase a parking permit, the applicant and the vehicle to be registered must meet all legal requirements for operation within the State of Connecticut. The vehicle must be owned (or operated) by the applicant or a member of his/her immediate family and must carry insurance or other form of security as established under Connecticut Motor Vehicle Laws (Title 14). Students may not register vehicles belonging to other students. Applicants must provide proof of vehicle registration when registering and all outstanding University fee bill charges must

be paid prior to obtaining a parking permit.

Further information about parking on the Storrs campus can be obtained by calling Parking Services at (860) 486-4930, by visiting the website at <<http://www.park.uconn.edu>>, or by stopping by the Parking Services Office at 3 North Hillside Road on the Storrs Campus.

Bus Service. The University offers an extensive, no-fare shuttle bus service on the Storrs campus when classes are in session. A copy of the shuttle bus routes and hours of operation can be obtained from the Transportation Office by calling (860) 486-1448, by visiting the website at <<http://www.park.uconn.edu>>. Copies are also available from the Student Union, the UConn Co-op, or from the Transportation Office at 3 North Hillside Road on the Storrs Campus.

The Windham Regional Transit District (WRTD) provides bus service which operates between Storrs and Willimantic (a nearby city). Information regarding the route, fares, and hours of operation can be obtained by calling WRTD at (860) 486-2223. Connections to out-of-town buses can be made in Willimantic or through the UConn Co-op.



OFFICE OF INTERNATIONAL AFFAIRS

The Office of International Affairs (OIA) and the Area Studies Programs are located in the Human Development Center/International Affairs Building (843 Bolton Road). Other units of the OIA include the Department of International Services and Programs, located in the Student Union, which is responsible for advisory and program services for international students and faculty, and the UConn American English Language Institute (UCAELI), which offers a full-service English language program and is located in the Human Development Center/International Affairs Building.

The activities of the Office of International Affairs also include technical assistance and training projects (especially in developing countries), international exchange of faculty, coordination of research, and assistance with grant proposals.

The Center for European Studies encourages interdisciplinary study and research on Europe. The Center for Latin American and Caribbean Studies coordinates both undergraduate and graduate study of Latin America. The Center for Contemporary African Studies coordinates the development of programs and exchanges with African institutions and scholars.

International Center -- Department of International Services and Programs

The International Center (Department of International Services and Programs) is located in the Student Union, Suite 307, Unit 3083, 2110 Hillside Road, (860) 486-3855.

The International Center seeks to establish friendship and understanding among people of diverse cultures and backgrounds, while also

providing an array of services to the international community.

The Center's facilities, which include a television lounge and game room, provide a focal point for a wide variety of intercultural programming. The Center is open every day for use by individuals and student groups.

International Advisory Services -- In addition to program activities, the International Center is responsible for the daily advisory services and program interests of international students, faculty, and staff. Full-time advisory staff are available to consult for the following:

- U.S. immigration concerns
- Personal, cultural, and academic adjustment
- Orientation and cross-cultural programming
- Special events for the campus community.

The Center provides an ideal meeting place for U.S. and international students. All are encouraged to visit. Weekly Coffee Hours are held.

UConn American English Language Institute (UCAELI)

UCAELI offers a full service intensive English program for students of English as a second language. Courses are designed to prepare students for academic work and professional pursuits. Fifteen-week sessions are offered each fall and spring and two four-week sessions are offered in the summer. A TOEFL preparation course is offered each session, as is the Institution TOEFL exam. An English Proficiency Certificate, accepted by the Admissions Office in lieu of the TOEFL score of 550, can be issued to qualified students. The majority of students in the program study full-time (22 hours per week); however, individual courses are also open to UCONN degree-seeking students. With permission, advanced students may elect to take UCONN credit-bearing courses in combination with their UCAELI courses. Tutoring and customized courses can be arranged. During the fall and spring, students may enter or depart at the middle of the session.

International Proposal Development/Fulbright Program Advisement

The Coordinator of International Proposal Development seeks sources for funding for proposals to enhance area studies programs and internationalize the curriculum, and assists faculty, staff, and students in developing internationally-oriented grant and contract proposals.

The Fulbright Program Advisor publicizes and recruits applicants for Fulbright Scholarships and Fellowships and Fulbright-Hays Training Grants. Applicants are assisted in preparing competitive applications. The Fulbright Program Advisor chairs the University's Fulbright Scholarship Committee, a standing committee of the University.

REGISTRATION

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

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

Advance registration and fee payments are accepted on the assumption that students will remain eligible to continue, having met the scholastic standards of the Graduate School and by having complied with its regulations.

The following instructions apply to students registering for most courses conducted on the Storrs campus. Information on registering for courses offered through the College of Continuing Studies, courses offered by the School of Social Work, or courses offered by the Master of Business Administration programs conducted at centers other than Storrs will be found in brochures published by those programs. All degree-seeking students must register for courses using one of the available methods of registration, and pay all fees at the Office of the University Bursar. All course charges (applicable tuition and fees) are due and payable by the close of business on the tenth day of the semester. Late fees and the reinstatement fee are assessed after that time. Part-time students who are not degree-seeking students must register through the Office of Credit Programs in the College of Continuing Studies.

Both new and continuing students should make appointments with their major advisors to determine the courses in which they plan to enroll. Instructions for registration are sent to all students by mail. Entering students receive it with their admission information, while continuing students receive it about a month prior to the registration period. The material is mailed to the student's last known address on file in the Graduate School. If a student fails to receive this material, replacement copies may be obtained

either from the Graduate School website (www.grad.uconn.edu/registration.html) or through the Graduate Records Office, Unit 1006, Storrs, Connecticut 06269-1006. Early registration will avoid confusion and increase the likelihood of obtaining the desired course(s). Ordinarily, there are two advance registration periods for the fall semester, one beginning in early April and the other beginning in mid-August. Similar periods for spring occur in late October and early January. The exact dates are contained in the registration mailing. Depending upon course selections, most students should be able to register entirely over the World Wide Web. Problems encountered during registration (including enrollment in restricted courses) may be brought to the Graduate School in the Whetten Graduate Center. In all cases, registration is not complete until all tuition and fees are paid at the Office of the University Bursar or a limited deferment of payment is obtained from the Deferment Office. In any event, both final registration for courses and final payment of fees (or issuance of a deferment) must be completed on or before the tenth business day of the semester. Failure to complete timely registration and payment of fees will subject the student in addition to the imposition of the Late Registration/Payment Fee and the Reinstatement Fee, as appropriate.

Continuous Registration

Master's, doctoral, sixth year in education, and graduate certificate students must begin their programs with course work and must maintain registration continuously each semester thereafter (except summer sessions) until all requirements for the degree have been completed. Registration may be maintained either by taking course work for credit or by registering for one of the four non-credit Continuing Registration courses. These include Special Readings at the master's (GRAD 398) or doctoral (GRAD 498) level, Master's Thesis Preparation (GRAD 399), and Doctoral Dissertation Preparation (GRAD 499). Other zero-credit courses may be substituted, if appropriate. Non-credit registration requires payment of the Graduate Matriculation Fee as well as the appropriate level of the General University Fee (see "General University Fee," "Graduate Matriculation Fee," and "Continuous Registration" under "Fees and Expenses"). Failure to maintain continuous registration during any semester results in the student's inactivation. Reinstatement is possible only after payment of all fees in arrears and the reinstatement fee. (See "Reinstatement Fee.") The consequences associated with matriculation via Continuing Registration rather than credit courses are addressed in the "Course Loads" section.

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

Any currently matriculated student taking course work at another institution, either for transfer to a University of Connecticut graduate degree program or for any other reason, must

register for Continuing Registration as specified above in any affected semester.

Enrollment in Continuing Registration is not required during the summer except as follows. A degree student, if not otherwise registered for the summer, must register for Continuing Registration and pay the Graduate Matriculation Fee if the student is fulfilling in part the doctoral residence requirement during the summer. To receive most forms of summer financial aid for study or research, a student must register for either 5 credits of coursework in each of two summer sessions or one of the full-time research courses, GRAD 396 (Full-time Master's Research) or GRAD 496 (Full-time Doctoral Research). Registration during the summer is done through the College of Continuing Studies.

Registration Deadlines

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

Course Loads

The number of credits and choice of courses for which a student registers is a matter to be discussed by the student and the major advisor. A student may be classified as a full-time student in one of three ways: (1) enroll in 9 or more credits of course work; (2) enroll in 6 or more credits of course work while holding a graduate assistantship (50% or greater); or (3) enroll in one of the four special purpose 3-credit courses. These courses include GRAD 396 (Full-time Master's Research), GRAD 496 (Full-time Doctoral Research), GRAD 397 (Master's Level Directed Studies), and GRAD 497 (Doctoral Level Directed Studies). The former two courses may be taken by students who have completed all requirements for the respective degree except the research component and who have no other obligations at the University (i.e., no other course work and no graduate assistantship). The latter two courses denote a full-time off-campus directed project, such as an internship, field work, or other special activity. Students in GRAD 397 or GRAD 497 may hold graduate assistantships if those assistantships are in direct support of their studies. Such an assistantship may not be a standard teaching assistantship.

To be classified as half-time, the student's course credit load must be between 5 and 8 credits/semester. A credit load of fewer than 5 credits/semester is a part-time load. These criteria apply to all registered students at the University. The currently defined Continuing Registration courses (GRAD 398, 399, 498, and 499) are zero-credit "placeholder" courses denoting part-time study and do not count toward the credit load requirement for half-time or full-time enrollment status. Degree-seeking students

who do not need to be certified by the University as holding at least half-time enrollment status may use these courses to maintain registration on a part-time basis.

Students holding graduate assistantships must register for 6 or more credits/semester. Such students are considered to be full-time students.

In addition to courses offered by each department, a student's credit load may include GRAD 395 (Thesis Research), GRAD 495 (Dissertation Research), and other equivalent research courses defined by the Graduate School, including seminar and other "colloquium" courses that are not part of the plan of study. These variable credit courses carry S/U grading, with the student's major advisor as the instructor of record.

No full-time member of the professional staff or faculty may take for credit academic work at this institution or elsewhere which conflicts with the staff or faculty member's assigned working hours. To take courses at all, staff and faculty members must have the approval of their department head and dean. (See "Admission," for regulations affecting staff or faculty members holding tenure or rank above instructor.)

Auditing Courses

Students who do not wish to register for credit may be permitted to register as auditors under the following conditions: (1) they pay the appropriate tuition and fees for courses; (2) they obtain the consent of the instructor; (3) they audit only courses for which there are adequate classroom or laboratory facilities; and (4) in the case of students in degree programs, they obtain consent from their major advisors. All permissions and registrations for auditing courses must be filed in the Office of the University Registrar. Courses audited are entered on the student's permanent record, but such courses cannot be used toward fulfilling requirements for a graduate degree at the University.

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

Students should not "sit-in" on classes for which they do not register as auditors.

Adding a Course

After the beginning of a semester or summer session, a student may not add a course if the instructor feels that elapsed time might preclude its successful completion. For degree-seeking students, courses added after the tenth day of a semester or after the fifth day of a summer-session term must be submitted to the Graduate Records Office. Changing a course from an audit to credit-based after this time must be done at the Graduate Records Office. Certain exceptions to this policy exist. Students in the Sixth-Year Program must obtain permission from the Associate Dean of the School of Education. Students in part-time M.B.A.

programs conducted at locations other than Storrs must obtain permission from the director of the program at their location. Students in Social Work must follow the procedures in effect at the School of Social Work.

Dropping a Course

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

During the first nine weeks of a semester or prior to the midpoint of a summer-session course, a course may be dropped by the following procedure. Students registered directly by the Graduate School at Storrs (or during the summer sessions, through the College of Continuing Studies) must file properly completed and signed schedule revision request card with the Graduate School. Non-degree students registered during either semester through the College of Continuing Studies must notify that office in writing. Students in part-time M.B.A. programs conducted at locations other than Storrs must notify the director of the program in writing. Students in Social Work must follow procedures in force at the School of Social Work.

After the first nine weeks of a semester or the midpoint of a summer-session course, students ordinarily are not allowed to drop a course or to change from participant to auditor. If, however, a student must drop a course because of illness or other compelling reason beyond the student's control, the student must request special permission as early as possible and well before the last day of classes. Permission to drop a course or to change from participant to auditor is granted only for good cause. All students – except those in the Sixth-Year Program, part-time M.B.A. programs conducted at locations other than Storrs, or the Social Work program – whether enrolled in daytime or evening classes, at Storrs or elsewhere, must obtain permission from the Graduate School. Permission is granted only on the major advisor's written recommendation, which must be convincing and sufficiently specific regarding reasons beyond the control of the student. The recommendation should be accompanied by properly completed and signed schedule revision request card for the course(s) to be dropped. Students in the Sixth-Year Program must obtain permission from the Associate Dean of the School of Education. Students in part-time M.B.A. programs conducted at locations other than Storrs must obtain

permission from the director of the program. Students in Social Work must follow procedures in force at the School of Social Work. Under no circumstances is a student at any location or in any program permitted to drop a course after the course has officially ended.

Dropping all Courses; Withdrawal from the Program

The general policies and procedures regarding dropping a course (above) apply to dropping all courses, whether the student wishes to remain active in the graduate degree program or to withdraw permanently from it. Permission from the Graduate School is needed for the student either to remain active in the program or to leave in good standing. If a student wishes to remain active and registered after dropping all courses, an appropriate zero-credit Continuing Registration course must be added to his or her enrollment record. The determination of active status is subject to the provisions contained in the "Continuous Registration" section.

If a refund is due to a student (See "Refunds and Cancellations of Charges"), the schedule-revision-request card must be signed by the appropriate Graduate School officer, regardless of the week of the semester. This signature is required so that the refund process may be initiated. No refund is possible unless all course work for credit is dropped.

STANDARDS AND DEGREE REQUIREMENTS

These represent general academic standards and requirements of the Graduate School as they apply to graduate students in degree programs. Some programs have special regulations more detailed or stringent. Students should acquaint themselves with their own program's requirements as set forth in this Catalog and subsequent ones, as appropriate. Undergraduate and non-degree students taking a graduate course should consult the appropriate bulletin for regulations which apply to them.

Course Grades

Instructors are required to file with the University Registrar grades for all courses that a student takes for credit. While instructors are free to set the standard of performance they expect in their courses, a uniform scale is published to encourage general agreement on the meaning of grades.

The letter *A* signifies work of distinction. The letter *B* represents work of good quality, such as is expected of any successful graduate student. The letter *C* represents work below the standard expected of graduate students in their area of study. It is recognized that work of *C* quality in a supporting area may be of benefit to students and that they should not be discouraged by the grading system from including some supporting work in their programs. Such work shall be identified on the plan of study. Plus and minus values may be assigned to all but failing grades, are entered on the permanent record, and are computed into the student's grade point average.

A grade of *D+*, *D*, or *D-* signifies work of unsatisfactory quality. If a graduate student receives any form of a *D* grade, the course may not remain on the plan of study and the student's eligibility to continue in the degree program is reviewed by the student's advisory committee.

The grade of *F* or *U* signifies failure in the course and necessitates a recommendation by the advisory committee to the Graduate School as to whether or not the student shall be permitted to continue graduate study.

Final grades of *S* (Satisfactory) or *U* (Unsatisfactory) are associated only with certain courses designated as such by the Executive Committee of the Graduate Faculty Council. Certain foreign language courses designed under method (2) for fulfillment of a doctoral language requirement also may carry the *S/U* grading option, if chosen by the student. (See "Foreign Language; Related or Supporting Area of Study.") All but the foreign language courses are identified

in this bulletin by the symbol † preceding the course number. This type of grading is designed for courses or sections of courses in which student performance cannot readily be evaluated due to the nature of the course as conducted at the time. An exception might occur for a student needing a letter grade for transfer to another institution. An *S* is not computed into the student's grade point average, while a *U* is counted as an *F* (except that no computation is made for 100's level courses).

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

A mark of *I* (Incomplete) is assigned if a student has been doing work of acceptable quality but, for some reason satisfactory to the instructor, has not completed all of the work required to earn credit for a course by the end of the semester or session.

The letter *W* signifies withdrawal from a course after either the tenth day of a semester course or the first week of a summer-session course. Except in extraordinary cases where academic factors or extreme or unusual circumstances warrant it, this mark is not deleted from the permanent academic record.

If a student whose work in a course throughout the semester has been of satisfactory quality fails to take a required final examination in the course because of illness or other serious cause, the instructor is permitted to give a mark of *X* (Absent) and may, with the permission of the Graduate School, reschedule the examination. If the student's work up to the time of the examination was not clearly of passing quality, the instructor is to enter a mark of *F* or *U* if a required final examination is missed.

The letters *L*, *N*, and *Y* are administrative symbols signifying that a letter grade had not been reported by the instructor when grades were processed. The letter *L* signifies lateness in reporting grades for an entire section of a course. The letter *N* signifies that no grade was reported for an individual student duly registered for a course. The letter *Y* signifies that no grades were due to be reported for an entire section of a course (because of the scheduling of the course) when grades were processed.

Beginning with the Fall 2004 semester, the symbol *I* or *X* is replaced by the final course grade on the permanent academic record when the student completes all required work for the course and the instructor reports the final grade to the Registrar. Prior to the Fall 2004 semester, the symbols *I* and *X* appear together with final course grades on students' permanent academic records.

The letter *T* indicates that course credit has been accepted in transfer from another institution.

The letter *R* is an administrative symbol signifying that a student is registered. Any zero-credit course (e.g., GRAD 398, 399, 498, or 499) for which a student registers appears on the permanent academic record with the letter *R* as the grade.

Scholastic Standards

Students are expected to maintain in their course program at least a *B* (3.00) average, for

which a grade point average will be computed on a scale where:

<i>A</i> + = 4.3	<i>B</i> - = 2.7	<i>D</i> + = 1.3
<i>A</i> = 4.0	<i>C</i> + = 2.3	<i>D</i> = 1.0
<i>A</i> - = 3.7	<i>C</i> = 2.0	<i>D</i> - = 0.7
<i>B</i> + = 3.3	<i>C</i> - = 1.7	<i>F</i> = 0
<i>B</i> = 3.0		

Maintenance of good academic standing in the Graduate School requires at all times a cumulative grade point average of 3.00 or higher in all completed 200's, 300's, and 400's level courses. An official transcript of an individual's graduate academic career, however, includes grade point average calculations based on all course work completed during the student's graduate career (including any 100's level courses). Credits completed elsewhere and accepted in transfer by the Graduate School do not affect the student's University of Connecticut grade point average in any way.

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

If all work required to change a mark of *I* or *X* is not submitted to the University Registrar within twelve months following the end of the semester or session for which the mark was recorded, or within a shorter period of time specifically designated by the instructor, no credit is allowed for the course, and the indicated *I* or *X* becomes a part of the permanent record. The instructor has the option of changing such a mark to a grade of *F* or *U* within thirteen months following the end of the original semester or session. For grades of *I*, it is the student's responsibility to reach and to maintain an understanding with the instructor concerning the timely completion of the work. For grades of *X*, it is the student's responsibility to seek the required permission to take the final examination from the Graduate School as soon as possible after it has been missed.

Upon the recommendation of the instructor to the Graduate School, a limited extension of an Incomplete may be granted. The Graduate School is not obligated to approve an extension if the instructor of the course no longer is a faculty member at the University of Connecticut.

If more than three courses have been left incomplete, the student may be required to complete those still viable before being allowed to register for additional course work. Too many permanent Incompletes on the record may be grounds for the student's termination or dismissal. An employment authorization for a graduate assistantship appointment may not be approved for a student who has four or more viable incomplete courses on his or her academic record.

For further information the reader is referred to the document, "Key to the Transcript," available from the Office of the University Registrar.

Termination of Status

To remain in good standing, a student at all times must have a major advisor as well as a viable terminal date (the date by which all degree requirements

must be completed). A viable terminal date may be the result of an extension of a student's expired original terminal date. Once the plan of study has been approved by the Executive Committee of the Graduate Faculty Council, a student at all times must have a duly constituted advisory committee with at least two associate advisors in addition to the major advisor.

In the event that a student's major advisor determines that resignation from the advisory committee is necessary, the student is provided with a reasonable opportunity to arrange for a new major advisor. If a new major advisor is not identified within six weeks of the resignation of the former major advisor, the student's graduate degree program status is terminated.

A graduate student and his or her major advisor should always be cognizant of the student's terminal date or terminal date extension, the date by which the Graduate School expects that all degree requirements will have been completed. The student and the major advisor are notified of the student's terminal date when the Graduate School sends approved copies of the student's plan of study. Any written recommendation to extend the terminal date must be submitted in a timely manner by the major advisor to the Graduate School. In the event that the major advisor determines that he or she cannot support a recommendation to extend an expiring terminal date or terminal date extension further, the Graduate School must be notified by the major advisor in writing at the earliest possible opportunity. Limited extensions of the terminal date are granted by the Graduate School only on the basis of substantial evidence that the student is making consistent and satisfactory progress toward the completion of degree requirements. In the absence of a timely recommendation to extend an expired terminal date, or in the event that a recommended extension has been denied by the Graduate School, the student's graduate degree program status is terminated.

Whenever a student's graduate degree program status is terminated, a letter is sent to the student by the Associate Dean. If the student wishes to request a hearing, the provisions outlined under "Hearing and Appeal Procedures" apply.

Academic Dismissal

A graduate student's progress in a degree program is monitored regularly by the student's advisory committee. If at any time, a student's academic performance, progress in a graduate degree program, or professional development and/or suitability is judged by his or her advisory committee to be unsatisfactory, and if the advisory committee determines that dismissal on any of these grounds is warranted, the advisory committee must submit its written recommendation that the student be dismissed on such grounds to the Dean of the Graduate School. A student may be subject to academic dismissal if he or she: (1) fails to maintain the minimum cumulative grade point average required by the Graduate School (3.00); (2) receives a grade of *D+*, *D*, *D-*, *F*, or *U* in any

course; (3) fails to satisfy a foreign language requirement for a degree; (4) fails the D.M.A. or Ph.D. general examination; (5) fails to produce an acceptable D.M.A. document or Ph.D. dissertation proposal; (6) performs unsatisfactorily in any aspect of the research or writing for a master's thesis or doctoral dissertation; (7) fails the final examination for the master's or doctoral degree; or (8) fails to satisfy any other academic requirement of the student's graduate degree program. The specific judgment on which the advisory committee's recommendation is based must be stated. The recommendation must bear the signature of each member of the advisory committee. For a student whose advisory committee has not yet been established, the major advisor alone submits the recommendation. If the student is to be dismissed on any of the above grounds, a letter of dismissal is issued by the Associate Dean. If the student wishes to request a hearing, the provisions outlined below under "Hearing and Appeal Procedures" apply.

Hearing and Appeal Procedures

If a student's graduate degree program status is to be terminated or if a student is to be dismissed on academic grounds, the Associate Dean issues a letter to the student stating this intent. If a student wishes to request a hearing before the Associate Dean, the student must submit a written request within 30 days of receipt of the letter. Following the hearing, the student may appeal the decision of the Associate Dean to the Dean. This appeal does not constitute a new hearing. Rather, it is a review of the record of the original hearing and is entertained only on one or both of two grounds: (1) the claim of an error in the hearing procedure, and (2) the claim of new evidence or information that was not available at the time of the hearing. If the student's termination or dismissal is upheld by the Dean, the student may appeal further to the Provost on only the same grounds as the appeal to the Dean. In any event, the decision of the Provost is final.

GRADUATE CERTIFICATE PROGRAMS

Graduate certificate programs may be offered within the structure of the Graduate School. Students may be awarded these certificates upon completion of a well-defined program of course work. The graduate certificate is not defined as a degree by the Graduate School; rather, it is simply a focused collection of courses that, when completed, affords the student some record of coherent academic accomplishment in a given discipline or set of related disciplines. Moreover, the graduate certificate is not viewed as a guaranteed means of entry into a graduate degree program. While the courses comprising a graduate certificate may be used as evidence in support of a

student's application for admission to a graduate degree program, the certificate itself is not considered to be a prerequisite. The didactic material contained within a graduate certificate program may represent a more practice-oriented subset of an existing graduate discipline. Detailed information concerning admissions criteria and procedures can be obtained from graduate certificate program coordinators.

An appropriate number of academic credits must comprise the certificate program. The number of graduate (300- or 400-level) credits may not be fewer than nine nor more than one-half of the credits necessary for a related Master's degree from the Graduate School. Ordinarily, the credit requirement ranges from 12 to 15 graduate semester credits. When there exists no related Master's program, the number of credits required for a graduate certificate is limited to 12.

A certificate student may enroll on either a part-time or a full-time basis, as determined by the certificate program coordinator and the number of credits taken by the student. Students enrolled on a full-time basis have access to many of the same campus services as other full-time graduate students. They may live in on-campus graduate student housing and they may be granted student library access and campus parking privileges, among others. They also may be considered for merit-based financial aid by the department or program, as well as for need-based financial aid by the Student Financial Aid Office, but at a reduced priority compared to degree-seeking students.

Currently, these Graduate Certificate programs are offered:

- Geographic Information Systems
- Global Governance Studies
- International Studies
- Music Performance
- Nonprofit Management
- Nursing – Acute Care
- Nursing – Primary Care
- Public Financial Management
- Quantitative Research Methods
- Women's Studies.

MASTER'S DEGREE PROGRAMS

Master's degree programs are offered in approximately 70 fields of study in the Graduate School. The Master of Arts degree usually is awarded to properly qualified candidates in the humanities, the social sciences, education, and all non-scientific fields except art, business administration, public affairs, and social work. The Master of Science degree is awarded to candidates in the natural, physical, mathematical, pharmaceutical, nutritional, and agricultural sciences, as well as Accounting, Nursing; and Engineering. Other Master's degrees awarded are the Master of Business Administration, the Master

of Dental Science, the Master of Engineering, the Master of Fine Arts, the Master of Music, the Master of Professional Studies, the Master of Public Administration, the Master of Public Health, and the Master of Social Work. A master's degree program represents the equivalent of at least one year of full-time study beyond the baccalaureate (or its equivalent).

Since the Master's degree is the only intermediate degree offered by this University, it should be emphasized that the education it provides may prepare students for a variety of goals. The advisory committee should take into consideration the student's objectives and insist on the student's giving sufficient time to the program so that they may be fulfilled. Those students who are committed to doctoral study generally need less time to complete a Master's degree than those for whom the master's program provides the only opportunity to prepare for various professions. Recognizing the difference between a research degree and a terminal Master's degree, the committee should determine the student's goals and potential as early as possible, so as to help the student develop an appropriate predoctoral or terminal plan of study.

In most fields of study, work for the Master's degree is offered mostly, if not exclusively, on the main campus at Storrs. There are some exceptions. The Master of Business Administration is offered on a part-time basis at the West Hartford and Stamford campuses and on a full-time basis at the Storrs campus. The Master of Dental Science program and the Master of Public Health program are offered primarily at the Health Center in Farmington. The Master of Social Work program is offered at the West Hartford campus. Certain courses in education, engineering, geological sciences, and oceanography are offered at locations other than Storrs. With the exception of the programs listed above, at least nine credits at the graduate level must be earned on the Storrs campus.

Time Limits

The student is expected to register for course work with reasonable regularity and to complete all requirements for the degree within a moderate span of time to assure continuity and adequate familiarity with developments in the field of study. (See "Continuous Registration.") Ordinarily, the Master's degree should be completed within two years or so. In any event, all work for the Master's degree must be completed within a maximum period of six years from the beginning of the earliest course, wherever taken, listed on the approved plan of study. Failure to complete the work within this period or failure to maintain continuous registration (see "Continuous Registration") will require re-evaluation of the student's entire program and may result in termination.

An extension of a student's terminal date is considered only when there is substantial evidence that the student has attempted to make regular and consistent progress toward completion of degree

requirements. A written recommendation to extend the terminal date must bear the signature of the student's major advisor, and it must be submitted in a timely manner to the Graduate School. Approval is granted by the Dean. Each subsequent request to extend a student's terminal date requires greater justification and more extraordinary circumstances. Third requests for extension are rarely, if ever, granted.

Plan A and Plan B Master's Degrees

Master's degrees may be earned under either of two plans, as determined by the advisory committee. The first plan (Plan A) emphasizes research, while the second (Plan B) requires comprehensive understanding of a more general character. Plan A requires not fewer than fifteen credits of advanced course work and for students entering Fall 1998 or later, not fewer than nine additional credits of Master's Thesis Research (GRAD 395 or GRAD 396), as well as the writing of a thesis. Plan B requires not fewer than twenty-four credits of advanced course work, a final examination, but no thesis. In either case, advisory committees may require more than the minimum number of credits.

Up to six credits of advanced course work taken on a non-degree basis at the University of Connecticut may be included on a Master's degree plan of study provided the following conditions are met: (1) the grades earned in such course work are *B* (not *B-*) or higher; (2) such course work is within the six-year limit for completion of Master's degree requirements; and (3) such credits have not been applied toward any other degree, here or elsewhere (already completed or to be completed in the future). In any event, inclusion of non-degree course work on the plan of study requires the consent of the advisory committee and is subject to the approval of the Executive Committee.

Up to six credits of advanced course work completed or to be completed at other institutions may be approved for transfer to the student's Master's degree program at the University of Connecticut. Such credits are to be listed "below the line" on the plan of study. The following conditions must be met before final approval of any transfer of credit is granted: (1) the advisory committee must indicate its approval of the transfer of credit by signing the plan of study; (2) the courses must be at a level appropriate for a graduate degree and offered by an accredited institution; and (3) the grades earned in any courses to be transferred must be *B* (not *B-*) or higher. Official transcripts of any course work to be transferred must be on file in the Graduate School. When the student's plan of study has gained the approval of the Executive Committee and official transcripts indicating satisfactory completion of the course work to be transferred are received, the transfer of credit is noted on the student's permanent academic record. Any credits transferred to a graduate degree program at the University of Connecticut must not have been used toward a degree elsewhere (already completed or to be completed in the future).

Students admitted to study for the degree of Doctor of Philosophy may earn a Master's degree, if one is offered specifically in their field, under either Plan A or Plan B. They also may apply for this degree if they have on file a fully approved doctoral plan of study including at least twenty-four completed credits of suitable course work taken at this University and have passed a master's final examination. They also may apply for this degree if they have completed at least 24 credits on an approved Ph.D. plan of study, have passed the doctoral general examination, and have been recommended by their major advisor or by the Dean of the Graduate School for award of the Master's degree.

More than one Master's degree may not be awarded at this institution to an individual student unless the degree titles are different or unless the degrees are earned in different fields of study. The same course may not be offered for credit toward more than one degree, except in the case of officially approved dual degree programs.

Candidacy and Plan of Study

To become a candidate for a Master's degree, the student must have on file with the Graduate School a plan of study prepared with the aid and approval of an advisory committee and approved by the Executive Committee of the Graduate Faculty Council. To be eligible for degree conferral, a Master's degree student must have been granted Regular status. The student may not take the final examination for the degree before the plan of study has been fully approved. The plan of study must be prepared in triplicate, signed by the student and the members of the advisory committee, and submitted to the Graduate School for approval by the Executive Committee when the student has completed not more than twelve credits of course work to be applied to the degree. Failure to present the plan on time may prolong the period of study for the degree. Before drawing up and approving the plan, the major advisor should have on file and should consult for guidance a set of transcripts of all undergraduate and graduate work the student has taken. The advisory committee may require that the student take an exploratory examination to guide the committee in formulating the plan of study.

Courses elected shall be consistent with the student's objectives and related to the field in which the degree will be taken. Plans of study shall consist largely of courses at the 300's level or above. A limited number of credits at the 200's level (not more than six), if not open to sophomores, may be accepted. In addition to the minimum number of course credits required for the degree, the advisory committee may require the student to take other courses with or without graduate credit, depending on the student's objectives and previous preparation. Course credit by examination is not allowed as a means of accumulating credits to meet the requirements for advanced degrees at this institution.

After approval of the plan by the Executive Committee, any request for change must be

submitted to the Graduate School on the official form bearing the signatures of the advisory committee and the student for approval by the Executive Committee. Successful completion of all work indicated on the approved plan of study is a fundamental prerequisite to the conferral of the degree.

Once the plan of study is approved, the student and the advisory committee should reevaluate it regularly and modify it, following the established procedure, if appropriate.

The Master's Thesis

The advisory committee must approve the topic and scope of the thesis required under Plan A and upon its completion, ascertain that it represents an independent investigation of a significant topic and is an important contribution to ongoing research in the candidate's field. The thesis must be acceptable in literary style and organization. The thesis is regarded as an important part of the student's program. Specifications for preparation of the thesis can be obtained at the Graduate School or from the Graduate School's website. It is the student's responsibility to be certain that the thesis conforms exactly to the specifications prescribed by the Graduate School.

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

The thesis must be dated as of the calendar year in which all requirements for the degree are completed. Two high quality copies of the thesis must be deposited in the Graduate School by the conferral period deadline in August, December, or May. Each copy must contain an approval page bearing original signatures of all members of the advisory committee. At least 25% cotton-content bond paper of at least 20-pound weight must be used for both copies. Only one side of the paper is to be used for printing. After binding, both copies become the property of the Homer Babbidge Library, and the identical second copy is made available for faculty and student use. If the thesis is lengthy, the Babbidge Library may require that it be bound as more than one volume. If a program requires one or more extra copies, it is the student's responsibility to supply them directly to the program.

Final Examination

Near the close of the candidate's period of study – not later than one year after the completion of course work or the thesis – the student must pass a final examination under the jurisdiction of the advisory committee. The student may not take the final examination before the plan of study has been approved by the Executive Committee or before Regular status has been granted. The advisory committee has discretion to determine whether the examination shall be written, oral, or both. Invitation to participate in an oral examination is issued by the advisory committee, although any and all members of the faculty may attend. The

examination must be completed by the published deadlines for the appropriate conferral period for the degree to have that conferral date.

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

Under Plan A the examination may center on the candidate's research and its relation to the field of study as a whole, but may have a wider scope. Under Plan B the examination shall be comprehensive and designed to assess the candidate's mastery of the field and ability to integrate the knowledge acquired. The Master's final examination often is used as a qualifying examination for doctoral study.



THE DOCTOR OF MUSICAL ARTS DEGREE

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

While certain minimum requirements are set by the Graduate School and the Music Department, it is important for students to realize that work toward this degree is not merely a matter of accumulating course credits or satisfying other requirements. The degree will be conferred only after the advisory committee and the Graduate Music Faculty are convinced that the student is able to demonstrate consummate artistry in a public forum, and has developed independence of judgment and mature scholarship.

Time Limits

The equivalent of at least two years of full-time study beyond the Master's degree is required. All work must be completed within seven years of the beginning of doctoral study. The beginning of doctoral study is defined as the beginning date of the earliest course, wherever taken, listed on the

approved doctoral plan of study. The general examination shall be passed within four years of the beginning of doctoral study. Failure to complete the work within the periods specified or failure to maintain continuous registration (See "Continuous Registration") will require re-evaluation of the entire program and may result in a notice of termination. A five-year time limit applies to the acceptance of foreign-language courses. (See "Foreign Language.")

An extension of a student's terminal date is considered only when there is substantial evidence that the student has attempted to make regular and consistent progress toward completion of degree requirements. A written recommendation to extend the terminal date must bear the signature of the student's major advisor, and it must be submitted in a timely manner to the Graduate School. Approval is granted by the Dean. Each subsequent request to extend a student's terminal date requires greater justification and more extraordinary circumstances. Third requests for extension are rarely, if ever, granted.

Residence Requirement

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

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

Plan of Study

The plan of study must be prepared; signed by the student, the members of the advisory committee, and the Director of Graduate Studies in Music; and then submitted to the Graduate School for approval by the Executive Committee of the Graduate Faculty Council. The student may not take the general examination before the plan of study has been fully approved. Failure to present the plan on time may prolong the period of study for the degree. Before formulating and signing the plan, the major advisor should have transcripts of all of the student's undergraduate and graduate work on file and should consult them for guidance. The advisory committee may require that the student

take an exploratory examination to guide the committee in formulating the plan of study.

A limited number of credits at the 200's level (not more than six), if not open to sophomores, may be accepted. The degree ordinarily requires at least 43 credits, depending on the area of concentration. The plan will designate any foreign language(s) in which the student is to be tested. Course credit by examination is not allowed as a means of accumulating credits to meet the requirements for advanced degrees at this institution. For students entering in Fall 1998 or later, at least fifteen credits of GRAD 495 must appear on the plan of study. This effort represents the research for the D.M.A. Dissertation, which is an essential component of the student's program.

Advanced course work taken on a non-degree basis at the University of Connecticut may be included on a D.M.A. plan of study provided the following conditions are met: (1) the grades earned in such course work are *B* (not *B-*) or higher, (2) such course work is within the seven year limit for completion of D.M.A. degree requirements, and (3) such credits have not been applied toward any other degree here or elsewhere (already completed or to be completed in the future). In any event, inclusion of non-degree course work on the plan of study requires the consent of the advisory committee and is subject to the approval of the Executive Committee.

After approval of the plan by the Executive Committee, any request for change must be submitted in advance to the Graduate School on an official form bearing the signatures of the members of the advisory committee and the student. Such changes are subject to approval by the Executive Committee. The successful completion of all work indicated on the approved plan of study is a fundamental prerequisite to conferral of the degree.

Once the plan of study is approved, the student and the advisory committee should reevaluate it regularly and modify it, following the established procedure, if appropriate.

Foreign Language

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

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

Transfer Credit

Transfer of credit for course work completed at other institutions is approved only after the student has demonstrated the ability to do acceptable

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

Evaluation of Performance

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

General Examination

The general examination shall be taken near the end of the course program but not later than eight months prior to the conferral of the degree. Before arrangements for the examination are made, the foreign language requirement(s) should have been met and the plan of study must have been approved by the Executive Committee of the Graduate Faculty Council. The examination is comprehensive in nature, and incorporates elements of music history and literature, music theory, performance practice, and practical application of these constituent components.

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

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

D.M.A. Dissertation Proposal

Before preparation of the D.M.A. Dissertation is well under way, the student must file a proposal describing the intended research with the Graduate

Studies Committee of the Music Department. Failure to file the proposal early may result in wasted effort on a document if changes are required in the project. The proposal must be approved by the Graduate Studies Committee in Music at least four months before the filing of the D.M.A. Dissertation and it must be approved by the Executive Committee of the Graduate Faculty Council at least three months before the filing of the D.M.A. Dissertation.

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

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

Students in every D.M.A. area of concentration except conducting must present three full-length recitals during the course of study for the degree. The first of these is considered a qualifying recital, which must be preceded by a pre-recital hearing. This hearing must be presented on a designated date at least three weeks before the scheduled recital, and is adjudicated by the full performance faculty. Hearing for subsequent degree recitals may be held at the discretion of the major advisor or applied instructor. These recitals and concerts represent the culmination of the performance aspect of this degree, and will be judged according to the highest levels of musical artistry. Majors in conducting must appear in concert as conductors with the appropriate departmental major ensemble. Either two one-half concert appearances or one whole concert appearance is required. In addition, conducting majors must present one full-length recital during the course of study for the degree.

A written dissertation representing research into some aspect of music performance, repertoire, or pedagogy is an important requirement of this degree. The D.M.A. Dissertation is under the immediate supervision of a member of the music theory or music history faculty, and secondarily under the supervision of the advisory committee. It must be acceptable in literary style and organization. Specifications for its preparation are available in the Music Department office. It is the student's responsibility to be certain that the dissertation conforms exactly to the specifications prescribed by the Music Department. The D.M.A. Dissertation receives no academic credit, although the fifteen credits of GRAD 495 (required of students entering in Fall, 1998 or after) are associated with its preparation. It is intended that this document will uphold the highest standards of scholarship, identical to those required of Ph.D. dissertations.

The advisory committee will set a date for completion of the D.M.A. Dissertation, allowing time for each advisor to make suggestions for revisions, and then will set a date for the final examination, allowing time for the student to make those revisions. In some cases, further revision of the

dissertation may be required by the advisory committee as a result of the final examination. Final approval of the dissertation following the examination is indicated by the original signatures of all members of the advisory committee on the dissertation's final approval page. This must be submitted to the Graduate School following the examination. Final approval pages must be received at the Graduate School by the conferral period deadline in August, December, or May. It is the student's responsibility to place a copy of the dissertation in the Music Library after acceptance by the committee. The technical specifications for the preparation of the D.M.A. Dissertation are identical to the specifications for the preparation of the Ph.D. dissertation (see "Candidacy and Dissertation Preparation").

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

Final Examination

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

THE DOCTOR OF PHILOSOPHY DEGREE

The Ph.D. is the highest degree offered by the University and is offered in more than 60 fields of study. The program leading to its attainment is intended to give persons of outstanding ability the opportunity to become creative contributors in a scholarly field. Award of the degree testifies to broad mastery of an established subject area, acquisition of acceptable research skills, and a concentration of knowledge in a specific field.

While certain minimum requirements are set by the Graduate School, it is important for students to realize that work toward this degree is not merely a matter of accumulating course credits or of

satisfying other requirements. The degree will be conferred only after the advisory committee and the Graduate Faculty are convinced that the student has developed independence of judgment and mature scholarship in the chosen field. An individual may not earn more than one Ph.D. degree in a single field of study at this institution.

Time Limits

The equivalent of at least three years of full-time study beyond the baccalaureate or two years beyond the master's degree (in the same or a closely-related field) is required. All work must be completed within eight years of the beginning of doctoral study, or, if the student entered with a master's degree in the same or a closely related field, the doctorate must be completed within seven years. The beginning of doctoral study is defined as the beginning date of the earliest course, wherever taken, listed on the approved doctoral plan of study. The general examination must be passed within five years of the beginning of doctoral study, or within four years if the student entered with a master's degree in the same or a closely-related field. Failure to complete the work within the periods specified or failure to maintain continuous registration (see "Continuous Registration") will require reevaluation of the student's entire program and may result in a notice of termination. A five-year time limit applies to the acceptability of foreign-language courses. (See "Foreign Language; Related or Supporting Area of Study.")

An extension of a student's terminal date is considered only when there is substantial evidence that the student has attempted to make regular and consistent progress toward completion of degree requirements. A written recommendation to extend the terminal date must bear the signature of the student's major advisor, and it must be submitted in a timely manner to the Graduate School. Approval is granted by the Dean. Each subsequent request to extend a student's terminal date requires greater justification and more extraordinary circumstances. Third requests for extension are rarely, if ever, granted.

Residence Requirement

The graduate student can fulfill the special demands of a doctoral program only by devoting a continuous period of time to concentrated study and patient research with a minimum of outside distraction or employment. During the second or subsequent years of graduate work in the field, at least two consecutive semesters must be completed in residence. Alternatively, this requirement may be met by combining one semester of residence plus a contiguous 12-week summer period made up of Summer Sessions I & II or Summer Session IV, if agreed upon by the advisory committee and the student. The residence period must be completed through registration for and completion of appropriate course loads or research at the Storrs campus or, if more appropriate, at one of the other sites of instruction and research within the University system. Students ordinarily must register for full-time student status during the residence period (see "Course Loads").

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

Plan of Study

The plan of study must be prepared, signed by the student and the members of the advisory committee, and submitted to the Graduate School for approval by the Executive Committee of the Graduate Faculty Council when the student has completed not more than twelve credits of course work to be applied to the degree. The student may not take the general examination before the plan of study has been fully approved. Failure to present the plan on time may prolong the period of study for the degree. Before formulating and signing the plan, the major advisor should review a set of transcripts of all undergraduate and graduate work the student has taken. The advisory committee may require that the student take an exploratory examination to guide it in formulating the plan of study.

Courses elected should be consistent with the student's objectives and related to the field in which the degree will be taken. Plans of study will consist largely of courses at the 300's level or above. A limited number of credits at the 200's level (ordinarily not more than six), if not open to sophomores, may be accepted. While there are no specific course requirements for the doctorate, the Executive Committee expects the plan to include about twenty to twenty-four credits of course work – exclusive of any related or supporting area offered in lieu of a non-credit language requirement – beyond the master's degree or its equivalent in the same or a similar field. In other words, the work presented for the Ph.D. degree should equate to 44 to 48 credits beyond the baccalaureate or its equivalent. For students entering in Fall, 1998 or later, at least 15 credits of GRAD 495 (Dissertation Research) must be included in the plan of study, representing the research effort the student devotes to the dissertation.

Special provisions apply to the Ph.D. degree in chemistry and in polymer science.

The plan shall designate any foreign language(s) in which the student is to be tested and any courses comprising a related or supporting area. Course credit by examination is not allowed as a means of accumulating credits to meet the requirements for advanced degrees at this institution. If an examination is permitted to be used to fulfill a related (or supporting) area requirement for the Ph.D. degree, course credit is not given. No course credit is given for the dissertation, but the research toward it is associated with the minimum

of 15 credits of GRAD 495 required of students entering in the Fall 1998 or later. The dissertation is regarded as an important part of the student's program and is considered to represent at least one year of full-time graduate study.

Advanced course work taken on a non-degree basis at the University of Connecticut may be included on a Ph.D. plan of study provided the following conditions are met: (1) the grades earned in such course work are *B* (not *B-*) or higher, (2) such course work is within the seven or eight year limit (whichever applies) for completion of Ph.D. degree requirements, and (3) such credits have not been applied toward any other degree here or elsewhere (already completed or to be completed in the future). In any event, inclusion of non-degree course work on the plan of study requires the consent of the advisory committee and is subject to the approval of the Executive Committee.

After approval of the plan by the Executive Committee, any request for change must be submitted to the Graduate School on an official form bearing the signatures of the members of the advisory committee and the student. Such requests are subject to approval by the Executive Committee. The successful completion of all work indicated on the approved plan of study is a fundamental prerequisite to the conferral of the degree.

Once the plan of study is approved, the student and the advisory committee should reevaluate it regularly and modify it, following the established procedure, if appropriate.

Foreign Language; Related or Supporting Area of Study

Students are required to have a competent reading knowledge of at least one foreign language appropriate to the general area of study *or* at least six credits of advanced work in a related or supporting area (unless faculty in a particular field of study have voted to require neither). However, an advisory committee may require a competent reading knowledge of more than one foreign language. The committee also may require additional advanced work in one or more related or supporting areas, alone or in conjunction with a foreign language.

If a related or supporting area is required, the courses chosen must comprise a coherent unit of advanced (i.e., 200's level not open to sophomores or above) work outside the major field of study (or area of concentration, if appropriate). Ordinarily, such course work is taken outside the student's "home" department. The courses must be approved by the advisory committee as a part of the plan of study. With few exceptions, they must be taken at this institution. No course credits will be accepted in transfer toward the related or supporting area unless approved by the Executive Committee before the courses are taken. With the approval of the advisory committee, however, the passing of an examination may be substituted for the course work. In the event of a non-language examination, one or more examiners shall be designated by the

Executive Committee. With the consent of the advisory committee, a three-credit advanced course in mathematics or statistics passed satisfactorily at this institution may fulfill the otherwise six-credit-minimum requirement if the student's preparation contains a suitably advanced prerequisite course (i.e., equivalent to a 200's level University of Connecticut course not open to sophomores) passed satisfactorily at this or another institution (although no course credits will be accepted in transfer).

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

(1) The student may pass both semesters of an approved one-year reading or intermediate course in the language with grades equivalent to *C* (not *C-*) or higher. This requirement will be considered to be met if, in light of previous preparation, the student is permitted by the instructor to enter directly into the second semester of the one-year sequence and earns a grade of *C* (not *C-*) or higher. The courses may be taken by graduate students on a Satisfactory/Unsatisfactory basis, with a grade of Satisfactory denoting performance at the level of *C* (not *C-*) or higher. The Executive Committee designates courses that may be taken for this purpose. Currently they are French 163-164, French 165-166, German 145-146, Russian 157-158, Spanish 183-184, and Spanish 185-186. Alternatively, the student may pass a course in a foreign language or literature at or above the 200's level, provided that the reading for the course is required to be done in the language.

Language courses taken at other institutions are not accepted. However, the student may consider option (2).

(2) The student may pass an examination set by a member of the University faculty (or, if approved by the advisory committee and the Graduate School, a faculty member at another college or university) designated by the student's advisory committee and approved by the head of the department in which the major advisor holds an appointment. The examiner may be a member of the same department but may not be a member of the student's advisory committee. The examination will include, but need not be limited to, the translation of a passage approximately 400 words in length. The use of a dictionary may be permitted at the option of the examiner. The translation is to be written in English unless permission is granted by the Executive Committee of the Graduate Faculty Council to write it in

another language. Such permission is granted only if it is deemed in the best interest of the student and if an acceptable examiner is available. The examiner will choose the passage from among books or articles submitted by the major advisor. The passage may be the same for a group of students in the same field or may be selected individually for each student. The examination must be supervised and have a reasonable time limit. The result of the examination, whether passed or failed, must be reported to the Graduate School on the official form bearing the signature of the examiner.

(3) A doctoral reading examination passed at another graduate school of approved standing may be accepted in transfer (subject to the above five-year limitation) provided the examination was taken prior to the student's enrollment in this Graduate School.

(4) The student may establish evidence of competence in the language through an official transcript stating that the baccalaureate or a higher degree was earned with that language as the major.

(5) The student may establish evidence of competence in the language through documentation that it is the student's native language, learned in childhood and used primarily through at least secondary school.

Transfer Credit

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

Evaluation of Performance

The advisory committee continually evaluates the student's performance. Any graduate student whose scholastic record does not meet the minimum requirements of the Graduate School may be subject to dismissal. However, the committee may insist on more than the minimum scholastic requirements and may take other factors into consideration in deciding whether or not to recommend to the Dean that the student be permitted to continue in the degree program.

General Examination

The general examination is taken near the end of the course program, but not later than eight months prior to the date of completion of all degree requirements. In any event, the examination must be passed within five years of the beginning of doctoral study or within four years if the student entered with a master's degree in the same or a closely related field. The beginning of doctoral study is defined as the beginning date of the earliest course, wherever taken, listed on the approved doctoral plan of study. Foreign language requirements should have been met and the related or supporting area courses completed well in advance. The student may not take the general examination before the plan of study has been approved by the Executive Committee.

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

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

After the examination, the major advisor communicates the results to the candidate and immediately sends the official report, bearing the signature of each member of the advisory committee, to the Graduate School. Should the committee permit the student to take the examination in several sections, only the final result should be reported.

Dissertation Proposal

Before preparation of the dissertation is well underway, the student must file a dissertation proposal addressing the intended research, following the guidelines contained on the special form obtainable at the Graduate School or from the Graduate School website. Failure to file the dissertation proposal early may result in wasted

effort on a dissertation if changes are required in the project. If human or animal subjects are involved in the proposed research, special forms must be completed and approval must be granted by the appropriate (either Storrs or Health Center) Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC). Documentation showing current IRB or IACUC approval is to be submitted to the Graduate School together with the dissertation proposal.

Dissertation proposals are reviewed with the following questions in mind: (1) Is the proposal well written, well organized, and well argued? (2) Does the proposal describe a project of appropriate scope? (3) Does the student demonstrate a knowledge of the subject and an understanding of the proposed method of investigation? (4) Does the student show awareness of the relevant research by others? and (5) Does the student consider how the proposed investigation, if successful, will contribute to knowledge?

When the dissertation proposal has been completed and signed by the student and also has been approved by the members of the advisory committee, the proposal then is submitted to the head of the department or program to which the student was admitted. The head appoints reviewers from outside the advisory committee to conduct a critical evaluation of the dissertation proposal. The use of at least one reviewer from outside the University is encouraged. Reviewers may be appointed to evaluate an individual student's proposal, or they may be appointed to a committee responsible for reviewing all proposals in a particular field of study or group of related fields of study. The head's signature on the proposal when the review is completed confirms that the results of the review were favorable. The evaluation may take the form of a reading of the proposal or attendance at an oral presentation and discussion of the proposal. The head of the department or program reports the result of its examination of a proposal to the Executive Committee in the form of a recommendation either to approve the proposal, to return it to the student for revisions, or to disapprove the proposal. The dissertation proposal normally should be submitted for review not later than six months before the expected date of degree completion. A copy of the signed approval form and dissertation proposal must be received by the Graduate School when the review process been completed.

Candidacy and Dissertation Preparation

Upon approval of the plan of study, passing the general examination, and having had the dissertation proposal fully approved by the Executive Committee of the Graduate Faculty Council, the student becomes a candidate for the degree of Doctor of Philosophy. Students are notified of their advancement to Candidacy.

A dissertation representing a significant contribution to ongoing research in the candidate's field is a primary requirement. The preparation of the dissertation is under the immediate and

continuous supervision of the advisory committee and it must meet all standards prescribed by the committee and by the Graduate School. It must be acceptable in literary style and organization. Specifications for its preparation may be obtained at the Graduate School or from the Graduate School website. It is the student's responsibility to be certain that the dissertation conforms exactly to the specifications prescribed by the Graduate School.

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

The dissertation is dated as of the calendar year in which all requirements for the degree are met. The advisory committee will set a date for completion of the dissertation, allowing time for each advisor to make suggestions for revision, and will set a date for the final examination, allowing time for the student to make revisions and to submit a complete preliminary or "working" copy of the abstract and dissertation at the Graduate School (or, if more appropriate, at a central office at the Health Center in Farmington) at least seven days before the dissertation defense. When submitted to the Graduate School (or to the Health Center), the complete preliminary or "working" copy of the abstract and dissertation must be accompanied by a tentative-approval form signed by all members of the advisory committee.

Following the examination, the student must submit the final, fully-revised copies of the dissertation to the Graduate School (also another copy if submitted to the Health Center). The final copies of the dissertation should be printed with a laser printer or they may be high quality photocopies. In any event, at least 25% cotton-content bond paper of at least 20-pound weight must be used for any copy of the dissertation submitted to the Graduate School (or to the Health Center). Only one side of the paper is to be used for printing.

In some cases, revision of the dissertation is required by the advisory committee as a result of the final examination. Final approval of the dissertation following the examination is indicated by the presence of original signatures of all members of the advisory committee on the final-approval page, which must be submitted to the Graduate School soon after the student has been examined if no revisions are necessary. In any case, final-approval pages (and the revised dissertation, if changes are required) must be received at the Graduate School by the conferral period deadline in August, December, or May. After binding, two copies of the dissertation become the property of the Homer Babbidge Library. If a department or program requires extra copies, it is the student's responsibility to supply them directly to the department or program.

Abstract, Microfilming, and Other Completion Requirements

At the time the dissertation is submitted, four copies of the abstract (five if the dissertation is

submitted to the Health Center) must be submitted to the Graduate School (or with the dissertation at the Health Center). The body of the abstract may not exceed 350 words in length, and it is published in *Dissertation Abstracts*.

Microfilming of the dissertation by PQIL is required. Agreement forms for this process must be completed by doctoral candidates when submitting the dissertation to the Graduate School (or the Health Center). This form also may be used to arrange for optional copyrighting of the dissertation.

The student is required to pay a fee for the microfilming of the dissertation. There also is a fee for copyrighting the dissertation, if this is desired. There is no charge to the student, however, for the binding of the two final copies of the dissertation. Both final copies become the property of the Homer Babbidge Library.

All doctoral students are complete the "Survey of Earned Doctorates," a federal form available at the Graduate School.

Final Examination

The final examination or dissertation defense is oral and it is under the jurisdiction of the advisory committee. It deals mainly with the subject matter of the dissertation. The examination may not be held not sooner than seven days after a working copy of the complete dissertation and tentative advisory committee approval have been

submitted to the Graduate School (or the Health Center) and by the conferral period deadline in August, December, or May. Invitation to participate in the examination is issued by the advisory committee, although any member of the faculty may attend. Not fewer than five members of the faculty, including all members of the candidate's advisory committee, must participate in the final examination, unless written approval for a lesser number has been secured in advance from the Dean of the Graduate School.

It is required that notification of the time, date, and place of the examination be posted at least two weeks prior to the examination on the University's Web-based events calendar. Instructions for posting the announcement are available at <<http://www.grad.uconn.edu/announcing.html>>. In addition, the examination should be advertised widely in the candidate's department and elsewhere throughout the University, as appropriate.

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

CONFERRAL OF DEGREES

Conferral

Degree conferral requires that the student be in good academic standing and that all requirements for the degree have been completed satisfactorily on or before the last day of the conferral period. Degrees are conferred three times each year – in August, December, and May – although there is only one annual graduate Commencement ceremony at which graduate degrees are awarded (in May). Students who qualify for degree conferral receive their diplomas by mail, normally within three months following conferral.

Application for the Degree

Formal application for a degree to be conferred must be filed on-line by the degree candidate using the PeopleSoft system. Information and instructions are available at this website: <http://www.grad.uconn.edu/degree_completion.html>. If filing is not timely, conferral is delayed to the next conferral period, even though all other degree requirements may have been completed on time.

Commencement

The graduate Commencement ceremony is held once each year at the end of the spring semester. Individuals who have had degrees conferred at the end of the previous summer or the previous fall semester and candidates for degrees who complete degree requirements by the end of the spring semester may participate in the annual Commencement ceremony and are urged to do so. Academic regalia appropriate for the University of Connecticut degree being conferred is strictly required for all who participate in the ceremony. Information concerning the Commencement ceremony, including academic regalia and guest tickets, is made available by mid-February exclusively on the Graduate School's website: <<http://www.grad.uconn.edu/>>.

FIELDS OF STUDY

Fields of study and areas of concentration officially recognized by the Graduate School are limited to those listed below. Graduate degrees are awarded in these fields of study. Each field of study is shown in conjunction with the degree or degrees that may be awarded. The final transcript also will record completion of the special requirements of one listed area of concentration, if appropriate. These requirements are determined by a student's advisory committee. The Graduate School does not require that a student select an area of concentration, although an advisory committee may require a student to do so.

Fields of Study	Degrees Offered
Areas of Concentration Accounting Business Administration Economics Finance Health Services Administration Human Resources Management International Business Information Systems Insurance Law Management Marketing Mathematics Mechanical Engineering Music Nursing Philosophy Physics Political Science Psychology Real Estate Sociology Spanish Statistics Teaching Theology Visual Arts Writing	Bachelor's Master's Doctoral

Accounting	M.S.
Adult Learning	Ph.D.
Agricultural and Resource Economics	M.S., Ph.D.
Allied Health	M.S.
Animal Science	M.S., Ph.D.
Physiology of Reproduction	
Anthropology	M.A., Ph.D.
Social Science and Health Care ⁵⁺	
Applied Financial Mathematics	M.S.
Applied Genomics	M.S.
Applied Microbial Systems Analysis	M.S.
Art	M.F.A.
Art History	M.A.
Biobehavioral Science &	M.S., Ph.D.
Behavioral Genetics	
Developmental Psychobiology	
Hormones and Behavior	
Human Genetics	
Neurochemistry	
Neuromorphology	
Neuropsychopharmacology	
Neurosciences +	
Biochemistry	M.S., Ph.D.
Biodiversity and Conservation Biology	M.S.
Biomedical Engineering +	M.S., Ph.D.
Biomedical Science ++	Ph.D.
Cell Biology	
Cellular and Molecular Pharmacology	
Genetics and Developmental Biology	
Immunology	
Molecular Biology and Biochemistry	
Neuroscience	
Skeletal, Craniofacial and Oral Biology	
Biophysics	M.S., Ph.D.
Biotechnology +	M.S.
Botany	M.S., Ph.D.
Morphology	
Natural Products Chemistry	
Paleobotany	
Phycology	
Plant Cell and Molecular Biology +	
Plant Physiology +	
Plant Systematics	
Business Administration	M.B.A., Ph.D.

Full - time M.B.A. program Areas of Concentration

- Finance
- Health Care Management
- Information Technology
- Management Consulting
- Marketing Intelligence

Fields of Study	Degrees Offered
Areas of Concentration	

Part - time M.B.A. program Areas of Concentration

- Accounting
- Finance
- General
- Health Care Management
- Human Resources &
- International Business
- Management
- Management of Technology
- Marketing
- Real Estate

Ph.D. program Areas of Concentration

Accounting	
Finance	
Management	
Marketing	
Operations and Information Management	
Cell Biology	M.S., Ph.D.
Cytology	
Developmental Biology	
Plant Cell and Molecular Biology +	
Plant Physiology +	
Chemical Engineering	M.S., Ph.D.
Chemistry	M.S., Ph.D.
Civil Engineering	M.S., Ph.D.
Applied Mechanics ⁵ +	
Environmental Engineering ² +	
Fluid Dynamics ⁵ +	
Geotechnical Engineering	
Structural Engineering	
Transportation and Urban Engineering	
Communication Sciences	M.A., Au.D., Ph.D.
Audiology ⁷	
Communication ¹	
Communication Processes and Marketing Communication ⁵	
Speech, Language, and Hearing ^{1 and 5}	
Comparative Literary and Cultural Studies +	M.A., Ph.D.
Computer Science and Engineering	M.S., Ph.D.
Curriculum and Instruction	Ph.D.
Bi-lingual and Bi-cultural Education	
Elementary Education	
Secondary Education	
Dental Science ++	M.Dent.Sc.
Dramatic Arts	M.A., M.F.A.
Acting	
Design	
Directing &	
Performance/Production ^{1&}	
Puppetry	
Technical Direction	
Theater History and Criticism ^{1&}	
Ecology	M.S., Ph.D.
Ecology and Biological Control	
Plant Ecology	

¹ M.A. degree program only + Interdisciplinary program

² M.S. degree program only ++ Health Center program only

⁵ Ph.D. degree program only

⁷ Au.D. program only

Fields of Study Areas of Concentration	Degrees Offered
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Economics	M.A., Ph.D.
Education	M.A.
Educational Administration	Ph.D.
Educational Leadership	Ed.D.
Educational Psychology	Ph.D.
Cognition/Instruction	
Counseling Psychology	
Gifted and Talented Education	
Measurement, Evaluation and Assessment	
School Psychology	
Educational Studies ^{&}	Ph.D.
History and Philosophy of Education	
Social Foundations of Education	
Educational Technology	Ph.D.
Electrical Engineering	M.S., Ph.D.
Electronics and Photonics	
Information, Communication, and Decision Systems	
Engineering	M.Eng.
Civil and Environmental Engineering	
Chemical Engineering	
Computer Science and Engineering	
Electrical and Computer Engineering	
Mechanical Engineering	
Metallurgy and Materials Engineering	
English	M.A., Ph.D.
American Studies ¹⁺	
Entomology	M.S., Ph.D.
Morphology and Physiology	
Systematics	
Environmental Engineering +	M.S., Ph.D.
French	M.A., Ph.D.
Genetics	M.S., Ph.D.
Geography	M.A., Ph.D.
Geological Sciences	M.S., Ph.D.
Geology	
Geophysics	
German	M.A., Ph.D.
History	M.A., Ph.D.
American Studies ¹⁺	
Latin American ⁵	
Medieval European ⁵	
Modern European ⁵	
United States ⁵	
Human Development and Family Studies	M.A., Ph.D.
Human Resource Management	M.P.S.
Humanitarian Services Administration	M.P.S.
International Studies +	M.A.
African Studies	
European Studies	
Italian History and Culture	
Latin American Studies	
Italian	M.A., Ph.D.
Judaic Studies +	M.A.
Kinesiology	Ph.D.
Exercise Science	
Social Science of Sport and Leisure	
Linguistics	M.A., Ph.D.

Fields of Study Areas of Concentration	Degrees Offered
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Materials Science +	M.S., Ph.D.
Alloy Science	
Biomaterials	
Corrosion Science	
Crystal Science	
Dental Materials	
Metallurgy	
Polymer Science	
Mathematics	M.S., Ph.D.
Actuarial Science ²	
Mechanical Engineering	M.S., Ph.D.
Applied Mechanics ⁵⁺	
Design	
Dynamics and Control	
Energy and Thermal Sciences	
Fluid Dynamics ⁵⁺	
Manufacturing	
Medieval Studies +	M.A., Ph.D.
Metallurgy and Materials Engineering	M.S., Ph.D.
Microbiology	M.S., Ph.D.
Music	M.Mus., M.A., D.M.A., Ph.D.
Conducting ^{3 and 4}	
Historical Musicology ¹	
Music Education ^{3 and 5}	
Music Theory and History ⁵	
Performance ^{3 and 4}	
Theory ¹	
Natural Resources: Land, Water, and Air	M.S., Ph.D.
Nursing	M.S., Ph.D.
Nutritional Science	M.S., Ph.D.
Oceanography	M.S., Ph.D.
Pathobiology	M.S., Ph.D.
Bacteriology	
Pathology	
Virology	
Pharmaceutical Science	M.S., Ph.D.
Pharmacy Administration ^{2&}	
Managed Care Pharmacy ^{2&}	
Medicinal and Natural Products Chemistry	
Neurosciences +	
Pharmaceutics	
Pharmacology and Toxicology	
Philosophy	M.A., Ph.D.
Physical Therapy ⁶	M.S.
Physics	M.S., Ph.D.
Physiology and Neurobiology	M.S., Ph.D.
Comparative Physiology	
Endocrinology	
Neurobiology	
Neurosciences +	

¹ M.A. degree program only² M.S. degree program only³ M.Mus. degree program only⁴ D.M.A. degree program only⁵ Ph.D. degree program only⁶ Integrated B.S./M.S. program only

+ Interdisciplinary program

& **Not** accepting new students at this time

Fields of Study Areas of Concentration	Degrees Offered
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Plant Science	M.S., Ph.D.
Agronomy	
Horticulture	
Landscape Architecture ²	
Plant Breeding	
Plant Environment	
Soil Science	
Political Science	M.A., Ph.D.
American Studies ¹ +	
Survey Research ¹	
Polymer Science +	M.S., Ph.D.
Professional Higher Education Administration &	Ph.D.
Psychology	M.A., Ph.D.
Behavioral Neuroscience	
Clinical	
Developmental	
Ecological Psychology	
General Experimental	
Industrial/Organizational	
Language and Cognition	
Neurosciences +	
Personality &	
Social	
Public Administration	M.P.A.
Public Health ++	M.P.H.
Social Work	M.S.W., Ph.D.
Sociology	M.A., Ph.D.
Social Science and Health Care ⁵ +	
Survey Research ¹	
Spanish	M.A., Ph.D.
Special Education	Ph.D.
Statistics	M.S., Ph.D.
Industrial Statistics ²	
Survey Research	M.A.
Zoology	M.S., Ph.D.
Biological Anthropology	
Parasitology	
Systematics and Evolution	

HEALTH CENTER PROGRAMS

The following degree programs, also included in the preceding Field of Study list, are offered primarily at the University of Connecticut Health Center. Application to these programs should be made to the Graduate School Admissions Office, University of Connecticut Health Center, Farmington, Connecticut 06030-1827. In addition, some interdisciplinary fields of study and areas of concentration involve Health Center fields as participants (see below).

Biomedical Science	Ph.D.
Cell Biology	
Cellular and Molecular Pharmacology	
Genetics and Developmental Biology	
Immunology	
Molecular Biology and Biochemistry	
Neuroscience	
Skeletal, Craniofacial and Oral Biology	
Dental Science	M.Dent.Sc
Public Health	M.P.H.



¹ M.A. degree program only + Interdisciplinary program
² M.S. degree program only ++ Health Center program only
⁵ Ph.D. degree program only & **Not** accepting new students at this time

INTERDISCIPLINARY PROGRAMS

An interdisciplinary program includes substantial course work in two or more existing fields of study. In some programs the degree is awarded in one of the fields of study involved while in other programs the degree is awarded in an interdisciplinary field of study. Where the degree is awarded in an interdisciplinary field of study, the Dean of the Graduate School may choose to appoint an advisory committee which represents the various fields of study involved in an interdisciplinary program. The following is a listing of approved interdisciplinary programs.

Interdisciplinary Fields of Study

Programs	Fields of Study Participating	Degrees Offered
Biomedical Engineering	Dental Science (Health Center), Electrical Engineering, Materials Science, Mechanical Engineering, and Psychology	M.S., Ph.D.
Biotechnology	Biochemistry, Biophysics, Cell Biology, Chemical Engineering, Chemistry, Pathobiology, Pharmaceutical Science	M.S.
Comparative Literary and Cultural Studies	English, French, German, Italian, and Spanish	M.A., Ph.D.
Environmental Engineering	Chemical, Civil, and Mechanical Engineering	M.S., Ph.D.
International Studies	Agricultural and Resource Economics, Anthropology, Comparative Literary and Cultural Studies, Economics, History, Philosophy, Political Science, and Sociology	M.A.
Judaic Studies	History, Modern and Classical Languages, Sociology	M.A.
Materials Science	Chemistry, Engineering, Physics, and others	M.S., Ph.D.
Medieval Studies	Art, Dramatic Arts, English, History, Modern and Classical Languages, Music, and Philosophy	M.A., Ph.D.
Polymer Science	Biochemistry, Biophysics, Chemical Engineering, Chemistry, and Physics	M.S., Ph.D.
Survey Research	Political Science, Sociology	M.A.

Interdisciplinary Areas of Concentration

Each interdisciplinary Area of Concentration listed below is offered in each of the participating Fields of Study indicated in the middle column.

Programs Offered	Fields of Study Participating	Degrees Offered
American Studies	Anthropology, English, History, Philosophy, and Political Science	M.A. in the specific field of study except Anthropology and Philosophy
Applied Mechanics	Civil Engineering and Mechanical Engineering	Ph.D. in the specific field of study
Fluid Dynamics	Civil and Mechanical Engineering	Ph.D. in the specific field of study
Neurosciences	Pharmaceutical Science, Physiology and Neurobiology, and Psychology	M.A. or M.S. and Ph.D. in the specific field of study
Plant Cell and Molecular Biology	Botany and Cell Biology	M.S. and Ph.D. in the specific field of study
Plant Physiology	Botany and Cell Biology	M.S. and Ph.D. in the specific field of study
Social Science and Health Care	Anthropology, Sociology, in conjunction with the Department of Community Medicine and Health Care (Health Center)	Ph.D. in the specific field of study
Survey Research	Political Science and Sociology	M.A. in the specific field of study

PROGRAMS AND COURSE OFFERINGS

Programs

All graduate degrees at the University of Connecticut except the M.D., D.M.D., Pharm.D., and J.D. are awarded through the Graduate School.

Only those Fields of Study and Areas of Concentration identified in the preceding list are recognized by the University and the Graduate School. Here, descriptions of degree programs appear under the titles of the approved fields of study, if possible. In some cases, it has been necessary to group the approved fields of study under a departmental or other title in order to facilitate location in the text. For many of the programs, special requirements (over and above those of the Graduate School) that are generally applied to all students in that program are outlined. However, each student's program is non-departmental in that the advisory committee alone, in supervising it, is directly responsible to the Dean of the Graduate School.

Course Offerings

The following lists include most of the graduate courses that the University has approved for offering. However, not all courses listed are offered every semester or every year. For actual current offerings, students should consult the appropriate schedule of classes which can be accessed from the Graduate School's registration Web site. Part-time, evening, and summer session students may wish to consult class schedules published by the Office of Credit Programs, Extended and Continuing Education. Descriptions of undergraduate courses are contained in the Undergraduate Catalog. The University reserves the right to change announced offerings.

Course Numbering System

At the University of Connecticut, undergraduate courses numbered 100-199 are primarily for freshmen and sophomores, undergraduate courses numbered 200-299 are primarily for juniors and seniors. Graduate courses are numbered 300-499. This Catalog contains listings of the 300-499 courses only (although up to six credits of 200's level courses, if not open to sophomores, also may be accepted toward a graduate degree provided they are approved as a part of the student's plan of study).

Satisfactory/Unsatisfactory Grading

Throughout the text, courses approved by the Executive Committee of the Graduate Faculty Council for Satisfactory (S)/Unsatisfactory (U) grading (*see* "Standards and Degree Requirements") are designated by the dagger symbol (†).

Course Semesters

Class schedules for each semester and session can be accessed from the University's PeopleSoft Web site. Not all courses are offered every semester or every year.

Information concerning the availability of particular courses may be obtained also from departmental and program offices.

Courses carrying hyphenated numbers are full-year courses extending over two semesters. The first semester of such courses is always prerequisite to the second, but the student may receive credit for the first semester without continuing with the second.

Course Meeting Times

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

Course Prerequisites

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

Course Instructor

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



Master's and Doctoral Research and Directed Studies Courses

Graduate School courses for master's and doctoral research as well as for directed studies are referenced throughout the programmatic sections which follow. Full descriptions of these courses are given below.

†GRAD 395. Master's Thesis Research

1 - 9 credits. Open only to Plan A master's students.

This course is associated with the research efforts of students pursuing a Plan A master's degree, and may be used to meet the nine-credit Master's research requirement.

†GRAD 396. Full-Time Master's Research

3 credits.

This course is to be used by those students who have completed all courses on the plan of study and who are performing master's level research on a full-time basis. It may contribute to meeting the nine credit Master's research requirement. No other courses may be taken concurrently. In the summer, this is a 12-week (Summer 4) course. Since this course denotes a full time commitment, students may not hold graduate assistantships while taking this course.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

This course denotes that the student is participating in a full-time internship, field work experience, or other course of off-campus study required as part of the

student's Master's program. No other courses may be taken concurrently.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits. Open only to doctoral students.

This course is associated with the research efforts of students pursuing a doctoral degree, and may be used to meet the fifteen-credit doctoral research requirement.

†GRAD 496. Full-Time Doctoral Research

3 credits.

This course is to be used by those students who have completed all courses on the plan of study and who are performing doctoral level research on a full-time basis. It may contribute to meeting the fifteen credit doctoral research requirement. No other courses may be taken concurrently. In the summer, this is a 12-week (Summer 4) course. Since this course denotes a full time commitment, students may not hold graduate assistantships while taking this course.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

This course denotes that the student is participating in a full-time internship, field work experience, or other course of off-campus study required as part of the student's doctoral program. No other courses may be taken concurrently.



Non-Credit Continuing Registration Courses

Once the program of study is begun, a graduate degree student must register and pay the appropriate fee(s) in every fall and spring semester (and on occasion, when required, in the summer) until all requirements for the degree have been completed. (*See* "Continuous Registration" under Registration.) Non-credit course designations GRAD 398 and GRAD 399 are used for master's degree students who otherwise are not registered for course work for credit, and GRAD 498 and GRAD 499 are used for doctoral students. These are referenced throughout the programmatic descriptions which follow. An explanation of each non-credit continuing registration course designation is given below.

GRAD 398. Special Readings (Master's)

Non-credit.

This is a course for which master's degree students must register in the event that their regular program of course work for credit has been interrupted and they are not otherwise registered in a particular semester. (*see* Continuous Registration.)

GRAD 399. Thesis Preparation

Non-credit. Open only to Plan A master's students.

This course is for thesis master's student's who are

not registered in a particular semester for course work for credit and who already have completed all required credits of GRAD 395.

GRAD 498. Special Readings (Doctoral)

Non-credit. Open only to Plan A master's students.

This is a course for which doctoral students must register in the event that their regular program of course work for credit has been interrupted and they are not otherwise registered in a particular semester. (see Continuous Registration.)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit. Open only to doctoral students.

This course is for doctoral student's who are not registered in a particular semester for course work for credit and who already have completed all required credits of GRAD 495.



AGRICULTURAL AND RESOURCE ECONOMICS

Department Head: Professor Emilio Pagoulatos
Professors: Bravo-Ureta, Cotterill, Langlois, L. Lee, T. Lee, Lopez, Ray, and Segerson
Associate Professors: Altobello, Larson, Minkler, Pomeroy, and Shah
Assistant Professor: Johnston

The Department of Agricultural and Resource Economics offers study leading to the M.S. and Ph.D. degrees in Agricultural and Resource Economics. The master's degree program includes courses designed to provide a foundation in theory, quantification, and policy. The opportunity of selecting a study area is offered via a thesis project and additional courses. Study may be undertaken in two broad areas, namely Agricultural Economics and Resource Economics and Development, including such sub-areas as prices and market performance, production economics, environmental economics, the economics of recreation, econometrics and statistics, economic development, demography, rural sociology, government policies and programs, and capital growth.

Ph.D. candidates usually take the courses listed below and, in addition, select complementary offerings from those available in the Departments of Economics, Natural Resources Management and Engineering, Sociology, and Statistics.

The Department recommends that applicants for admission to the master's program have a background of courses in economic principles, mathematics, and statistics, although there are no fixed requirements.

Special Requirements for the Ph.D. Degree. The student takes about ten semester courses beyond the master's program and plans a research project as early as possible in the Ph.D. program. Examples of possible research topics follow: estimation of demand and supply functions, market structure analysis, simulation of firm growth, environmental impacts of economic programs, resource and environmental policy, and studies of economics of scale, interregional competition, spatial and temporal equilibrium, pricing and taxation policies, and resource development.

Special Facilities. A collection of production, marketing, and price data is maintained in the Department and is available for testing economic models and hypotheses. Cooperative arrangements with other agricultural institutions provide additional research material. The Department also maintains an ample supply of reports, bulletins, census data, and professional journals.

A staff member is available for assisting in data processing and computer programming, and a file of computer programs is being assembled to widen the selection of research tools.

COURSES OF STUDY

ARE 300. Special Topics

1-3 credits. Lecture. May be repeated for credit with a change of topic.

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

ARE 305. The Role of Agriculture in Economic Development

3 credits. Lecture.

The role of agriculture in the economic development of less developed countries. Population and rural employment, the economics of food consumption and nutrition, international food aid, agricultural marketing and trade, land tenure, agrarian reform, and appropriate agricultural technology.

ARE 307. Benefit-Cost Analysis and Resource Management

3 credits. Lecture

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

ARE 309. Independent Study in Agricultural Economics

1-6 credits. Independent study.

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

ARE 314. Human Ecology

3 credits. Lecture.

A review of ecological theories and their application to the study of the human community.

ARE 315. Research Methods in Agricultural Economics

3 credits. Lecture.

Science and the scientific method. Agricultural Economics as a science. Development of Agricultural Economics in the U.S. Tools and techniques of research methods.

ARE 325. Microeconomics I

3 credits. Lecture.

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

ARE 335. Mathematical Programming for Economists

3 credits. Lecture.

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

ARE 345. Econometrics I

3 credits. Lecture. Also offered as ECON 310.

Construction, estimation, and interpretation of economic behavioral and technical equations using data that are passively generated by a system of simultaneous, dynamic and stochastic relations.

ARE 351. Demography

3 credits. Lecture

Survey of important theories and issues in the field of demography. This includes topics in the area of population growth and distribution, population composition, mortality, fertility, migration, and population policy.

ARE 353. Methods of Population Analysis
3 credits. Lecture. Also offered as SOCI 353.

The sources and characteristics of demographic data and vital statistics and the methods and problems of population data analysis.

ARE 354. Environmental Economics
3 credits. Lecture. Prerequisite: ARE 325 or ECON 308. Also offered as ECON 354.

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

ARE 355. Economics of Natural Resources
3 credits. Lecture.

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

ARE 357. Seminar in Human Fertility, Mortality, and Migration
3 credits. Lecture. Also offered as SOCI 357.

A review and critique of the literature on fertility, mortality, and migration, and the dynamic interaction of these variables in population change.

ARE 358. Industrial Organization: Empirical Analysis
3 credits. Lecture.

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

ARE 360. Microeconomic Applications to Food Markets
3 credits. Lecture. Prerequisites: ARE 325 or ECON 308 and ARE 345 or ECON 310.

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

ARE 375. Theory of Location, Time and Capital

3 credits. Lecture. Prerequisite: ARE 325 and 335. Economic theory and empirical studies in economic planning over space and time for agricultural products, land and capital.

†**GRAD 395. Master's Thesis Research**
1 - 9 credits.

†**GRAD 396. Full-Time Master's Research**
3 credits.

†**GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†**GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.

†**GRAD 496. Full-Time Doctoral Research**
3 credits.

†**GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

ALLIED HEALTH

Dean: Professor Joseph W. Smey

Professors: Bohannon, Hasson, Joseph, Miller, and Smey

Associate Professors: Coble, Cosmas, Duffy, Faghri, Ilich-Ernst, Kerstetter, Pescatello, Reese, Tiberio, and Zito

Assistant Professors: Kinsella-Shaw and Paliswamy

Clinical Associate Professor: Leavitt

The School of Allied Health Professions' graduate program, leading to the Master of Science degree in Allied Health, emphasizes an interdisciplinary approach to graduate study for the student who has completed professional education in one of the allied health fields. The program is designed to prepare health professionals to become leaders and to meet current and future needs in health care.

Emphasis is placed on the development of individualized plans of study to meet the professional and educational goals of each student. Students are required to plan a program of study which includes four components: core, health discipline, an area of emphasis, and thesis or project-practicum. The core courses are designed to provide a cross-disciplinary perspective of (1) health care policy, (2) the allied health professional in contemporary society, and (3) research methods in allied health. The health discipline is broadly defined and includes graduate level courses designed to meet the individual needs of students and to expand their disciplinary competence. Each student selects one area of emphasis and coursework related to his/her long range professional and educational goals. The emphasis areas include: administration, allied health education, dietetics, health promotion, medical laboratory science, occupational safety and health, orthotics and prosthetics.

Students are able to select Plan A (Thesis) or Plan B (Project and Practicum) options within any area of emphasis. In Plan A the thesis utilizes problem solving methodology and the scientific method of inquiry in the completion of a research project. In Plan B the project provides an individualized opportunity to focus and to apply abilities gained during the academic phase of the program. The practicum provides an individualized, supervised practical experience and an opportunity to apply, strengthen, and to develop further knowledge and skills related to the area of emphasis and the health disciplines.

Admission. In addition to the standard requirements of the Graduate School, applicants must be health professionals who hold a baccalaureate degree. Applicants are preferred to have at least one year of successful practice in their respective health professions, however this is not mandatory. Three letters of recommendation and a personal statement are required.

COURSES OF STUDY

Health Promotion and Allied Health Sciences: (GPAH)

GPAH 300. Investigation of Special Topics

1-6 credits. Independent study.

Advanced study for qualified students who present suitable projects for intensive, independent investigation in allied health.

GPAH 301. Workshop in Allied Health
1-6 credits. Independent study.

Designed to provide allied health professionals with skills and knowledge responsive to contemporary issues and changes in the health fields.

GPAH 303. Health Care Policy

3 credits. Lecture.

Concepts of health policy with special emphasis on federal policy. Examination of current health policy models, agencies involved in policy development, and the impact of policy on providers and clients. Selected policy issues will be studied through case studies, readings, and discussions with policy makers and regulators.

GPAH 304. The Allied Health Professional in Contemporary Society

3 credits. Lecture

Examination of professional and contemporary issues relevant to the role of the allied health professional in contemporary society. Course focus will include the health care team, compliance issues, professional ethics and legal concerns.

GPAH 305. Program Evaluation for Health Professionals

3 credits. Lecture.

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

GPAH 306. Research Methods in Allied Health

3 credits. Lecture. Prerequisite: EPSY 309 or a course in basic statistics.

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

GPAH 307. Counseling the Eating Disordered Client

1-3 credits. Lecture.

The psychodynamics of eating disorders are reviewed with emphasis placed on developing the necessary counseling skills for treatment.

GPAH 309. Health and Aging

3 credits. Lecture.

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

GPAH 310. Integrative Seminar in Allied Health Research

1-3 credits. Seminar. Prerequisite: EPSY 309 and 313.

Examination of advanced topics in allied health research. Emphasis is on integrating and applying research concepts and methodology.

GPAH 311. Financial Management for the Allied Health Professional

3 credits. Lecture

Course provides students with an understanding of selected financial management principles with immediate application to their respective disciplines. Class assignments facilitate financial management, skill development and focus on each student's place of employment and/or professional discipline.

GPAH 312. Integrative Seminar in Allied Health Administration

3 credits. Lecture.

Specific topical problems of allied health administration are investigated. Emphasis is on integrating and applying business and health care concepts to the management of allied health activities.

GPAH 313. Managing the Organization for Allied Health Services

3 credits. Lecture.

Management of allied health services in emerging and traditional practice settings for allied health professionals. Emphasis is placed on managerial skills, marketing services, and evaluation of quality.

GPAH 314. Problems and Issues in Allied Health Education, Administration and Research

1-6 credits. Independent study. Prerequisite: At least 15 credits in Allied Health.

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

GPAH 315. Managing Human Resources in Allied Health Organizations

3 credits. Lecture.

An examination of the human resource component of allied health services and application of the processes needed to achieve the goals of effective human resource management.

†GPAH 316. Professional Development Seminar

1 credit. Lecture.

Analysis of personal goals and professional issues relevant to the planning of the practicum experience.

GPAH 317. Problems and Issues in Allied Health Education, Administration or Research: Professional Development

1-6 credits. Practicum. Prerequisite: GPAH 316, which may be taken concurrently.

The implementation and/or application of theory in the student's emphasis and discipline.

GPAH 319. Allied Health Education Science

3 credits. Lecture.

The study and application of current learning theories and principles needed by experienced health professionals to become effective instructors in didactic, clinical, and community settings.

†GPAH 322. Advanced Clinical Dietetics

3 credits. Lecture.

Consideration of the physiologic and biochemical alterations in disease states requiring therapy by diet modification. Past and current practice of diet prescription and treatment are evaluated based on present theory, scientific knowledge and factors affecting the individual's ability to carry out the therapy. Effect of medications and other treatments on nutritional status and dietary intake will be included.

GPAH 323. Counseling for Health Professionals

3 credits. Lecture.

To assess and enhance counseling skills of health professionals. Theories and practices appropriate in preventive and treatment settings are examined. Special issues include: stress management, behavior modification, disability and loss, eating disorders, trauma, sexuality, and cultural considerations.

GPAH 324. Critical Issues in Health Promotion, Disease and Disability Prevention

3 credits. Lecture.

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

GPAH 325. Diagnostic Instrumentation/Advanced Cytotechnology and Medical Microscopy

3 credits. Lecture. Open to Medical Laboratory Scientists, others by consent.

This course exposes the student to the innovative manual, semi-automated and automated methods used in the medical and cytopathology laboratory to assist in the arrival of patient diagnoses, prognoses and monitoring of therapeutic interventions.

GPAH 326. Modern Multimedia for Medical Laboratory Scientists

3 credits. Lecture. Open to Medical Laboratory Scientists, others by consent.

This course is designed to expose the medical laboratory scientist to various modern methods of multimedia for the delivery of new information needed to maintain an optimal level of competence in the profession.

GPAH 327. Quantitative and Analytical Cytopathology and Medical Microscopy

3 credits. Lecture. Open to Medical Laboratory Scientists, others by consent.

This course provides theoretical concepts and diagnostic morphological information involving quantitative and analytical cytopathology and advanced medical microscopy.

GPAH 328. Cancer Intervention for Allied Health Professionals

3 credits. Lecture.

Introduction to cancer from the biologic, pathologic, Wellness Testing and Cancer Prevention, public education, professional education and policy issues perspectives. With this knowledge each student designs and implements a Cancer Intervention Program pertinent to their field of study. Development and use of media models is encouraged in each project emphasizing distant learning, teleconferences and video conferences as a means to present Cancer Intervention Programs.

GPAH 330. Dissection of the Human Body

1-6 credits. Independent study.

In-depth study of gross structure. Primarily dissection of the adult human cadaver.

GPAH 331. Nutrition for Healthy Communities

3 credits. Lecture

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

GPAH 340. Clinical Topics in Medical Technology

1-6 credits. Lecture. Open to Medical Laboratory Scientists, others by consent.

Observation, study and practice in special problems, advanced techniques and methodologies in clinical laboratory science. May be repeated in the clinical areas of Clinical Chemistry, Clinical Microbiology, Hematology, and Immunohematology.

GPAH 341. Leadership Development and Contemporary Issues: Implications for the Medical Laboratory

3 credits. Lecture.

Examination and development of leadership and management skills through an analysis of contemporary issues confronting the modern medical laboratory.

GPAH 350. Advanced Theory and Application in Orthopedic Dysfunction

3 credits. Lecture. Open to registered physical therapists, others by consent.

A comprehensive analysis of the common pathologies of the joints, muscles, and fascia that relate to locomotor function. Common diagnostic tools that are used in the rehabilitation of orthopedic disabilities will be discussed. Major therapeutic regimens including mobilization will be compared and contrasted. Clinical application will be emphasized through case histories.

GPAH 351. Advanced Theory and Application in Cardiopulmonary Dysfunction

3 credits. Lecture. Open to registered physical therapists, others by consent.

Provides an in-depth analysis of the theory and rationale for major therapeutic evaluative and

treatment approaches utilized in the management of the client with cardiac and/or pulmonary dysfunctions. Clinical application of a variety of treatment and evaluative approaches will be emphasized through case histories.

GPAH 352. Advanced Theory and Application in Neurological Dysfunction

3 credits. Lecture. Open to registered physical therapists, others by consent.

Provides an in-depth study of the neurophysiological influences on normal and abnormal movement throughout the life cycle. Theory and rationale for major therapeutic evaluative and treatment approaches are analyzed. Clinical application will be emphasized through case histories.

GPAH 353. Interdisciplinary Roles in Orthotic/Prosthetic Rehabilitation

3 credits. Lecture.

Contemporary orthotic and prosthetic practice and management in multiple settings. Emphasis is on the psychosocial, financial, and consumer aspects of disability using an interdisciplinary approach to contextual care.

GPAH 354. Assessment and Treatment of Motor Performance in Patients with Brain Lesions

3 credits. Lecture.

Methods of assessment and treatment of motor deficits in adult patients with brain lesions are presented. Course emphasizes predictive factors of motor performance and function.

GPAH 355. Advanced Topics in Medical Laboratory Sciences

3 credits. Lecture. Open to Medical Laboratory Scientists, others by consent.

Observation, study and practice in special problems, advanced techniques and methodologies in clinical laboratory science.

GPAH 360. Cross Cultural Health Care.

3 credits. Lecture

Exploration of the relationships between culture/ethnicity and health status, health care beliefs and behaviors. Develops greater understanding of, and sensitivity toward the patient's way of life utilizing case examples from the United States and international settings.

GPAH 361. Related Services Collaboration

3 credits. Seminar

An interdisciplinary interactive exploration of the ways in which multiple educational and related service personnel collaboratively support children with disabilities and their families across the life span. Team based learning and problem solving emphasized.

GPAH 380. Loss Control Methods

3 credits. Lecture

This course offers a detailed study of loss control research methods and application techniques with

emphasis on the control of hazards using safety engineering methods in a variety of industrial settings.

GPAH 381. Advanced Loss Control and Management Theory

3 credits. Lecture.

This course offers an in-depth look at the theoretical basis of safety and health management and loss control. The epidemiological concepts are used to analyze Occupational Safety and Health, addressing selected occupational disease or injury mechanisms.

GPAH 382. Analysis of Occupational Safety and Health Law Regulations

3 credits. Lecture.

This course provides the substance for understanding the Occupational Safety and Health laws and regulations, the regulatory process, and the research data and analyses required to promulgate or revise a law or regulation.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

GPAH 403. Health Promotion, Disease and Disability Prevention Research Seminar

3 credits. Seminar.

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

GPAH 405. Exercise Intervention for Health Promotion in Persons with Chronic Disease and Disability

3 credits. Lecture

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

GPAH 409. Geriatric Nutrition

3 credits. Lecture.

This course provides in-depth information on nutritional problems and requirements for the healthy and ill older adult. The focus is on design and critique of research methodology in the nutrition literature.

Development and presentation of a major nutrition-related research proposal is required of all students.

GPAH 420 Clinical Management Models for Health Promotion

3 credits. Seminar.

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

GPAH 421. Design and Implementing Health Promotion Programs

3 credits. Lecture.

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

GPAH 422. Writing Successful Grant Proposal

0 credits. Lecture.

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

GPAH 423. Advanced Topics in Stress and Health Promotion

3 credits. Seminar.

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

GPAH 424. Principles and Practices of Alternative/Complementary Medicine

3 credits. Lecture.

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

AMERICAN STUDIES

A graduate degree in American Studies is not offered. Students who wish to earn the master's-level area of concentration in American Studies must first be admitted to one of the participating fields of study: English, History, or Political Science. The student then informs his or her major advisor and the Director of American Studies of the intention to pursue the concentration.

The student must complete all of the degree requirements of the home field of study. During this process, the student would take two graduate-level courses outside of that field.

To earn the concentration, the student must write an interdisciplinary thesis on a topic approved by the major advisor and the Director of American Studies. The membership of the advisory committee must include one member from outside the home field of study. This committee advises the student during the writing of the thesis and approves it as acceptable for the American Studies concentration.

ANIMAL SCIENCE

Interim Department Head: Professor Michael Darre

Professors: Faustman, Hart, Hoagland, Silbart, Yang, and Zinn

Associate Professors: Andrew, Dinger, Kazmer, Milvae, and Venkitanarayanan

Assistant Professors: Nadeau, Rasmussen, Scheifele, and Tian

The Master of Science and Doctor of Philosophy degrees are offered in Animal Science with supportive instruction in biochemistry, environmental health, food science, physiology, biology, nutrition, statistics and related fields. All prospective students should have a strong academic background in the biological sciences. In addition to the credit requirements indicated below, M.S. and Ph.D. students are required to complete 1 and 2 credits of ANSC 397, respectively, and 1 credit of ANSC 390. All graduate students receiving assistantship support are required to assist with the teaching of 1 course per year of enrollment.

The M.S. degree offers students the opportunity to emphasize study in animal behavior, food science, nutrition, growth, physiology of lactation, physiology of reproduction, environmental health, or production management within Animal Science. Master of Science students are required to conduct thesis research (Plan A) or attain a comprehensive understanding in one of the above outlined areas (Plan B). Plan A programs of study must include a minimum of 15 credits of formal course work exclusive of research. Plan B programs of study must include a minimum of 24 credits of formal course work of which at least two, but not more than four credits, shall be a special research project. Additional specialization may be attained by focusing on dairy and beef cattle, sheep, swine, poultry, horses, companion or aquatic animals or their products.

Admission. In addition to the admission requirements of the Graduate School, all applicants are required to submit scores from the General Test of the Graduate Record Examinations.

The Ph.D. Program. The Doctor of Philosophy degree is offered in Animal Science with an area of concentration in Physiology of Reproduction. Dissertation research may also emphasize environmental health, animal behavior, animal breeding, food science, nutrition, growth, and physiology of lactation. The Ph.D. degree requires demonstrated capabilities for conducting independent research plus related scholarly attributes. Each Ph.D. plan of study must include 44 to 48 credits of course work beyond the baccalaureate degree, not including credits for foreign language or those substituted for foreign language requirements prescribed by the Graduate School.

Special Facilities. Modern and extensive laboratory capabilities exist for the support of graduate student research in animal science, reproductive physiology, animal food products, and environmental health. Special laboratory facilities include eight modern endocrinology, physiology, and molecular genetic laboratories; a modern abattoir; and numerous modern field laboratories.

COURSES OF STUDY

ANSC 300. Special Topics

1-6 credits. Lecture. May be repeated for credit with a change of topic.

ANSC 303. Food Chemistry

3 credits. Lecture.

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

ANSC 306. Vaccines: Mechanisms of Immune Protection

3 credits. Lecture. Also offered as PVS 306.

The focus is on several different approaches to inducing prophylactic immunity in the host. Both traditional and modern molecular approaches to vaccine design will be discussed. In addition, the mechanisms employed by pathogenic microbes to avoid hosts' immune responses will be examined in the context of vaccine design. The students will gain an appreciation for the transition from basic research to practical applications.

ANSC 322. Physiology of Lactation

3 credits. Laboratory/Lecture.

Examines anatomical, endocrine and metabolic aspects of lactation, emphasizing lactation in dairy cattle. Mastitis prevention and therapy are discussed.

ANSC 329. Frontiers in Animal Embryo Biotechnology

3 credits. Lecture.

Focuses on the genetic aspects of embryology such as imprinting and X inactivation. Introduces the state of technology of numerous established and emerging embryo biotechnologies such as assisted reproductive technologies, transgenesis, cloning and gene targeting. Lab demonstrations of basic embryology techniques will be included.

ANSC 333. Advancements in Ruminant Nutrition

2 credits. Lecture.

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

ANSC 344. Growth and Metabolism of Domestic Animals

3 credits. Lecture/Discussion.

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

ANSC 350. Fundamentals of Proteomics

1 credit. Lecture.

Principles and practices of various methodologies of protein separation science will be covered. The course intends to serve as an introduction to methodologies such as 1-D and 2-D electrophoresis, mass spectrometry, peptide mass fingerprint, tandem MS, protein identification by MS/MS, post-translational modification characterization etc. A lab exercise on database search on the internet is included.

ANSC 360. Research

1-6 credits. Independent study.

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

ANSC 366. Environmental Health

3 credits. Lecture.

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

ANSC 370. Current Advances in Epigenetics

1 credit. Seminar. This course can be repeated to a maximum of three credits. Also offered as MCB 370.

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

ANSC 390. Graduate Presentation Skills

1 credit. Lecture.

A discussion-based class which prepares students to make oral presentations.

ANSC 395. Independent Study

1-3 credits. Independent study.

ANSC 397. Animal Science Seminar

1 credit. Seminar.

Students present a seminar on the topic of their thesis research (Plan A) or project (Plan B).

†GRAD 395. Master's Thesis Research

1-9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

ANSC 477. Current Topics in Ovarian and Uterine Physiology

3 credits. Lecture.

An in-depth analysis of current topics in ovarian and uterine physiology, pregnancy and parturition.

†GRAD 495. Doctoral Dissertation Research

1-9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

ANTHROPOLOGY

Department Head: Professor W. Penn Handwerker
Professors: Boster, D'Andrade, Dewar, Linnekin,
 McBrearty, and Wilson

Associate Professors: Dussart, Erickson, Martínez,
 McBride, and Sosis
Assistant Professor: Munro

The Department of Anthropology offers programs leading to the M.A. and Ph.D. degrees in anthropology. Selected study areas at the Ph.D. level include: applied medical anthropology, ecology and evolution, globalization and transitional studies, New England ethnology and ethnohistory, Old World prehistoric archaeology, and psychological anthropology. Area strengths include Africa, Caribbean, Latin America, and North America, including both North American and other U.S. ethnic minorities. Interdisciplinary study in related fields may be pursued in consultation with the major advisor.

Admission Requirements. Applicants must present results of the General Test of the Graduate Record Examinations and three letters of recommendation. These should be sent directly to the Graduate School, University of Connecticut, 438 Whitney Road Extension, Unit 1006, Storrs, CT 06269-1006. The application deadline is December 1st.

The M.A. Program. An undergraduate major in anthropology is not required for admission to the M.A. program. Qualified students who hold a baccalaureate in various fields may be admitted provided that they meet the requirements of the Graduate School and the department.

The Ph.D. Program. The department admits into the Ph.D. program only those students whose past work in anthropology on either the undergraduate or the graduate level shows promise of high scholastic ability and whose research interests are compatible with the areas of specialization represented among the faculty. Students are expected to define at the outset the study area which they wish to emphasize. A period of field research normally precedes the writing of the dissertation.

Interdisciplinary Study. The medical anthropology area of emphasis involves course work and research in public health at the Health Center in Farmington.

COURSES OF STUDY

†ANTH 301. **Proseminar**
 1 credit. Seminar.

Current theories and issues in Anthropology.

ANTH 303. **Issues in Human Evolutionary Theory**
 3 credits. Lecture.

Evolutionary theory as it applies to human evolution and the implications of human evolutionary history for modern human physical characteristics, behavior, and social organization.

ANTH 305. **Investigation of Special Topics**
 1-6 credits. Seminar. May be repeated to a maximum of 24 credits with a change of course content.

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

ANTH 306. **Human Behavioral Ecology**
 3 credits. Seminar.

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

ANTH 308. **Human Evolutionary Theory**
 3 credits. Lecture.

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

ANTH 309. **Violence, Stress, and Social Support**
 3 credits. Seminar.

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

ANTH 311. **Seminar: Contemporary Theory in Social and Cultural Anthropology**
 3 credits. Seminar.

†ANTH 312. **Seminar: Contemporary Theory in Social and Cultural Anthropology**
 3 credits. Seminar.

ANTH 315. **Gender and Culture**
 3 credits. Seminar.

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

ANTH 321. **Ethnographic Methods I**
 1-3 credits. Seminar.

Theoretical foundations and basic tools used to conduct professional field studies in anthropology. Research design; moral and ethical dimensions of field work; designing and conducting informal, semi-structured and structured interviews (one-on-one and in groups); managing field notes, questionnaires, and data; computer data management; summary statistics and graphics; identifying and interpreting random variation; modeling and testing explanations.

ANTH 322. **Ethnographic Methods II**
 1-3 credits. Seminar.

Theoretical foundations and basic tools used to conduct professional field studies in anthropology. Research design; moral and ethical dimensions of field work; designing and conducting informal, semi-structured and structured interviews (one-on-one and in groups); managing field notes, questionnaires, and data; computer data management; summary statistics and graphics; identifying and interpreting random variation; modeling and testing explanations.

ANTH 332. **Cognitive Anthropology**
 3 credits. Seminar.

The study of how the content of thought or

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

ANTH 334. **Culture and Religion**
 3 credits. Seminar.

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

ANTH 335. **Psychological Anthropology**
 3 credits. Seminar.

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

ANTH 336. **Cultural Ecology**
 3 credits. Seminar.

Interrelationships between population organization in contrasting preindustrial societies.

ANTH 337. **Economic Anthropology**
 3 credits. Seminar.

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

ANTH 339. **Cultural Dynamics**
 3 credits. Seminar.

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

ANTH 341. **Analysis of Rituals**
 3 credits. Seminar. Prerequisite: Anthropology 311.

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

ANTH 343. **Anthropological Linguistics**
 3 credits. Seminar.

Interrelations of language and culture and applications of linguistic theory and techniques to analysis of ethnographic data.

ANTH 350. **Physical Anthropology**
 3 credits. Seminar.

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

ANTH 352. **Medical Anthropology**
 3 credits. Seminar.

An overview of current theory and practice in medical anthropology.

ANTH 353. **Applied Anthropology**
 3 credits. Seminar.

An overview of various applications of anthropology to solve human problems both internationally and within the United States. Emphasis upon history of

applied anthropology, ethical considerations, and specific roles of anthropologists in development.

ANTH 354. Contemporary Issues in Archaeology

3 credits. Seminar.

A critical review of current trends and developments in archaeological method and theory.

ANTH 356. History of Archaeological Theory

3 credits. Seminar.

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

ANTH 357. Settlement Systems

3 credits. Seminar.

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

ANTH 358. Analytical Methods in Archaeology

3 credits. Seminar.

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

ANTH 359. Advanced Analysis in Archaeology

3 credits. Seminar. Prerequisite: ANTH 358.

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

ANTH 361. The Ecology of Human Evolution

3 credits. Seminar.

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

ANTH 363. Archaeological Site Formation Processes

3 credits. Seminar.

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

ANTH 364. New England Prehistory

3 credits. Seminar.

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

ANTH 365. Northeast North American Ethnohistory

3 credits. Seminar.

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

ANTH 369. Culture and Reproduction

3 credits. Seminar.

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

ANTH 374. Culture, Power, and Social Relations

3 credits. Seminar.

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

ANTH 375. Ethnographic Methods Laboratory

1-6 credits. Seminar.

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

ANTH 376. Ethnomedicine

3 credits. Seminar.

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

ANTH 377. International Health

3 credits. Seminar.

The role of anthropology in international health, morbidity and mortality, population, maternal and child health, nutrition, infectious diseases and epidemiology, health care infrastructure and underdevelopment.

ANTH 381. Sex and Gender

3 credits. Seminar.

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

ANTH 382. Universals in Human Behavior

3 credits. Seminar.

Examination of evidence regarding cross-cultural universals in human behavior. Selected topics within the following domains may be reviewed: culture, social and emotional behavior; cognitive behavior and development; language and language acquisition.

ANTH 383. Parent-Child Relations in Cross-Cultural Perspective

3 credits. Seminar.

Critical analysis of research and theory regarding the antecedents and effects of major dimensions of parental behavior on child development in the U.S.A. and cross culturally. Possible topics include parental warmth, control, punishment and their interactions.

ANTH 389. Population Ecology

3 credits. Seminar.

This seminar surveys theory and observations bearing on the causes and consequences of changes in fertility and mortality rates, and in the configuration of causes of mortality and morbidity in human populations.

ANTH 390. Cultural Rights

3 credits. Seminar.

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

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

APPLIED MECHANICS

Courses and research opportunities leading toward the Ph.D. degree in the interdisciplinary area of applied mechanics are offered by the Applied Mechanics Committee of the School of Engineering. This Committee comprises faculty members from both the Civil and Environmental Engineering and the Mechanical Engineering Departments. Study areas include elasticity, plasticity, plates and shells, stability, dynamics, wave propagation, vibrations, and biomechanics.

The facilities of the departments are available and include solid mechanics, vibrations, and photoelasticity laboratories. In addition, the University Computer Center is available.

The major advisors authorized to supervise doctoral work in applied mechanics are M. Accorsi, J. DeWolf, H. Epstein, J.-H. Kim, R. Malla, and E. Smith in the field of study of civil engineering; and R. Jeffers, E. Jordan, K. Murphy, K. Reifsnider, N. Sammes, and P. Zhang in the field of study of mechanical engineering.

ART AND ART HISTORY

Department Head: Professor Judith Thorpe
Professors: Mazzocca, Muirhead, Myers, and Talvacchia

Associate Professors: Bock, D'Alleva, Deibler, DiCapua, Givens, Greeley, Hagen, Noelker, Oguibe, Orwicz, Scalora, Sloan, and Yegir

Assistant Professors: Dennis, Hoyt, Machida, Pritchard, and Zurolo

The Master of Fine Arts. The Master of Fine Arts degree, a terminal degree for studio artists, requires a minimum of two years study in residence. Graduate level studio work for the serious artist is desirable to enable intensive aesthetic experimentation assisted by the guidance of established professional artists. As a result of such experience, a student is expected to complete a body of art significant in content and of professional quality. Students develop a plan of study in consultation with a major advisor and advisory committee. While the program emphasizes individualized studies concentrating on and combining studio art areas such as ceramics, drawing, painting, photography, printmaking, and sculpture, there also are courses which enable students to engage other resources of the Department of Art and Art History and the University community.

Admission. Students are admitted to begin study in the fall semester only. Applicants for the M.F.A. degree must first meet the admission requirements of the Graduate School as specified in this Catalog. Consideration for admission also requires submission of the following to the Department of Art and Art History: (1) examples of recent original art presented in the form of photographic color transparencies, or a portfolio of actual works, or a combination thereof; (2) three letters of recommendation; (3) a personal letter of application; (4) official transcripts of all undergraduate and graduate level studies. The principal criterion for admitting applicants into the M.F.A. program is the quality of the art work submitted and the potential for graduate level development it suggests. Applicants are not required to take the Graduate Record Examinations or the Miller Analogies Test.

Plan of Study. Students establish their own direction and goals in consultation with a major advisor and an advisory committee. After such consultation, the plan of study is completed for the approval of the student's advisory committee. Candidates for the M.F.A. are required to complete a minimum of 60 credits of graduate course work. This total typically includes 39 credits of graduate studio art distributed as follows: 21 credits in an area of major emphasis, 12 credits outside the area of major emphasis, and six credits of M.F.A. project. An additional 15 credits are to be taken in non-studio graduate art courses and are distributed as follows: nine credits of graduate art seminar, three credits in historical and contemporary issues in art criticism, and three credits of special topics in art history. The remaining six credits are graduate electives. When deemed appropriate by the advisory committee, additional credits in advanced studio or art history may be required of students whose undergraduate backgrounds are deficient in these areas.

M.F.A. Project. Reserved for the last semester of study after candidacy review, the M.F.A. project requires accomplishment of a body of studio work culminating in a substantial exhibition for public viewing,

supported by a written statement, public presentation, and a photographic color-transparency portfolio. The advisory committee conducts an oral defense by the candidate of the completed body of studio work and of the written statement. The exhibition emphasizes work resulting from the M.F.A. project and courses taken in the final year of study. A public presentation is required in conjunction with the exhibition. The photographic color-transparency portfolio, which is to include each work in the exhibition, and the candidate's written statement should be prepared in duplicate for retention in the Department of Art and Art History and in the Art and Design Division of the Homer Babbidge Library.

Scholastic Standards. The advisory committee evaluates the student's program whenever a grade of C or lower is recorded for a graduate course. Progress in all courses is monitored by the advisory committee, particularly if a student's cumulative grade point average falls below 3.00 at any time during the course of study. The M.F.A. is not conferred unless the candidate maintains a cumulative grade point average of at least 3.00 in all course work.

□

The Master of Arts in Art History. Starting in Fall 2005, the Department will offer a Master of Arts program in Art History. The M.A. will emphasize the application of a range of investigative methods to historical and contemporary visual practices, exploring the ways they inform and organize our understanding of both Western and non-Western visual traditions. This interdisciplinary program provides students with a focused structure for advanced studies in the history, theory, and criticism of visual art. The program highlights the investigation of a range of theoretical and methodological approaches that engage art-making within its social, political and cultural contexts. The Master of Arts in Art History requires a minimum of two years study in residence.

Admission. Applicants for the M.A. degree must meet the admission requirements of the Graduate School as specified in this Catalog. Three letters of recommendation, preferably from members of the academic profession, along with a writing sample and personal statement from the applicant are required. Students are admitted to begin study in the fall semester only.

Advisory Committee. The advisory committee includes a major advisor and at least two associate advisors, one a member of the Art History faculty and one from outside the Department of Art and Art History. One associate advisor may be chosen from outside the University in accordance with Graduate School procedures.

Plan of Study. Candidates for the M.A. are required to complete a minimum of 30 credits of graduate course work including 18 credits of required work and twelve elective credits. A plan of study listing the courses to be taken must be prepared by the student, and approved by the advisory committee and the Graduate School. Other requirements including specifics regarding the language requirement, the M.A. Thesis, and the Final Examination are described in the pamphlet, *The Graduate Program in Art History*, which may be obtained from the Department of Art and Art History.

Foreign Language Requirement. A reading knowledge of one foreign language appropriate to scholarly research in art history is required. Mastery of French, Italian, Spanish, or German are accepted for this

requirement; others will be considered by formal petition. Proficiency may be demonstrated by passing a departmental language exam or by passing a graduate-level literature course at the University of Connecticut in one of the accepted languages with a grade of *B* or above. The language requirement must be completed before the student is eligible to take the M.A. Final Examination (Thesis Defense). Language proficiency is considered by the faculty in making graduate assistantship awards.

M.A. Thesis. The required M.A. thesis is a research paper of approximately 50 pages that is intended to demonstrate the candidate's mastery of independent scholarly study and a professional understanding of the discipline of art history.

Final Examination. The final examination or thesis defense is an oral examination under the jurisdiction of the advisory committee that deals primarily with the subject matter of the thesis.



Special Facilities. Since graduate students are required to work in the immediate University vicinity, individual or shared studio space is available for students in the M.F.A. program. Technical facilities are available in photography, printmaking, sculpture, and ceramics. Located on the main campus is the William Benton Museum of Art and within two hours of driving time from Storrs are the Wadsworth Atheneum, New Britain Museum of American Art, Boston Museum of Fine Arts, Worcester Art Museum, Yale Art Galleries, Lyman Allyn Museum, Slater Museum, and other notable museums and public collections. New York City is just under three hours travel time from the University campus.

COURSES OF STUDY

ART

ART 301. Graduate Studio Art (Ceramics)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 302. Graduate Studio Art (Graphic Design)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 303. Graduate Studio Art (Painting)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 304. Graduate Studio Art (Photography)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 305. Graduate Studio Art (Printmaking)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 306 Graduate Studio Art (Sculpture)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 307 Graduate Studio Art (Drawing)
3-6 credits. Laboratory. Open to students in Studio Art, others with permission.

ART 310. Graduate Art Seminar
3 credits. Seminar. Open to students in Studio Art, others with permission.
Discussions, readings, and analyses relating current studio work to contemporary trends in art.

ART 330. Interdisciplinary Study
3-6 credits. Practicum. Open to students in Studio Art, others with permission.
Special course work that combines resources in art and/or areas outside of art.

ART 340. Studio Art Instruction and Curriculum Planning
3 credits. Lecture. Must be taken in the first semester in the initial program year by all graduate students with teaching appointments.
Teaching methods, strategies, and curriculum planning in studio art instruction.

ART 392. Independent Study
3-6 credits. Independent Study. Open to students in Studio Art, others with permission.

ART 397. M.F.A. Project
6 credits. Practicum. Open to students in Studio Art, others with permission.
Studio work culminating in required exhibition, supported by a written statement, public presentation and photographic color-transparency portfolio.

ART HISTORY

ARTH 319. Theories of Visual Representation
3 credits. Seminar.
Theoretical and interpretive practices that have shaped the field of art history, including: Marxism, psychoanalysis, semiology, and feminism.

ARTH 320. Historical and Contemporary Issues in Art Criticism
3 credits. Seminar.
Seminar investigating selected issues of significance to the criticism of the visual arts, involving a core of general reading and discussion on the history of art criticism from the eighteenth century to the present day. An individual research project culminating in an oral presentation and a final paper on the research are required.

ARTH 321. Historiography of Art History
3 credits. Seminar.
Philosophical, theoretical, cultural and historical issues that under write art historical methods

ARTH 322. Theory in Art History
3 credits. Seminar. Prerequisites: ARTH 319 and ARTH 321. May be repeated to a maximum of 6 credits with a change in course content.
Selected topics in theory and/or methodology.

ARTH 340. Museum Practices.
3 credits. Seminar. Prerequisites: ARTH 321 and ARTH 322.
Contemporary and theoretical issues in museum and exhibition practices directed toward their application in various internship contexts.

ARTH 383. Special Topics in Art History
3 credits. Lecture. Instructor consent required. May be repeated for credit with a change in course content. For M.F.A. students, consent of advisory committee and instructor required for enrollment beyond 3 credits.
Seminar focusing upon a special, limited topic in the history of art. The content will vary from semester to semester.

ARTH 392. Independent Study
3 credits. Independent study. May be repeated to a maximum of 6 credits with a change in course content.
Independent study in Art History.

ARTH 397. Museum Studies Internship
3 credits. Practicum. May be repeated to a maximum of 6 credits with a change in course content.
Internship practicum in museum, gallery, or other curatorial context.

ALL SECTIONS

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

BIOMEDICAL ENGINEERING

Program Director: Professor John D. Enderle

Biomedical Engineering (BME) is a profession involving engineering and the life sciences, physical sciences and medical science to understand problems in physiology and biology and improve human health. The BME Graduate Handbook at the website <http://www.bme.uconn.edu> further describes the program.

The goal of the biomedical engineering graduate program is to provide students the interdisciplinary training in biological and medical sciences, physical sciences, and engineering necessary to solve complex biomedical problems. Faculty members from engineering, biomedical sciences, materials sciences, chemistry, physics, medicine, and dental medicine form an interdisciplinary graduate degree program that spans the University of Connecticut campuses at Storrs and at the Health Center (UCHC) in Farmington. Biomedical engineering can embrace the following diverse yet complementary research areas: biochemical engineering, bioinformatics, bioinstrumentation, biomaterials, biomechanics, biomedical imaging/biosignal processing, biosensors, biotechnology, cellular and tissue engineering, clinical engineering, ergonomics, medical informatics, physiological systems modeling, and rehabilitation engineering.

An entering student's primary undergraduate training may be in engineering, the physical sciences, medicine or biology. However, all students must demonstrate competence in mathematical analytical methods, certain basic and advanced skills in engineering and computer science, as well as knowledge of core fundamentals of biomedical engineering at the time of their graduation. Plans of study are developed in consultation with the student's advisory committee, are designed to meet individual needs and program requirements.

Application Procedure. Applicants are required to submit three letters of recommendation (preferably from members of the academic profession), a personal letter from the student describing their interest in biomedical engineering and the application to the Graduate School. The GRE and TOEFL (minimum score of 550) are required only for students with an undergraduate degree from a non-US institution.

The M.S. Program. Students whose primary training is in engineering can prepare themselves for entrance into one of the biomedical fields by completing a program leading to the master's degree in biomedical engineering. The program also offers the biology and chemistry student a means of achieving the mathematical, engineering, and instrumentation skills necessary for a career in biomedical engineering after completing remedial coursework.

Only the Plan A (thesis option) is offered. Eight graduate courses (24 credits), nine credits of Master's Thesis Research (GRAD 395), and the writing and oral defense of a thesis are required. Courses required of all M.S. students include: BME 310, BME 311 or BME 354, BME 312, BME 313 and BME 315. The remaining courses are selected from the BME course offerings and should be consistent with the student's background, interests, and career plans. Master's students are required to present and publish their MS research at a

conference (or have their paper accepted before graduation). Exceptions to the specified M.S. course requirements must be approved by the BME Program Director.

The Ph.D. Program. Applicants to the Ph.D. program are expected to demonstrate outstanding ability and to show, based on their record of previous scholarship and experience, that they are likely to do superior creative work in their respective fields. Holding a master's degree from this or any other institution does not render the applicant automatically admissible to a doctoral program. In general, doctoral applicants must meet all admission requirements for the BME MS degree and must present evidence that they are capable of doing independent work of distinction. Exceptional students with a BS degree may be directly admitted into the BME Ph.D. program. It is recommended, however, to first earn a BME MS degree before starting Ph.D. studies.

Beyond the MS, a minimum of 24 credit hours of BME course work is required for the Ph.D. Additionally, 15 credits of Doctoral Dissertation Research (GRAD 495) are required. There is no language requirement for a Ph.D. in BME.

If a doctoral student has not taken the five required MS courses or their equivalents (see "The MS Program"), these courses are required in addition to the course work and research credits otherwise required for the Ph.D. The BME Program Director must approve any exceptions to the course requirements.

The BME Ph.D. program requires the passing of two tests, the Qualifying Exam and the General Exam. Admitted Ph.D. students must pass the BME Qualifying Exam within their first year of study. The exam is given once a year in May. The objective of this exam is to determine the student's suitability to advance to candidacy for Ph.D. studies in Biomedical Engineering. This examination seeks to evaluate a candidate's competency in basic skills and knowledge essential to conducting research in Biomedical Engineering by examining the student's grasp of material covered in the BME core curriculum. The Ph.D. Qualifying Exam is a written test given by the BME program with five parts that are based on the candidate's in-depth grasp of the material in five of the following seven core areas: BME 310, BME 311 or BME 354, BME 312, BME 313, BME 315, BME 360 and BME 380. Students who have passed any of these courses at the University of Connecticut with a grade of B or better will automatically pass the portion of the Qualifying exam related to that course, and therefore do not need to take that part of the exam.

All Ph.D. Candidates must take the BME General Exam no later than nine months before defending their dissertation at a time arranged between the Ph.D. Candidate and Advisory Committee. The objective of the General Exam is to evaluate a PhD candidate's competency in developing and formulating a research project and the student's ability to approach a new problem in ways appropriate for an independent scientist. The exam will consist of a research proposal based on the student's research project. At least two weeks prior to the exam, the student will submit a written research proposal (approximately 40 pages) to the advising committee. The general exam is mainly an oral defense of this research proposal by the student. The committee tries to evaluate the candidate's competency in developing and formulating the research project, as well as the scientific merits of the project, research hypothesis, research methods, potential findings, implications and limitations. The General Exam must be

conducted by at least five faculty (including the Ph.D. Candidate's Advisory Committee) in the fields related to the student's project. There are no exemptions from the General Exam.

Research required for the doctoral degree in biomedical engineering involves the use of advanced engineering techniques for the solution of a biological or medical problem. Ph.D. candidates must submit at least two journal papers to a leading BME journal before graduation, with at least one of them having gone through the review process favorably. Note that the journal submissions must be full papers, with two short papers the equivalent of a full paper.

Clinical Engineering Internship. This is a hospital-based, two-year program supported by the clinical engineering departments of Hartford Hospital, The John Dempsey Hospital (UCHC), Baystate Medical Center, UMass Medical Center, Rhode Island Hospital and West Haven V.A. Hospital. Applications should be received by January 1 for full consideration. As part of the selection process, applicants are invited to the hospital and campus in February and March for interviews. The interview is required to secure a graduate assistantship (paid internship). Final selections are made in April for Fall admission. Each intern is expected to spend 20 hours per week in a hospital's clinical engineering department. The primary objectives are to: (1) provide exposure to hospital organization and administrative structure; (2) provide an opportunity to apply engineering techniques to patient care and hospital-based research; and (3) provide substantial hands-on experience working with health care technology and hospital personnel, including administrators, nurses, technicians and medical staff. Clinical engineering trainees are supported by stipends contributed by the participating hospitals. Students accepted for the internship earn a Plan A Master's degree.

The following courses are required of all Clinical Engineering interns: BME 310, BME 311 or BME 354, and BME 350. The remaining courses are taken only from the BME course offerings, and should be related to the student's background, interests and future career plans. The BME Program Director must approve any exceptions to the course requirements.

Industrial Engineering Internship. The industrial internship offers an in-depth, vigorous, industrial experience that complements the engineering expertise gained in the classroom. Students in the industrial internship can earn an MS and Ph.D. degree. Companies located throughout New England participate in the program. The primary objectives of this industrial internship program are to provide: exposure to the industrial workplace; the opportunity to apply engineering knowledge and expertise to a variety of industrial projects; and the opportunity to interact with a variety of industrial work groups, including administrators, engineers, and technicians.

Additional details are contained in the BME Graduate Handbook.

Research Facilities. Because of the interdisciplinary nature of the Biomedical Engineering field of study, graduate research facilities in biomedical engineering are diverse, and can be found in the various academic departments of the biomedical engineering major advisors on the Storrs campus and at the University of Connecticut Health Center in Farmington.

Graduate Advisors in Biomedical Engineering. The following faculty serve as graduate major advisors in the biomedical engineering research areas listed below:

Biochemical Engineering: P. Campagnola, M. Epstein, C. Erkey, W. Mohler, R. Weiss, R. Srivastava, and T. Wood

Bioinformatics: I. Greenshields, I. Mandoiu, M. Sarfarazi, D. Shin, R. Simon, and C. Wolgemuth

Biomaterials: C. Davis, J. Goldberg, D. Kreutzer, L. Kuhn, W. Mohler, M. Wei, and R. Weiss

Biomechanics, Rehabilitation Engineering, and Ergonomics: D. Adams, M. Cherniack, C. Davis, J. Enderle, M. Epstein, P. Faghri, K. Kazerounian, M. L. Newport, N. Olgac, D. Peterson, and N. Warren

Biosensors and Bioinstrumentation: M. Escabi, M. Fox, F. Jain, D. Kreutzer, and Q. Zhu

Biotechnology: P. Campagnola, T. Chen, M. Epstein, D. Kreutzer, W. Mohler, and T. Wood

Cellular and Tissue Engineering: P. Campagnola, M. Epstein, D. Kreutzer, L. Kuhn, W. Mohler, M. Sarfarazi, and R. Simon

Clinical Engineering: J. Enderle

Imaging and Biosignal Processing: P. Campagnola, J. Enderle, M. Epstein, M. Escabi, M. Fox, L. Loew, D. Kim, W. Mohler, D. Oliver, R. Simon, and Q. Zhu

Neural Systems Engineering: J. Enderle, M. Escabi, D. Kim, D. Waitzman, C. Wolgemuth

Physiological and Biomedical Modeling: L. Bernstein, P. Campagnola, W. Chapple, V. Clark, D. Das, J. Enderle, M. Epstein, M. Escabi, D. Kim, D. Kreutzer, J. Ligas, L. Loew, W. Mohler, A. Moiseff, D. Oliver, C. Pilbeam and D. Waitzman

Program Director. For further information, contact the Program Director and Graduate Admissions Chair of the Biomedical Engineering graduate field of study, Dr. John D. Enderle, Biomedical Engineering, University of Connecticut, 260 Glenbrook Road, Unit 2247, Storrs, CT 06269-2247. Phone: (860) 486-5521. FAX: (860) 486-2500. E-mail: jenderle@bme.uconn.edu

COURSES OF STUDY

BME 300. Special Topics in Biomedical Engineering

1-6 credits. Lecture.

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

BME 310. Physiological Systems I

3 credits. Lecture. Recommended preparation: BME 210 (or equivalent).

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

BME 311. Clinical Instrumentation. Systems

3 credits. Lecture. Recommended preparation: ECE 210W, BME 251, and BME 252 (or equivalent).

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

BME 312. Human Biomechanics

3 credits. Lecture. Recommended preparation: BME 261W (or equivalent).

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

BME 313. Biomaterials and Tissue Engineering

3 credits. Lecture. Recommended preparation: BME 271 (or equivalent).

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

BME 315. Physiological Modeling

3 credits. Lecture. Recommended preparation: BME 210 and BME 251 (or equivalent).

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

BME 316. Computational Neuroscience

3 credits. Lecture.

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

BME 318. Physiological Systems II

3 credits. Lecture. Prerequisite: BME 310 or consent of the instructor. Enrollment limited to BME students in the Ph.D. program. Also offered as MEDS 472.

A problem based learning course that focuses on in-depth coverage of four human organ systems with an engineering perspective. An extensive literature review is required for each topic which culminates in a major report that highlights the engineering standpoint unified mathematically. Case studies are used to develop each topic. Format: didactic session followed by group problem solving.

BME 320. Independent Study

1-3 credits. Independent study.

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

BME 321. Biochemical Engineering

3 credits. Lecture. Also offered as CHEG 373.

Principles and design of processes involving biochemical reactions. Nature of biological materials,

biochemical kinetics, heat and mass transfer, application to fermentation and other biological processes.

BME 331. Biofluid Mechanics

3 credits. Lecture. Prerequisite: BME 312.

Provides a foundation for continued studies of biofluid mechanical subjects. Topics covered include kinematic principles, the Navier-Stokes equations, the vorticity equation, unsteady fluid flows of physiologic relevance, turbulence and interfacial phenomena. Emphasis is placed on physical analysis of the cardiovascular and pulmonary systems, as well as of other biologic systems of interest.

BME 350. Clinical Engineering Fundamentals

3 credits. Lecture.

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

BME 351. Engineering Problems in the Hospital

3 credits. Lecture.

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

BME 352. Human Error and Medical Device Accidents

3 credits. Lecture.

This course teaches the basic principles needed to analyze medical devices, medical device users, medical device environments and medical device accidents. It particularly focuses on human factors engineering as an important step to minimizing human error. The role of medical device manufacturers, medical device regulators and medical device owners will be examined to identify their role in reducing medical device use errors and medical device accidents. The nature and types of human error as well as a taxonomy of medical device accidents will also be presented. Investigative techniques involving root cause analysis and failure modes and effects analysis will be taught and applied to industrial and

medical device accidents. Operating room fires, electrosurgical and laser burns, anesthesia injuries, infusion device accidents, catheters and electrode failures and tissue injury in the medical environment will be discussed in detail. A semester project will require the student to employ these tools and techniques to analyze a medical device accident.

BME 353. Biomedical Instrumentation Laboratory

3 credits. Lecture.

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

BME 354. Biomedical Instrumentation I
3 credits. Lecture. Prerequisite: BME 311 or consent of the instructor.

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

BME 355. Biosensors

3 credits. Lecture. Prerequisite: BME 311 or consent of the instructor

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

BME 356. Medical Instrumentation in the Hospital

3 credits. Lecture.

This course will examine 10-12 current major technologies in use by healthcare practitioners. It will review the physiological principles behind each technology, the principles of operation, major features, methods for testing and evaluating each technology and will highlight available versions of the devices on the market today. Technologies to be covered will be selected from anesthesia equipment, surgical and ophthalmic lasers, cardiac assist devices, surgical & endoscopic video systems, radiographic and fluoroscopic devices, CT, MRI, ultrasound imaging equipment, radiation therapy, nuclear medicine, clinical chemistry analyzers, spectrophotometers and hematology analyzers. The course will be based on one text, selected manufacturers training documents as well as journal articles from current medical publications. Grading will be based on exams, quizzes, a semester project and class participation. Several classes will take place on site in Hartford area hospitals in order to observe and examine the equipment being discussed.

BME 357. Neuronal Information Processing and Sensory Coding

3 credits. Lecture. Prerequisite: BME 315 or consent

of the instructor. This course and ECE 372 may not both be taken for credit.

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

BME 358. Biomedical Imaging

3 credits. Lecture. Recommended preparation: BME 251 or ECE 232 (or equivalent).

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

BME 359. Advanced Ultrasonic Imaging Techniques

3 credits. Lecture. Prerequisite: EE 378.

Introduction to advanced techniques of ultrasonic image formation for biomedical applications. Introduction to acoustic wave propagation. A, B, C, M and Doppler ultrasonic imaging modes. Interaction of ultrasound with biological tissue. Acoustical holography. Ultrasonic transducer design and calibration. Transducer arrays. Ultrasound detection modes. Laboratory demonstrations will include Schlieren visualization of ultrasound fields and transducer calibration techniques. Assumes a background in linear systems.

BME 360. Medical Imaging Systems

3 credits. Lecture. Prerequisite: BME 311 or BME 354 or consent of the instructor.

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

BME 361. Systems Identification of Physiological Systems

3 credits. Lecture. Prerequisite: BME 315 or consent of the instructor.

Overview of linear and nonlinear methods for determining the input-output relationship of sensory and other physiological systems. Topics include: white noise analysis using the Volterra and Wiener expansion of non-linear system, moving average and autoregressive models, transfer function method, parametric identification using least-squares method, multi-input systems, spectrottemporal and spatiotemporal reverse correlation, spectral estimation methods using coherence. Examples from a host of neuronal systems will be provided, including the mammalian and amphibian visual and auditory systems

BME 362. Biosolid Mechanics

3 credits. Lecture. Prerequisite: BME 312 or consent of the instructor. Recommended preparation: BME 261, CE 287, and BME 312 (or equivalent).

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

BME 363. Biodynamics

3 credits. Lecture. Prerequisite: BME 312 or consent of the instructor.

Dynamic modeling of biological systems using three-dimensional rigid body dynamics with a review of kinematics and kinetics and three-dimensional vector calculus. Applications of Newton's Laws and Lagrangian Equations presented. A critical review of various biodynamic assessment techniques and the principles of their operation will also be discussed. Biodynamic data analysis techniques will be shown along with fundamental model construction.

BME 365. Cellular Systems Modeling

3 credits. Lecture. Prerequisite: BME 312.

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

BME 366. Introductory Ergonomics for Biomedical Scientists and Engineers

3 credits. Lecture. Prerequisite: BME 312 or consent of the instructor.

This problem-based course begins with a work-related overview of the design strengths and limitations of human anatomy and physiology (molecular, tissue and systems levels). Definition and measurement of normal and non-normal or pathological conditions are explored. Measurement of the response of these biological tissues and systems to work-related stressors is examined, to define the mechanism and presentation of musculoskeletal disorders. The course focuses on the translation of external exposure to internal response, with experience in modeling these mechanisms. The course addresses physiological and anatomical damage due to both biomechanical and psychosocial stressors and explores the range of possible control strategies of interest to the engineer and public health

practitioner. These range from job- and task-specific engineering changes to organization-level interventions. Finally, the course explores the role of human cognition and perception in work performance and the contribution of work/worker mis-matches to the development of disease. A research project is required.

BME 367. Exposure Assessment in Ergonomics

3 credits. Lecture. Prerequisite: BME 366 or consent of the instructor.

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

BME 380. Bioinformatics

3 credits. Lecture. Recommended preparation: BME 280 (or equivalent).

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

BME 381. Computational Cell Biology for Biomedical Engineers

3 credits. Lecture.

In the last decade, interdisciplinary science has established itself as a leading area of scientific investigation. The use of physics and mathematics to help understand biological systems hints at being one of the major scientific frontiers of this coming century. This course looks at biology at three separate length scales: molecular, cellular, and organismal/population. We will find that the math/physics of elasticity, hydrodynamics, statistical mechanics and reaction/diffusion can explain a broad range of phenomena throughout these size ranges. This course stresses the physical intuition of how to apply quantitative methods to the study of biology through the use of dimensional analysis, analytic calculation and computer modeling.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

BIOMEDICAL SCIENCE

Field of Study Coordinator: Assistant Professor H. Leonardo Aguila

The following programs leading to the Ph.D. degree in various areas of the biomedical sciences are offered at the University of Connecticut Health Center at Farmington. Further information about these programs may be obtained from the Biomedical Science Graduate Admissions Committee, University of Connecticut Health Center, Farmington, Connecticut 06030-3906.

Cell Biology

Program Director: Assistant Professor Linda Shapiro

Professors: A. Arnold, Berlin, Carmichael, A. Fein, Feinstein, Hansen, Hla, Jaffe, Koppel, Liang, Loew, Peluso, Pfeiffer, Rowe, Schenkman, Sha'afi, White, and C. Wu, G. Wu

Associate Professors: Claffey, R. Clark, Furneaux, Hurley, S. King, Maulik, Pachter, Pilbeam, Rosenberg, Terasaki, Watras, and D. Wu

Assistant Professors: Bansal, Campagnola, Caron, Cowan, Dodge, Dorsky, Fong, Graveley, Han, Huber, Mehlmann, Menoret, O'Rourke, Rodionov, Shapiro, Tirnauer, Wolgemuth, and Yue

The Cell Biology graduate program offers a program of study for the Ph.D. degree with comprehensive training in the modern molecular and cellular research. The program is composed of Health Center faculty from basic as well as clinical departments, all of whom are conducting state-of-the-art research. The fundamental philosophy of the Cell Biology program is to advance knowledge in basic and clinical problems from the cellular and molecular perspective.

The program is particularly strong in these research areas: angiogenesis, cancer biology, cytoskeleton and molecular motors, gene expression, molecular medicine, optical methods, reproductive biology, sensory transduction, signal transduction, tumor immunology, and vascular biology.

Genetics and Developmental Biology

Co-Program Directors: Assistant Professor Brenton

Graveley and Assistant Professor William Mohler
Professors: Arnold, Carmichael, Das, King, Hansen, Helfand, Hla, Jaffe, Kosher, Kream, LaLande, Maxwell, Morest, Peluso, Radolf, Rossomando, Rowe, Sarfarazi, Tsiouras, Upholt, White, Wikel, and Wu

Associate Professors: Clark, Dealy, Epstein, Gunzl, Kuchel, Lichtler, Mayer, Mina, Reenan, and Rosenberg

Assistant Professors: Ben Mamoun, Claffey, Fang, Fong, Graveley, Kresch, Li, and Rogina

The Ph.D. program in the area of concentration of Genetics and Developmental Biology provides qualified students with fundamental interdisciplinary training in modern molecular genetics and developmental biology, emphasizing cellular and molecular aspects as well as tissue interactions. Primary emphasis is placed upon regulation of gene expression and molecular events in development. Areas of emphasis include the

mapping and cloning of human genes responsible for disease, RNA processing (including RNA editing, alternative splicing, antisense regulation, and RNA interference), the molecular mechanisms of aging, signal transduction pathways, microbial pathogenesis, developmental neurobiology, cell differentiation, musculoskeletal development, morphogenesis and pattern formation, reproductive biology and endocrinology. Faculty members are from several basic science and clinical departments and study a wide range of organisms including yeast, worms, fruit flies, mice, and humans.

Immunology

Program Director: Associate Professor Lynn Puddington

Associate Program Director: Assistant Professor Anthony Vella

Professors: Bigazzi, Cone, Das, Goldschneider, Kreutzer, Lefrançois, Lorenzo, Mukherji, J. O'Rourke, Radolf, Rajan, Srivastava, Thrall, and Wikel

Associate Professors: Clark, Huang, Puddington, and Zeff

Assistant Professors: Adler, Aguila, Li, McSorely, Vella, and C. Wu

The Ph.D. program in the area of concentration of Immunology is focused on the cellular and molecular aspects of immune system structure and function in animal models and in humans. Areas of emphasis include: (1) Innate and adaptive immune responses to infectious agents including viruses, bacteria, or parasites; (2) Anti-tumor immunity and immunotherapy; (3) Hematopoiesis and development of cells of the adaptive (lymphocytes – T or B cells) or the innate immune system (NK cells, dendritic cells, osteoclasts); (4) Organ-specific inflammatory diseases of the respiratory (asthma) or gastrointestinal tracts (inflammatory bowel disease); and (5) Autoimmunity including pathogenesis and prevention (tolerance and immunoregulation).

Cellular and Molecular Pharmacology

Program Director: Professor Joel Pachter

Professors: Cinti, Feinstein, Pachter, Pappano, Ressler, Rosenberg, Schenkman, and Winokur

Associate Professors: Epstein, Levine, Smilowitz, and Watras

Assistant Professors: Americk, Brocke, Jansson, Lambrecht, O'Rourke, and Stoilov

The Ph.D. program in the area of concentration of Cellular and Molecular Pharmacology includes the study areas of neuropharmacology, cardiovascular and pulmonary pharmacology, immunopharmacology (with an emphasis on neuroimmunology) and chemotherapy and enzymes of xenobiotic biotransformation. Signal transduction at the cellular and subcellular level is the broad, underlying theme of the interdisciplinary research that includes faculty from other basic science departments at the Health Center. Signaling mechanisms from the plasma membrane to the nucleus are represented in the research programs of the faculty.

Molecular Biology and Biochemistry

Program Director: Associate Professor Henry Furneaux

Professors: Bonovsky, Carmichael, Carson, Das, Eipper, Eisenberg, Hla, G. King, S. King, Klobutcher, Koppel, Osborn, Ozols, Pfeiffer, Rothfield, Setlow, Shanley, Weller, and Wikel

Associate Professors: Cowan, Furneaux, Gunzl, Hoch, and Peng

Assistant Professors: Ben Mamoun, Gryk, Heinen, Maciejewski, Schiller, and Ton-That

The Ph.D. program in the area of concentration of Molecular Biology and Biochemistry explores biological phenomena at the molecular level with special emphasis on the genetic and biochemical mechanisms controlling biosynthesis, structure and function of macromolecules and their assembly into organized cellular structures. There are five major study areas: (1) relation of the structure of macromolecules to their function, with special emphasis on the structural base for the activity of enzymes and the interactions of macromolecules in biological systems; (2) biosynthesis of macromolecules, including nucleic acids, proteins, and polysaccharides; (3) control of gene expression in bacteria, viruses and eucaryotic cells; (4) assembly of macromolecules into complex cellular structures during the processes of cellular development and differentiation; and (5) genetic and molecular basis of complex cellular processes, such as cell division and cellular development and differentiation.

Neuroscience

Program Director: Associate Professor Sandra Hewett

Professors: Barbarese, Carson, Deckel, Eipper, Frank, Kim, Kuwada, Loew, Mains, Maxwell, Morest, Oliver, Pachter, Papermaster, Pappano, Pfeiffer, Potashner, Smilowitz, and Trahiotis

Associate Professors: Bansal, Bernstein, Epstein, Helfand, S. Hewett, Shoemaker, and Waitzman

Assistant Professors: Antic, Bansal, Buell, Conti, J. Hewett, Levine, McCullough, Rasband, Reenan, Schiller, Wang, and Zecevic

The neuroscience program takes an interdisciplinary approach to research with the goal of understanding function and dysfunction of the nervous system. This interdepartmental program of study encompasses experimental approaches that range from molecules to complex systems, including cellular, molecular, and developmental neurobiology, neuroanatomy, neurophysiology, neurochemistry, neuroendocrinology, neuropharmacology, and neuropathology. Specific topics include the biology of neurotransmission; synthesis, storage and secretion of neuropeptides; structure and function of voltage-sensitive ion channels; control of gene expression and membrane biogenesis in neurons and glia; RNA trafficking in neurons and glia; electrophysiology of excitable tissue; development of the autonomic nervous system; stimulus coding, synaptic organization, development of sensory systems; structure and

function of auditory and gustatory systems; mathematical modeling; degeneration, regeneration, and plasticity. Diseases/disorders of focus include Stroke, Epilepsy, Huntington's disease, Multiple Sclerosis, deafness/hearing loss.

Skeletal, Craniofacial and Oral Biology

Program Director: Professor William Upholt

Professors: Arnold, Frank, Goldberg, Gronowicz, Hand, Hansen, Helfand, Hurley, Kosher, Kream, Lalande, Lefrançois, Lurie, Mina, Pilbeam, Rossomando, Rowe, Tanzer, Tsiouras, and Upholt

Associate Professors: P. Epstein, Dealy, Gronowicz, Helfand, Hurley, Lichtler, Mina, and Pilbeam

Assistant Professors: Delany, Dongari-Bagtzoglou, Kuhn, Mallya, Reichenberger, and Rogina

This program provides students with interdisciplinary research training in the areas of skeletal, craniofacial, and oral biology, emphasizing contemporary research technologies in cell, molecular, and developmental biology, genetics, and biochemistry. Trainees may enter a Ph.D. Program, a dual D.M.D./Ph.D. or M.D./Ph.D., or a combined Dental Residency/Ph.D. Program. Thus the Program prepares trainees for academic or industrial careers in the basic biomedical sciences, or for academic careers in Medicine or Dental Medicine. Areas of research include regulation of the formation, outgrowth, and patterning of the developing limb; control of cartilage differentiation, endochondral ossification, osteogenesis, and joint formation; molecular regulation of gene expression in bone; homeobox gene regulation of osteoblast differentiation; gene therapy of bone diseases; hormonal and cytokine regulation of bone growth, formation, and remodeling; control of craniofacial skeletogenesis and tooth development; biochemistry, function, and regulation of the extracellular matrix; signal transduction and intracellular signaling pathways; cellular and molecular aspects of the pathogenesis of inflammatory disease; microbiology, pathogenesis, and immunology of caries and periodontal disease; neural structure and function in the gustatory system; biomaterial development for tissue engineering; bone cell/implant interactions; and, analysis of oral and mucosal function and disease.

Dual M.D./Ph.D. Degree Program. This program leads to the awarding of dual degrees, the M.D. and the Ph.D. It is designed for a small number of outstanding students who have clearly defined career goals of research and teaching in the general area of the biological and biomedical sciences and who have the motivation and the ability to pursue a rigorous training program in this area. The program provides basic science and research training as well as the standard medical curriculum, and is designed to produce individuals likely to make important contributions to the solution of problems of significance to the health sciences. The overall program is administered by the Committee on Graduate Programs at the University of Connecticut Health Center. The student applies as a Dual Degree applicant. The Steering Committee of the Dual Degree Program operating in conjunction with the

admissions committee of the School of Medicine, reviews the application and admits the student. The student normally completes the program, including the dissertation, in a period of approximately seven academic years, including summers. Assistantship support is provided to highly qualified individuals.

COURSES OF STUDY

Medical School Courses. These courses are offered by the Schools of Medicine and Dental Medicine and are open to qualified graduate students only. Permission from the Course Directors and the Dean for Academic Affairs (Dr. Bruce Koeppen) is required in writing in order to register. The syllabus will not be distributed to any student who does not have written permission. Forms are available in the Graduate School Office, Room LM035.

MEDS 306. Physiological Digital Imaging
3 credits. Lecture.

A combination lecture/seminar/project course in "Foundations of Imaging Science." It covers the principal mechanisms of physiological imaging in digital applications and focuses on critical analysis of the performance of modern imaging sensors, modeling and measuring of visual perception parameters for image information and optimizing of digital imaging for the life sciences, pathology and radiology, including teleradiology. The course is intended for anyone who works with or will use digital images.

MEDS 307. Critical Analysis of the Biological Literature
2 credits. Seminar.

This course is intended to develop and improve each student's capacity for critical analysis of research articles, with special emphasis on the logic used to frame hypotheses and justify conclusions. An understanding of experimental methods will also be emphasized. Each week one or two papers, across a wide spectrum of modern biomedical research, will be discussed in depth in a small group format.

MEDS 308. The Nature of Evidence in Scientific Research
2 credits. Discussion.

This course will examine the aspects of the scientific process that are common to all levels of biomedical investigations: from biophysics in cell-free systems to molecular biology in cells, to physiology in whole organisms, to epidemiology and clinical investigation in humans. These features begin with enunciation of the question to be asked, and include: (1) Identification of a system to address the question, (2) Specification of the systems and their manipulation, (3) Assessment of outcomes, and (4) Drawing inferences on the basis of results. The course will be designed as a discussion of seminal, published works on the topics. Two to three key papers will be distributed to participants at least one week before the scheduled discussions. There will be no examination for the course. Students are expected to actively participate in critical evaluation and discussion during

each of the weekly two-hour sessions. Evaluation of performances will be based solely on such participation.

MEDS 309. Molecular Basis of Disease
2 credits. Discussion. Prerequisite: MEDS 350 and MEDS 365.

This is a seminar and discussion based course that reviews the molecular understanding of human disease.

†MEDS. 310. Responsible Conduct in Research
1 credit. Discussion.

This course introduces the student to ethical and legal issues associated with the practice and reporting of science. The course uses a case study approach and requires in-class student participation.

MEDS 322. Developmental Biology
2 credits. Lecture.

This course covers history, concepts, and experimental strategies in both classical and modern developmental biology. Topics ranging from early fertilization, to early embryonic development, to the formation of adult structures are considered and compared in a range of model organisms. Class format includes one hour of lecture by instructors and one hour of literature analysis and discussion by students each week. Course grade will combine results of class participation and a final exam.

MEDS 323. Genetics and Developmental Biology Journal Club
1 credit. Seminar.

Reading and discussion of current research in the fields of genetics and developmental biology with emphasis on molecular aspects. Periodic presentation of research papers and active discussion will be expected of all participants.

MEDS 325. Practical Applications of Sequence Analysis
2 credits. Lecture.

Provides an understanding of how to analyze genetic sequence information by computer. Includes basic analyses such as restriction mapping and detection of coding sequences, to more advanced analyses such as sequence similarity searching, sequence comparisons and multi-sequence alignment, prediction of functional motifs from primary sequence information, and current tools for mapping, assembly, and analysis of genomic sequence information. The course emphasizes NCBI and other Web-based tools currently available for use. Students will be exposed to the Genetic Computer Group (GCG) series of sequence analysis programs, but these are not emphasized. Students are required to complete a series of computer-based exercises to demonstrate proficiency in the application and use of the various computer programs presented in class.

MEDS 329. Immunobiology I
2 credits. Lecture.

An overview of basic concepts in immunology including antibody structure, function and production,

molecular genetics of the immune system and cellular regulation of immunity.

MEDS 330. Immunobiology II
2 credits. Lecture. Prerequisite: MEDS 329.

This continuation of MEDS 329 will consider effect or mechanisms of the immune system in inflammation, hypersensitivity, transplantation and autoimmunity as well as regulation of the immune system by cells, cellular products and chemical or physical agents.

MEDS 333. Immunobiology of Transplantation
2 credits. Lecture.

Immunogenetics of transplantation, alloantigen reaction lymphocytes, afferent recognition phase of transplantation immunity, cellular effector mechanisms and antibody participation in transplant immunity.

MEDS 335. Advanced Molecular and Cellular Immunology I

4 credits. Lecture. Prerequisite: MEDS 329 and 330.

Major areas covered include: (1) Development of the immune system with respect to lymphoid organs and lymphocyte subsets; (2) Mechanisms of antigen processing and presentation; (3) Lymphocyte activation including the role of costimulatory molecules and (4) Regulation of the immune response including tolerance induction, cytokine interactions and signal transduction.

MEDS 336. Advanced Molecular and Cellular Immunology II.

4 credits. Lecture. Prerequisite: MEDS 329 and 330.

Major areas covered include: (1) Immunoglobulin genetics and structure; (2) T cell receptor genetics and structure; (3) Molecular nature of antigen recognition by T cell receptor; (4) Structure, function and molecular genetics of lymphocyte accessory molecules; (5) Mechanisms of cytotoxicity and (6) Complement and complement receptors.

MEDS 337. Immunopathology
3 credits. Lecture.

The immediate-type hypersensitivities will be considered, with special emphasis on anaphylactic-type responses, pathologic responses, pathologic responses to immunologic complexes, immunohematologic diseases and models such as virus immunopathology, and rheumatoid arthritis and systemic lupus erythematosus.

MEDS 341. Molecular Neurobiology of Excitable Membranes
3 credits. Lecture.

Emphasizes the relation between structure and function of biological interfaces that comprise electrically excitable and chemically excitable (synaptic) membranes. Models of electrically-and chemically-induced regulation of ion movement via channels and transporters are examined. Genetic manipulation of channel composition is evaluated with attention to altered function and inferences about their structure.

MEDS 346. Cyclic Nucleotide Metabolism - Second Messenger and Signal Transduction

2 credits. Lecture.

Reviews second messenger systems involved in receptor mediated signal transduction, including cyclic nucleotides, calcium, inositoltrisphosphate and tyrosine kinases. Proteins involved in signal transduction such as G proteins are also covered. Emphasis is mostly on cyclic nucleotides, with an examination of the enzymes which metabolize them (cyclases, phosphodiesterases), as well as those which mediate their actions (protein kinases).

MEDS 349. Principles of Pharmacology

1-3 credits. Lecture.

An introductory course covering the basic principles of Pharmacology. Introduces the student to the concept that drugs and chemicals act on the body by binding to receptors. The physico-chemical properties of ligand-binding to macromolecules is examined, followed by an examination of the nature of receptors and the mechanisms whereby they exert their physiological responses to pharmacological agents. The uptake and fate of xenobiotics (compounds foreign to the body) in the body is discussed. The responses to chemicals, as therapeutic agents, i.e., the desired correction of diseased conditions, as well as toxins, carcinogens and teratogens. The mechanisms governing these different responses are examined in detail.

MEDS 350. Biochemistry I

4 credits. Lecture.

Introductory biochemistry of protein structure, function and synthesis, enzymology, structure and replication of nucleic acids, membrane structure and function.

MEDS 351. Biochemistry II

3 credits. Lecture.

This course covers fundamentals of biomolecular interactions and protein structure. Additionally, the course covers the structure/function of select proteins and enzymes essential to the following: metabolic pathways, DNA/RNA transactions, gene expression, cell cycle and signal transduction, and the cytoskeleton.

MEDS 365. Genetics

3 credits. Lecture.

Introduction to the principles and practices of molecular genetics of prokaryotes and eukaryotes. Topics include gene structure and function; gene transfer and recombination; gene regulation; molecular genetics of eukaryotic viruses, yeast, *Drosophila*, somatic cells and humans.

†MEDS 367. Introduction to Molecular Biology and Biochemistry

1 credit. Lecture. Open only to students enrolled in the Biomedical Science doctoral program.

This course involves reading and discussing classic papers in Molecular Biology and Biochemistry in order to introduce first year students to the field and to develop critical skills. Topics will vary from year to

year but may include nature of the gene, basic principles of transcription, translation, DNA replication, and membrane structure.

†MEDS 368. Topics in Biochemistry and Molecular Biology

1 credit. Lecture. May be repeated to a maximum of 3 credits with a change in course content.

To be offered every semester by a different faculty member on a rotating basis. Topic to be determined by individual faculty member. The purpose of the course will be to discuss and critically evaluate relevant literature in each topic. The topics will include viral replication strategies, membrane molecular biology, growth factors and second messengers, molecular biology of microbial development, membrane receptors, extracellular matrix-cell interactions, and peptide hormones.

MEDS 369. Advanced Genetics and Molecular Biology

3 credits. Lecture.

An advanced course emphasizing approaches to the genetic analysis of eukaryotic systems including yeast, fungi, *Drosophila*, mice, and humans. Topics include genome organization, DNA replication, regulation of gene expression, development, and differentiation.

MEDS 370. Introductory Neuroscience

1 credit. Lecture.

This course will provide an introduction to neuroscience as a discipline and the important concepts and problems that make the nervous system unique. The nervous system consists of the brain, spinal cord, and peripheral nervous structures. Our scientific understanding of sensation, movement, emotional behavior, homeostatic systems, and cognition each require knowledge and understanding of the nervous system. This course will provide the student with an introduction to the neurobiological bases of these behaviors and the experimental approaches that underlie modern neurobiological research. The course will also introduce the student to the unique cell and molecular biology of the nervous system. Neuroscience, as a discipline, incorporates data from many other scientific fields to address fundamental problems. Therefore, one goal of the course is to show how our understanding of the nervous system requires the integration of data from disciplines like endocrinology, genetics, computation biology, engineering, and biophysics. In addition, this course will introduce common diseases of the nervous system. Diseases are instructional since dysfunction may help explain normal function. More important though is that the cure of diseases, such as stroke, Alzheimer's disease, and multiple sclerosis, provide a strong motivation for research in the nervous system.

MEDS 371. Systems Neuroscience.

2 credits. Lecture. Prerequisite: MEDS 370.

Part of the core series in the Neuroscience graduate program. This course will address the functional organization of neural systems underlying sensation, movement, language, learning/plasticity, and emotion/arousal. Sensory systems will include

the somatosensory, auditory, visual, vestibular, and chemosensory systems. Motor systems will include the spinal cord, brain stem, cerebellum, vestibular system, oculomotor system, basal ganglia and cerebral cortex.

MEDS 372. Neuroscience: Cellular and Molecular Neuroscience

2 credits. Lecture.

Part of a core series in the Neuroscience Program, this course provides an introduction to basic concepts in the study of cell biology, neuroanatomy, neurophysiology, neurochemistry, and molecular biology of the nervous system.

MEDS 374. Neuroscience: Structure, Function, and Development of the Nervous System

1-6 credits. Lecture. Prerequisites: MEDS 372 and 373.

Provides systematic coverage of neuroanatomy, neurophysiology, neuropathology, neurochemistry and developmental neurobiology (including embryology and neural plasticity). Introduction to neuroendocrinology, degeneration and regeneration, communicative sciences (speech, hearing, chemical senses, and psychophysics), and research methods.

MEDS 375. Neuroscience: Current Research Topics

1 credit. Seminar.

Review and critique of selected articles from the research literature. Specific topics are selected from each of the following areas; molecular neurobiology, cellular neurobiology, neurochemistry, neuroimmunology, electrophysiology, neuropharmacology, sensory neurobiology, and behavioral and cognitive neuroscience. Students will present oral reports on current literature and participate in discussion.

MEDS 376. Developmental Neurobiology

2 credits. Lecture. Prerequisite: MEDS 350.

Emphasis on the cellular and molecular mechanisms which underlie the development of the nervous system. Reading and discussion of research papers in the literature is stressed.

MEDS 377. Neurobiology of Hearing

3 credits. Lecture.

Provides in-depth analysis (using the Auditory System as a model system) with application of interdisciplinary approaches of cell and molecular biology, developmental neurobiology, neuroanatomy, neurophysiology/biophysics, neurochemistry, neural modeling, psychophysics, and plasticity, with state-of-the-art methods used in neuroscience research today. The team of faculty members contribute a variety of complementary fields of study.

MEDS 378. Computational Neuroscience

3 credits. Lecture.

Students study the function of single neurons and neural systems by the use of simulations on a computer. The course will combine lectures and classroom discussions with conducting computer simulations. The simulations will include exercises

and a term project. Each student will complete a term project of neural simulation to be developed during the second half of the semester. The topic of the term project should be approved by the instructors by the middle of the semester. The grade will be based on the exercises and the term project. Course includes: analysis of electrical circuits modeling neuronal cell membrane and the related differential equations; the Hodgkin-Huxley model of voltage- and time-dependent sodium and potassium conductances in the squid axon; voltage-clamp and current-clamp; the relationship between two rate constants versus the steady-state value and time constant underlying each conductance; neuronal response properties that are related to voltage-dependent and calcium-dependent ion channels; single- and multi-compartment models with ionic conductances simulating specific neuronal response properties described in the literature; excitatory and inhibitory postsynaptic currents and underlying ligand-gated ion channels; dendritic electrotonus and synaptic integration; temporal and spatial interactions of synaptic inputs to the dendritic tree and the cell body; action potential propagation in axons; neural circuits.

MEDS 380. Cell Biology

4 credits. Lecture. Prerequisite: MEDS 350.

Basic eucaryotic cell biology. Major topics include: Methods in Cell Biology; Cell Growth and Proliferation; Cytoskeleton; Transport: Hormone Response; Cytoplasmic Organelles and Membrane Structure, Function, Biogenesis, Transport and Sorting; Cell Motility; Chromatin Structure and Organization; and Extracellular Matrix and Cell Adhesion.

MEDS 381. Cell Biology and Physiology II

4 credits. Lecture. Prerequisite: MEDS 380.

Part I: Lecture format on membrane biophysics (membrane structure and permeability, electrical properties and gated channels, concentration gradients, volume and shape control, energy transduction, membrane dynamics). Part II: Lecture/Seminar format. Topics in receptors and channels, cell biology of the senses, cell junctions in the nervous system, growth factors and cell activation, cell cytoskeleton and matrix. Emphasis on in-depth discussions of specific cell systems through current literature. Final paper required in the form of research proposal.

MEDS 382. Molecular Mechanisms of Signal Transduction

2 credits. Lecture.

Intracellular signaling is one of the most rapidly advancing fields in cell biology. The objective of this course is to introduce to the students the most recent achievements in the field of intracellular signaling and regulation. Each of the participating faculty members will give an introductory lecture to provide an overview of signaling events in their field of expertise and discuss the most important recent papers.

MEDS 384. Mammalian Neuroanatomy

2 credits. Lecture. Prerequisites: MEDS 370 and MEDS 371.

The Mammalian Neuroanatomy course offers the

opportunity to learn the mammalian spinal cord and brain and to explore the relationship of structure and function in the nervous system. It is intended to complement courses that cover integrative, functional systems, and cognitive neuroscience. Using an informal, small-group, laboratory-based format, students will undertake an extensive analysis of histological cross sections of the central nervous system to learn to correlate brain and neuron structure with the function of neural systems. Students will explore the entire central nervous system in the human and the rat. Readings and discussions will address how structural information is obtained from the intact nervous system at sub-cellular, cellular, or tissue levels, and the students will learn how this information is applied to the analysis of neural systems. Additional activities will include dissection of the spinal cord and brain and the analysis of the human brain in magnetic resonance images (MRI) and computerized axial tomography (CAT) scans.

MEDS 385. Advanced Molecular Neuroendocrinology

3 credits. Lecture.

This course is a special topics discussion in current "hot topics" in cell and molecular endocrinology and neuroscience. The underlying theme is that the underlying biochemical and molecular events in many endocrine and neurobiological processes are unfolding, often raising more interesting new avenues of research as one area becomes clarified. The course will include studies of lower vertebrates and invertebrates, genetic approaches, a wide variety of molecular and biochemical techniques, as well as some electrophysiology and anatomical mapping as appropriate.

MEDS 388. Principles and Techniques of Biological Electron Microscopy

1-4 credits. Lecture.

A lecture/laboratory course on the theory and practice of transmission and scanning electron microscopy as applied in the biological sciences. Topics include instrument design and operation, electron optics, specimen preparation, photography, microscopic image interpretation and special techniques. Laboratory students learn and carry out commonly used preparative techniques, observe and photograph specimens in the electron microscope, and complete an independent project.

MEDS 391. Enzymes of Xenobiotic Biotransformation

2 credits. Lecture.

Lectures and student presentations of journal articles relevant to the lectures plus one laboratory. Topics include an overview of metabolic routes of drugs and chemicals in the body with an emphasis on the hepatic cytochrome P450 monooxygenases. Other topics include conjugative xenobiotic metabolizing enzymes.

MEDS 395. Independent Study

1-6 credits. Independent Study.

MEDS 400. Human Biology

1-9 credits. Lecture.

Introduces the histology of the major types of tissues and cellular ultrastructure. Following this introductory material, the students will dissect the limbs, and study epithelia, connective tissue, and skin including the extracellular matrix and body fluid compartments. The course will also cover muscle, bone, peripheral nerves, the neuromuscular junction, blood vessels, and other elements essential to understanding the function of the limbs. For all tissues considered, there will be an integrated presentation of structure, biochemistry, and physiology. Also, presents the general principles of biochemistry and molecular biology. Fundamental processes involved in cellular growth and division are included as well as an overview of metabolism and energy production. This is followed by consideration of cellular differentiation. Finally, there will be a survey of the general principles of immunology and the lymphoid tissues including the function of blood cells and coagulation.

MEDS 401. Organ Systems I

1-9 credits. Lecture

Presents, in an integrated fashion, the anatomy, histology, biochemistry, and physiology of the central nervous system. Concurrently, the students dissect the head and the neck.

MEDS 402. Organ Systems II

1-9 credits. Lecture.

Presents, in an integrated fashion, the anatomy, histology, biochemistry, and physiology of the cardiovascular, respiratory and renal-urinary systems. The emphasis is placed on how these organ systems interact and work together to maintain homeostasis. Concurrently, the students dissect the thorax. Introductory biostatistics and epidemiology are also presented at this time.

MEDS 403. Organ Systems III

1-9 credits. Lecture.

Presents, in an integrated fashion, the anatomy, histology, biochemistry and physiology of the gastrointestinal, endocrine and reproductive systems. Also presented is material related to principles of human genetics. At the same time, students dissect the abdomen and pelvis.

†MEDS 404. Correlated Medical Problem Solving - Part A

2 credits. Lecture.

This course serves to expand upon and integrate basic science concepts introduced in the Human Systems.

†MEDS 405. Correlated Medical Problem Solving - Part B

2 credits. Lecture.

Expands upon and integrates basic science concepts introduced in the Human Systems course.

MEDS 406. Human Development and Health

1-9 credits. Lecture.

This 170-hour course comprises (a) a multidisciplinary scientific survey of biological, psychological, and social development from conception to death; (b) an investigation of the behavioral and social dimensions of health and illness; (c) an introduction to principles of medical law and ethics applied to doctor-patient relationships and health care problems; and (d) an overview of the structure, function, and services of the American health care system and the political and economic forces shaping its evolution.

MEDS 407. Mechanisms of Disease: Part A

1-9 credits. Lecture.

General pathology, pharmacology and infectious disease.

MEDS 408. Mechanisms of Disease: Part B

1-9 credits. Lecture.

Diseases affecting homeostasis.

MEDS 409. Mechanisms of Disease: Part C

1-9 credits. Lecture.

Medicine. Oncology, metabolism, endocrinology, and the nervous system.

MEDS 410. Mechanisms of Disease: Part D

1-9 credits. Lecture.

Reproduction, immunology, and connective tissue.

†MEDS 411. Clinical Practicum

12 credits. Practicum.

Clinical experience in the major disciplines including: Medicine, Surgery, Obstetrics & Gynecology, Psychiatry, Family Medicine, and Pediatrics.

†MEDS 412 Advanced Clinical Practicum

11 credits. Practicum.

Advanced clinical work with opportunities in the major clinical disciplines.

MEDS 413. Cancer Biology

2 credits. Lecture. Prerequisite: MEDS 350 and MEDS380.

This is a survey course to explore the genetics and pathobiology of cancer by focusing on a variety of current research topics. Understanding the disease process requires studying normal mechanisms of growth control. Emphasis will be on topics such as differentiation, apoptosis, growth factors, oncogenes, tumor suppressor genes, viruses and signal transduction.

†MEDS 414. Advanced Correlated Medical Problem Solving - Part A

2 credits. Lecture.

Expands upon and integrates basic science concepts introduced in Human Development and Health and Mechanisms of Disease.

MEDS 416. Contemporary Topics in Oral Biology II

2 credits. Lecture.

A combination-lecture/seminar course which focuses on current investigation in the areas of dentomaxillofacial growth and development, oral microbiology and immunology, oromaxillofacial mineralized tissues, and salivary glands and saliva. Subject matter covered in this course and DENT 415 will rotate over a two to three year schedule.

†MEDS 417. Advanced Correlated Medical Problem Solving - Part B

2 credits. Lecture.

Expands upon and integrates basic science concepts introduced in Human Development and Health and Mechanisms of Disease.

†MEDS 418. Classic Papers in Molecular Biology and Biochemistry

1 credit. Lecture.

Students are required to read and critically analyze one or two papers selected by the instructor each week.

†MEDS 419. Classic Papers in Neuroscience and Immunology

1 credit. Lecture.

Students are required to read and critically analyze one or two papers selected by the instructor each week.

†MEDS 421. Classic Papers in Cell Biology and Developmental Biology

1-6 credits. Lecture.

Students are required to read and critically analyze one or two papers selected by the instructor each week.

†MEDS 422. Classic Papers in Cellular and Molecular Pharmacology

1 credit. Lecture.

Students are required to read and critically analyze one or two papers selected by the instructor each week.

MEDS 423. Cellular and Molecular Biology of the Vascular System

2 credits. Lecture.

Systematic survey of classic and current literature in vascular biology, emphasizing the molecular and cellular basis of the development, function, and malfunction of the vascular system.

MEDS 424. Neuropharmacology

2 credits. Lecture.

Highlights the different neurotransmitter and neuromodulator systems and the pharmacological agents that affect them. Emphasis is placed on the mechanisms of drug action in the treatment of nervous system and mental disease, serving to complement other courses in neuroscience, pharmacology, immunology, and pharmaceutical science.

MEDS 425. Neuroimmune Interactions

2 credits. Lecture.

Addresses the chemical and physical relationships between the immune system and the nervous system and emphasizes the coordinate operations of the two systems.

MEDS 430. Molecular and Medical Parasitology

2 credits. Lecture.

Provides students with an in-depth knowledge of classical and modern parasitology. The course will focus on the molecular and cellular bases of parasite development, differentiation, parthenogenesis and host-pathogen interactions. The course also will address the most recent advances in genomics, proteomics, bioinformatics and large-scale functional analyses and their contributions to treatment and prophylaxis of parasitic infections.

MEDS 439. Craniofacial Growth and Development

2 credits. Lecture.

MEDS 444. Molecular Microbiology

3 credits. Lecture.

Provides first and second year graduate students with a broad understanding of contemporary topics in bacteriology and virology. Although the course centers primarily around the more basic aspects of these two disciplines, the outline also includes sessions intended to relate this basic material to important issues in pathogenesis of bacterial and viral diseases.

MEDS 445. Skeletal Biology

3 credits. Lecture.

A comprehensive survey of the cellular and molecular mechanisms that regulate the development, growth, differentiation, remodeling, and repair of the skeletal system.

MEDS 447. Presentation of Scientific Data

1 credit. Lecture/Discussion.

Through a series of lectures and workshops, this course is designed to improve the ability of students to present scientific data in written and oral format. These skills are essential, not only as a graduate student, but in future careers as scientist. The curriculum covers basic elements and logical order of presentations. Reviewer's perspectives, grant writing resources, workshops, and evaluation of recent seminars help students to design and evaluate research projects.

MEDS 471. Physiological Systems I

3 credits. Lecture.

Designed for engineers or other graduate students without a life sciences background. Contents: introduction to cell structure and function; the cardiovascular, respiratory, and renal/urinary systems; the basics of hematology, and the interactions between these organ systems to transport oxygen and eliminate wastes. Format: didactic session followed by group problem-solving. Course grade will

be determined by level of participation in the problem-solving session and by two take-home problem-solving exams. This course is available to all students involved in the BEACON (Biomedical Engineering Alliance for Central Connecticut) program. Also offered as BME 310.

MEDS 472. Physiological Systems II
3 credits. Lecture. Prerequisite: MEDS 471 or BME 310 or consent of instructor.

A problem based learning course that focuses on in-depth coverage of four human organ systems with an engineering perspective. An extensive literature review is required for each topic which culminates in a major report that highlights the engineering standpoint unified mathematically. Case studies are used to develop each topic. Format: didactic session followed by group problem solving. Also offered as BME 318.

MEDS 479. Chemistry and Biology of Drugs of Abuse
5 credits. Lecture.

An in-depth interdisciplinary approach to the neurobiology of drug abuse, integrating basic and clinical sciences. Lectures, student presentations of original research reports, and laboratory exercises dealing with methods to measure neurotransmitter transport, ligand binding to receptors and transmitter action on ligand-activated channels.

MEDS 495. Independent Study
1-6 credits. Independent study.

A reading course for those wishing to pursue special topics in the biomedical sciences under faculty supervision.

MEDS 496. Laboratory Rotation
1-6 credits. Laboratory.

MEDS 497. Graduate Seminar
1-6 credits. Seminar.

Reading and discussion of recent research developments in various areas of biomedical science.

†**GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.

†**GRAD 496. Full-Time Doctoral Research**
3 credits.

†**GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

BIOTECHNOLOGY

Biotechnology is the high technology field that applies basic knowledge in biology and materials of biological origin to the development of products and processes with practical applications. Although the basis of biotechnology is in molecular biology, its practice is highly interdisciplinary. Chemists and chemical engineers play essential roles in the design and development of processes, and applications are developed by workers in medicine, agriculture, pharmaceutical science, environmental science, and other fields.

The M.S. Program. The Master of Science degree in Biotechnology is directed by an interdisciplinary graduate faculty from the College of Agriculture and Natural Resources, the College of Liberal Arts and Sciences, the School of Engineering, and the School of Pharmacy, and is administered in the Department of Molecular and Cell Biology. The program stresses both theory and current laboratory practice in molecular biology and other central areas of biotechnology. Major use is made of the core laboratory research facilities of the University of Connecticut Biotechnology Center. The Biotechnology M.S. is Plan B, based on course work; although students complete a substantial number of laboratory courses and spend a research period in a university or industrial laboratory, no research thesis is required. Students are prepared for challenging positions in industry and for entry into Ph.D. programs.

Entering students' undergraduate training should be in science, with biology, chemistry, and chemical engineering especially appropriate. A complete description of the program with recommended preparation and instructions for applying may be obtained from Dr. Robert T. Vinopal, Department of Molecular and Cell Biology, Unit 3044, Storrs, Connecticut 06269-3044. Telephone: (860) 486-4886. E-mail: vinopal@uconnvm.uconn.edu

BUSINESS ADMINISTRATION

Dean: William C. Hunter

Associate Deans: Jeffrey Rummel, Richard N. Dino, and C.F. Sirmans

Director, M.B.A. Program: Lane Barrow

Director, Executive M.B.A. Program: Afshin Ghiaei

Director, M.S. in Accounting Program: Andrew J. Rosman

Director, Ph.D. Program: John E. Mathieu

Professors: Biggs, Carrafiello, J. Clapp, K. Fox, Garfinkel, Ghosh, Giaccotto, Gopal, Hegde, Hussein, S. Jain, Kumar, Lubatkin, Marsden, Mathieu, Nair, O'Brien, Powell, Santerre, Scott, Sewall, Sirmans, Sutton, and Veiga

Associate Professors: Arnold, Ba, Bapna, Bhattacharjee, Coulter, Dechant, Diaby, Dino, Dolde, Dunbar, Floyd, Gedajlovic, Goes, Golec, Goodman, Gupta, Harding, Hoskin, Klein, LaPlaca, N. Moore, Nunn, Palmer, Phillips, Punj, Rosman, Rummel, Salorio, Seow, Spiggle, Srinivasan, Stallaert, Thakur, Tung, and Willenborg

Assistant Professors: Baker, Beliveau, Bird, Chiang, Cruz, Day, Dunbar, Earley, Fischer, Gilson, Gramling, Gupta, Harding, Knopf, Madjar-Nanovska, Martins, Mehta, Novak, Nunez, Rich, Simsek, Teitel, Venkatesan, Yin, and Zhang

The School of Business offers course work and research leading to the degrees of Master of Business Administration (M.B.A.), Master of Science in the field of Accounting, and to the Ph.D. in Business Administration. Detailed descriptions of these programs (as well as the Executive M.B.A.) can be found in brochures available from the School of Business.

The Ph.D. Program

The Ph.D. Program prepares students to conduct state-of-the-art research and to take faculty positions in business schools at leading universities and research positions in government and industry. Students select an area of concentration from the following: accounting, finance, management, marketing or operations and information management. The program emphasizes: (1) student/faculty interaction; (2) flexibility in designing a program to meet individual needs; and (3) timely completion of the degree.

Degree Requirements. The Ph.D. program has four major components: Course work, qualifying research paper, written general qualifying examination, and dissertation. While specific course work will vary depending upon the student's area of concentration (students should confer with their major advisors to obtain specific information), all students must complete a minimum of 37 credits in the following categories: Orientation (1 credit), research methods (9 credits), major area of concentration (12 credits), and supporting courses (15 credits). Students concentrating in Marketing must complete a minimum of 40 credits while those in Accounting must complete a minimum of 49. All courses must be at the graduate level and the twelve credits in the major area typically are Ph.D. level seminars. Interdisciplinary courses are

encouraged in the supporting electives. Completion of the qualifying research paper is required by the end of the second year. The general qualifying examination is administered by the faculty in the student's area of concentration. The dissertation is the final requirement.

Admission. Admission to the Ph.D. program is based upon the applicant's potential to conduct research and commitment to a rigorous program of study. Applicants must submit a score on the Graduate Management Admission Test. Students who have not previously acquired knowledge of the subject matter of the Common Body of Knowledge courses of the AACSB are expected to acquire that knowledge as part of their program. In addition, applicants should have satisfactorily completed one year of calculus. Letters of recommendation also are considered in the admission decision and a campus interview is desirable. International applicants must submit scores on the Test of English as a Foreign Language and Test of Spoken English.

Special Facilities. All doctoral students are assigned to offices equipped with personal computers with a full array of software, and ready access to laser printers. Students also have access to terminals connected to the University's mainframe computer. Data bases include Compustat, CRSP and other tapes routinely used in business research. The School of Business Administration also houses research centers that employ graduate students for collaborative research.

The M.S. Program in Accounting

The Master of Science Program in the field of Accounting is an online degree which will provide students with the skill set critical to a successful professional career in public and private accounting. A dynamic online community has been created that supports and nurtures student-centered learning and information literacy, also known as "learning to learn". Information literacy is the process of identifying a problem and information sources, evaluating information to make a judgment, and then communicating that judgment. Student-centered learning shifts the focus for learning from the instructor to the student, with the instructor facilitating and guiding the learning experience. Both information literacy and student-centered learning produce individuals who can succeed in challenging work environments.

The online community allows students to readily access other students in the online class as well as pertinent faculty members. Completion of this program, combined with an undergraduate degree with at least 30 credit hours in business or economics other than accounting, will fulfill the 150-hour educational requirements in preparation for the CPA exam in most U.S. states.

Students can complete the degree in eight months on a full-time basis or within 16 months on a part-time basis. The part-time program provides a wide range of summer course offerings minimizing the coursework taken during the fall semester.

The program offers 13 courses and students select 10 courses to take to complete the degree.

Admission. Admission is highly selective. General targets for admission are: a GMAT score of 550 (with a

reasonable balance between verbal and quantitative scores), and an undergraduate grade point average of 3.2 on a 4.0 scale. In addition, applicants must have completed at least 24 semester hours of accounting courses and received a baccalaureate degree at a college or university accredited by a regional accounting commission subscribing to established national policies and procedures or of equivalent accreditation as determined by the Connecticut State Board of Accountancy. Students with fewer than 24 credits in accounting should contact the program director or manager to discuss acquiring the necessary background courses.

Applicants with significant work experience and applicants who add to the cultural and geographic diversity of the student body are encouraged to apply even if they do not possess typical GMAT scores or undergraduate grade-point averages.

Students enter the program in May of each year. Applications and all accompanying materials should be received as early as possible, since admissions decisions are made on a rolling basis until the entering class is filled. The deadline for submitting the application and all materials is March 1.

The M.B.A. Program

The M.B.A. Program emphasizes the role of information technology and globalization across all functional disciplines. The curriculum requires a total of 19 courses (57 credits) to earn the degree. This typically takes two academic years to complete.

The M.B.A. Program requires a laptop computer as a tool of the trade, and the laptop's use is completely integrated into the curriculum.

The first-year M.B.A. curriculum during the fall semester consists of core introductory courses in economics, managerial statistics, financial accounting and reporting, managing organizations, and management information systems. The spring semester consists of core introductory courses in financial management, operations management, cost analysis and control, and market-driven management.

As part of the first-year curriculum, students are grouped into functional teams. These teams undertake a comprehensive Integration Project which solves business problems faced by a partner company. As the term "integration" implies, students synthesize knowledge and skills from all first-year courses and past professional experiences to develop solutions. Recent projects include experiential learning with such firms as Pratt & Whitney, Xerox, Engineering Systems, General Electric Capital Financial Services (GE Capital), and Hamilton Sundstrand.

In the second year, students complete courses toward their chosen concentrations. Concentrations enable M.B.A. candidates to explore areas of business in greater depth to prepare for specific careers. By March of their first year, full-time M.B.A. students are required to choose a primary concentration (in which the M.B.A. degree is to be awarded) and a secondary concentration. These concentrations are to be chosen from the five that have been designated for the full-time M.B.A. Program: Finance, Health Care Management, Information Technology, Interactive Marketing, and Management Consulting. Students are required to take four specific courses in their primary concentration and three courses in their secondary concentration.

Second-year students also benefit from a partnership with General Electric through which the School of Business operates a 10,000 square foot IT facility called *edgelab*. M.B.A. students participate in real-time IT/e-business research projects, mentored by faculty and by GE executives. By "pushing the envelope" of cooperative research and analysis, by employing student teams on substantive "live" projects, and by providing a creative, collaborative environment, *edgelab* is redefining the partnership between business and education at UConn.

Admission. All applicants must take the Graduate Management Admission Test (GMAT) and must meet the general requirements for admission to the Graduate School. Interviews may be requested by the M.B.A. admissions committee. Non-degree students are permitted, in exceptional cases, to register for a total of not more than 15 credits. They also are required to take the GMAT before enrolling in courses.

Scholastic Standards. Ordinarily, a student will not be permitted to continue in the M.B.A. program if he or she: receives two or more grades of B- or below with a cumulative average below 3.0 after completing four courses in the program, accumulates four grades of B- or below at any point in the program with a cumulative average below 3.0, or receives an F at any point in the program.

Under no circumstances will the M.B.A. degree be conferred if the student has a mark of Incomplete (I) or Absent (X) on his or her record even though the course may not be listed on the plan of study.

The Executive M.B.A. Program

The objective of the Executive M.B.A. program is to provide experienced managers with the opportunity to broaden and update their managerial knowledge and skills. The program is designed for individuals with significant managerial experience. By using a Friday/Saturday format for classes, managers are able to retain their positions in their companies while pursuing graduate studies. Completion time is approximately 20 months. Class size is limited to provide a highly interactive classroom environment.

The program leads to the degree of Master of Business Administration. The School of Business at the University of Connecticut is accredited by the AACSB - The American Assembly of Collegiate Schools of Business. Admission takes place only once per year. Classes are held in two locations - Hartford and Stamford, Connecticut.

Admission. All applicants must take the Graduate Management Admission Test (GMAT) and must meet the general requirements for admission to the Graduate School. Interviews may be requested by the Executive M.B.A. Admissions Committee.

Curricular Program for the Full-Time M.B.A. Degree

Students are required to complete the following general curricular program unless they enter the specialized M.B.A. program in health care management.

57 Credit General Program

Candidates for the general M.B.A. degree are required to complete 57 credits of graduate study: 39 credits prescribed and 18 elective/breadth credits as follows:

Required Courses – 39 Credits:

ACCT 321 – Financial Accounting and Reporting
 ACCT 323 – Cost Analysis and Control
 BLAW 375 – Business, Law, and Ethics in Modern Society
 FNCE 301 – Financial Management
 FNCE 317 – Economic Analysis for Business
 MGMT 338– Managing Organizations
 MGMT 390 – Strategy, Policy, and Planning
 MKTG 315 – Market-Driven Management
 OPIM 303 – Managerial Statistics
 OPIM 310 – Operations Management
 OPIM 365 – Management Information Systems
 BADM 300–Integration Project

In their second year, full-time M.B.A. students choose a primary concentration (in which the M.B.A. degree is to be awarded) and a secondary concentration. Concentrations include: Finance, Information Technology, Interactive Marketing, Management Consulting, and Health Care Management. The primary concentration consists of four courses and the secondary concentration consists of three courses.

Based upon prior preparation, substitution of up to 6 credits of required courses, other than MGMT 390, may be possible. Each student in the 57 credit general program is required to establish an area of emphasis consisting of at least six credits of course work beyond the required courses.

A college-level calculus course covering limits, functions, integration, and differentiation must have been completed at or prior to the time of admission to the M.B.A. program. Each student who transfers from another institution must earn a minimum of 42 credits of graduate work at the University of Connecticut.

Dual M.B.A. and J.D. Degree Program. This program offers the student the opportunity to combine academic training in the fields of Business Administration and Law by combining into four years of study the three-year J.D. program offered by the School of Law and the two-year M.B.A. program offered by the Graduate School. Fifteen credits from the J.D. program are used to meet the M.B.A. requirements. Twelve credits from the M.B.A. program are used to satisfy the J.D. requirements. To be admitted to the joint M.B.A./J.D. program, a student must meet the admission requirements of both schools. For additional information, interested students should review the materials of the regular programs contained in the catalogs of the respective schools.

Dual M.B.A. and M.D. Degree Program. Rapid changes in the health care industry as well as the increasing size and complexity of health care organizations have created a demand for physicians who also are effective managers. The Doctor of Medicine program is offered at the University of Connecticut Health Center. Usually, students complete the first two years of study in the School of Medicine, enroll in the full-time M.B.A. program in Storrs for the third year, and then return to the Health Center to take electives in both the School of Medicine and the M.B.A. program in Hartford. M.D./M.B.A. students are required to complete 42 credits in the M.B.A. program. For more information, contact the Director of the Storrs M.B.A. program or the Office of Admissions, School of Medicine.

Dual M.B.A. and M.S.W. Degree Program.

This program is designed for students who anticipate careers in the management and administration of social work services in either governmental or private agencies. Application to each school is made independently. Nine credits in the M.B.A. program are used to meet the M.S.W. requirements. Fifteen credits in the M.S.W. program are used to meet the M.B.A. degree requirements. Additional details are available from the Storrs M.B.A. Director and the School of Social Work.

Dual M.B.A. and M.A. in International Studies Degree Program. This program is designed for students interested in the management of international organizations in African, Latin American and Caribbean, and European areas. Fifteen credits of course work in area studies in the School of Liberal Arts and Sciences are used to meet both M.B.A. and M.A. degree requirements. More details are available from the Directors of the Storrs M.B.A. Program, the Center for Contemporary African Studies, the Center for Latin American and Caribbean Studies or the Center for European Studies.

Dual M.B.A. and M.S. in Nursing. This dual degree program is available for students in the administrative track in the Nursing Program. The M.S. in Nursing usually includes a minimum of 39 credits. Fifteen credits of course work in the Nursing Program are used to meet both M.B.A. and M.S. degree requirements.

Dual M.B.A. and M.I.M. Degree Program.

A two-year program, with one year in the University of Connecticut Graduate School and one year in France, permits the student to earn the University of Connecticut M.B.A. and the Master's In Management from the Ecole Supérieure de Commerce (ESC) de Lyon. Classes at ESC Lyon are taught in French.

Continuous Registration for Degree Students. All continuing M.B.A. students not registered for credit courses during the fall or spring semesters must register for **GRAD 398 Special Readings (Master's)**.

COURSES OF STUDY

Well qualified non-degree students are admitted into M.B.A. courses only in very special cases and only if they have taken the GMAT.

Accounting

ACCT 300. Special Topics in Accounting
 1-3 credits. Seminar.

Investigation and discussion of special topics in accounting.

ACCT 303. Advanced Accounting
 3 credits. Lecture. Prerequisite: ACCT 322. Not open to students who have passed ACCT 203.

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

ACCT 304. Assurance Services
 3 credits. Lecture. Not open to students who have passed ACCT 243.

Issues relevant to the public accounting profession, such as legal liability and ethics, audit

risk analysis, planning of audit engagements, audit reports, and other assurance services and reports. Students learn to think critically about issues facing the audit profession, primarily by analyzing cases and completing a number of individual and research group projects.

ACCT 305. Understanding the Responsibilities of an Accounting Professional
 3 credits. Seminar. Open to students in the Accounting M.S. program.

The groundwork for three fundamental issues that are embedded throughout the curriculum in the MS in Accounting Program will be set. First, students will explore the foundations of the accounting professional ethics and ethical ideals in the conduct of a professional, the importance of an auditor in serving the public interest, the cultural significance of accounting, and the regulatory environment governing the accounting profession. Second, students will be exposed to the use of technology within the profession and learning environments. Third, they will apply the concept of information literacy to help ensure continued professional development throughout their careers as they develop the skill set to identify an information need, efficiently select information resources relevant to that need, effectively retrieve pertinent information from those relevant resources, astutely synthesize that information into a form that responds to their initial information need, and lastly, articulate the fit of that response as they seek to become critical users of a variety of information sources within the profession.

ACCT 321. Financial Accounting and Reporting

3 credits. Lecture. Open to MBA students, others with permission.

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

ACCT 322. Financial Accounting
 3 credits. Lecture. Prerequisite: ACCT 321.

Study of the financial accounting principles which determine financial statements and the uses of the financial statements. The course adopts a broad perspective to understanding major accounting concepts contained in the intermediate accounting curriculum. Emphasis is placed on financial statement presentation and the meaning of resulting balance sheet and income statement amounts.

ACCT 323. Cost Analysis and Control
 3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: ACCT 321.

Internally, managers need timely information in order to plan and control operations. This course

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

ACCT 325. The Federal Income Tax and Business Decisions

3 credits. Lecture. Prerequisite: ACCT 321.

Designed for the business manager who wants an awareness of tax considerations involved in business decisions. It involves a symptom/recognition level of learning rather than a detailed analysis of each section of the law. The course involves an examination of the definition of income, evaluation of different business entities, methods of reporting income and deferral transactions. Students examine how slight changes in a transaction can materially alter the tax consequences. The course includes discussion of the social, economic, and political aspects of taxation as well as an opportunity to familiarize the student with tax research techniques.

ACCT 331. Contemporary Financial Accounting Issues

3 credits. Lecture.

Study of major financial accounting issues, including the conceptual framework of accounting, the standard-setting process, asset valuation, and income determination. Concentrates on developing theories of the usefulness of accounting information in financial markets. This theoretical perspective is used to evaluate the conceptual framework, specific accounting standards, and issues related to international harmonization of accounting standards.

ACCT 333. Contemporary Managerial Accounting Issues

3 credits. Lecture.

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

ACCT 335. Global Financial Reporting and Analysis

3 credits. Lecture.

Develops skills in analyzing and interpreting accounting information about multinational enterprises from both a preparer and user perspective. Special attention is given to the impact of examining accounting information on (1) culture and differences in measurement and disclosure practices across countries, (2) type of industry, (3) stage or maturity of business life cycle, and (4) form of business activity, such as joint ventures and strategic alliances.

ACCT 339. Financial Services Reporting and Analysis in the Financial Services Industry

3 credits. Lecture.

Introduces the nature of and accounting for

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

ACCT 343. Advanced Assurance Services

3 credits. Lecture.

Advanced treatment of significant assurance services issues. Intended for students with previous coursework in assurance services and/or auditing. Emphasis is placed on: (1) planning and performing audits of financial information systems, (2) computer applications of auditing and assurance services, (3) statistical applications in auditing and assurance services, and (4) contemporary ethical and legal issues confronting the professional accounting environment.

ACCT 351. Systems Control and Risk Analysis

3 credits. Lecture.

This course focuses on the importance of well-designed internal controls for the prevention, detection, and correction of information processing errors and related fraudulent activities. The course provides a broad overview of information systems development and management along with a more detailed study of the specific control structures necessary to minimize the risk to information systems and their related accounting and business information.

ACCT 352. Enterprise Systems

3 credits. Lecture.

This course focuses on the impact of enterprise systems integration on traditional and contemporary business processes. This includes exploration of the technology that drives enterprise systems (such as enterprise resource planning (ERP) systems and e-business systems) and the resulting impact on organizational internal control structures.

ACCT 371. Taxation of Business Entities

3 credits. Lecture.

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

ACCT 372. Research in Taxation

3 credits. Lecture.

Application-oriented tax research, which has the objective of determining the defensibly correct tax treatment of a transaction based on the existing law. Tax research is a process of two basic activities: (1) the conceptualizing process to decide what research is needed and then to evaluate any information located through tax research, and (2) the search process, which requires the ability to use the massive quantity of tax authority available in electronic format. Students

further develop their communication skills, both oral and written.

ACCT 373. Advanced Corporate Taxation

3 credits. Lecture. Prerequisite: ACCT 371.

Accounting 372 preferred but not required.

Focus is on topics relating to the taxation of corporations: taxable sales and acquisition of going concerns; tax-free reorganizations; multistate taxation; and international taxation of U.S. multinational corporations. The objective is to familiarize the student with the applicable tax rules. Students learn to identify applicable tax planning strategies and tax issues present in business decisions such as those involving the sale or acquisition of a going business, the location or expansion of operations, the repatriation of foreign earnings, and the setting of transfer prices for goods and services provided to related parties.

ACCT 374. Advanced Individual Taxation

3 credits. Lecture. Prerequisite: ACCT 371.

Accounting 372 preferred but not required.

Focus is on topics relating to taxation of individuals: estate and gift taxation; income taxation of estates and trusts; estate planning; compensation planning including, but not limited to, equity-based compensation; income taxation of and planning for high-income taxpayers, including taxation of investments and charitable planning. Students learn tax rules and tax planning strategies necessary for individuals to create, preserve, and transfer wealth to future generations.

ACCT 380. Financial Planning for Accounting Professionals

3 credits. Lecture. Prerequisite: ACCT 371.

Accounting 372 preferred but not required.

Designed for the accounting professional in the role of financial planner, this course covers all facets of a professional in financial planning practice. Topics include personal income tax planning, debt management, investment and retirement planning, risk management and insurance, and estate planning.

ACCT 396. Independent Study in Accounting

1-6 credits. Independent study.

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

ACCT 400 Investigation of Special Topics

1-3 credits. Lecture.

ACCT 401. Introduction to Accounting Research

3 credits. Seminar.

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

illustrated in the accounting literature. Finally, students are introduced to the major research paradigms in accounting.

ACCT 402. Seminar in Accounting Research II: Organizational Behavior
3 credits. Seminar.

Continuation of study in current research topics in accounting.

ACCT 403. Accounting and Capital Markets

3 credits. Seminar.

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

ACCT 404. Judgment and Decision Making in Accounting

3 credits. Seminar.

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

ACCT 411. Seminar in Special Research Topics

1 credit. Seminar.

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

Business Administration

BADM 300. Special Topics

1-9 credits. Lecture. Open to MBA students, others with permission.

BADM 401. Introduction to Research and Teaching

1 credit. Lecture. Open only to PhD students in the School of Business.

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

Business Law

BLAW 300. Seminar

1-3 credits. Seminar.

Investigation and discussion of special topics in law.

BLAW 375. Business, Law, and Ethics in Modern Society

3 credits. Lecture. Open to MBA students, others with permission.

In order to survive, business must meet the legal and ethical standards being imposed by a changing society. This course emphasizes that the business enterprise is not an island and that business decision-making must be undertaken in light of current legal and ethical demands. Such demands may take the form of globalization of business enterprise, reactions to hostile takeovers, concerns with market concentration and efficiency, changes in legal philosophy and corporate ethics and developments in international law and administrative regulation. By examining the philosophical, legal, social, historical, and political/economic regulatory environments, this course places business decision-making in the legal and ethical perspective so critical in today's markets.

BLAW 376. Law for the Manager

3 credits. Lecture.

All business activity must be conducted with a sensitivity toward both the requirements of the law and the legal ramifications that flow from discretionary action. Whether such activity involves the formation of a contract, the choice of a business organization, the use of an agent, the purchase or sale of securities, or the institution of a lawsuit, legal considerations are pervasive. This course exposes students to some of the basic tenets of business law including the judicial process, contracts, partnerships, corporations, securities regulation, labor law, torts, and the principal-agent relationship.

BLAW 396. Special Topics in Business Law

1-6 credits. Independent study.

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

Finance

FNCE 300. Seminar

1-3 credits. Seminar.

Investigation and discussion of special topics in finance, risk and insurance and/or real estate and urban economic studies.

FNCE 301. Financial Management

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: OPIM 303 or other introductory statistics course.

All major business decisions have financial implications, and therefore, the financial manager's contribution to directing the operations of the firm has become increasingly critical in the last decade. This course provides an overview of techniques for effectively studying financial decisions and their impact on the company. The course covers the basic concepts and tools necessary to understand the financial decision-making process. The fundamental issues of timing and uncertainty are integrated into the problem of asset valuation. Financial analysis models for determining appropriate sources of capital and effective use of long term and short term assets are discussed.

FNCE 302. Investment and Security Analysis

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: FNCE 301.

A rigorous foundation in risk/return analysis, asset valuation, the use of derivatives, and financial engineering techniques in risk management and overall portfolio management. Information technology is applied, including computerized financial modeling and asset management software.

FNCE 303. Corporate Finance

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: FNCE 301.

A markets-oriented approach to corporate finance issues, especially capital structure and dividend policy. Modern concepts of agency theory and asymmetric information are integrated.

FNCE 304. Options and Futures

3 credits. Lecture. Prerequisite: FNCE 301 or permission of instructor.

Analysis and valuation of speculative securities including options and futures with emphasis on their use for hedging and speculative motives. Major valuation models are discussed and applications of contingent claim valuation framework to corporate finance problems are also explored.

FNCE 305. Global Financial Management.

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: FNCE 301.

An exploration of global finance topics such as 1) international trade, 2) balance of payments, 3) exchange rate determination, 4) currency exposure, and 5) the cost of capital in global financial markets. Information technology is applied.

FNCE 306. Financial Institutions: Management and Capital Markets

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: FNCE 301.

Investigation of the structure financial services companies (banks, insurance companies, securities firms, and so forth). Emphasis is on the tools used by these firms to compete to provide basic financial services like pooling resources, managing risk, transferring economic resources, pricing information and clearing and settling payments. Financial services product development and the role of information

technology in financial services, including software and data.

FNCE 307. Working Capital Management
3 credits. Lecture. Prerequisite: FNCE 301.

Working capital management is critical in determining whether a firm is competitive and profitable. Each component of working capital cash, marketable securities, receivables, inventories, and payables is studied and is related to the firm's operations. The course concentrates on applications and includes lectures by working capital managers from major corporations.

FNCE 308. Asset Allocation and Capital Market Theory

3 credits. Lecture. Prerequisite: FNCE 301 or permission of instructor.

Provides an integrative overview of issues in financial theory. Contemporary theoretical developments in corporate finance and financial markets are addressed. Major topics include agency theory, option theory, term structure theory, CAPM, APT, market efficiency, capital structure, and dividend policies under full and asymmetric information.

FNCE 310. Personal Financial Planning

3 credits. Lecture. Prerequisite: FNCE 301 or permission of instructor.

This course is for the professional working in the area of financial services as well as for one's personal planning. It is the application of finance theory to the individual and family. This integrated approach covers lifetime cash flows, asset accumulation and allocation, debt management, retirement planning, and risk management.

FNCE 311. Financial Modeling

3 credits. Lecture. Prerequisite: FNCE 301.

This course is a "hands-on" use of computerized decision aids to analyze a variety of financial problems. Applications will be drawn from corporate financial planning, modern portfolio theory, options pricing, dynamic trading, and so forth. No computer experience is required; this course will help students develop the necessary programming skills to build fairly sophisticated models.

FNCE 312. Fixed Income Instruments and Markets

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: FNCE 301.

This course examines contemporary portfolio management of fixed income institutional investors, issuers, and broker-dealers. It assesses current practice and presents a theoretical framework for anticipating change. Coverage includes pricing, assessment of return and risk, and the development of overall strategies, for these markets: government, corporate, municipal, and international bonds; mortgage-related and other asset-backed securities; and derivative securities including futures, options, swaps, and other interest rate contracts.

FNCE 313. Advanced Corporate Finance: Capital Investment Finance

3 credits. Lecture. Prerequisite: FNCE 301.

This course in dynamic capital budgeting applies corporate finance theory to the real-world problems that financial analysts face every day, integrating theory and practice, facilitated through the use of simulation analysis. These tools include both an understanding of the theoretical underpinnings of sound capital budgeting techniques and a mastery of the technology necessary to practically implement this knowledge in a real-world setting.

FNCE 317. Introduction to Economic Markets

3 credits. Lecture. Open to MBA students, others with permission.

Provides a foundation in the economics of markets, with particular application to financial markets and the role of information. Specific topics include the following: (1) the basic principles of supply, demand, profit maximization, price determination, international trade, and exchange rates; (2) the basic structure of modern, global financial markets, as an application of the basic economic principles; (3) the use of information and information technology in financial markets, including use of the internet, Bloomberg, Dow Jones and other computerized sources of information; and (4) a review of the "efficient market hypothesis."

FNCE 321. Risk and Insurance

3 credits. Lecture. Prerequisite: FNCE 301 or permission of instructor.

A study of the recognition, analysis, and treatment of pure risk from the viewpoint of the enterprise. This course considers various methods of risk management but emphasizes the role of insurance.

FNCE 330. Real Estate: A Personal Investment Perspective

3 credits. Lecture

Real estate is a major component of household wealth. Important household real estate decisions include, for example, where to buy a house; renting versus owning a home; choosing between alternative mortgage instruments; understanding the house purchase transaction; and the risks and returns of real estate investing. This course surveys the fundamentals of real estate from a personal investment perspective.

FNCE 331. The Internet and Information Systems Applied to Real Estate

3 credits. Lecture.

Specialized information technology is now available for all segments of the real estate industry. For example, investment firms are particularly interested in information technology that helps them monitor, understand, and manage risks associated with mortgage-backed securities. Database management systems and geographic information systems (GIS) give the decision-maker unprecedented power to manage data and analyze risks. The Internet opens up vast new sources of timely information. This course stresses the use of GIS and of the Internet. Students will gain hands-on experience with these tools through projects that are organized around business problems.

FNCE 332. Real Estate Capital Markets

3 credits. Lecture. Prerequisite: FNCE 301 or permission of instructor.

This course covers the structure and operation of the mortgage market. Topics include the identification, measurement and management of risk from the perspective of borrower, lender, and investor. The course stresses the integration of the real estate debt markets with the global capital market, and considers the role and impact of mortgage-backed securities for residential and commercial real estate lending.

FNCE 333. Real Estate Investment and Portfolio Management

3 credits. Lecture. Prerequisite: FNCE 301 or permission of instructor.

This course provides an overview of real estate investment decision-making. Topics include: risk-return analysis of alternative types of real estate investments; leases, operating costs, and tax consequences; valuation techniques, including discounted cash flow and option pricing; real estate portfolio management; and alternative forms of equity securitization such as real estate investment trusts.

FNCE 396. Special Topics in Finance

1-3 credits. Independent study.

Faculty-student interaction on a one-to-one basis involving independent study of specific areas of finance, risk and insurance, and/or real estate and urban economic studies. Emphasis, selected by the student, may be on theoretical or applied aspects. A written report is required.

FNCE 400. Investigation of Special Topics

1-2 credits. Seminar. Prerequisite: FNCE 308.

FNCE 401. Introduction to Finance Theory and Evidence

3 credits. Lecture.

Topics include: efficient market hypothesis, utility theory, portfolio theory, CAPM, arbitrage pricing theory, option pricing, capital structure / tax theory, capital budgeting under uncertainty, current empirical studies.

FNCE 402. Corporate and Institutional Finance

3 credits. Lecture. Prerequisite: FNCE 308.

Topics include: information asymmetry, agency, internal capital markets, governance, market microstructure, moral hazard / adverse selection. Concepts are applied in both corporate and financial institution settings.

FNCE 403. Theory of Financial Markets and Valuation

3 credits. Lecture.

Topics include: fundamental pricing theorems, state preference theory, martingale pricing, dominance, spanning and arbitrage restrictions, consumption models, and continuous-time approaches to asset pricing, interest rate models, and derivatives pricing.

FNCE 404. Empirical Methods in Finance Research

3 credits. Lecture. Prerequisite: FNCE 308.

Topics include: predictability of asset prices, time series models of market microstructure, event study methodology, tests of asset pricing models and derivative pricing models, market efficiency, volatility of asset returns, and term structure interest rates.

Health Systems Management**HSMG 300. Seminar**

1-3 credits. Seminar.

Investigation and discussion of special topics in health care management.

HSMG 380. Health Care Organization and Management

3 credits. Lecture.

This course examines the nation's healthcare delivery system with overviews provided for each major sector of the health economy. The basic tools of economics and finance are employed to gain critical insights into the structure, conduct and performance of each of these sectors. This course is designed to accommodate both health care professionals and individuals from other business areas interested in learning more about the health care industry.

HSMG 381. Health Care Law and Policy

3 credits. Lecture. Prerequisite: HSMG 380. May be substituted for BLAW 375.

This course examines legal, regulatory and ethical considerations in health care management, and the formation of public policy in the health care setting. Emphasis is on understanding legal principles and issues including administrative and regulatory law; institutional and individual liability in the health care sector; employment law; and torts. Special attention is paid to ethics in health care management and its interrelation to law and public policy.

HSMG 382. Decision Analysis in Health Care

3 credits. Lecture. Prerequisite: FNCE 301 and HSMG 383 or consent of the instructor.

The course covers methods used by health care managers in making strategic and operating decisions, including (but are not limited to) sales forecasting, product valuation, and cost effectiveness and cost/benefit analyses. Example of potential applications include estimating the value of new drugs under development, the payoff profile from strategic alliances and limited partnerships in different health care industries, the valuation of healthcare mergers and acquisitions, the profitability of different HMO benefit plans, and other ventures pertaining to health care organizations

HSMG 383. Health Care Economics

3 credits. Lecture. Prerequisites: FNCE 301 and HSMG 380.

This course demonstrates how various economic theories can be used to think about health care issues

and takes a macro or industry perspective of various health care problems and policy questions. Students are provided with a set of economic tools to evaluate a theoretical or empirical argument relating to health or medical care. The course culminates with an in-depth analysis of the structure, conduct, and performance of the markets for medical insurance, physician services, hospital services, pharmaceutical products, and long-term care. Health care reform is also discussed.

HSMG 384. Competitive Strategies for Health Care Organizations

3 credits. Lecture. Prerequisite: HSMG 383 or consent of the instructor.

This course focuses on the microeconomic organization of healthcare business units and analyzes various issues central to the individual firm's short-term and long-term competitive success. Competitive strategies pertaining to various types of healthcare organizations such as physician practices, hospitals, health maintenance organizations, and pharmaceutical companies are explored using a wide variety of business tools and methods. Efficient market theory, industry analysis, the boundaries of the firm, principal and agent problems, incentive mechanisms, mergers and acquisitions, the development and sustainability of competitive advantage, and competitive pricing are some of the general topics discussed in the context of the health care sector.

HSMG 385. Management of Long-Term Health Care Organizations

3 credits. Lecture. Prerequisite: HSMG 380.

This course examines administrative processes within the long-term health care facility including issues related to organizational effectiveness, financial management, the regulatory structure, operational procedures, policies and practices.

HSMG 386. Competitive Strategies for Health Care Organizations

3 credits. Lecture. Prerequisites: FNCE 301 and FNCE 317.

This course examines health insurance choices from the perspective of individuals, employers, and insurers. A portfolio perspective for individuals; choices is taken. Other topics include: health insurance loss and contingency distributions; health insurance loss reserving; pricing (rate-setting) for health insurance products; LTC insurance; health insurer risk management; health reinsurance structures; health insurance derivatives.

HSMG 389. Health Care Internship

1-3 credits. Practicum.

Under the guidance of a qualified preceptor, students are provided opportunities to study and analyze an organization's characteristics, functions, goals, strategies, and decision-making processes. Managerial skill is developed through the performance of administrative tasks and through participation in problem-solving processes. A research paper is required.

HSMG 391. Management of Long-Term Health Care Organizations

3 credits. Lecture. Not open to M.B.A. degree students.

This course examines administrative processes within the long-term health care facility including issues related to organizational effectiveness, financial management, the regulatory structure, operational procedures, policies and practices.

HSMG 392. Internship in Health Care Management

1-9 credits. Practicum. Not open to M.B.A. degree students.

Under the guidance of a qualified preceptor, the student participates in the administrative process in the long-term health care organizational structure. A project is required.

HSMG 396. Special Topics in Health Care Management

1-6 credits. Independent study.

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

Management**MGMT 300. Seminar**

1-3 credits. Seminar.

Investigation and discussion of special topics in management.

MGMT 334. Entrepreneurship

3 credits. Lecture.

Entrepreneurship is concerned with more than creating, starting and growing small business ventures. Entrepreneurial issues and decisions occur long after the start-up phase has ended and an organization has grown large. Many larger organizations are trying to start and grow smaller units along with maintaining the entrepreneurial spirit. This course is concerned with these issues along with concepts related to acquiring, franchising and operating various types of entrepreneurial ventures. An applied approach is taken in the course through the study of cases.

MGMT 337. Organization Behavior

3 credits. Lecture.

The course is divided into two major components: micro and macro organization behavior. The first component focuses on individual and group-level problems and the second focuses on organizational-level problems, as they relate to improving organizational performance. This course introduces some of the central topics in management theory, research, and practice and provides the basis for understanding and evaluating organizations and their management.

MGMT 338. Managing Organizations

3 credits. Lecture. Open to MBA students, others with permission.

Today's business climate demands that organizations and their managers be innovative, flexible, adaptive, and capable of maximizing the contributions of all their members. In addition, today's manager must possess the leadership and team skills necessary to manage the increasingly diverse work force. Knowing how to reap maximum benefit from an organization's human capital is essential for today's manager. This course examines topics such as leadership, motivation, team dynamics, organization structure, design and culture, conflict, power and politics.

MGMT 339. Gender and Diversity in the Workplace.

3 credits. Lecture.

The demographic composition of the international labor force is changing. In the United States, the proportions of both women and people of color have steadily increased in recent years. This course chronicles and examines the transition that is taking place in the workplace due to the increased diversity in employees. It examines gender-related issues such as sex differences and sex role development, occupational choice and organizational entry, peer and manager-subordinate interactions, sexual harassment, career development, the interface between work and family, and strategies for promoting equal opportunity in organizations. It examines diversity issues stemming from differences in individual characteristics such as race, ethnicity, and national origin.

MGMT 340. International Business

3 credits. Lecture.

The growing impact of a rapidly changing international business environment on organizations today means that few managers can afford to remain indifferent to the issues of international business. It is important to understand the changing patterns of international business, the dynamics of international competition, government-business interactions in other countries, and the organizational challenges of managing strategically across borders. This course addresses these issues through an applied approach in the discussion of cases.

MGMT 350. Managerial Communications

3 credits. Lecture.

Designed to improve effective oral and written communication skills for managers. Topics in written communications include: organization, structure, and clarity of business communications; practice in writing formal papers and research reports; establishing style and tone in different types of written business communications. Topics in oral communications include: analysis of audiences, presentations to small and large groups, persuasion and motivation techniques, using audio-visual aids, and improving delivery and style using video feedback.

MGMT 360. Management of Technology and Innovation

3 credits. Lecture. Open to MBA students, others with permission.

In today's dynamic organizations, management of research, technology and change are generic processes which constitute irresistible and critical elements of the overall environment of business. Awareness of these processes can be a powerful force for an organization's management of its future. This course introduces the student to the management of innovation in several contexts, dealing with products and services, tangible and intangible outputs.

MGMT 372. Career Dynamics

1-3 credits. Lecture.

As individuals pass through organizations, they both shape them and are shaped by them. This course looks at the issues involved in integrating the individual with the organization through the process known as career development. In particular, it focuses on the realities of entry, membership, and advancement that occur in organizations. Topics cover career stages and life stages; career stages and organizational stages; individual self-assessment including personal characteristics, interests, values and interpersonal styles; individual career mapping; and changing jobs and careers.

MGMT 373. Organizational Renewal Development

1-3 credits. Lecture.

Organizational renewal must be a regular part of the job of every manager. This course focuses on the management skills needed to diagnose, change and develop an organization. Participants learn not only the latest concepts but also are required to engage in organizational development (OD) exercises. Topics to be covered include methods of diagnosing organizations, planning and OD effort, deciding on a change strategy, fitting the intervention to the client's needs, managing an intervention and obtaining evaluative feedback. Through the use of exercises, presentations and hands-on-training, participants have the opportunity to practice their OD skills.

MGMT 374. Negotiation Strategies

3 credits. Lecture.

Developing and implementing effective negotiation strategies and tactics is an increasingly important activity in a wide range of managerial positions. This course deals with negotiations both within and between organizations. Effective negotiations skills are essential for successful managers in complex contemporary organizations characterized by changing structures, temporary task forces, multiple demands on resources, and the increased importance of interdepartmental cooperation. Critical negotiation situations with other organizations range from those dealing with labor unions, purchasing, mergers, acquisitions, and joint ventures. During this course, participants plan and conduct negotiations simulations, as well as receive feedback on their performance.

MGMT 375. Strategic Management of Human Resources

3 credits. Lecture.

Effective human resources management (HRM) is one of the most decisive factors in the success of any organization. This course examines how to manage

human resources effectively in the dynamic legal, social, and economic environments currently constraining organizations. Among the topics included are: formulation and implementation of human resource strategy, job analysis, methods of recruitment and selection, techniques for training and management development, performance appraisal, compensation analysis and administration, and evaluation of the effectiveness of HRM systems. Attention is also given to the need for adjusting human resource strategies and tactics when applying them in a foreign setting. Emphasis is placed on integrating human resource management with other key aspects of management. A variety of teaching methods are used to help students acquire an understanding and appreciation of HRM.

MGMT 376. Business Improvement through Training and Development

3 credits. Lecture.

Planning, implementing, and evaluating training programs designed to meet individual and organizational needs. Training methods, techniques, and processes. Strategic and international training issues. Focuses on the process by which organizations train and develop employees. Topics include training needs assessment, program design, training evaluation, and management development practices.

MGMT 377. Human Resource Information Systems

3 credits. Lecture.

Nearly every aspect of human resource management and labor relations is or will be undergoing significant improvements via information technology. Increasingly human resource professionals are called upon to be part of a team in the design of information systems. Indeed their role is critical in insuring that the system truly supports and integrates HR needs. HR professionals must also query databases, create reports and contribute to departmental web sites. This course will prepare students for these challenges. The course will focus on future systems as well as seek to understand current configurations. It will explore the implications that systems design has for flexibility, efficiency, and effectiveness over the longer run.

MGMT 378. Compensation and Benefits

3 credits. Lecture.

Application of compensation principles to organizational objectives. Strategic use of compensation systems for attracting, motivating, and retaining employees. Managerial aspects of paying employees at all organizational levels. Focuses on managing employee compensation in contemporary organizations. The major objectives are: to examine the current state of compensation decision making, to examine how recent theoretical and research developments inform compensation decisions, and to offer an opportunity to develop competencies in making compensation decisions.

MGMT 381. Business and Managerial Ethics

3 credits. Lecture.

Recent observers of the business scene have questioned whether today's modern executive has lost his/her "moral compass." Clearly all businesses and their managers must be held accountable to ethical standards. At issue then is what is ethical behavior and what problems are created in trying to exercise such behavior. This course examines in detail the processes of policy formulation and implementation as they relate to ethical problems. Alternative responses to expressed and anticipated social needs, expectations and demands that arise in the daily conduct of business are considered.

MGMT 382. Management Consulting
3 credits. Lecture. Open to MBA students, others with permission.

This course introduces students to the roles individual consultants and consulting firms play in enhancing the effectiveness of their clients. The course draws on a wide range of management theory and practice to help students develop the interpersonal, analytical, and technical skills required in consulting interventions. The course will provide an overview of the consulting industry and address such topics as relationship and client management, intervention frameworks and their application, project management, ethical issues in consulting, and implementation issues.

MGMT 383. Organizational Development and Managing Change
3 credits. Lecture. Open to MBA students, others with permission.

This course focuses on the planned, systematic process in which applied organizational theory and behavioral science principles and practices are introduced into organizations, toward the goal of increasing both individual and organizational effectiveness. Additionally, this course is designed to prepare students to become effective change agents at the individual, group, and organizational levels. The course addresses such topics as assessing organizational effectiveness/performance measurement, fundamental organizational development techniques, change methodologies, individual, group, and organizational change processes, applied research methods for analysis of change problems, process interventions, the power and politics of change, and strategic change.

MGMT 384. Management Consulting Practicum

3 credits. Practicum. Open only to MBA students in the Management Consulting concentration.

The goal of this practicum is to give students hands-on experience with clients and the rigors of consulting interventions — whether they be strategic, information systems, or change management oriented. Students are required to prepare a consulting proposal for a client (scope of work, timeline, etc.), negotiate an end-product with the client, perform the proposed intervention, prepare a final report and present findings and recommendations to the client for evaluation and critique.

MGMT 389. Formal Corporate Planning Systems

3 credits. Lecture.

Planning is a corporate, group, and business function whose character has changed markedly and whose importance is universally recognized. Special attention is given to particular topics: environmental forecasting, corporate vs. business planning, staff vs. line functions, cycling/rolling systems, planning's impact on results, and others. In order to emphasize the essential nature of creating a managerial system which is efficient and effective through tailoring it to the specific requirements of the organizational setting, the work of the course centers on case analyses, but it employs also, as appropriate, lectures, discussions, and field projects and reports.

MGMT 390. Strategy, Policy, and Planning
3 credits. Lecture. Open to MBA students, others with permission.

A firm's ability to survive and succeed in an increasingly competitive global arena depends on its ability to develop and maintain an effective strategy. This capstone course deals with the two major aspects of strategy: formulation and implementation. Strategy formulation examines such issues as environmental threats and opportunities, the values and priorities of management and societal stakeholders, and the strengths of company resources and competencies relative to principal competitors. Strategy implementation covers such topics as strategic leadership, organizational structure, resource allocation, and building a strategy-supportive culture. The course uses cases and readings to develop the knowledge and skills necessary to prepare students to deal with strategic issues. The student must have completed basic courses in the functional areas of business in order to be ready to assume the holistic perspective required of those who address this important topic.

MGMT 391. Advanced Strategy, Policy, and Planning

3 credits. Lecture.

This advanced strategy course offers practical tools to evaluate sources of a firm's competitive advantage. A supplement to the capstone course, this course offers an in-depth look at special strategic problems such as the implementation of strategy, corporate renewal, strategy formulation in decline contexts, and/or political elements of strategy.

MGMT 396. Special Topics in Management
1-3 credits. Independent study.

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

MGMT 400. Directed Readings in Special Topics

1-6 credits. Independent study. Open only to PhD students in the School of Business.

MGMT 401. Seminar in Organizational Behavior

3 credits. Seminar.

A survey of research in organizational behavior and theory. Topics include learning and cognition in organization, attribution theory, satisfaction and performance, leadership, motivation and group dynamics.

MGMT 402. Research Methods in Strategic Management

3 credits. Seminar.

This course is an in-depth review of the content of policy research. The course is designed to cover several "streams" of research currently popular in the strategic management literature. The course will cover the major findings within each stream.

MGMT 403. Contemporary Research in Organizational Behavior

3 credits. Seminar.

Focus is on several of the contemporary research themes popular in Organization Behavior. Students critique the methodology and future potential of each theme.

MGMT 404. Seminar in Strategic Management

3 credits. Lecture.

Reviews the research of strategic management that emphasizes macro explanatory models. Students review recent dissertations and critique the content and methodology of each.

MGMT 405. Research Design

3 credits. Lecture.

Examination of research methods utilized in management research. Topics include the laboratory-field distinction, randomized experiments in field settings, content analysis and interrater reliability, log-linear analysis, instrument design and reliability analysis, survey design and sampling techniques, meta-analysis, quasi-experimental design, nonequivalent group design, interrupted time-series design and correlational analysis.

MGMT 406. Applied Research in Management

3 credits. Lecture.

Students, individually or in groups, formulate, conduct and prepare a written report in publishable format on a research project pertaining to the area of management. Meetings will be devoted to discussion of issues which arise in the conduct of student projects and to presentation of projects.

Marketing

MKTG 300. Seminar

1-6 credits. Seminar.

Investigation and discussion of special topics in marketing.

MKTG 315. Market-Driven Management
3 credits. Lecture. Open to MBA students, others with permission.

The purpose of a business is to create a satisfied customer. To accomplish this objective managers must incorporate both their customers' and competitors' perspectives into their decision-making. This course focuses on the necessity to become a market-driven organization. Topics covered in this course include: market segmentation and target marketing, marketing research for obtaining critical customer information, development of marketing strategies, product development and the key linkage between marketing and R&D, pricing strategies and implementation, working with distribution partners, developing effective promotional programs, control and evaluation of the marketing function. These and other topics are applied in a wide range of market arenas such as global marketing, the new service economy, industrial and high technology products, consumer goods and services, financial services, and health care.

MKTG 320. Customer Relationship Marketing

3 credits. Lecture. Prerequisite: MKTG 315.

This course discusses the scope of interactive marketing strategies and programs and introduces business models that are suited for this purpose. It covers the concept of customer lifetime value and its linkage to various customer relationship forms including customer, partner, stakeholder, and employee relationship marketing. Cross-marketing strategies for maximizing customer lifetime value are emphasized. Brand development and brand equity management are also explored from a relationship marketing perspective. Integrated marketing communications and interactive marketing tools including digital marketing are discussed. Students obtain hands-on experience of creating detailed marketing plans with appropriate financials for typical interactive marketing situations. Case studies of actual companies are used to better illustrate the concepts.

MKTG 325. Marketing for Global Competitiveness

3 credits. Lecture. Prerequisite: MKTG 315.

The United States is the largest market for consumer goods in the world, yet it is also one of the slowest growing markets. Faced with increasing competition from American, Japanese, European and other global competitors, all companies are faced with the necessity of developing truly global marketing strategies. This course helps prepare the manager for these challenges by investigating specific success criteria in the world's major markets. Cultural, political, economic and institutional factors are discussed and their implications for marketing strategies are explored.

MKTG 330 New Product and Innovation Management

3 credits. Lecture. Prerequisite: MKTG 315.

This course takes a "whole enterprise" approach to the management of innovation, based on the perspectives of product managers and a CEO. The

course's primary objective is to develop effective conceptual frameworks and analytical tools for managing innovation throughout the firm. The analytical tools used in the course range from traditional methods for forecasting new product performance (e.g. Bases, Assessor, etc.) to more sophisticated methods that use virtual reality lab environments. Topics include the nature of innovation, new product development processes, new product sales forecasting, successful integration of marketing and R&D, and acceleration of the new product process from design to commercialization advantages.

MKTG 335. Marketing for Non-Profit Institutions

3 credits. Lecture. Prerequisite: MKTG 315.

With reduced financial support from the government, non-profit organizations must adopt a marketing orientation to successfully survive in the turbulent environments which they face. This course explores techniques to analyze market needs and environmental opportunities as the basis for planning the products, services and communications of such non-profit organizations as government agencies, social action groups, universities, hospitals, religious organizations, charities, museums, public arts organizations, and civic groups. The course utilizes extensive case studies as well as field projects.

MKTG 340. Integrated Marketing Communications

3 credits. Lecture. Prerequisite: MKTG 315.

The implementation of integrated marketing communications is increasingly important for an organization's competitiveness. This course covers: communications models; the communications mix; communications strategy - including setting objectives, designing and implementing communications programs, and evaluation. Emphasis upon: customer response models; interactive marketing; direct marketing; information driven marketing; measuring customer life-time value, creation and use of marketing data bases in communications strategy, the emergence of one-to-one marketing, and measurement of marketing productivity.

MKTG 345. Business and Industrial Marketing

3 credits. Lecture. Prerequisite: MKTG 315.

Explores the differences between consumer markets and business-to-business or industrial markets. Organizational buying models are discussed as they apply to a variety of purchasing situations. Special consideration is given to industrial and high technology market segmentation, industrial distribution, industrial sales practices, and requirements of cross functional marketing.

MKTG 350. Market Research and Information Systems

3 credits. Lecture. Prerequisites: MKTG 315 and OPIM 303.

This course discusses the collection and use of information on customers and their needs for designing marketing programs. The course develops skills in obtaining and using customer input for product

design, communications, pricing, distribution, and customer service decisions. Some of the topics covered include: research design; use of secondary information sources; decision support systems; sampling techniques; questionnaire design; scaling and measurement; and multivariate data analysis procedures. The applications discussed in the course include the creation and use of data-warehouses; customer satisfaction measurement; customer-based brand equity measurement; and the use of the Internet as an information-gathering tool.

MKTG 351. Data Analytics

3 credits. Lecture. Prerequisite: MKTG 315.

Introduces students to the concepts, methods, and quantitative tools for creating and exploiting customer databases. The course will have a strong hand-on methodological orientation with emphasis on applications involving real customer data. Students will learn quantitative tools for estimation of customer lifetime value, customer response modeling (e.g., multiple regression, logistic regression, cluster analysis, discriminant analysis, and neural network analysis) and experimentation in test markets. Applications will include prospecting, market segmentation and targeting, product customization, cross-selling, and customer loyalty programs. The applications will span several different types of businesses, such as Internet retailing, financial services, computers, and knowledge-intensive enterprises.

MKTG 355. Pricing Strategies

3 credits. Lecture. Prerequisite: MKTG 315.

One of the most closely scrutinized aspects of the marketing mix, pricing is a critical factor in the success of both new and old products and services. This course examines the price-setting process and the role of marketing, engineering, manufacturing and other business functions in price determination. Students will integrate economic and behavioral aspects of customer response to pricing, legal constraints as they impact the marketing manager's pricing flexibility, and the particular problems of pricing within the context of a global marketing strategy.

MKTG 360. Customer and Market Behavior

3 credits. Lecture. Prerequisite: MKTG 315.

Current theories and research of buyer behavior from marketing, psychology, sociology, cultural anthropology, and economics are analyzed with special attention to their application in managerial decision-making. Specific theories of buyer learning, attitude development, perception, group interactions and decision-making, organizational dynamics, personality and culture are used to explain and predict customer response to market offerings.

MKTG 362. Services Marketing

3 credits. Lecture. Prerequisite: MKTG 315.

An examination the application of marketing principles to the service arena. Exploration of the differences between the marketing of goods and services. Development of appropriate decision models

for services in consumer and industrial market segments and the use of services as a differentiation tool for product marketers. Topics include new service development; the service-profit chain; evaluating service quality; strategic service management; and the impact of customer satisfaction and loyalty on company profits. A variety of service industries are used as points of illustration, including telecommunications; insurance and financial services; health care; and business-to-business services such as advertising, temporary employees, and accounting.

MKTG 365. Digital Marketing

3 credits. Seminar. Prerequisite: MKTG 315.

An exploration and evaluation of the potential for digital technology, especially the Internet, to enhance the marketing of goods and services. Emphasis is on strategies and tactics for creating, retaining, and enhancing customer relationships via the World-Wide-Web, and on integrating the digital environment into other elements of the marketing mix. Business models for cyberspace are compared and contrasted with those for physical space. Heavy reliance on the Internet as a teaching tool.

MKTG 396. Special Topics in Marketing

1-6 credits. Independent Study.

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

MKTG 400. Investigation of Special Topics

1-6 credits. Lecture. Open only to students in the Marketing doctoral program.

MKTG 401. Seminar in Research Methods in Marketing

3 credits. Seminar.

Provides an introduction to key issues in research design and philosophy of science as they apply to marketing and to the applied social sciences in general. Methods to assess and ensure reliability and validity in designs, procedures, and measures are examined. Seminar readings and discussion also provide an overview and appreciation of different research styles and orientations in marketing. Relationships among conceptual, methodological, and substantive domains in marketing are explored.

MKTG 402. Advanced Seminar in Buyer Behavior

3 credits. Seminar.

Covers skills necessary for conceptualizing and evaluating contemporary research in buyer behavior. Covers substantive areas such as: attitude theory, affect, information processing, buyer decision making, advertising, and cultural meanings of goods. Also covers the use of appropriate quantitative and interpretive methods in buyer behavior.

MKTG 403. Quantitative Models in Marketing

3 credits. Seminar.

This seminar provides an introduction to mathematical models in marketing. The focus is on a selective survey of the literature in some of the major modeling areas in marketing. The discussion emphasizes model applications rather than the mathematics underlying model development. Market definition and response models, decision-support models, and models of marketing phenomena are covered.

MKTG 410. Seminar in Theory and Practice in Marketing

3 credits. Seminar.

Seminar discussions focus on scholarly research on substantive problems in marketing strategy and in marketing program decisions. The seminar also examines the conceptual foundations of marketing and the evolution of marketing thought and practice. Conceptual and empirical contributions toward the understanding of marketing phenomena are discussed.

MKTG 496. Special Topics: Progress toward Qualifying Paper

3 credits. Independent Study. Open only to students in the Marketing doctoral program.

Independent study under faculty supervision in area chosen for doctoral student's qualifying paper. Satisfactory progress on qualifying paper (including literature review and research conceptualization) is required. Student can also determine research design, conduct pilot studies, and refine questionnaires and measures. A written report is required.

Operations and Information Management

OPIM 300. Seminar

1-6 credits. Seminar.

Introduces many of the most exciting concepts emerging in the field of consumer oriented Internet-working, including high speed access [cable modem, satellites and digital subscriber lines (DSL)] and infrastructure developments such as gigabyte networking with asynchronous transfer mode (ATM). Evaluates the emerging directions in EC that are expected to shape both consumer and business applications in the coming decade. A "macro perspective" is used to examine the technical and managerial aspects of electronic commerce. Focus is on questions such as: What are or will be the key attributes of current and future digital products, payment systems, online retailing, and banking? How are these systems designed and implemented? What are the different mercantile processes and tradeoffs associated with these processes? What impact has global connectivity made on traditional supply-chain(s)?

OPIM 302. Mathematical Analysis for Business

3 credits. Lecture.

Review of algebra followed by introduction to functions, limits, differentiation, integration, vectors, matrices and linear programming. Examples and

applications of mathematical topics to business problems.

OPIM 303. Managerial Statistics

3 credits. Lecture. Open to MBA students, others with permission.

A manager is concerned with recognizing and formulating statistical problems in business decision-making. This course covers some of the more familiar classical inference procedures and the basic statistical concepts that are often essential to the interpretation of business data. Methods of understanding variability, and detecting changes are explored using descriptive, exploratory, and inferential statistics found in widely available statistical packages. Topics include: discrete and continuous random variables, sampling, confidence intervals, hypothesis testing, and linear regression.

OPIM 304. Advanced Managerial Statistics

3 credits. Lecture. Prerequisite: OPIM 303.

Study of intermediate statistical analysis for managerial control. Includes multiple linear regression, time series analysis, sample designs, and analysis of variance.

OPIM 310. Operations Management

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: OPIM 303.

An operations manager is concerned with designing, operating and controlling a system for producing goods and services. Design decisions include selecting a process technology, organizing jobs, selecting vendors, and developing the location and layout of facilities. Operating the system involves planning and scheduling work and material flow, controlling quality, and managing inventories. General systems concepts and models are developed and applied. Topics include process flow analysis, inventory systems, waiting line analysis, quality design, capacity resource planning, project management, and integrating operations with the firm's strategic plans.

OPIM 341. Operations Research in Management

3 credits. Lecture.

Study of managerial applications of operations research, using mathematical programming, systems analysis, and simulation methods.

OPIM 365. Management Information Systems

3 credits. Lecture. Open to MBA students, others with permission.

A manager is concerned with the solution of business problems by exploiting the information resources that are becoming available through the explosion in information technology. The emphasis is on business applications and how to structure the development and use of information systems for maximum benefit to the organization. Topics include: decision support systems, impact of the computer upon individual and organizations, competitive

implications, technology change, telecommunications, and control of information systems resources.

OPIM 368. System Simulation

3 credits. Lecture. Prerequisites: OPIM 303, OPIM 304, and OPIM 365.

Development, application, and evaluation of systems simulation models. The use of simulation languages in conjunction with digital computers.

OPIM 370. Systems Development

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: OPIM 365.

Builds upon the student's acumen in business, IT programming, data structures/data-base, and electronic commerce. Integrates the areas of computer technology, information systems analysis, systems design, and organizational behavior to aid in the design of large scale systems and systems applications. Various approaches to information systems design and specification are presented. Topical coverage includes infrastructure issues, IT enabled virtual organizations, and systems to facilitate electronic commerce. Students identify an actual systems problem, and analyze and design a small system.

OPIM 371. Decision Support Systems

3 credits. Lecture. Prerequisite: OPIM 365. Examines computer based decision support modeling technologies for loosely structured problems. Emphasis is placed on "hands on" involvement with commercially available decision support systems and on designing and implementing simple decision support systems for special managerial problems.

OPIM 372. Data Base Systems

3 credits. Lecture. Open to MBA students, others with permission. Prerequisite: OPIM 365.

Introduces concepts of databases and how they can be leveraged to manage data for improving business competitiveness. The industry standard relational database model is covered in detail, with hands-on examples on database design, implementation, data storage, retrieval and processing, using a leading DBMS tool. Also introduces SQL, the de facto language for building and querying large-scale databases. Database integrity, security and administration issues are discussed. Features and selection criteria of DBMS tools for various business purposes are highlighted.

OPIM 380. Managing and Controlling Information Systems

3 credits. Lecture. Prerequisite: OPIM 365.

Examines the management control problems and systems development processes from the dual perspective of (a) managers of the computer information system, and (b) the organization as a whole, including persons who interact extensively with the systems personnel or are administratively in a position to influence the information system.

OPIM 396. Special Topics in Information Management

1-3 credits. Independent Study.

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

OPIM 401. Research Methods for Operations and Information Management

3 credits. Seminar.

Several advanced analytical methods that are relevant to students' areas of research will be studied in depth in this seminar. Topics may include special mathematical programming; complex decision making; linear models; advanced statistical analysis; and stochastic processes.

OPIM 402. Seminar in Operations Management

3 credits. Seminar.

Introduces doctoral students to the current research concerns in the field of Operations Management. The course will also acquaint students with the variety of research tools used in the field, enable them to critically evaluate the research of other scholars in the field as well as to develop research skills in identifying potential research problems to be analyzed.

OPIM 403. Seminar in Management Information Systems

3 credits. Seminar.

A topic on a significant applied or theoretical aspect of information systems will be chosen. Broadly, these aspects will encompass modeling, design, implementation, testing, and operation of computer information systems, and the implications of information technologies for the organization.

All Sections

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

CHEMICAL ENGINEERING

Department Head: Professor Douglas Cooper
Professors: Achenie, Helble, M. Shaw, Weiss, and Wood
Associate Professors: Anderson, Erkey, Fenton, and Parnas

Assistant Professors: Srivastava and Zhu

Adjunct Associate Professor: Bryers and Curtis

The Department offers studies and research programs leading to the degrees of Doctor of Philosophy and Master of Science in chemical engineering. Areas of special interest include: environmental engineering, electrochemical engineering, biochemical engineering, polymer science and engineering, kinetics, catalysis and reaction engineering, computer simulation of chemical processes, process optimization, and process dynamics and control.

Requirements for the Ph.D. Degree. Ph.D. candidates must pass both written and oral qualifying examinations taken after the first semester of graduate study. The written exam covers the areas of thermodynamics, transport phenomena, and kinetics (CHEG 301, 315 and 321 are recommended preparation for this exam). The oral exam involves the critique and discussion of a paper from the literature assigned to the student after passing the written exam. The doctoral plan of study developed jointly by the student and his/her advisory committee usually includes one year of full-time course work beyond the master's degree. Doctoral students also must fulfill a foreign language requirement of the Graduate School (which may be satisfied by courses in a related or supporting area such as math or computer science). In addition to the qualifying exams, the student must complete a General Examination and the writing of a Ph.D. dissertation proposal, which is defended orally. The Ph.D. dissertation must contain the results of original research in chemical engineering. An oral defense of the dissertation is required.

Special Facilities. The Department maintains large, well-equipped laboratories. Facilities and research opportunities are available through a number of other departments and University Institutes as well, including Chemistry, the Institute of Materials Science, the Environmental Research Institute, the Biotechnology Center, Booth Research Center and the Advanced Technology Institute. Examples of equipment available in these research laboratories include: clean room for surface and interface research, polymer preparation and characterization instrumentation, surface analysis equipment, a wide variety of analytical and visualization equipment, electrochemical instrumentation and reactors, electrodialysis units, fuel cell lab, injection molding machine, and a variety of biological reactors. Computing resources are widely available, including those in the University Computer Center and the Booth Computer Applications and Research Center. Machine, glass and electronics shops provide services for the construction of specialized equipment.

COURSES OF STUDY

CHEG 300. Independent Study
 1-3 credits. Independent Study.

Independent study under the supervision of a Chemical Engineering faculty member.

CHEG 301. Chemical Engineering Thermodynamics I
 3 credits. Lecture.

An advanced study of classical thermodynamics with emphasis on phase and chemical equilibria and applications to the chemical process industries. Kinetic theory and statistical thermodynamics with emphasis on the prediction and correlation of physical and chemical properties of gases and liquids, including mixtures. Theory and application of flames, plasmas, and shock waves.

CHEG 302. Chemical Engineering Thermodynamics II
 3 credits. Lecture.

An advanced study of classical thermodynamics with emphasis on phase and chemical equilibria and applications to the chemical process industries. Kinetic theory and statistical thermodynamics with emphasis on the prediction and correlation of physical and chemical properties of gases and liquids, including mixtures. Theory and application of flames, plasmas, and shock waves.

CHEG 311. Transport Phenomena
 3 credits. Lecture.

An advanced study of transport phenomena and rate processes with emphasis on a differential balance approach. Designed for non-chemical engineers and chemical engineers with an inadequate background in differential balances.

CHEG 315. Transfer Operations I
 3 credits. Lecture.

An advanced study of momentum, heat and mass transfer with application to complex problems. Cartesian tensors, non-Newtonian flow, statistical theory of turbulence. Mass transfer in multicomponent systems and with chemical reaction. Mass transfer in drops and bubbles; two-phase flow and fluidization.

CHEG 316. Transfer Operations II
 3 credits. Lecture.

An advanced study of momentum, heat and mass transfer with application to complex problems. Cartesian tensors, non-Newtonian flow, statistical theory of turbulence. Mass transfer in multicomponent systems and with chemical reaction. Mass transfer in drops and bubbles; two-phase flow and fluidization.

CHEG 320. Investigation of Special Topics
 1-3 credits. Lecture.

This course is designed for special topics, or for individual students who desire to pursue investigations in a specialized field.

CHEG 321. Reaction Kinetics I
 3 credits. Lecture.

Chemical kinetics and reactor design. An advanced study of chemical reaction engineering with emphasis on catalysis. Applications to stirred-tanks, fixed-bed, and fluidized bed reactors.

CHEG 322. Reaction Kinetics II
 3 credits. Lecture.

Chemical kinetics and reactor design. An advanced study of chemical reaction engineering with emphasis on catalysis. Applications to stirred-tanks, fixed-bed, and fluidized bed reactors.

CHEG 325. Equilibrium Stage Operations
 3 credits. Lecture.

Principles of the design of multicomponent stage processes. Emphasis on distillation, but with applications to extraction and absorption. Azeotropic and extractive distillation, batch distillation and transient behavior of processes, tray efficiencies.

CHEG 331. Process Engineering
 3 credits. Lecture.

Applications of thermodynamics, kinetics, unit operations, mechanics, and economics to the design of process plant equipment and complete plant design.

CHEG 332. Process Engineering
 3 credits. Lecture.

Applications of thermodynamics, kinetics, unit operations, mechanics, and economics to the design of process plant equipment and complete plant design.

CHEG 336. Process Dynamics and Control I
 3 credits. Lecture.

Dynamic behavior of chemical process operations. Distributed parameter and non-linear processes. Specification of control systems. Stability analysis. Optimal operation of chemical processes. Design of feedback and feedforward control schemes for multiloop processes. Adaptive control.

CHEG 337. Process Dynamics and Control II
 3 credits. Lecture.

Dynamic behavior of chemical process operations. Distributed parameter and non-linear processes. Specification of control systems. Stability analysis. Optimal operation of chemical processes. Design of feedback and feedforward control schemes for multiloop processes. Adaptive control.

CHEG 345. Chemical Engineering Analysis I
 3 credits. Lecture.

Techniques for the solution of chemical engineering problems including the solution of ordinary and partial differential equations, numerical analysis, and computer simulation.

CHEG 346. Chemical Engineering Analysis II
 3 credits. Lecture. Prerequisite: CHEG 345.

An advanced study of the mathematics and computation of optimization of chemical engineering problems. Linear and non-linear applications.

CHEG 347. Optimization
 3 credits. Lecture.

Advanced topics in optimization such as linear and nonlinear programming, mixed-integer linear and non-

linear programming, deterministic and stochastic global optimization, and interval global optimization. Example applications drawn from engineering.

CHEG 350. Nuclear Reactor Design

3 credits. Lecture. Prerequisite: CHEG 345.

Involves the complete design of a reactor: conception, core design, critical parameters, heat removal, shielding, instrumentation.

CHEG 351. Polymer Physics

3 credits. Lecture.

Modern concepts relating to glassy, rubbery and organized states of bulk polymers. Considers rubber elasticity, glass-to-rubber transitions, networks, elements of crystallization, blends and interfacial phenomena.

CHEG 352. Polymer Properties

3 credits. Lecture.

Interrelationships between solid state structure, dynamics, and mechanical properties of non-crystalline and semi-crystalline polymers. Considers polymer viscoelasticity, diffusion, failure mechanism, and elementary polymer rheology.

CHEG 355. Polymer Structure and Morphology

3 credits. Lecture. Prerequisite: CHEM 381.

A fundamental study of the various levels of structure and morphology in polymers from the molecular to the macroscopic level, and how this structure influences the overall material properties. The principle methods used to characterize morphology are described for the analysis of amorphous and crystalline homopolymers, polymer blends, and copolymers.

CHEG 356. Adhesion

3 credits. Lecture. Prerequisite: CHEG 351.

A study of both physical and chemical factors controlling adhesion behavior. Thermodynamics, surface energy and surface tension. Intermolecular forces. Surface roughness effects. Mechanical evaluation of bond strength. Factors controlling adhesion durability. Chemical coupling agents.

CHEG 357. Surface and Interfacial Properties of Polymers

3 credits. Lecture. Prerequisite: CHEM 381.

A comprehensive coverage of the fundamental behavior of polymers at surfaces and interfaces from a molecular perspective. Techniques are described for the characterization of interfacial properties. Topics include polymer adsorption, surface segregation in multiconstituent polymers, polymer-polymer interface structure, wetting and contact angles, surface and interfacial tension, and Langmuir-Blodgett monolayers.

CHEG 358. Composite Materials

3 credits. Lecture.

An introduction to the mechanical properties of fiber reinforced composite materials. Included are discussions of the behavior of unidirectional composites, short fiber composites and laminates.

Special topics such as fatigue, fracture and environmental effects are also included.

CHEG 361. Nuclear Chemical Engineering

3 credits. Lecture.

Scientific and engineering principles involved in processes and materials of importance in nuclear chemical technology. Chemical processing of nuclear feed fuels. Separation of isotopes, purification of metals, solvent extraction, separation of reactor products, radioactive waste disposal and utilization in chemical processes. Formerly CHEG 360.

CHEG 363. Electrochemical Engineering

3 credits. Lecture.

Principles underlying electrochemical processes. Transformation of chemical and electrical energy. Applications of fundamental electrochemical laws to industrial processes, energy conversion, and electrometallurgical operations.

CHEG 367. Polymer Rheology

3 credits. Lecture.

Analysis of the deformation and flow of polymeric materials. Topics include non-Newtonian flow, viscoelastic behavior and melt fracture with application to polymer processing.

CHEG 368. Polymer Rheology and Processing Laboratory

3 credits. Lecture/Laboratory. Prerequisite: CHEG 367.

Classical and modern experimental techniques for measuring the viscoelastic properties of polymers. Experiments include: creep, dynamic mechanical analysis, cone and plate viscometer, single-screw extruder, capillary rheometer, and extensional viscosity.

CHEG 373. Biochemical Engineering

3 credits. Lecture.

Principles and design of processes involving biochemical reactions. Nature of biological materials, biochemical kinetics, heat and mass transfer, application to fermentation and other biological processes. Also offered as BME 321. Formerly CHEG 383.

CHEG 374. Bioremediation

3 credits. Lecture.

Application of engineering and biological principles toward remediation of hazardous wastes. Degradation of toxic chemicals using genetically-engineered microorganisms. Biological contacting devices for waste remediation.

CHEG 375. Fermentation and Separation Technology Laboratory

3 credits. Laboratory. Also offered as MCB 384.

Introduction to techniques used for industrial mass culture of prokaryotic and eukaryotic cells, and methods used to extract useful products from these cultures. Metabolic processes, energetics, growth kinetics and nutrition of microorganisms. Synthesis of cellular material and end products. Heat exchange, oxygen transfer, pH control, sterilization and design of

fermentors. Culture of eukaryotic cell mass. Immobilized enzyme and cell reactors. Product recovery methods of precipitation centrifugation, extraction filtration and chromatography. Formerly CHEG 384.

CHEG 381. Water Purification Principles

3 credits. Lecture.

An advanced study of the application of thermodynamics, transfer operations, and chemical kinetics to disposal and recovery of aqueous industrial and municipal wastes.

CHEG 382. Environmental Systems Engineering

3 credits. Lecture

The analysis and design of water and wastewater treatment systems using optimization techniques and control theory.

CHEG 385. Air Pollution

3 credits. Lecture. Prerequisites: CE 390 or ENVE 300 for non-CHEG majors.

Sources and properties of air pollutants, atmospheric chemistry, dynamics of atmospheric pollution, analytical and sampling techniques, control and abatement processes and air pollutants.

CHEG 387. Aerosol Science

3 credits. Lecture.

Physics and chemistry governing aerosols. Particle formation and growth, aerosol particle dynamics, and population balances. Techniques for particle characterization are also addressed. Systems include ambient particulate matter and materials

CHEG 389. Chemical Transport Processes in the Environment

3 credits. Lecture.

Movement and fate of chemicals within the air, water, and soils in the environments. Emphasis on interfacial processes and exchange rates involving surface water, groundwater and air pollution problems.

†CHEG 391. Seminar

1 credit. Seminar.

†CHEG 392. Seminar

1 credit. Seminar.

CHEG 393. Seminar

0 credits. Seminar.

CHEG 394. Seminar

0 credits. Seminar.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†**GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.

†**GRAD 496. Full-Time Doctoral Research**
3 credits.

†**GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

CHEMISTRY

Department Head: Professor Steven L. Suib
Professors: W. Bailey, Basu, Birge, Bohn, David, Frank, Howell, Kumar, Michel, Papadimitrakopoulos, Rusling, M. Smith, Sung, and Tanaka
Associate Professors: Seery, Sotzing, and B. Shaw
Assistant Professors: Asandei, Brückner, Lagadic, Leadbetter, Peczu, and Yao

The Department of Chemistry offers course work and research in the areas of analytical, biological, environmental, inorganic, organic, physical, and polymer chemistry leading to the M.S. and Ph.D. degrees in Chemistry. Research projects within these areas include: Analytical – atomic spectroscopy, biomedical sensors and microarrays, chemistry, proteomics, separations and mass spectrometry; Biological – bio-analytical, bio-inorganic, bio-organic, bio-physical, bio-polymer, and bio-materials; Inorganic – bioinorganic and coordination chemistry, catalysis, crystal growth and structure, organometallic and transition metal chemistry, physical methods, solid state chemistry, structure determination, synthesis and characterization, and surface analysis; Organic – bioorganic, medicinal and toxicological chemistry, natural products, synthetic and physical organic chemistry, and organic polymer chemistry; Physical – kinetics, biophysical chemistry, spectroscopy, physical methods, theoretical chemistry, thermodynamics, x-ray crystal structure; and Polymer – organic and inorganic polymers, and synthesis and characterization of materials. A detailed description of the research programs of individual faculty members is available in a departmental brochure, which is available on the departmental Website <<http://web.uconn.edu/chemistry/>>.

In addition to the basic requirements for admission to the Graduate School, an applicant should submit scores from the General and the Advanced Test in Chemistry of the Graduate Record Examinations at the time of application. All entering graduate students must take comprehensive proficiency examinations in analytical, inorganic, organic, and physical chemistry at the advanced undergraduate level. The results of these examinations are used to determine the appropriate course level for the student.

The student must qualify in the four areas listed above either by passing the proficiency examinations upon entry, or by earning a grade of B or higher (not B-) in a graduate course in the discipline(s) in which the examination was not passed. Students lacking undergraduate background in an area, may elect to take an undergraduate course or sequence and retake the proficiency examination. Students who do not qualify for admission to the Ph.D. program may be allowed to continue towards a master's degree.

Requirements for the Ph.D. Degree. There are no specific course requirements for the Ph.D. degree in chemistry beyond those established by the student's advisory committee. The department has starred (*) courses in each of the divisions as guidelines in preparing for the Ph.D. general examination, and ordinarily students are also expected to demonstrate reasonable competence in an area or areas outside their major program emphasis.

After the successful completion of the qualification requirements (see above), the student must pass the

General Examination for the Ph.D. degree, consisting of a written and an oral portion as determined by the student's chosen Division (analytical, biological, environmental, inorganic, organic, physical and polymer). The General Examination (see the department's Graduate Student Handbook for details) usually is completed during the second or third year of graduate study.

Students working toward the Ph.D. degree must complete the related area or foreign language requirement of the Graduate School before taking the Ph.D. General Examination. Foreign languages appropriate for fulfilling this requirement include: Chinese, French, German, Japanese, Korean, Russian, and Spanish. Upon passing the written portion of the General Examination, the student takes an oral examination based on a research proposal written by the student.

The Ph.D. dissertation must contain the results of original research in chemistry and make a substantial contribution to the particular field. Upon completion of the dissertation, the student takes an oral examination in its defense.

Special Facilities. In addition to the usual equipment in a department of chemistry, the facilities available for research include: electrochemical instrumentation, electron spin resonance (esr) instruments, FT-IR and Raman spectrometers, high resolution FT-NMR, gas and liquid chromatographs, flash photolysis apparatus, laser spectroscopy instrumentation (atomic and molecular), Mössbauer instruments, magnetic susceptibility balances, mass spectrometers, 400 and 270 MHz nuclear magnetic resonance spectroscopy, polymer preparation and characterization instrumentation, GC-MS, surface analysis equipment (Auger, SAM, XPS, ISS-SIMS), scanning electron microscope, thermal analysis equipment, ultra-high temperature and pressure equipment, uv-visible spectrophotometers, spectrofluorimeters, and x-ray diffraction equipment. Molecular graphics work stations and general computing facilities are available within the Department; computer services are also available at the University of Connecticut Computer Center on campus. Some faculty members are also members of the University's Materials Science Institute or the Environmental Research Institute where additional research facilities are available, especially for polymer synthesis, characterization, and processing, or environmental analysis and research, respectively.

COURSES OF STUDY

CHEM 300. Independent Study
1-3 credits. Independent Study.

CHEM 305. Computerized Modeling in Science
4 credits. Lecture.

Development and computer-assisted analysis of mathematical models in chemistry, physics and engineering. Topics include chemical equilibrium, reaction rates, particle scattering, vibrating systems, least squares analysis and quantum chemistry.

†**CHEM 310. Seminar**
1 credit. Seminar.

Reports and discussion of topics of current interest in a variety of fields of chemistry.

CHEM 311. Research Methods

1-3 credits. Practicum.

An introduction to the operations of major department instruments and to the applications of these to research.

CHEM 316. Crystal Growth of Inorganic Compounds

3 credits. Lecture.

Theory and problems of crystal growth of inorganic compounds and factors affecting morphology and habit; thermodynamic and phase equilibria factors important in the growth from different media; extensive discussion of practical techniques of crystal growth.

CHEM 324. Advanced Inorganic Chemistry I

3 credits. Lecture.

Synthetic methods in inorganic chemistry; the application of physical methods to the investigation of inorganic compounds.

CHEM 325. Advanced Inorganic Chemistry II

3 credits. Lecture. Prerequisite: CHEM 324.

In depth study of general principles of inorganic chemistry; the structure of the elements and of inorganic compounds; group theory; different approaches to understanding the chemical bond.

CHEM 326. Advanced Inorganic Chemistry III

3 credits. Lecture. Prerequisite: CHEM 325.

Main group and transition metal compounds with inorganic and organic ligands; the study of the transition metals is in preparation for Chemistry 327.

CHEM 327. Advanced Inorganic Chemistry IV

3 credits. Lecture. Prerequisite: CHEM 326.

Transition metal chemistry; organometallic and coordination compounds of the transition elements, including the lanthanides and actinides; selected topics in bioinorganic chemistry.

CHEM 335. Theoretical Analytical Chemistry

3 credits. Lecture.

A problem oriented course, involving hands on computer use, which incorporates modern methods of analyzing data obtained from the various analytical techniques. Use of theoretical and empirical models and chemometrics is stressed.

CHEM 336. Electroanalytical Chemistry

3 credits. Lecture.

A study of the theoretical and practical basis for electroanalytical methods. Topics include voltammetric methods of analysis (including polarography, cyclic voltammetry, rotating disk voltammetry, pulse and square-wave methods, and stripping analysis), coulometric, and chronoamperometric methods. Recent advances using micro- and modified electrodes, thin-layer and flow

cells, electrochemical sensors and detectors, and bioelectrochemistry may be included.

CHEM 337. Optical Methods of Analysis

3 credits. Lecture.

A discussion of fundamental principles, instrumentation and applications of some spectroscopic techniques of analytical chemistry including Raman spectroscopy, molecular fluorescence spectroscopy, atomic spectroscopy.

CHEM 338. Separation Methods

3 credits. Lecture.

A study of the theoretical and practical basis for modern separation methods. Topics to be discussed include the various methods dealing with gas-liquid, liquid-liquid, liquid-solid, gas-solid, ion-exchange, size exclusion, chromatography, electrophoresis, and mass spectrometry.

CHEM 340. Electronic Interpretation of Organic Chemistry

1 credit. Lecture.

Approaches to writing organic reaction mechanisms.

CHEM 341. Advanced Organic Chemistry

3 credits. Lecture.

This course will review the fundamentals of bonding, stereochemistry and conformations and basic reactions from undergraduate organic chemistry. These fundamental principles will then be elaborated to include more advanced concepts of reactions and reactivity.

CHEM 343. Organic Reactions

4 credits. Lecture.

Nomenclature. Classes of compounds. A focus upon those reactions in which C-C bonds are formed. Emphasis on the fundamentals of each reaction, their utility and applications. A background of functional group exchanges; reaction control by steric, electronic, and topological considerations.

CHEM 344. Concepts in Organic Chemistry

3 credits. Lecture. Prerequisite: CHEM 343.

Structure and mechanism. Such topics as chemical bonding, stereochemistry, conformation, molecular orbital theory and applications, acids and bases, and study of organic reaction mechanisms, including kinetics, substitutions, rearrangements and photochemical reactions.

CHEM 345. Determination of Organic Structures

3 credits. Lecture. Prerequisite: CHEM 343.

Structural problem solving using fundamental data including spectroscopic and wet chemical techniques.

CHEM 347. Organic Synthesis

3 credits. Lecture. Prerequisite: CHEM 343 and CHEM 344.

An investigation of efficient strategies for the synthesis of natural and unnatural organic molecules. Topics include: retrosynthetic analysis, synthetic

strategies, common carbon-carbon bond formation reactions, multiple bond disconnection strategies (applications of pericyclic reactions), organometallic coupling reactions, radical and carbene reactions in organic synthesis, strategies to construct carbocyclic and heterocyclic ring systems.

CHEM 349. Readings in Organic Chemistry

1 credit. Lecture.

Informal discussions of the current literature. Formal oral presentations of current topics.

CHEM 351. Quantum Chemistry I

3 credits. Lecture.

The concepts of the quantum theory starting with an historical introduction and proceeding to the formulation of the Schrödinger equation and its exact solutions. Other topics include group theory, angular momentum, and approximate methods with applications to atomic and molecular structure and spectroscopy.

CHEM 352. Quantum Chemistry II

3 credits. Lecture. Prerequisite: CHEM 350 or CHEM 351.

Selected topics in quantum chemistry, building on the concepts developed in Chemistry 351.

CHEM 353. Chemical Kinetics

3 credits. Lecture.

The empirical and theoretical treatment of reaction rates. Experimental methods and treatment of data. Simple kinetic forms. Deduction of reaction mechanisms. Reaction energetics. Theories of elementary reaction rates. Diffusion. Homogeneous and heterogeneous catalysis. Extrakinetic probes of mechanism.

CHEM 354. Photochemistry

3 credits. Lecture. Prerequisite: CHEM 350 or CHEM 351.

The interaction of light with organic and inorganic molecules. Dynamical processes of excited states. Kinetics and mechanism of photochemical reactivity. Excimers. Lasers. Experimental techniques.

CHEM 355. Chemical Thermodynamics

3 credits. Lecture.

An understanding of the standard methods of calculus, e.g. partial differentiation, is required. Classical thermodynamics applied to pure substances and solutions.

CHEM 356. Statistical Thermodynamics

3 credits. Lecture. Prerequisite: CHEM 355.

The relationship between the micro and macro world is explored and discussed.

CHEM 359. Introduction to X-ray Crystallography

3 credits. Lecture.

Crystallographic symmetry including macroscopic and microscopic symmetry elements, point groups and space groups. Microscopic examination of crystals. Interaction of X-rays with matter. Powder diffraction

methods and identification of crystalline substances. Single crystal diffraction techniques and methods of structure determination.

CHEM 360. Biological Chemistry I

3 credits. Lecture.

Recent advances in understanding the mechanisms of chemical processes in biological systems. Chemical perspectives or problems of biological significance at the interfaces of the various divisions of chemistry.

CHEM 361. Biological Chemistry II

1-3 credits. Lecture.

Selected topics in Biological Chemistry building on the concepts developed in Chemistry 360.

CHEM 370. Environmental Chemistry I

3 credits. Lecture.

Recent advances in studies of sources, reactions, transport, effects and fate of chemical species in air, water and soil environments. Emphasis on analytical methods for studying environmental phenomena and sampling methods.

CHEM 371. Environmental Chemistry II

3 credits. Lecture. Prerequisite: CHEM 370.

Environmental sampling and methods of chemical contaminant analyses, sources and types of chemical pollution, pollution prevention, waste management, waste reduction, recycling, and ultimate chemical destruction.

CHEM 380. Polymer Synthesis

3 credits. Lecture.

Chemistry of the formation of high polymers, including kinetics, mechanisms, and stereochemistry of step growth and addition polymerization. Recent advances in polymer synthesis.

CHEM 381. Polymer Physical Chemistry

3 credits. Lecture.

A molecular description of the fundamental physico-chemical aspects of polymer solutions and solids. Considers thermodynamics, chain statistics, dynamics, and structure of polymer molecules.

CHEM 382. Polymer Characterization I

3 credits. Lecture/Practicum.

Experimental techniques for characterizing polymers on a molecular level, with emphasis on the provision of a working knowledge of instrumental analysis. Experiments include dilute solution viscosity, vapor pressure osmometry, gel permeation chromatography, chemical and spectroscopic analysis.

CHEM 384. Polymer Characterization II

3 credits. Lecture/Practicum.

Experimental techniques for characterizing polymers on a macroscopic scale, with emphasis on provision of a working knowledge of instrumental analysis. Experiments include calorimetry, mechanical analysis, surface characterization, and structure determination.

CHEM 385. Reactions of Polymers

3 credits. Lecture

A comprehensive coverage of theories of reactions of high polymers, as applied to reaction mechanisms and the relationships of structure with physical properties and reactivity. Topics include modification of polymers, degradation of polymers, polymer reagents and polymer catalysis.

CHEM 386. Microscopy Morphology of Polymers

3 credits. Lecture/Practicum.

Instrumental methods of optical and electron microscopy and their applications to the study of polymers, including polarized light, phase contrast, interference, dark field, micro-thermal analysis, automatic image analysis, photomicrography and micrometry; electron microscopy. Applications to measuring optical properties of polymers, birefringence, orientation, polymer single crystals and polymer texture.

CHEM 387. Polymer Photophysics and Photochemistry

3 credits. Lecture. Prerequisite: CHEM 381.

Lectures and experimental projects on molecular photochemistry and photophysics of polymers. Topics include fluorescence energy transfer and migration, excimers, phosphorescence, photo- and radiation chemistry of polymers.

CHEM 388. Infrared Spectroscopy of Polymers

3 credits. Lecture.

The nature of the interaction of IR radiation with molecules, modern spectrometer design, non-conventional sampling techniques, and applications to polymer-related problems.

CHEM 393. Special Topics in Physical Chemistry

1-3 credits. Lecture.

CHEM 394. Special Topics in Polymer Chemistry

1-3 credits. Lecture.

CHEM 395. Special Topics in Analytical Chemistry

1-3 credits. Lecture.

CHEM 396. Special Topics in Inorganic Chemistry

1-3 credits. Lecture.

CHEM 397 Special Topics in Organic Chemistry

1-3 credits. Lecture. Prerequisite: CHEM 343.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

CIVIL ENGINEERING

Department Head: Professor Erling A. Smith

Associate Department Head & Graduate Program

Director: Associate Professor Ramesh B. Malla

Professors: Accorsi, Davis, DeWolf, Epstein, Frantz, and Or

Associate Professors: Abboud, Anagnostou,

Aultman-Hall, Bagtzoglou, Demars, Garrick, Holmén, Ivan, Liu, and Ogden

Assistant Professors: Kim, MacKay, and Wang

Adjunct Professor: Grasso

Adjunct Associate Professors: Curtis and Smets

The Department of Civil and Environmental Engineering offers graduate courses and research opportunities for students seeking the M.S. or Ph.D. Research areas include environmental, geotechnical, structural and transportation engineering. In addition, the Department participates in interdisciplinary programs in applied mechanics, environmental engineering and fluid dynamics.

Special Requirements for the Master's Degree. Master's degrees may be earned under either of two plans. Plan A requires not fewer than 21 credits of graduate program course work and the writing of a Thesis, while Plan B requires not fewer than 30 credits of graduate program course work and a final examination (but no thesis). For outstanding students who have completed six credits of approved graduate-level course work (300's level or higher) as part of an undergraduate program (as electives and/or as professional requirements) prior to entry to the master's degree program (with grades of **B+** or higher in all such courses) the advisory committee may reduce the course work to 15 credits for Plan A and to 24 credits for Plan B.

Special Requirements for the Ph.D. Program. By the end of the first year of study, the Ph.D. student must have passed a qualifying examination and have submitted evidence of his or her capacity for independent study in the form of a master's thesis or a comparable achievement. In many cases the final examination of the student's M.S. program serves as the qualifying examination. (See also "Applied Mechanics" and "Fluid Dynamics.")

Special Facilities. The Department has fully-equipped, state-of-the-art laboratories for graduate research in applied mechanics, environmental, geotechnical, structural and transportation engineering. In addition to the typical laboratories, special departmental facilities include a 40' x 65' fully-equipped structures testing strong floor, state-of-the-art computer lab for computer aided design (CAD) and geographical information systems (GIS) laboratory, specialized asphaltic and bituminous materials laboratories and controlled environment rooms for both environmental and geotechnical research laboratories. Equipment is also available for conducting experimental research in the field. Specialized laboratories of the Environmental Research Institute (ERI) are also available for research in environmental engineering. Departmental research is funded by national and state agencies and by the private sector.

Special Courses. For additional mathematical analysis and fluid mechanics courses students should consider ME 307, 308, and 312.

COURSES OF STUDY

NOTE -- The following courses are part of the interdisciplinary Applied Mechanics program: CE 322, 324, 325, 326, 332, 334, 358, 359, 360, 361, 366, and 367.

CE 300. Independent Graduate Study in Civil Engineering

1-6 credits. Independent Study.

Special problems in civil engineering as arranged by the student with a supervisory instructor of his or her choice.

CE 301. Engineering Aspects of Urban and Regional Planning

3 credits. Lecture.

Growth patterns, land use, transportation location and development, municipal utilities. Geographic Information Systems.

CE 302. Case Studies in Transportation Engineering

3 credits. Lecture. Not open to students who have passed CE 255.

Analysis of transportation case studies in transportation design, and transportation and land use planning. Application of transportation engineering and planning skills. Oral and written group reports, group discussions, individual papers.

CE 304. Probabilistic Methods in Engineering Systems

3 credits. Lecture. Also offered as ENVE 304.

Common probabilistic models used in engineering and physical science design, prediction, and operation problems; derived distributions, multivariate stochastic models, and estimation of model parameters; analysis of data, model building and hypothesis testing; uncertainty analysis.

CE 305. Transportation and Air Quality

3 credits. Lecture. Also offered as ENVE 305.

Mobile source emissions models in theory and practice. Regulatory framework. Emissions control technology. Field and laboratory measurement techniques. Roadway dispersion modeling. Current topics in mobile source emissions.

CE 312. Civil Engineering Graduate Seminar

1 credit. Lecture. May be taken up to three times for credit.

Presentation and discussion of advanced civil engineering problems.

CE 313. Hydroclimatology

3 credits. Lecture. Also offered as ENVE 313.

This course focuses on the physical principles underlying the spatial and temporal variability of hydrological processes. Topics include atmospheric physics and dynamics controlling the water/energy budgets; global water cycle, its dynamics, and causes of variability/changes; occurrence of drought and flood; climate teleconnections and their hydrological

application; hydrological impact of global changes; quantitative methods in hydroclimatic analysis.

CE 314. Environmental Monitoring

3 credits. Lecture. Also offered as ENVE 314.

Introduction to complexities and challenges associated with acquisition of information on environmental processes and characteristics of natural systems. Hands-on experience with selection of measurement strategy and sensing technology; sampling network and protocol design; and deployment, acquisition and interpretation of measurements in natural systems.

CE 315. Unsaturated Flow and Transport

3 credits. Lecture. Also offered as ENVE 315.

Modern approaches to water flow and solute transport in partially-saturated porous media including media characterization (review); unsaturated flow in porous media (governing equations, hydraulic functions, numerical and analytical solution methods); solute transport in unsaturated media (convection dispersion, transfer functions, solutions); modeling and observational scales; coupled water flow and solute transport (model applications); special topics (preferential flow, effects of spatial variability, stochastic aspects of flow and transport, gas exchange and transport measurement methods).

CE 316. Vadose Zone Hydrology

3 credits. Lecture. Also offered as ENVE 316.

Theoretical and experimental elements of primary physical and hydrological properties of porous media and processes occurring in partially-saturated soils. Practical experience in measurement and interpretation of hydrological information and methods of analysis for vadose-zone related environmental problems.

CE 319. Wood Design

3 credits. Lecture.

Physical and mechanical properties of wood. Behavior of wood beams, columns, beam columns, connectors and fasteners; introduction to plywood and glued-laminated members; analysis and design of structural diaphragms and shear walls.

CE 320. Advanced Topics in Civil Engineering

1-3 credits. Lecture.

Classroom or laboratory courses as announced for each semester. For independent, study see Civil Engineering 300.

CE 322. Advanced Mechanics of Materials

3 credits. Lecture.

Stress and strain, combined stress, and theories of failure. Torsion of non-circular sections. Shear center, unsymmetrical bending, curved flexural members, and beams on elastic foundations. Energy methods.

CE 324. Applied Elasticity

3 credits. Lecture.

Theory of elasticity; two-dimensional solutions of beams, wedges, disks, and rings under load; stress

concentrations; strain-energy methods; torsion of bars; stresses in bodies of revolution.

CE 325. Plates and Shells

3 credits. Lecture.

Stresses and deformations in flat plates and curved shells; bending of circular and rectangular plates; energy methods; buckling; shells of revolution.

CE 326. Elastic Stability

3 credits. Lecture.

Buckling of elastic and inelastic columns; lateral buckling of beams; buckling of plates, rings and tubes; stability of frames.

CE 327. Numerical Methods in Civil Engineering

3 credits. Lecture.

Solution of linear and nonlinear systems of equations and algebraic eigenvalue problems. Interpolation, numerical integration, and regression. Ordinary and partial differential equations by finite difference method. Computer programming.

CE 332. Advanced Fluid Mechanics I

3 credits. Lecture. Also offered as ENVE382.

Dimensional analysis; vector analysis, circulation and vorticity; irrotational motion and velocity potential; two-dimensional flow and stream function; complex variable theory; conformal mapping; airfoils; sources and sinks; free streamline flow; water waves; three-dimensional flow.

CE 334. Advanced Fluid Mechanics II

3 credits. Lecture. Also offered as ENVE 383.

Turbulent boundary layer. Dimensional analysis. Free shear flows. Flows in pipes and channels. Boundary layers on smooth and rough surfaces.

CE 338. Open Channel Hydraulics

3 credits. Lecture. Also offered as ENVE 384.

Unsteady, nonuniform flow; energy and momentum concepts; flow control; de St. Venant equations; unsteady flow modeling of channels and natural rivers.

CE 341. Advanced Soil Mechanics

3 credits. Lecture.

Principles of soil mechanics, effective stresses, shear strength, consolidation, permeability, seepage effects, phase relations.

CE 343. Advanced Foundation Design

3 credits. Lecture.

Soil behavior in retaining systems, shallow foundations, deep foundations.

CE 344. Geosynthetics in Geotechnical Design

3 credits. Lecture.

The properties of geotextiles, geomembranes, geocomposites, and geogrids and their use in road construction, retaining structures, drainage, hazardous waste sites, etc. Design, testing and selection.

CE 345. Earth Structures

3 credits. Lecture.

Embankments, earth dams, earth and rock slopes, consolidation, vertical drains, soft deposits, landslides, subsurface investigations.

CE 346. Ground Water Flow and Drainage

3 credits. Lecture.

Permeability, flow nets, ground water flow and filter design, excavation dewatering, foundation drains, slope stabilization, highway drainage.

CE 347. Soil Behavior

3 credits. Lecture.

Clay mineralogy and interfacial properties, electro-osmosis, thixotropy, shear strength, consolidation, permeability, frost heave, and swelling.

CE 348. Soil Settlement and Consolidation

3 credits. Lecture.

Settlement predictions, theories of consolidation, secondary compression, numerical solutions, analysis of field data.

CE 349. Soil Shear Strength

3 credits. Lecture.

Failure theories for particulate media, plastic equilibrium, laboratory testing and interpretation.

CE 351. Classical Structural Analysis

3 credits. Lecture.

Classical indeterminate analysis, displacement analysis, consistent deformations, energy methods, elastic center and column analogy, slope-deflection, moment and shear distribution, second order effects.

CE 352. Bridge Structures

3 credits. Lecture.

Steel, reinforced concrete, prestressed concrete, and girder, box girder bridges; curved bridges; loadings; durability; fatigue; vibrations. Design project.

CE 353. Advanced Steel Structures

3 credits. Lecture.

Behavior, stability and design of steel columns, beams, beam-columns, plates, bracing, frames; torsional behavior; fatigue and brittle fracture; review of design specifications.

CE 354. Prestressed Concrete Structures

3 credits. Lecture.

Analysis, design, and behavior of pretensioned and post-tensioned concrete; simple and continuous span structures; time dependent behavior; review of design specifications.

CE 355. Advanced Reinforced Concrete Structures

3 credits. Lecture.

Behavior and design of reinforced concrete for flexure, shear, torsion, bond, and axial loads; two way slabs; beam-column joints; general flexure theory; seismic considerations; review of design specifications.

CE 356. Thin Shell Concrete Structures

3 credits. Lecture.

Folded plate structures, barrel shells, hypars, shells of revolution and translation, strength, stability and deflections; methods of construction.

CE 357. Nonlinear Structures

3 credits. Lecture.

Plastic and inelastic analysis of beams, frames, grids, plates and slabs; plastic hinge, collapse configurations, upper and lower bound theorems, deflection, incremental collapse; nonlinear analysis methods.

CE 358. Theory of Shells

3 credits. Lecture.

Curvilinear coordinates. Surface geometry. Thin shell theory. Comparison of various theories. Shells of revolution. Variational principles. Approximate methods. Shallow shell theory.

CE 359. Structural Vibrations

3 credits. Lecture.

Vibrating systems; application to design; discrete and continuous systems, free and forced vibrations; response to periodic and non-periodic loads; analytical and numerical techniques; earthquake loading; response spectra.

CE 360. Matrix Analysis of Structures

3 credits. Lecture.

Matrix methods; force and displacement methods; energy principles; analysis of indeterminate structures, rigid frames, trusses and grids; settlement of supports, lack of fit, and temperature stresses; computer programming.

CE 361. Advanced Matrix Analysis of Structures

3 credits. Lecture.

Review of matrix methods. Methods of substructures and modification of structures, and structural synthesis; non-prismatic and non-linear structures; buckling and vibrations of structures. Computer programming.

CE 363. Applied Finite Element Analysis

3 credits. Lecture. This course and CE 366 may not both be taken for credit.

Structural engineering applications using plane stress, plane strain, plate and solid finite elements. Applications using available programs.

CE 364. Ductility of Reinforced Concrete

3 credits. Lecture.

Design for ductility; limit design; yield line analysis; seismic considerations.

CE 366. Finite Element Methods in Applied Mechanics I

3 credits. Lecture. Also offered as ME 380. This course and CE 363 may not both be taken for credit.

Formulation of finite elements methods for linear static analysis. Development of two and three dimensional continuum elements, axisymmetric elements, plate and shell elements, and heat transfer elements. Evaluation of basic modeling principles including convergence and element distortion.

Applications using commercial finite element programs.

CE 367. Finite Element Methods in Applied Mechanics II

3 credits. Lecture. Also offered as ME 381.

Formulation of finite elements methods for modal and transient analysis. Development of implicit and explicit transient algorithms. Stability and accuracy analysis. Formulation of finite element methods for material and geometric nonlinearities. Development of nonlinear solution algorithms. Applications using commercial finite element code.

CE 370. Transportation Planning

3 credits. Lecture.

Transportation economics, urban transportation planning process, local area traffic management, evaluation of transportation improvements, land use and transportation interaction.

CE 371. Highway Engineering - Design

3 credits. Lecture.

Urban street and highway design: vertical and horizontal alignment, cross-section elements, traffic barriers, interchanges and intersections, pedestrian and bike facilities, traffic calming, community and roadside elements.

CE 372. Bituminous Materials

3 credits. Lecture.

Properties, performance and design of bituminous materials for highway and airport paving; physical and chemical properties of binders; testing methods; specifications; production and construction.

CE 373. Pavement Design

3 credits. Lecture.

Analysis and design of flexible and rigid pavements; testing and characterization of paving materials.

CE 378. Traffic Engineering Characteristics

3 credits. Lecture.

Relationships among traffic flow characteristics; microscopic and macroscopic representations of traffic flow; capacity of highways; traffic stream models; shock wave analysis; queueing analysis; traffic simulation.

CE 379. Traffic Engineering Operations

3 credits. Lecture.

Driver, pedestrian and vehicle operating characteristics. Traffic data collection. Accident and safety analysis. Highway capacity analysis. Traffic signs and markings. Traffic signal timing and operation. Traffic management.

CE 380. Travel Demand Forecasting

3 credits. Lecture.

Alternative formulations and calibration of trip generation, trip distribution and travel mode choice prediction models. Traffic network equilibrium and assignment.

CE 381. River Mechanics

3 credits. Lecture.

Erosion and sedimentation, physical properties of sediment, dimensional analysis, mechanics of sediment laden flows, particle motion, incipient motion, bedforms, bed load, suspended load.

CE 383. Hydrometeorology

3 credits. Lecture. Also offered as ENVE 385.

Global dynamics of aquatic distribution and circulation. Hydrologic cycle, atmospheric circulation, precipitation, interception, storage, infiltration, overland flow, distributed hydrologic modeling, and stream routing.

CE 384. Hydraulic Machinery and Transients

3 credits. Lecture. Also offered as ENVE 386.

Pumps and turbines. Surging, water hammer, cavitation, hydraulic machinery for hydroelectric plants, water supply, irrigation, and river navigation.

CE 385. Hydraulic Structures

3 credits. Lecture. Also offered as ENVE 387.

River regulation and development. Hydroelectric plants, storage and turbines, canals, locks, and penstocks, dams, regulation of power, flood control, navigation and irrigation.

CE 386. The Flood Problem

3 credits. Lecture.

Flood hazards. Preventing or alleviating damages. Flood frequency analysis. Effect of land-use/land-cover and soil moisture on flooding. Remote sensing in flood prediction. Flood and dam-break modeling. Multiple purpose projects.

CE 387. Environmental Physicochemical Processes

3 credits. Lecture. Also offered as ENVE 321.

Reactor dynamics, applications of interfacial phenomena and surface chemistry, processes for separation and destruction of dissolved and particulate contaminants. Scholarly reviews.

CE 388. Environmental Biochemical Processes

3 credits. Lecture. Also offered as ENVE 322.

Major biochemical reactions; stoichiometric and kinetic description; suspended and attached growth modeling; engineered biotreatment systems for contaminant removal from aqueous, gaseous, and solid streams; process design.

CE 389. Environmental Transport Phenomena

3 credits. Lecture. Also offered as ENVE 310.

Movement and fate of chemicals: interfacial processes and exchange rates in environmental matrices.

CE 390. Environmental Engineering Chemistry - I

3 credits. Lecture. Also offered as ENVE 300.

Quantitative variables governing chemical behavior in environmental systems. Thermodynamics

and kinetics of acid/base coordination, precipitation/dissolution, and redox reactions.

CE 391. Advanced Environmental Engineering Laboratory

3 credits. Lecture/Laboratory. Also offered as ENVE 302.

Analysis of water and waste water. Experimental laboratory and plant investigation of water, wastewater and industrial waste treatment processes.

CE 392. Industrial Waste Management and Regulation

3 credits. Lecture. Also offered as ENVE 324.

Origin and characteristics of industrial wastes. Engineering methods for solving industrial waste problems.

CE 394. Biodegradation and Bioremediation

3 credits. Lecture. Prerequisites: CE 390 or ENVE 300, and CE 490 or ENVE 301. Also offered as ENVE 306.

Biochemical basis of the transformation of key organic and inorganic pollutants; quantitative description of kinetics and thermodynamics of pollutant transformation; impact of physiochemical and ecological factors on biotransformation.

+GRAD 395. Master's Thesis Research

1 - 9 credits.

+GRAD 396. Full-Time Master's Research

3 credits.

+GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

CE 400. Seminar in Environmental Sciences and Engineering

1 credit. Seminar. Also offered as ENVE 400.

Extended discussions on presentations contributed by staff, students and outside speakers. A certificate of completion will be issued from the Environmental Engineering Program.

CE 401. Ocean Engineering I

3 credits. Lecture. Also offered as ENVE 389.

Dynamics of the ocean, including waves, tides and currents; shore processes and protection works; chemical and physical characteristics of seawater; estuarine flushing, mixing and diffusion; sedimentation; engineering applications.

CE 403. Wastewater Engineering for Unsewered Areas

3 credits. Lecture. Also offered as ENVE 325.

Management, planning and design criteria. Recycling, water consumption reduction, soil clogging and

treatment methods. Pollutational loads and treatability of each pollutant.

CE 404. Solid Waste Engineering

3 credits. Lecture. Also offered as ENVE 326.

Methods of collection, transport and disposal, design of solid waste treatment, disposal and recycle systems, management, pollution effects, literature research.

CE 405. Environmental Systems Modeling

3 credits. Lecture. Also offered as ENVE 311.

Modeling pollutants in natural surface waters. Advective, dispersive, and advective-dispersive systems. Modeling water quality, toxic organic and heavy metals pollution.

CE 406. Groundwater Flow Modeling

3 credits. Lecture. Also offered as ENVE 388.

Basics of modeling with Finite Difference and Finite Element Methods. Modeling flow in saturated and unsaturated zones. Model calibration and validation. Parameter estimation. Treatment of heterogeneity. Basic geostatistics. Modeling surface-groundwater interactions. Application to field sites.

CE 407. Subsurface Contaminant Transport Modeling

3 credits. Lecture.

Fate and transport of contaminants in groundwater. Convection, dispersion, adsorption, and biological and radioactive decay. Field scale modeling. Galerkin finite elements. Application to field sites.

CE 408. Transport and Transformation of Air Pollutants

3 credits. Lecture. Prerequisite: CE 390 or ENVE 300. Also offered as ENVE 343.

Transport and deposition of gaseous and aerosol pollutants; chemical formation and reactions of oxidants and acidic compounds.

CE 410. Ground Water Assessment and Remediation

3 credits. Lecture.

Quantitative evaluation of field data in assessing nature and extent of groundwater contamination. Subsurface control and remediation. Case studies. Also offered as ENVE 320.

CE 411. Contaminant Source Remediation

3 credits. Lecture. Prerequisites: CE 387 or ENVE 321, and CE 388 or ENVE 322. Also offered as ENVE 323.

Regulatory framework. Soil clean-up criteria. Treatment technologies: soil vapor extraction, solidification - stabilization, soil washing - chemical extraction, hydrolysis - dehalogenation, thermal processes, bioremediation. Risk analysis.

CE 432. Environmental Quantitative Methods

3 credits. Lecture. Also offered as ENVE 432. This course and NRME 432 may not both be taken for credit.

Topics on natural resources and environmental data analysis: random variables and probability distributions, parameter estimation and Monte Carlo simulation, hypothesis testing, simple regression and curve fitting, wavelet analysis, factor analysis; formulation and classification of optimization problems with/without constraints, linear programming; models for time series; solution of ordinary differential equations with Laplace transforms and Euler integration; solution of partial differential equations with finite differences; basics of modeling.

CE 490. Environmental Engineering Chemistry - II

3 credits. Lecture. Prerequisite: CE 390 or ENVE 300. Also offered as ENVE 301.

Environmental organic chemistry: ideal and regular solution thermodynamics; linear free energy relations; estimation of vapor pressure, solubility, and partitioning behavior, abiotic organic compound transformations; chemical fate modeling.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

COMMUNICATION SCIENCES

Department Head: Professor Harvey R. Gilbert

Professors: Buck, Coelho, Lin, Musiek, and Snyder

Associate Professors: Cienkowski, D'Alessio, Grela, Hamilton, Jalbert, Krcmar, Rios, and Van Lear

Assistant Professors: Cornetto, Farrar, Gaztambide-Geigel, Johnson, Moncrieff, Max, Nowak, Tufts, and Wang

The field of communication science deals with the process and analysis of human communication. The Department of Communication Sciences has two major sections: Communication Disorders and Communication Processes, each of which offer M.A. and Ph.D. degree programs. The Communication Disorders Section offers both M.A. and Ph.D. concentrations in Speech, Language, and Hearing and offers the Au.D. degree in Audiology. The Communication Processes Section offers an M.A. concentration in Communication and a Ph.D. concentration in Communication Processes and Marketing Communication.

Communication Disorders. Three areas of emphasis leading to the M.A. degree are offered in the concentration of speech, language, and hearing: (1) speech-language pathology, (2) audiology, and (3) the general emphasis. Students may elect either the thesis or non-thesis option in speech-language pathology and/or audiology. The general emphasis requires a thesis. The emphasis in speech-language pathology leads to clinical certification and is accredited by the American Speech-Language Hearing Association's (ASHA), Council on Academic Accreditation (CAA). The general emphasis is designed for students interested in speech, language, and hearing processes and their disorders, but not planning a career as certified clinicians. The mission of these areas of emphasis is to provide an understanding of human communication disorders and their clinical management emphasizing a scientific approach. Academic courses and clinical education experiences encourage a theoretical perspective and experimental orientation to develop an appreciation of current knowledge and future research needs.

The Ph.D. also is offered in the area of concentration of speech, language, and hearing. Five areas of emphasis within this concentration are available: (1) speech pathology, (2) language, (3) audiology, (4) speech science, and (5) hearing science. Doctoral students are expected to obtain a broad mastery of the area of concentration (speech pathology and audiology) and an in-depth knowledge of one of the five emphases through advanced course work and research.

A Doctor of Audiology (Au.D.) program is offered. The emphasis here leads to clinical certification in Audiology.

Communication Processes. Master's level work in communication emphasizes the empirical investigation of human communication. Students receive a basic foundation in communication theory and research methodology. Those pursuing the M.A. in communication prepare to carry out independent research in communication and to evaluate communication programs, either at institutions offering doctoral-level work in communication or in

business or government. Areas of emphasis include: (1) general communication theory; (2) organizational communication; (3) mass communication; (4) interpersonal communication; (5) marketing communication; and (6) new communication technology (12-month course of study). Ample experimental and survey research facilities are available.

The Ph.D. in the Communication Processes and Marketing Communication area of concentration provides the student with strong theoretical and research skills to prepare for an academic career or professional research position. Research areas include: media effects, persuasion, emotional, intercultural, international, nonverbal, organizational, political, relational, and small group communication; public opinion, health communication campaigns, new communication technology, advertising, social marketing, and consumer research.

COURSES OF STUDY

Communication

COMM 300. Independent Study in Communication Science

1-6 credits. Independent Study. Formerly COMS 300.

This course is an independent study course in which periodic conferences with the instructor are required.

COMM 301. Introduction to Graduate Communication Research

3 credits. Lecture.

An introduction to quantitative research methods and statistics. Issues of measurement and design of communication studies as well as basic descriptive and inferential statistics are covered.

COMM 302. Research Methods

3 credits. Lecture. Formerly COMS 302.

Integrative approach to modeling theory, research design, and statistical analysis, including mathematical models, scale construction, measurement issues, correlation, regression, and analysis of variance.

COMM 303. Advanced Communication Research Methods

3 credits. Lecture. Prerequisite: COMM 302. Formerly COMS 306.

Research techniques and procedures for the study of communication. Research design, multivariate statistics, and structural modeling.

COMM 305. Theory Construction and Research Design

3 credits. Lecture. Prerequisite: COMM 302. Formerly COMS 325.

Conceptualization, theory construction, and review of communication methodologies. Students will write a proposal for independent research, thesis, or dissertation.

COMM 310. Persuasion Theory and Research

3 credits. Lecture. Formerly COMS 319.

Evaluation of current and traditional theories of persuasion and attitude change from communication, social psychology, and related disciplines.

COMM 315. Communication Campaigns

3 credits. Lecture. Formerly COMS 301.

Campaign theory and planning. Students learn how to conduct interviews and focus groups with members of a target audience, and work with non-profit organizations to design a campaign.

COMM 320. Interpersonal Communication

3 credits. Lecture. Formerly COMS 308.

Cognitive, emotional and behavioral interactions in specific contexts, including interpersonal relationships, groups, and work.

COMM 322. Seminar in Speech

1-6 credits. Seminar. May be repeated for credit. Formerly COMS 320.

COMM 325. Group Communication Research

3 credits. Lecture. Formerly COMS 313.

The group communication process with emphasis upon research methodologies for the study of interactions in a group setting.

COMM 326. Organizational Communication: Theory and Research

3 credits. Lecture. Formerly COMS 322.

Relationship of prescribed and informal communication networks to organizational goal achievement and individual integration. Emphasis on frequently used research methodologies.

COMM 330. Mass Communication Theory

3 credits. Lecture. Formerly COMS 309.

Introduction to major theories, with emphasis on the structure, function, and effects of mass media.

COMM 331. Seminar in Mass Communication Research

3 credits. Seminar. Formerly COMS 371.

Recent theories of social and political effects of mass communication, and the cognitive processing of media messages.

COMM 340. Motivation

3 credits. Lecture. Also offered as PSYC 340. Formerly COMS 340.

Theories of motivation considered in relation to their supporting data.

COMM 341. Political Communication

3 credits. Lecture. Prerequisite: COMM 330. Formerly COMS 310.

The media and the political process. Media and the electoral process: voter decision making, political advertising, and election debates. Media and the policy process: the impact of news on political institutions and domestic and international policy making, and the uses of media by interest groups. Media coverage of protest, political violence and terrorism.

COMM 350. Nonverbal Communication

3 credits. Lecture. Formerly COMS 312.

The study of metacommunication: Kinesics, space, time and other concomitants of verbal messages. How the non-verbal band helps in the interpretation of verbal messages.

COMM 351. Seminar in Nonverbal Communication and Persuasion

3 units. Lecture. Formerly COMS 374.

Role of media nonverbal communication in persuasion and media preferences. Affective and analytic communications in attitude formation, structure, and change.

COMM 365. Seminar in Message Systems Analysis

3 credits. Lecture. Formerly COMS 307.

Selected topics in information and communication; analysis of message elements in human communication; discussion of message factors as related to behavioral effects.

COMM 371. Computer Mediated Communication

3 credits. Lecture. Formerly COMS 314.

Communication networks, human-computer interaction and interface design, social and collaborative communication via computer.

COMM 379. Computer Modeling in Communication Research

3 credits. Lecture. Formerly COMS 321.

History, basic concepts, and minimal skills of computer simulation and mathematical modeling.

COMM 390. Practicum in Research

1-6 credits. Practicum. May be repeated for credit. Formerly COMS 319.

COMM 401. Proseminar in Communication Research

3 credits. Seminar. Prerequisites: COMM 302, COMM 303, and COMM 305. Formerly COMS 401.

Advanced topics in communication research presented by faculty and specialists. Topics include information theory, survey of sampling and data collection, time series analysis (time-domain and panel design), physiological measurement, interaction analysis, and meta analysis.

COMM 402. Topics in Applied Communication Research

3 credits. Seminar. Formerly COMS 402.

Investigation of special research techniques and findings in selected areas of applied communication research.

COMM 480. Seminar in Marketing Communication Research

3 credits. Seminar. Formerly COMS 405.

Theories of emotional and cognitive processing of communications; cognitive mapping and message construction; design, implementation and evaluation of information campaigns.

COMM 490. Seminar and Directed Research in Communication

1-6 credits. Seminar. Open to graduate students in the Marketing Communication Program. May be repeated to a maximum of 12 credits. Formerly COMS 404.

Communication Disorders

CDIS 300. Independent Study in Communication Science

1-6 credits. Independent Study.

This course is an independent study course in which periodic conferences with the instructor are required.

CDIS 319. Practicum in Research

1-6 credits. Practicum. May be repeated for credit.

CDIS 320. Directed Observation in Hearing

1-3 credits. Lecture. May be repeated for credit.

Directed observation of diagnostic and rehabilitative procedures in audiology for pediatric and adult populations. Effects of etiology considered. Credits and hours by arrangement.

CDIS 321. Otologic Basis of Hearing Loss

3 credits. Lecture.
Basic and advanced principles of medical audiology including anatomy and physiology of the system, disorders of the auditory system, genetics, radiology, and functional brain imaging.

CDIS 322. Electrophysiology Techniques and Interpretation I

4 credits. Lecture/Laboratory.

Review of clinical applications of otoacoustic emissions, auditory brainstem response, electrocochleography, and auditory steady state potentials with emphasis on diagnostic issues.

CDIS 323. Geriatric Audiology

3 credits. Lecture.

The physical effects of aging on the auditory periphery and central nervous system, as well as the consequences of aging on diagnostic and rehabilitative services to older clients.

CDIS 324. Psychosocial Issues of Hearing Loss

3 credits. Lecture.

Contemporary counseling issues related to working with individuals with hearing disorders. Emphasis on family systems and the impact of a hearing disorder.

CDIS 325. Adult Aural Rehabilitation

3 credits. Lecture. Prerequisite: CDIS 356.

The provision of aural rehabilitation services to adults with hearing loss including auditory training, speechreading, auditory-visual integration, effective communication strategies, and Deaf culture.

CDIS 326. Professional Issues in Audiology

3 credits. Lecture.

Issues related to ethics and practice in the field of audiology, multicultural sensitivity, legal rights and responsibilities.

CDIS 335. Stuttering: Theory and Research

3 credits. Lecture. Formerly COMS 335.

Research data and theoretical models regarding the etiology and characteristics of stuttering are integrated to form the foundation for clinical management. Treatment approaches for children and adults are presented.

CDIS 336. Clinical Practicum in Speech Disorders

1-6 credits. Discussion/Practicum.

CDIS 337. Clinical Practicum in Hearing

1-6 credits. Discussion/Practicum. May be repeated for credit. Formerly COMS 337.

CDIS 339. Aural Habilitation

3 credits. Lecture. Formerly COMS 339.

Communication assessment and management of children with hearing loss. Individualized rehabilitation plans, family education, and collaborative team models.

CDIS 342. Aphasia

3 credits. Lecture. Formerly COMS 342.

The differential diagnosis of acquired neurogenic communication disorders as well as research, theory, and efficacy of language interventions for aphasia in adults.

CDIS 343. Cognitive-Communicative Disorders

3 credits. Lecture. Formerly COMS 343.

Cognitive-communicative disorders in adults secondary to right hemisphere damage, traumatic brain injury, and dementia. Emphasis on differential diagnosis and theories and research pertaining to clinical management including the efficacy of interventions.

CDIS 344. Pediatric Rehabilitative Audiology

3 credits. Lecture. Formerly COMS 344.

Auditory-based components of managing hearing loss in children; the role of the family and cultural environment in service delivery.

CDIS 345. Motor Speech Disorders

3 credits. Lecture. Formerly COMS 345.

The effects of acquired and developmental neuropathology on speech. Emphasis on differential diagnosis and clinical management.

CDIS 346. Dysphagia

1-3 credits. Lecture. Formerly COMS 346.

Dysphagia secondary to neurologic impairments, cancer, and degenerative disease. Anatomy and physiology of normal and disordered swallowing, evaluation including instrumental assessment techniques, and multidisciplinary management.

CDIS 348. Language Assessment

3 credits. Lecture. Formerly COMS 348.

The nature and assessment of delayed and deviant language behavior in children.

CDIS 349. Language Management

3 credits. Lecture. Formerly COMS 349.

The management of language disordered children.

CDIS 351. Amplification for Residual Hearing

3 credits. Lecture. Formerly COMS 351.

Introduction to hearing aids and assessment of the personal amplification needs of hearing-impaired individuals.

CDIS 353. Articulation Disorders

3 credits. Lecture. Formerly COMS 353.

CDIS 354. Physiological and Psychological Acoustics

3 credits. Lecture. Formerly COMS 354.

Anatomy, physiology and psychoacoustics of the auditory system.

CDIS 356. Audiological Assessment

3 credits. Lecture. Formerly COMS 356.

The development and administration of advanced pure-tone and auditory discrimination tests; the interpretation of audiometric findings for adults and children.

CDIS 357. Organic Disorders of Communication

3 credits. Lecture. Formerly COMS 357.

Research and theory pertaining to speech and language disorders resulting from congenital structural anomalies.

CDIS 358. Diagnostic Principles in Speech Pathology

3 credits. Lecture/Laboratory. Formerly COMS 358.

CDIS 359. Voice Disorders

3 credits. Lecture. Formerly COMS 359.

CDIS 360. Laboratory Instrumentation

3 credits. Lecture/Laboratory. Formerly COMS 359.

Presentation of basic concepts necessary for the application of electronic instrumentation to the study of speech and hearing. Description, analysis, and application of electronic and electro-acoustical instrumentation employed in communication science research.

CDIS 361. Advanced Speech Science I

3 credits. Lecture/Laboratory. Formerly COMS 361.

Generation, transmission, detection, and analysis of the speech signal. Special attention is given the myology of speech production and the physiological correlates of the acoustic output. Theoretical models of speech production are examined in light of recent empirical findings. Biomedical and other research techniques are employed in the laboratory setting to investigate the speech communication processes.

CDIS 362. Advanced Speech Science II
3 credits. Lecture/Laboratory. Prerequisite: CDIS 361. Formerly COMS 362.

A continuation of CDIS 361.

CDIS 363. Seminar in Speech Pathology
1-6 credits. Seminar. May be repeated for credit with a change in content. Formerly COMS 363.

CDIS 364. Seminar in Audiology
1-6 credits. Seminar. May be repeated for credit with a change in content. Formerly COMS 364.

CDIS 365. Seminar in Speech Science
1-6 credits. Seminar. May be repeated with a change in content. Formerly COMS 365.

CDIS 366. Seminar in Hearing Science
1-6 credits. Seminar. May be repeated for credit with a change in content. Formerly COMS 366.

CDIS 367. Topics in Hearing and Speech Science
1-3 credits. Lecture. May be repeated for credit with a change in content. Formerly COMS 367.

CDIS 368. Topics in Speech Pathology
1-3 credits. Lecture. May be repeated for credit with a change in content.

CDIS 369. Topics in Audiology
1-3 credits. Lecture. May be repeated for credit with a change in content. Formerly COMS 369.

CDIS 370. Seminar in Psycholinguistics
3 credits. Seminar. May be repeated for credit with a change in content, Formerly COMS 370.

Reports and discussion of current research on a selected topic each semester.

CDIS 372. Central Auditory Disorders
3 credits. Seminar. Formerly COMS 372.

Assessment of auditory processing in adults and children. Effects of processing problems on communication and a discussion of management techniques. Electrophysiological measurement techniques are stressed.

CDIS 373. Pediatric Audiology
3 credits. Lecture. Formerly COMS 373.

Physiological and perceptual maturation of the auditory system from gestation through two years of age. Assessment of children's hearing, including difficult to test children, public school and neonatal screening.

CDIS 374. Clinical Project in Speech-Language Pathology
1 credit. Independent Study.

Written report and oral presentation on a client's clinical intervention. The clinical project must be successfully completed to graduate with an M.A. in speech-language pathology via the non-thesis track.

CDIS 401 Amplification of Residual Hearing II

3 credits. Lecture. Prerequisite: CDIS 351.

Theoretical and clinical issues related to hearing aid candidacy and fitting with an emphasis on advanced signal processing strategies.

CDIS 402. Hearing Conservation / Industrial Audiology

3 credits. Lecture.

Effects of noise on the structure and function of the auditory system. Elements of noise measurements, otoprotection, and key issues in establishment and maintenance of a hearing conservation program.

CDIS 422. Electrophysiologic Techniques and Interpretation II

4 units. Lecture/Laboratory. Prerequisite: CDIS 322.

Methods of acquiring, averaging and analyzing cortical evoked and event-related potentials following auditory input. Emphasis on utilization of multi-channel recording devices for research and clinical purposes. Four credits. Lecture. Three class periods and one 1-hour laboratory period.

All Sections

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

COMPARATIVE LITERARY AND CULTURAL STUDIES

The Program in Comparative Literary and Cultural Studies offers work leading to the M.A. and Ph.D. degrees, encouraging intercultural and interdisciplinary approaches to the study of literature and culture. Students are prepared in such areas as literary theory, discourse analysis, the history and methods of literary and cultural criticism, and in the comparative study of literary texts in relation to other cultural productions. The program's curriculum reflects changing relations among the literatures and cultures of Europe, the Middle East, Africa, Asia, the Americas and other regions of the world.

The Master's degree student chooses one literature other than English for major emphasis and a second for minor emphasis; the Ph.D. candidate chooses in addition a third literature or related area of study such as music or philosophy.

Admission to Degree Programs. A prospective student should be able to do graduate study in at least two different fields when applying for admission to the master's program and in three fields when applying to the doctoral program. An undergraduate major in one of these fields is not required. In special cases students may be required to make up lacunae in their background by taking additional courses. Also, the student's committee may require changes in the student's program in view of his or her particular needs.

The M.A. Program. The M.A. ordinarily requires a minimum of 24 credits of course work beyond the baccalaureate, including a course in literary theory and methodology; a course in at least one non-Western literature and culture; and a course from at least two of the following periods—ancient, medieval/Renaissance, modern. The course work must include studies in at least two genres. Proficiency is required in three languages, one of them English. Students are responsible for two periods in one literature and for one period in another. Students must successfully complete the M.A. qualifying exams, or, with the approval of the committee, have the option to prepare a Masters' project, a 50-page comparative work on a topic not previously submitted for a course and applying a critical apparatus.

The Ph.D. Program. The Ph.D. ordinarily requires 24 credits beyond the satisfaction of the requirements for the master's degree listed above, drawn from courses in theory and criticism, studies in at least two courses in literature and cultures drawing on non-western traditions, work in more than one discipline (e.g., anthropology, architecture, history, film, and sociology); a course involving the period before 1700 A.D.; proficiency in three languages, one of them English, and a reading knowledge of an ancient language; Ph.D. qualifying exams, written and oral; a Ph.D. dissertation that reflects appropriate use of bibliographic materials in foreign languages, the application of a critical apparatus upon a genuinely comparative topic, successful teacher training and practice supervised by members of the committee in a workshop series.

All students are expected to develop proficiency in a national language and literature to increase their

options when entering the professional job market.
 Language Requirements. These may be satisfied either by scoring a B or above in a 200-level literature or culture course in the target language or by obtaining a respectable score on a proficiency examination. The reading exams require translations of materials chosen by the faculty, to be completed before the final semester of studies.

Foreign Study. The program offers the possibility of studying in a variety of foreign countries for graduate credit. Universities now open to our students are located in Canada, Europe, Latin America, North Africa and Sub-Saharan Africa.

Information about the program and admissions may be obtained by writing to the Chairperson of the Program (Associate Professor Lucy McNeece).

Advisors from the fields of study participating include:

English – Professors Benson, Higonnet, Hogan, R. Miller, Peterson; Associate Professors Coundouriotos and Phillips; and Assistant Professor Sánchez

Classics – Assistant Professors Travis and Johnson
French – Professor Berthelot; Associate Professors Célestin and McNeece

Italian – Professor Masciandaro; Associate Professor Bouchard; and Assistant Professor Gambarota

Spanish – Associate Professor Gomes and Assistant Professor Pardo

COURSES OF STUDY

CLCS 300. Introduction to Comparative Literature

3 credits. Lecture.

Survey of comparative approaches to literary criticism; genre, period style, theory, literature in relation to the arts and social sciences.

CLCS 301. Variable Topics

3 credits. Lecture. May be repeated for up to nine credits with a change of topic.

Possible topics include literature and the other arts, the sociology of literature, literature and psychology, and themes.

CLCS 302. Critical Theory

3 credits. Seminar.

Modern literary theories and critical approaches, such as structuralism, semiotics, archetypal, or Marxist criticism.

CLCS 303. Comparative Studies in the Novel

3 credits. Lecture.

The novel as a modern literary form, its relation to society, its epistemological strategies; European and American texts, including detective fiction.

CLCS 304. Studies in Literary History

3 credits. Seminar.

Periods, movements, and literary relations involving several national literatures. Possible topics include the Baroque, the Enlightenment, Symbolism, and the Avant-Garde.

CLCS 305. Comparative Studies in Romanticism

3 credits. Lecture.

West European Romanticism, the Bildungsroman, the quest, stories of the fantastic, and the greater Romantic lyric. Includes works of Goethe, Coleridge, Poe, Hugo and Leopardi.

CLCS 306. Studies in Form and Genre

3 credits. Seminar.

Aspects of epic, drama, poetry, or narrative, such as the classical epic, the historical drama, the pastoral poem, or the picaresque novel.

CLCS 307. Literature and Science

3 credits. Lecture.

The impact of science on literary imagination and style.

CLCS 308. Marxist Literary Criticism

3 credits. Lecture.

Introduction and survey of Marxist texts from Marx and Engels to Gramsci, Lukacs, Frankfurt School theoreticians, and contemporary theorists, feminists, and third-world practitioners.

CLCS 310. Psychoanalysis and Literature

3 credits. Lecture.

Introduction to the literary and cultural application of psychoanalytic theory to the reading of literary texts; psychoanalytic interpretation from Freud to Lacan and feminist Lacanians.

CLCS 311. Introduction to Semiotics

3 credits. Lecture.

Historical development and fundamentals of semiotics. Classical and structural models. Varying emphasis on a particular theory and its development.

CLCS 312. Third-World Narratives

3 credits. Seminar.

The study of creative and critical writings from developing nations in Latin America, Africa, and Asia, including works of minorities in America.

CLCS 313. Theory and Practice of Translation

3 credits. Lecture.

CLCS 314. Studies in Film History

3 credits. Lecture.

Film history from the Silent era to the present. The development of film theory and the evolution of cinematographic language. Esthetics and ideology.

CLCS 315. Third-World Cinema

3 credits. Seminar.

The cinema of developing countries studied as art and as cultural document; its relation to political and social realities and to film produced in the industrialized world.

CLCS 316. Literature and Linguistics

3 credits. Lecture.

Literary texts studied in the light of modern linguistic theory.

CLCS 317. Studies in Comparative Culture

3 credits. Seminar.

The intersection of ideas concerning urbanization and modernism through the medium of literature, architecture, fine arts, and film.

CLCS 318. Special Studies

1-6 credits. Practicum. May be repeated for up to nine credits with a change of topic.

+GRAD 395. Master's Thesis Research

1 - 9 credits.

+GRAD 396. Full-Time Master's Research

3 credits.

+GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

+GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

+GRAD 496. Full-Time Doctoral Research

3 credits.

+GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

COMPUTER SCIENCE AND ENGINEERING

Department Head: Professor Reda Ammar

Professors: Barker, Cooper, Demurjian, Lipsky, Rajasekaran, and Shin

Associate Professors: Greenshields, McCartney, Peters, Russell, Santos, and Shvartsman

Assistant Professors: Cui, Gokhale, Goldin, Huang, Kiayias, Mandoiu, Michel, and Shi

Study leading to the Master of Science and Doctor of Philosophy degrees in Computer Science and Engineering is offered. This study can involve courses selected from the fields of computer science, engineering, mathematics, statistics and the natural sciences. Current research activities are in the areas of software engineering, reusability, databases, data mining, programming languages, artificial intelligence, decision support, robotics, security, cryptography, theory of computing, algorithms, distributed computing, quantum computing, computer networks, parallel computing, cluster computing, grid computing, performance modeling, queueing theory, bioinformatics, scientific computing, pattern recognition, image processing, computer graphics, computational geometry, and optimization.

Admission to the M.S. Program. Normally it is expected that an applicant has a B.S. in Computer Science, Computer Engineering or a closely related field. Students with a degree in another area, but with a strong background in mathematics through calculus, extensive experience with one or more computer languages, and course work involving digital network design, computer organization, and programming systems also will be considered for admission. Students with little or no previous experience in the computer area will not be considered until they have acquired an adequate background. The following courses or their equivalents normally are expected: (A) MATH 115, 116, 210 (calculus), MATH 211 (differential equations), MATH 227 (linear algebra), STAT 220 (statistical methods); (B) CSE 134 (computing), CSE 207 (digital systems organization), CSE 220 (microprocessor assembly language), CSE 249 (computer organization), CSE 230 (software engineering), CSE 237 (automata); (C) CSE 221 (probabilistic performance analysis), CSE 244 (compilers), CSE 228 (parallel systems), CSE 254 (mathematics of discrete systems), CSE 258 (operating systems), CSE 259 (algorithms).

Outstanding students who are missing some of this background may be admitted before all of it is acquired but the first 2 calculus courses and all of (B) MUST be completed before acceptance. Students admitted to the program without an undergraduate degree in the computer area normally must take a number of undergraduate courses as background before starting their graduate studies. Some of these courses may be available during the summer session. These additional courses will lengthen the period of study necessary to earn the M.S. degree.

Requirements of the Ph.D. Program. Decision for acceptance to the Doctor of Philosophy program is made by the graduate admissions committee in consultation with an advisor selected (if feasible) by the applicant. Admitted students must also

submit evidence of capacity for independent study in the form of a master's thesis or comparable achievement.

Special Facilities. *Graduate Computing Facilities* – The Computer Science & Engineering Department maintains several computing labs for graduate training and research. These include labs consisting of Sun Workstations running Unix and Pentium platforms running a mixture of Linux, Solaris for Intel, and Windows operating systems. The facilities are managed by the department and used for various research projects. This is in addition to 10 specialized research labs located in the Information Technology Engineering building, maintained by individual faculty members supporting different projects in the department.

Additional Research Facilities – The Taylor L. Booth Engineering Center for Advanced Technologies maintains a modern set of networked laboratory facilities available to Computer Science and Engineering faculty and graduate students conducting research. These include several high performance computing systems and servers including the BECAT GRID which consists of over 24 nodes supporting grid and cluster middleware architectures. In addition to the BECAT GRID, there are numerous computing workstations which are available for small-scale and prototype research projects using platforms that range from Solaris to Windows to Linux.

For specific information with regard to the Computer Science and Engineering Program, fellowships, assistantships, and part-time instructorships, students should write to:

Chair, Computer Science Graduate Admissions Committee

Department of Computer Science and Engineering, Unit 2155

Storrs, Connecticut 06269-2155

Information concerning assistantships in the University Computer Center should be addressed to the Executive Director.

COURSES OF STUDY

CSE 300. Special Topics in Computer Science and Engineering

3 credits. Lecture.

Classroom courses in special topics as announced in advance for each semester.

†CSE 311. Seminar

1 credit. Seminar. This course may be repeated to a maximum of 3 credits.

Presentation and discussion of advanced computer science problems.

CSE 320. Independent Study in Computer Science and Engineering

1-6 credits. Independent Study.

Individual exploration of special topics as arranged by the student with an instructor.

CSE 321. Software Performance Engineering

3 credits. Lecture. Recommended preparation: CSE 221 and CSE 228 or the equivalent.

Study of performance engineering techniques for the development of software systems to meet performance objectives. Software performance principles, hierarchical performance modeling, and current research trends related to Software Performance Engineering. Methods for computer performance evaluation and analysis with emphasis on direct measurement and analytic modeling, including queueing networks, computation structure models, state charts, probabilistic languages, and Petri-nets. Case studies for the evaluation and analysis of software architecture and design alternatives.

CSE 322. Software Reliability Engineering

3 credits. Lecture. Recommended preparation: CSE 221 and CSE 230 or the equivalent.
State-of-the-art as well as emerging reliability assessment techniques. Topics covered will include reliability modeling paradigms, software reliability growth models, software metrics and reliability, software testing and reliability, and architecture-based reliability assessment. Hands-on experience in the application of these techniques.

CSE 326. Probabilistic Methods in Digital Systems

3 credits. Lecture. Recommended preparation: CSE 221 or the equivalent.

Probabilistic methods used to describe random processes and queueing theory and their application to such areas as computer performance, scheduling algorithms, error correcting codes, and stochastic machines.

CSE 327. Advanced Software Engineering

3 credits. Lecture. Recommended preparation: CSE 230 and CSE 244 and CSE 258, or the equivalent.
An in-depth study of methodologies for the specification, design, implementation, verification, testing, and documentation of large complex software systems. Special attention is given to the impact of programming language constructs on the quality of complex software.

CSE 330. Advanced Computer Networks

3 credits. Lecture. Recommended preparation: CSE 245 and CSE 221 or the equivalent. This course and ECE 335 may not both be taken for credit.
This course covers advanced fundamental principles of computer networks. Topics include network design and optimization, protocol design and implementation, network algorithms, advanced network architectures, network simulation, performance evaluation, and network measurement.

CSE 331. Distributed Database Systems

3 credits. Lecture. Prerequisite: CSE 350. Recommended preparation: CSE 255 and CSE 258 or the equivalent.
Architecture of distributed database systems and their major design problems. Topics include efficient data distribution, distributed views, query processing and optimization, and distributed synchronization. Particular attention is paid to the issue of concurrency

control and reliability for distributed transaction processing. Backend database processors and database servers for local area networks are also discussed.

CSE 332. High-Performance Parallel Computing

3 credits. Lecture. Recommended preparation: CSE 249 and CSE 228 or the equivalent.

Models of parallel computations, fundamental parallel algorithms and applications, scalable parallel/distributed programming paradigms on clusters and grids, performance measures and analysis of parallel computers, data flow/pipelined/multi-threaded/object-oriented processor design in parallel architectures.

CSE 333. Distributed Component Systems

3 credits. Lecture. Recommended preparation: CSE 244 and CSE 258 or the equivalent.

This course examines the methodologies, techniques, and tools that can be utilized to design, construct, and prototype a distributed application using a combined object- and component-based approach. Topics that are covered include object-oriented modeling, reusable components, software architectures, security, software agents, interoperation techniques, and deployment strategies. The role of emerging technologies in support of these topics will also be considered.

CSE 334. Advanced Programming Languages

3 credits. Lecture. Recommended preparation: CSE 233 and CSE 237 or the equivalent.

This course covers the theory and pragmatics of modern programming languages. Topics include syntax, semantics, type systems and control mechanisms. Key contributions from Functional and Logic Programming including first-order functions, closures, continuations, non-determinism and unification are studied. Study of declarative and operational semantics of recent entries in the field like Constraint Programming and Aspect Oriented Programming.

CSE 340. Computer Architecture

3 credits. Lecture. Recommended preparation: CSE 249 or the equivalent.

This course provides an in-depth understanding of the inner workings of
This course provides an in-depth understanding of the inner workings of modern digital computer systems. Traditional topics on uniprocessor systems such as performance analysis, instruction set architecture, hardware/software pipelining, memory hierarchy design and input-output systems will be discussed. Modern features of parallel computer systems such as memory consistency models, cache coherence protocols, and latency reducing/hiding techniques will also be addressed. Some experimental and commercially available parallel systems will be presented as case studies.

CSE 350. Advanced Database Topics

3 credits. Lecture. Recommended preparation: CSE 255 and CSE 258 or the equivalent.

Data models/languages including entity-relationship, functional, semantic, and object oriented. Database components including the different building blocks of a database system, concurrency, control, recovery, security, access methods, query optimization, and views. Database architectures including database machines, text-database systems, distributed database systems, multimedia systems, and performance metrics and methodologies. Database applications including CAD/CAM and CASE.

CSE 351. Semantic Data Models

3 credits. Lecture. Recommended preparation: CSE 255 and CSE 237 or the equivalent.

Conceptual data models, semantic and object-oriented data base systems, formal representation methods for data and knowledge, models of active and passive information.

CSE 352. Data Mining

3 credits. Lecture.

An introduction to data mining algorithms and their analysis. Application of and experimentation with data mining algorithms on real-world problems and domains, with a dual focus on addressing the solution quality issue and the time efficiency issue.

CSE 353. Information and Data Security

3 credits. Lecture. Recommended preparation: CSE 255 and CSE 258 or the equivalent.

Introduction to privacy, confidentiality, and organizational considerations in the development of security policies for protecting information and data stored, processed and transmitted in computer and communication systems from unauthorized disclosure and modification. In depth study of security enforcement methods and techniques applied to operating systems, database systems and computer networks including user identification and authentication techniques, data access controls, information flow controls, inference controls and cryptographic techniques.

CSE 354. Modern Cryptography: Foundations

3 credits. Lecture. Recommended preparation: CSE 221 and CSE 237 and CSE 259, or the equivalent.

This course covers the foundations of modern cryptography introducing basic topics such as computational hardness, one-way functions, computational indistinguishability, trapdoor permutations and interactive proof systems. The course will cover fundamental cryptographic constructions such as hard-core predicates, security amplification, and pseudorandom generators; these are applied to develop generic, secure public-key encryption schemes and zero-knowledge proof systems.

CSE 355. Computational Geometry

3 credits. Lecture. Recommended preparation: MATH 210Q and MATH 227 or the equivalent.

Curve and surface definitions emphasizing the interplay between those mathematical properties and efficient graphical display. Topics may include Bezier curves and surfaces, nonuniform rational B-spline (NURBS) curves and surfaces, Coons patches, Gordon surfaces, superquadrics, shape preservation, continuity/smoothness, differentiability, twist estimation, the convex hull property, and the treatment of supporting algorithms. Experimental projects are required.

CSE 356. Advanced Computer Graphics

3 credits. Lecture. Recommended preparation: CSE 275 or the equivalent.

Computer graphics as a tool for effective human-machine communications. Graphical input and output devices and their relation to human perception. Software systems for image generation, display and manipulation. Languages for description of both static and moving pictures. Solutions to visible-surface and related problems. Computer animation. Models and methodologies for the design of interactive systems for various graphics-oriented applications. Experimental projects are required.

CSE 357. Advanced Numerical Methods in Scientific Computation

3 credits. Lecture. Prerequisite: MATH 215Q or ECE 301, which may be taken concurrently.

Development, application and implementation of numerically stable, efficient and reliable algorithms for solving matrix equations that arise in modern systems engineering. Computation of matrix exponential, generalized inverse, matrix factorization, recursive least squares, eigenvalues and eigenvectors, Lyapunov and Riccati equations. Extensive digital computer usage for algorithm verification and test.

CSE 358. Advanced Operating Systems

3 credits. Lecture. Recommended preparation: CSE 258 or the equivalent.

Topics in modern operating systems with the focus on distributed computing, communication, and concurrency. Selected topics from current research in the theory, design, implementation, and verification of operating systems.

CSE 361. Advanced Sequential and Parallel Algorithms

3 credits. Lecture. Recommended preparation: CSE 228 or the equivalent.

Computational complexity measures. Survey of major techniques used to design an efficient algorithm. These include divide and conquer, greedy, dynamic programming, and branch and bound techniques. Randomized algorithms. General characteristics of parallel computation models. General structure of parallel algorithms. Development techniques of efficient parallel algorithms.

CSE 364. Modern Cryptography: Primitives and Protocols

3 credits. Lecture. Recommended preparation: CSE 221 and CSE 237 and CSE 259, or the equivalent.

This course covers modern cryptography emphasizing provable security and concrete constructions based on the hardness of specific computational problems. The cryptographic primitives that will be covered include various public and private key encryption schemes, hash functions and digital signature algorithms. The protocols include identification and key-exchange schemes, distributed key generation, e-cash, blind signatures and electronic voting systems.

CSE 365. Fundamentals of Automata
3 credits. Lecture.

A rigorous treatment of automata and formal language theory. Emphasis placed upon finite state automata, regular languages, context-free languages, push-down automata, and Turing machines.

CSE 366. Computational Complexity
3 credits. Lecture. Recommended preparation: CSE 237 and CSE 259 and CSE 221 or the equivalent.

The course consists of a systematic study of resource-bounded computation, including time and space complexity, hierarchy theorems, nondeterministic and randomized computation, and reduction and completeness. Advanced topics may be introduced such as relativized computation, derandomization, communication complexity, lower bounds on circuit complexity, and probabilistically checkable proofs

CSE 367. Computer Science and Engineering Research Laboratory
3 credits. Lecture. May be repeated for credit with a change in content.

Experimental investigation of current research topics in computer science.

CSE 372. Image Processing
3 credits. Lecture. Recommended preparation: MATH 227 or the equivalent.

A formal approach to continuous variable and discrete variable imaging. Continuous and discrete transforms. Image enhancement. Image analysis including multidimensional edge-primitive theories, shape analysis. Multispectral imaging and applications. Image modelling. Syntactical analysis, aspects of image database theories. The course involves exposure to multispectral and extraterrestrial imagery. A substantial programming project is assigned.

CSE 377. Bioinformatics
3 credits. Lecture.

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

CSE 382. Advanced Artificial Intelligence
3 credits. Lecture.

Design and implementation of intelligent systems. Topics covered will include automated reasoning, natural language, learning, agents, probabilistic reasoning, and robotics. The course will include a

substantial design project, and advanced independent study of at least one of the above topics. This course and CSE 282 may not both be taken for credit.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

CSE 426. Linear Algebraic Queueing Theory
3 credits. Lecture. Prerequisite: CSE 326.

Brief survey of Markov Chains, and their application to simple queues, with some emphasis on their transient behavior. Matrix operators are then introduced to represent the behavior of non-exponential servers. This algebraic structure is applied to the steady-state and non steady-state behavior of both open and closed M/G/1 queues. Then G/M/1 queues are examined in detail. As time permits additional advanced topics will be covered. Applications to computer and telecommunications system performance modeling will be studied.

CSE 430. Research Topics in Computer Networks
3 credits. Lecture. Prerequisite: CSE 330.

Current research issues in the Internet, wireless and mobile networks, as well as emerging concepts such as sensor networks. Overview of the fundamental design principles underlying these networks. Discussion and exploration of the advanced research topics in these and other areas.

CSE 455. Computational Topology
3 credits. Lecture. Prerequisite: CSE 455.

Topology has traditionally generalized concepts of real analysis to metric spaces and set axioms. The new field of computational topology has great potential for encompassing abstractions to unify domain-specific techniques now used in computational geometry, geometric modeling, visualization, image processing, engineering analyses and molecular simulation. The course will include perspectives from traditional topology and show how these need to be modified for realistic use in modern computing environments. Topics and emphases will vary.

CSE 461. Fault-Tolerant Parallel Computing

3 credits. Lecture. Prerequisite: CSE 332 or CSE 361.

Advanced topics in fault-tolerant parallel algorithms. Shared memory and message-passing models of computation. Models of failure. Formal treatment of complexity measures, such as time, space, communication, work, and speedup. Lower bounds for parallel fault-tolerant computation. Design

and analysis of efficient fault-tolerant algorithms. Combining efficiency and fault-tolerance in parallel and distributed algorithms.

CSE 483. Natural Language Processing
3 credits. Lecture. Prerequisite: CSE 382.

An artificial-intelligence approach to computational linguistics. Representation of meaning and knowledge in computer-usable form. Understanding and generation of natural-language sentences and text. Theories of inference and application of world knowledge. Organization of large knowledge-based text-processing systems for applications in summary and paraphrase, question-answering, machine translation, conversation and computer-aided instruction. "Real" text-processing systems are demonstrated, and a term project is required.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

DENTAL SCIENCE

Program Director: Professor R. L. MacNeil

Professors: Cone, E. Eisenberg, Frank, Freedman, Goldberg, Grasso, Hand, Kennedy, Lurie, Nanda, Nuki, Reisine, Rossomando, Safavi, Spangberg, J. Tanzer, Taylor, Trummel, and Upholt

Associate Professors: Agar, Beazoglou, D'Ambrosio, Dealy, Dean, Gronowicz, Kreutzer, Meiers, Mina, Nichols, Pendrys, and Pilbeam

Assistant Professors: Dongari-Bagtzoglou, Kazemi, Krebs, Kuhlberg, Mallya, Reichenberger, Rogina, Thibodeau, Uribe, and Zhu

Master of Dental Science Degree Program.

Students in residency and specialty training in the School of Dental Medicine may also pursue a Master of Dental Science degree in the Graduate School. This program offers an opportunity for study and research in dental science, the basic life sciences, and the allied health fields and leads to the degree of Master of Dental Science. It is designed to fill the gap between the Ph.D. program in Biomedical Science and the various residency and specialty training programs provided by the School of Dental Medicine. The principal objective is to provide instruction in dental science that will enhance the student's ability to instruct and undertake research in dental schools. Courses of study are flexible with major emphasis on the accomplishment of research. Possibilities for interdisciplinary research are enhanced by cooperative activities with several university departments. Students may combine their work in this program with advanced training in the Departments of Endodontics, Oral Diagnosis, Orthodontics, Pediatric Dentistry, Periodontics and Prosthodontics. Further information and an application may be obtained from the School of Dental Medicine, Office of Admissions, Room AG030, University of Connecticut Health Center, Farmington, Connecticut 06030-3905.

Dual D.M.D./Ph.D. in Biomedical Science Degree Program. *Program Director:* Professor A. Lurie. This program leads to the awarding of dual D.M.D. and Ph.D. degrees. It is designed for a small number of outstanding students who have clearly defined career goals of research and teaching in the general area of the biological and biomedical sciences and who have the motivation and ability to pursue a rigorous training program in this area. The program provides basic science and research training as well as the standard dental curriculum and is designed to produce individuals who are likely to make important contributions to the solution of problems of significance to the health sciences. The overall program is administered by the Graduate Programs Committee of the Health Center. The student applies as a dual-degree applicant to the Dual D.M.D./Ph.D. Committee of the Office of Admissions of the School of Dental Medicine. The Dual D.M.D./Ph.D. Committee operating in conjunction with the admission committee of the School of Dental Medicine reviews the application and admits the student. The student normally completes both programs, including the dissertation in a period of approximately seven academic years, including summers.

Ph.D. in Biomedical Science Degree Program. This is a rigorous academic program designed for students who have chosen career paths in research and teaching. The degree may be pursued independently or in conjunction with residency/specialty training in the

School of Dental Medicine. For further information, see Biomedical Sciences.

Ph.D. Degree Program in Materials Science:

Dental Materials. Students with research interests in the field of dental materials may pursue a Ph.D. degree in Materials Science. Similar to other special interdisciplinary programs in Material Science, students study the broad areas of thermodynamics, kinetics, analysis and structure/property relations. The program also provides overviews of the structure of dental and oral tissues; the epidemiology, etiology and manifestations of dental diseases; and the treatment of dental diseases. These overviews are obtained in the formal course work at the Health Center. A primary objective of the program is to help the student develop an understanding of the manner in which the prevention and clinical treatment of dental disease is integrated with the limitations of the materials employed. The dissertation may involve study of any materials-related problem, but normally addresses a particular dental material or material-oral tissue interaction. Applicants would typically have backgrounds in materials science, metallurgy, polymer science or a related field and specific career goals in dentistry. For further information, see Materials Science.

COURSES OF STUDY

DENT 414. Introduction to Biomaterials and Tissue Engineering

3 credits. Lecture.

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

DENT 415. Contemporary Topics in Oral Biology I

2 credits. Lecture.

A combination lecture/seminar course which focuses on current investigation in the areas of dentomaxillofacial growth and development, oral microbiology and immunology, oromaxillofacial mineralized tissues, and salivary glands and saliva. Subject matter covered in this course and MEDS 416 will rotate over a two to three year schedule.

DENT 430. Advanced Oral Histology

2 credits. Lecture.

Histologic structures, their embryological origin and function. Structure of developing teeth, alveolar bone, temporo-mandibular joint, oral mucosa, gingiva and salivary glands. Lecture and laboratories.

DENT 431. Advanced Oral Pathology and Diagnosis

2 credits. Seminar.

Seminars on current developments in oral disease processes, with an emphasis on the clinical. Student presentations and lectures covering principles of Oral Diagnosis.

DENT 432. Biomaterials for Dental Graduates

2 credits. Lecture.

Literature review/seminar covering various subjects of current interest in dental materials. Some prior knowledge of dental materials or of materials science is assumed.

DENT 433. Biodontics II: Integrating Craniofacial Biology with Clinical Dentistry

2 credits. Lecture.

Contemporary knowledge of the macromolecules of mineralized and non-mineralized extracellular matrices, with reference to the oral cavity. How do the various extracellular matrices fulfill their biological roles? How do the macromolecular components of the matrices arise and how are they regenerated? How do the matrices contribute to tissue differentiation, pattern regulation and craniofacial development? How do physiologic and pathologic processes affect matrices? Lectures and seminars.

DENT 434. Functional Oral Anatomy

2 credits. Lecture.

Anatomic structures and relationships of the head and neck emphasizing surgical anatomy for oral, periodontal and endodontic surgery. Lectures and dissections.

DENT 435. General Pathology

2 credits. Lecture

DENT 436. Oral Physiology

2 credits. Lecture

Head and neck anatomy and physiology. Neuroanatomy and neurophysiology underlying oral motor and sensory systems. Lectures, seminars and laboratory.

DENT 437. Principles of Oral Microbiology and Infections

2 credits. Lecture.

Oral flora with emphasis on recent research developments. Ecology of the oral cavity, dental caries and periodontal disease, viral and yeast infections. Prior knowledge of microbiology and biochemistry assumed. Lectures and discussions, term paper required

DENT 438. Craniofacial Growth and Development

2 credits. Lecture.

Part of a core series in the postgraduate program of orthodontics. Provides systematic coverage of basics in growth and development of the human face. Review and critique of selected articles from the research literature of the following areas: Physiology of facial growth, theories in growth mechanisms, pre- and postnatal growth of the face, normal and abnormal courses of the facial growth.

DENT 439. Research Methods in Epidemiology and Behavioral Sciences

1 credit. Lecture. Prerequisite: DENT 456 or equivalent.

This course is intended to provide students with an applied understanding of behavioral science research methods, building off of concepts introduced in Biostatistics D456. Featured topics include:

theoretical and methodological issues in research design; data collection strategies, focusing on survey measurement and the design and evaluation of survey questions; population sampling; data entry and variable construction; strategies for analyzing quantitative data, focusing in particular on regression analysis with dichotomous outcomes; and issues in analyzing longitudinal data.

DENT 440. Biodontics: Integrating Biotechnology with Clinical Dentistry
3 credits. Lecture.

Molecular, cellular and tissue mechanisms operating during normal and abnormal development. Illustrate current biochemical microdissections and tissue culture procedures as applied to developmental biology. Lectures and discussions.

DENT 441. Biomechanics in Dental Science
4 credits. Lecture.

Physics and engineering principles applied to clinical and research problems in dentistry. Principles of statics and mechanics of materials. Engineering analysis of orthodontic appliances. Lectures, seminars, and demonstrations.

DENT 442. Biomechanics in Dental Science
1 credit. Lecture. Prerequisite: DENT 441.

History and critical review of orthodontic appliance systems. The relationship between treatment planning and therapy is explored. Detailed biomechanical analysis of appliance therapy. Lectures, seminars and demonstrations.

DENT 443. Biology of Tooth Movement
1 credit. Lecture. Prerequisite: DENT 441.

Hard and soft tissue responses to tooth movement caused by orthodontic appliances; theory of related bone resorption and apposition from a morphological and biochemical standpoint. Seminars.

DENT 444. Epidemiology of Oral Diseases: Interpreting the Diseases
2 credits. Seminar. Open to dental residents in the M.Dent.Sc. program.

The goal of this course is to provide the student with a basic understanding of epidemiologic principles to enable the critical review of the literature and to provide a methodological framework with which to better understand basic statistics. An overview of the specific epidemiology of oral diseases will be provided.

DENT 446. Connective Tissue Biology II
2 credits. Lecture. Prerequisite: DENT 433.

Selected topics in developmental biology, cell biology, molecular biology, structural biology and genetics of connective tissue.

DENT 448. Periodontal Pathobiology I
3 credits. Lecture.

The first of a two-part course spanning the full year covering the structure and function of the periodontal tissues and the pathogenesis of diseases

affecting these tissues. Special emphasis is placed on the role of oral bacteria and the host response to these bacteria in the initiation and progression of inflammatory periodontal disease. Lectures and seminars.

DENT 449. Periodontal Pathobiology II
3 credits. Lecture.

The second of a two-part course spanning the full year covering the epidemiology, natural history, diagnosis, prevention, treatment planning, and treatment of periodontal diseases.

DENT 450. Epidemiologic Methods in Oral Disease Research: Skills in Assessing the Literature
2 credits. Lecture.

Provides both an epidemiologic knowledge base and a set of analytical reading skills that clinical dentists can use to enhance understanding of epidemiologic research articles and to weigh and judge research findings that pertain to clinical techniques.

DENT 452. Oral Maxillofacial Diagnostic Imaging and Interpretation
4 credits. Lecture.

Seminar course examining interpretation of images produced by various techniques used in diagnosis of diseases involving the oral maxillofacial complex.

DENT 453. Basic Radiation Sciences I: Radiation Physics and Molecular and Cellular Radiation Biology
2 credits. Lecture.

Lecture/seminar course examining the nature and production of radiations, their interactions with matter and their effects on molecular and cellular structure, function and proliferation.

DENT 454. Basic Radiation Sciences II: Tissue, Organ and Organismic Radiation Biology
2 credits. Lecture.

Seminar course in which the effects of ionizing radiation on tissue and organ systems, whole organisms and genetic integrity as well as the induction of cancer, will be examined.

DENT 455. Scientific Writing
2 credits. Lecture.

This course consists of three parts. The first reviews syntax and the elements of clear written expression. The second deals with the forms and functions of manuscripts, review articles, grant applications, and dissertations. The final component addresses rewriting, abstracting, and editing to improve clarity and conciseness.

DENT 456. Biostatistics
2 credits. Lecture.

The course contains 13 units and covers research design, probability theory, descriptive statistics, and for most of the course, inferential statistics including z and t tests, chi-square, correlation, linear regression, analysis of variance, and some repeated measures.

The goal is to enable the student to accurately understand and explain the biological and biomedical literature. Take-home assignments and three examinations are required.

DENT 460. Cariology and Periodontology
3 credits. Lecture.

Examines epidemiology, clinical manifestations, microbiology, immunology, morphology, chemistry, and societal consequences of these two most prevalent human infectious diseases.

DENT 461. Oral Histology
2 credits. Lecture.

Lectures and slide laboratories examine the morphology, development and function of oral tissues. Areas included are salivary glands, tooth germs, dental enamel, dentin, dental pulp, alveolar bone, cementum, periodontal ligament, oral mucosa, the dentogingival junction and facial growth.

DENT 462. Restorative Sciences
4 credits. Lecture.

This course teaches the biological concepts of basic cavity preparation in Operative Dentistry and Fixed Prosthodontics. The didactic portion covers the theoretical concepts of cavity preparation, principles of which are then applied during laboratory exercises on artificial teeth, simulating clinical conditions.

DENT 495. Independent Study
1-6 credits. Independent Study.

A reading course for those wishing to pursue special topics in dental science under faculty supervision.

+GRAD 395. Master's Thesis Research
1 - 9 credits.

+GRAD 396. Full-Time Master's Research
3 credits.

+GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

DRAMATIC ARTS

Department Head: Professor Gary English
Professors: Crow, Franklin, Hill, McDonald, Molette, Sabatine, Rose, Ryker, and Stern
Associate Professors: McDermott, Nardi, Roccoberton, and Saternow

The Department of Dramatic Arts offers two graduate degree programs: the Master of Arts and the Master of Fine Arts.

The Master of Arts degree generally is considered a preparatory program for an advanced degree at a level between baccalaureate study and a terminal degree in Dramatic Arts. Our department offers the Master of Arts degree in Production, an applied study program with two areas of emphasis: Puppetry and Costuming.

Pursuit of the MA in production (with either the Puppetry or the Costuming emphasis) requires fulfillment of the admission requirements of the Graduate School and three letters of recommendation. All applicants for the MA (which requires a minimum of 30 credits) should consult the Department concerning program availability, personal interview with the program director, and portfolio review. Further information may be obtained by contacting the Department of Dramatic Arts.

The Master of Fine Arts degree generally is considered a terminal degree for students preparing for professional careers in commercial, regional, and educational theatre. Areas of concentration include: Acting, Design (Lighting, Costume and Scenery), Puppetry, and Technical Direction. Admission to this program requires fulfillment of the admission requirements of the Graduate School. Three letters of recommendation are required. Practical experience may be accepted in lieu of some course work. A personal interview on campus is required for residents of New England, New York and New Jersey. An audition is required for Acting applicants, and a portfolio is required for Design and Puppetry. Interview, audition and portfolio requirements can be fulfilled by applicants to the University Resident Theatre Association (U/RTA) finals in New York City, Evanston, Illinois, and Irvine, California. The Department admits a new class of MFA students in Acting once every three years. Prospective applicants for the MFA in Acting must consult the Department concerning program availability prior to applying. The Master of Fine Arts is a three year process-oriented program requiring a minimum of 60 graduate credits. A final project to be determined by student and advisors is required in all areas. A production record-book is required in all areas. Further information may be obtained by contacting the Department of Dramatic Arts.

Curricular Opportunities and Special Facilities. Through practicums and independent studies, students in the Department may expand the area of training beyond that indicated by the list of course offerings. Supplemental course work may be taken in humanistic and scientific disciplines appropriate to the concentration. The production program of the Department affords ample opportunity for students to supplement their work with practical experience in the many productions offered the public throughout the year. Opportunities for students in particular programs to act, direct,

design and technically produce are available in various facilities. Opportunities also are offered for original creative work.

The Department has at its disposal a well-equipped theatre, the Harriet S. Jorgensen, which houses most of the major productions. It is air-conditioned and seats nearly 500. A studio theatre seating about 100 and a unique multi-space theatre, the Mobius, provide additional opportunities for experimentation. In addition, there are facilities for film and television production work.

COURSES OF STUDY

DRAM 301. Studies in Scene Design

1-3 credits. Lecture.

DRAM 302. Advanced Scene Design I

3 credits. Lecture.

Advanced work in the principles and techniques of scene design. Students applying for admission to this course must submit sketches that indicate ability to draw.

DRAM 303. Advanced Scene Design II

3 credits. Lecture.

Detailed analysis of and practical experience in the solving of unusual problems in scene design. Students applying for admission to this course must have a thorough knowledge of technical theatre.

DRAM 304. Scene Painting

1-3 credits. Laboratory.

Scene painting in a variety of media and techniques. Traditional and experimental materials are explored.

DRAM 305. Production Drafting

3 credits. Lecture.

Emphasis on preparation of plans appropriate for scenic studio bidding procedures.

DRAM 306. Advanced Lighting Design I

3 credits. Lecture.

Advanced work in the principles and techniques of lighting design and origins and traditions of equipment and style.

DRAM 307. Advanced Lighting Design II

3 credits. Lecture.

Detailed analysis and practical experience in the solving of unusual and complex problems in lighting design.

DRAM 308. Studies in Lighting Design

3 credits. Lecture.

DRAM 309. Technical Direction

3 credits. Lecture.

A study of the planning, management and execution of all technical aspects of production.

DRAM 311. Studies in Technical Production

1-3 credits. Lecture.

DRAM 312. Technical Analysis

3 credits. Lecture.

Analysis of scenic structures and materials, including stress and vector analysis, static and dynamic loading of beams and battens, truss design, and time/cost studies.

DRAM 313. Advanced Costume Design I

3 credits. Lecture.

Advanced work in the principles and techniques of costume design. Students applying for admission must submit sketches that indicate ability to draw.

DRAM 314. Advanced Costume Design II

3 credits. Lecture.

Detailed analysis of unusual problems in costume design: Opera, Ballet, Musical Theatre.

DRAM 315. Studies in Costume Design

1-3 credits. Lecture.

DRAM 316. Audio Production

3 credits. Lecture.

Audio recording and playback techniques used in the preparation of theatrical sound scores.

DRAM 317. Sound Technology

3 credits. Lecture.

Application of signal processing devices and signal modification for specialized audio effects for production.

DRAM 318. Electricity and Electronics for the Theatre

3 credits. Lecture.

Study of current electrical technology and applications, including AC theory and codes.

DRAM 319. Theatre Producing and Management

3 credits. Lecture.

The creative and business aspects of producing the play.

DRAM 320. Advanced Voice and Diction

3 credits. Lecture.

An intensive program of vocal training on the graduate level. Recommended only for students with a concentration in acting.

DRAM 321. Computer Applications

3 credits. Lecture.

Survey of current software available for application to production management and technical design and production.

DRAM 322. Studies in Theatre Design

3 credits. Lecture.

Investigates the physical problems and codes involved in integrating theatre technology into the architectural requirements of a performance facility.

DRAM 323. Properties Construction

3 credits. Lecture.

Fabrication of unusual stage properties and study of the application of experimental materials.

DRAM 324. Advanced Rigging Techniques
3 credits. Lecture.

Technology and materials used in conventional and specialized rigging systems.

DRAM 327. Shop Technology
3 credits. Lecture.

Use of materials, equipment and processes required in special fabrication techniques.

DRAM 328. Stage Technology
3 credits. Lecture.

Power sources and drive mechanisms for stage machinery including electro-mechanical, hydraulic and pneumatic systems.

DRAM 329. Technical Research and Writing
3 credits. Lecture.

Application of writing techniques and research methods used in preparation of technical reports and project documentation.

DRAM 330. Introduction to Graduate Studies in Stage Design
1-3 credits. Laboratory.

Projects in scenery, lighting and costume design for first-year graduate students in stage design and puppetry. Reading and discussion of various 20th century works on design theory for the theatre.

DRAM 331. Design Drawing
1-3 credits. Laboratory.

Studio course in figure drawing and perspective drawing as foundation for students in theatre costume, scenic, and lighting design and puppetry arts.

DRAM 337. Advanced Movement for the Actor I
3 credits. Laboratory.

Intensive study of organic movement, physicalization of character and movement in a scene for the advanced actor.

DRAM 338. Advanced Movement for the Actor II
3 credits. Laboratory. Prerequisite: DRAM 337.

Continuation of DRAM 337.

DRAM 345. Advanced Acting I
3 credits. Laboratory.

DRAM 346. Advanced Acting II
3 credits. Laboratory. Prerequisite: DRAM 345.

DRAM 349. Advanced Puppetry I
3 credits. Lecture.

Advanced work in the history and construction of marionettes.

DRAM 350. Advanced Puppetry II
3 credits. Lecture. Prerequisite: DRAM 349.

Advanced work in the principles and techniques of marionette production.

DRAM 351. Studies in Puppetry
1-3 credits. Lecture.

DRAM 352. Studies in Acting
1-3 credits. Laboratory.

DRAM 355. Studies in Television
1-3 credits. Lecture.

†DRAM 359 Practicum in Dramatic Arts
1-3 credits. Practicum.

Special projects in dramatic arts.

DRAM 361. Directing I
3 credits. Lecture.

Advanced problems in styles of directing, and in the directing of original plays.

DRAM 362. Directing II
3 credits. Lecture. Prerequisite: DRAM 361.

DRAM 363. Studies in Directing
1-3 credits. Lecture.

DRAM 376. Studies in Film Production
1-6 credits. Lecture.

DRAM 383. Dramatic Form and Structure: Tragedy and Related Forms
3 credits. Lecture.

Form, structure and conventions as influenced by historical and theatrical conditions governing production.

DRAM 384. Dramatic Form and Structure: Comedy and Related Forms
3 credits. Lecture.

Form, structure and conventions as influenced by historical and theatrical conditions governing production.

DRAM 389. Field Studies Internship in Design/Technical Theatre
1-6 credits. Independent Study.

Supervised practical experience in professional/regional theatres or academic institutions.

DRAM 390. Internship in Dramatic Arts
0 credits. Practicum. Open only to Dramatic Arts graduate students holding a dramatic arts graduate assistantship.

Internships in acting, costuming, lighting, management, media, puppetry, pedagogy and technical theatre.

DRAM 391. Performance Techniques
1-3 credits. Lecture.

Performance study and practice in selected areas of dramatic arts.

DRAM 392. Independent Study
1-6 credits. Independent Study.

DRAM 393. Studies in Theatre History
1-3 credits. Lecture.

DRAM 395. Seminar
1-3 credits. Seminar.

Studies in selected areas of theatre arts. Topics may include but are not limited to such fields as aesthetics, criticism, theory and history.

DRAM 396. M.F.A. Project
1-6 credits. Independent Study. Open only to M.F.A. candidates. Students may enroll up to four times for a total not to exceed 12 credits.

In design/technical theatre - the design of sets, costumes and/or lights or technical direction for a production in the Department of Dramatic Arts. This project may consist of a portfolio presentation instead of an actual production.

In puppetry - the design and direction of a puppetry production in the Department of Dramatic Arts.

In acting - the preparation and performance of a substantial and challenging role from dramatic literature.

In directing - the direction of a production in the Department of Dramatic Arts.

DRAM 397. Investigation of Special Topics
1-6 credits. Independent Study.

A reading course under the direction of an appropriate staff member.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

ECOLOGY AND EVOLUTIONARY BIOLOGY

Department Head: Professor Gregory J. Anderson
Professors: Caira, Chazdon, Colwell, Desch, Henry, Holsinger, Les, Schaefer, Schlichting, Schwenk, Silander, Simon, Turchin, Wells, and Yarish
Associate Professors: Adams, Cardon, Goffinet, Jockusch, C. Jones, L. Lewis, P. Lewis, Rich, Schultz, Taigen, Trumbo, and Wagner
Assistant Professors: Coe, Elphick, and Rubega

Ecology and Evolutionary Biology emphasizes the diversity and evolution of animals and plants and their interactions with the environment. The department includes the following major areas of research: (1) *Botany* – angiosperm taxonomy and evolution; paleobotany and anatomy; pollination biology; plant morphology; cytobotany; phycology; ethnobotany. (2) *Ecology* – behavioral ecology; population and community ecology; ecosystem ecology; physiological ecology; theoretical ecology; marine ecology; plant ecology; limnology. (3) *Entomology* – insect systematics, biogeography, and evolution; insect ecology; insect behavior. (4) *Zoology* – animal behavior; herpetology; ichthyology; mammalogy; ornithology; parasitology; vertebrate systematics and morphology; (5) *Evolutionary Biology* – population genetics; evolutionary ecology; speciation theory; systematic theory; molecular evolution and systematics.

Interdisciplinary Study

Plant Biology. Course work and research opportunities in plant biology are offered in three separate departments. Plant systematics and evolution, plant ecology, plant physiological ecology, plant morphology, and plant molecular systematics and evolution are offered in the Department of Ecology and Evolutionary Biology. Plant physiology, cellular and molecular biology are offered in the Department of Molecular and Cell Biology. Additional course offerings in plant biology are available in the Department of Plant Science.

Marine Sciences. Research and teaching facilities for marine sciences are located at the Avery Point campus of the University of Connecticut, and on the main campus in Storrs. Major areas of research include the ecology, physiology, behavior, and systematics of marine organisms; physical and chemical oceanography; sedimentology; and climatology. Recirculating sea water systems are available for maintaining marine organisms over extended periods for research. Direct inquiries to: Department Head, Marine Sciences, University of Connecticut at Avery Point, Groton, Connecticut 06340-6043.

Organization for Tropical Studies. The University of Connecticut is a member of the Organization for Tropical Studies, which offers graduate courses on tropical ecology in Costa Rica. Qualified graduate students in biology and related areas are eligible to participate in the February-March and July-August sessions. For information, write to

Director of Graduate Studies, Department of Ecology and Evolutionary Biology, Unit 3043, Storrs, Connecticut 06269-3043.

COURSES OF STUDY

EEB 301. Population and Community Ecology

3 credits. Lecture. Open to graduate students in EEB, others with permission.

Overview of population and community ecology, including population regulation and dynamics, metapopulations, species interactions, biodiversity, community structure, and evolutionary ecology. Theoretical and case-history approaches, emphasizing plants, invertebrates, and vertebrates. Lecture, discussion, and exercises in analysis and modeling.

EEB 302. Organisms and Ecosystems

3 credits. Lecture. Open to graduate students in EEB, others with permission.

Overview of organismal and ecosystem ecology, including biophysical basics, resource utilization and allocation, life history patterns, energetics, matter and energy flow in ecosystems, and temporal and spatial dynamics at ecosystem and landscape scales. Theory, experiments, and computer modeling.

EEB 303. Developmental Plant Morphology

4 credits. Laboratory.

Exploration and analysis of diversity in plant form using basic principles of plant construction and development. A research paper is required, in which the principles learned in lecture are applied to the analysis of the development of a plant from seed through reproductive maturity.

EEB 304. Aquatic Plant Biology

4 credits. Laboratory

Field and laboratory-oriented study of the anatomy, morphology, ecology, physiology, systematics and evolution of vascular aquatic and wetland plants. A research paper and class presentation are required on a topic pre-approved by the instructor.

†EEB 306. Internship in Ecology, Conservation, or Evolutionary Biology

1-9 credits. Practicum

An internship with a non-profit organization, a governmental agency, or a business under the supervision of Ecology and Evolutionary Biology faculty. Activities relevant to the practice of ecology, biodiversity, evolutionary biology, or conservation biology will be planned and agreed upon in advance by the job site supervisor, the faculty coordinator, and the intern. One credit may be earned for each 42 hours of pre-approved activities up to a maximum of nine credits.

EEB 307. African Field Ecology and Renewable Resources Management

4 credits. Field studies.

An intensive, field oriented methods course conducted primarily in South Africa at the Basil Kent

Field Station, Great Fish River Reserve in collaboration with the University of Fort Hare. An introduction to South Africa culture and history, ecology, and natural resources is provided in weekly meetings during the semester. This is followed by 3 weeks in South Africa. Topics covered include vegetation and faunal surveys, data collection and analysis, biodiversity monitoring, and conservation management. A research paper relating to an independent study conducted by the student in the field is required.

EEB 309. Soil Degradation

3 credits. Lecture

Causes and consequences of soil degradation in agricultural and natural ecosystems, including salinization, erosion, nutrient impoverishment, acidification, and biodiversity loss. Historical perspectives and current strategies for soil conservation. Readings in original literature will be emphasized.

EEB 310. Conservation Biology

3 credits. Lecture.

Case studies and theoretical approaches to conservation of biological diversity, genetic resources, plant and animal communities, and ecosystem functions. Topics emphasize ecological and evolutionary principles that form the scientific basis of this emerging, interdisciplinary field, as well as socio-political, legal, economic, and ethical aspects of conservation.

EEB 333 Evolutionary Developmental Biology

3 credits. Lecture.

An advanced course in evolutionary biology, emphasizing the underlying developmental bases of evolutionary change. Concepts of homology, constraint, and heterochrony, with examples from both animal and plant systems.

EEB 335W. Vertebrate Social Behavior

3 credits. Lecture.

Lectures and discussions dealing with various aspects of vertebrate social behavior, including territoriality, mating systems, sexual selection, and group behavior. The emphasis is on reading and critical analysis of original literature.

EEB 340. Biology of Bryophytes and Lichens

4 credits. Lecture/Laboratory.

Diversity, evolution, ecology, development and taxonomy of the bryophytes (mosses, liverworts, and hornworts) and lichen-forming fungi.

EEB 348. Population Genetics

3 credits. Lecture

This course is designed to provide a theoretical background for studies in evolution. Emphasis is placed on understanding the conceptual foundations of the field and on the application of these concepts to an understanding of the roles of mutation, evolution of populations.

EEB 349. Phylogenetics.

4 credits. Lecture. Prerequisite: EEB 458 or consent of instructor

Estimation of genealogies at the level of species and above, and their application and relevance to various biological disciplines, including systematics, ecology, and morphological and molecular evolution. Surveys both parsimony and model-based methods, but emphasizes maximum likelihood and Bayesian approaches.

EEB 369. Social Insects.

3 credits. Lecture/Discussion. Open to graduate students in EEB, others with permission.

Behavior, ecology, and evolution of social insects (especially wasps, bees, ants, and termites) with an emphasis on the evolution of social behavior and on the ecological impact of social insects.

EEB 371. Current Topics in Molecular Evolution and Systematics

1 credit. Lecture.

Current concepts, ideas and techniques in the field of molecular evolution, and theoretical problems peculiar to the phylogenetic analysis of molecular data.

EEB 372. Computer Methods in Molecular Evolution

3 credits. Lecture.

Practical aspects of molecular data analyses. Databank searches, sequence alignments, statistical analyses of sequence data. Parsimony, distance matrix, and spectral analysis methods. Students compile and analyze a data set of their choice.

EEB 375. Evolution and Ecology of Communities.

3 credits. Lecture.

The evolutionary consequences of ecological interactions between species and the role of evolution in shaping biological communities. Readings, lectures, and discussions emphasize the importance of descriptive, experimental, and theoretical approaches in community biology.

EEB 380. Evolution of Green Plants

3 credits. Lecture.

Introduction to morphological, ultrastructural, and molecular characters used for inferring evolutionary relationships of green plants, from the green algae to the flowering plants, with emphasis on evolutionary changes involved in the transition from aquatic to terrestrial habitats.

EEB 385. Functional Ecology of Plants

3 credits. Lecture.

Physiological, morphological, and structural responses of plants to the physical and biotic environment and to environmental change. Readings, lectures and discussions emphasize plant responses at all levels of organization, from cells to whole plants. Themes include: organismal integration, consequences and constraints in plant adaptation, and the functioning of plants within communities and ecosystems.

EEB 390. Biology of the Algae

4 credits. Lecture/Laboratory.

Laboratory and field-oriented study of the major groups of algae, emphasizing structure, function, systematics, and ecology.

EEB 391 Evolution of Green Plants Laboratory

1 credit. Laboratory. Open only to students who are enrolled in or have completed EEB 380.

Study of morphological and anatomical characters of extant and fossil plants. Phylogenetic inferences from morphological and molecular characters. Discussion of primacy literature.

EEB 395. Independent Study

1 credit. Independent study.

A reading course for those wishing to pursue special work in biology. It may also be elected by undergraduate students preparing to be candidates for degrees with distinction.

EEB 396. Investigation of Special Topics

1-6 credits. Lecture.

Advanced study in a field within Ecology and Evolutionary Biology.

EEB 397. Research

1-6 credits. Independent study.

Conferences and laboratory work covering selected fields of Ecology and Evolutionary Biology.

†GRAD 395. Master's Thesis Research

1-9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

EEB 445. Advanced Invertebrate Zoology

4 credits. Lecture/Laboratory.

The functional morphology, ecology and evolution of selected invertebrate groups. Field trips are required.

EEB 447. Mathematical Ecology

4 credits. Lecture.

Theory and methods of mathematical modeling as applied to ecological systems. Modeling techniques developed around examples from ecological literature.

EEB 449. Evolution

3 credits. Lecture.

A review of our current understanding of the patterns and processes of organic evolution. Class periods will include discussion and critical analysis of primary literature.

EEB 452. Field Ecology

2 credits. Lecture.

A field of study of the biotic communities in selected areas of eastern North America.

EEB 453. Helminthology

3 credits. Lecture/Laboratory.

Morphology, taxonomy, and physiology of the parasitic worms. Methods of culture, preparation for study, and experimental determination of life cycles.

EEB 454. Mammalogy

4 credits. Lecture/Laboratory.

Lectures cover diversity, natural history (including behavior, ecology, reproduction, etc.), and evolution of mammals; readings from original literature are included. Laboratories cover anatomy, systematics, and distribution of major groups of mammals.

EEB 457. Advanced Systematic Entomology

1-6 credits. Lecture/Laboratory.

A research course in advanced taxonomy.

EEB 458 Principles and Methods of Systematic Biology

4 credits. Lecture/Laboratory.

The basic concepts and modern procedures employed in systematic biology: literature retrieval, species description, phylogenetic inference, nomenclature, and current conceptual issues. Laboratories include computer techniques in phylogenetic analysis.

EEB 459. Aquatic Insects

3 credits. Lecture/Laboratory.

Taxonomic, habitat, and life history studies of aquatic insects.

EEB 462. Evolutionary Pattern and Process: Experimental Approaches

4 credits. Lecture/Laboratory.

A rigorous introduction to the concepts and methods for systematic and evolutionary studies with an emphasis on genetic, molecular (proteins and DNA), and phylogenetic analyses. The laboratory portion provides the opportunity to gain experience in DNA extraction, amplification, sequencing, alignment, and phylogenetic analyses.

EEB 463. Plant Ecology

4 credits. Lecture/Laboratory.

An advanced course in plant ecology with emphasis on the effects of environment on development of vegetation, metabolism of the ecosystem, cycling of nutrients, growth and succession. Principles of vegetation dynamics, classification and their ecological interpretation will be discussed.

EEB 465. Herpetology

4 credits. Lecture/Laboratory.

Lectures cover environmental physiology, ecology, and behavior of amphibians and reptiles. Emphasis is on readings from the original literature. Laboratories

cover evolution, systematics, and distribution of major groups of the world.

†EEB 469. **Seminar**

1-3 credits. Seminar.

Study and discussion of current researches, books and periodicals in the field of Biology. Subtopic designations: Ec, Ecology; M, Mammalogy; Mec, Marine Ecology; Pr, Parasitology; En, Entomology; Bi, Biogeography; Ev, Evolution; Sy, Systematics.

EEB 471. **Systematic Botany**

4 credits. Lecture/Laboratory.

Classification, identification, economic importance, evolution and nomenclature of flowering plants. Laboratory compares vegetative and reproductive characteristics of major families. A research paper and class presentation are required on a topic pre-approved by the instructor.

EEB 477W. **Insect Phylogeny**

3 credits. Lecture.

A review of our current understanding of the evolutionary relationships of the major orders and families of insects, including the phylogenetic position of Insecta within Arthropoda.

†EEB 480. **Seminar in Vertebrate Biology.**

1 credit. Seminar.

Analysis and discussion of current literature in vertebrate biology.

†EEB 481. **Seminar in Biodiversity.**

1 credit. Seminar.

Provides the opportunity for students to present research plans, reports of work in progress, and full-length seminars on completed research projects in ecology, systematics, and evolutionary biology to a supportive but critical audience.

†EEB 482. **Seminar in Spatial Ecology**

1 credit. Seminar.

Analysis and discussion of current literature in spatial ecology.

†EEB 483 **Seminar in Marine Biology.**

1 credits. Seminar.

Analysis and discussion of current literature in marine biology.

†EEB 484. **Seminar in Plant Ecology**

1 credit. Seminar.

Analysis and discussion of current literature in plant ecology.

†EEB 485. **Seminar in Comparative Biology**

1 credit. Seminar.

Analysis and discussion of current literature in evolution and comparative ecology.

†EEB 486. **Seminar in Systematics**

1 credit. Seminar.

Analysis and discussion of current literature in systematic biology.

†EEB 487. **Seminar in Parasitology**

1 credit. Seminar.

Analysis and discussion of current literature in parasitology.

†EEB 488. **Current Topics in Biodiversity.**

1 credit. Seminar.

Analysis and discussion of current literature on biodiversity.

†EEB 489 **Current Topics in Conservation Biology**

1 credit. Seminar.

Analysis and discussion of current literature on conservation.

†EEB 490. **Seminar in Behavioral Ecology**

1 credit. Seminar.

Analysis and discussion of current literature in behavioral ecology.

†GRAD 495. **Doctoral Dissertation Research**

1 - 9 credits.

†GRAD 496. **Full-Time Doctoral Research**

3 credits.

†GRAD 497. **Full-Time Directed Studies (Doctoral Level)**

3 credits.

GRAD 498. **Special Readings (Doctoral)**

Non-credit.

GRAD 499. **Dissertation Preparation**

Non-credit.

ECONOMICS

Department Head: Professor Kathleen Segerson

Professors: Carstensen, Cosgel, Hallwood, Heffley, Knoblauch, Langlois, Miceli, and Ray

Associate Professors: Ahking, Alpert, Couch, Cunningham, Harmon, Kimenyi, Landau, Lott, Minkler, Morand, Randolph, Ross, Tripathi, and Zimmerman

Assistant Professors: Dharmapala and Matschke

Study leading to the Master of Arts and Doctor of Philosophy degrees is offered.

Requirements for the Master of Arts Degree. The program of studies for the M.A. degree is not uniform for all students. The combination of courses depends on the candidate's objective. For some purposes, a broad spread of subject-matter courses may be advisable, while for other purposes a narrowly focused program may be appropriate. Economics 308, 309, 310, and 314 are required. Candidates with inadequate backgrounds in mathematics are required to take Economics 214Q.

Requirements for the Doctor of Philosophy Degree. Students in the Ph.D. program are required to pass Economics 411, 412, 414, 418, 419, 420, 428, 429 or their equivalents.

If a supporting area of study is elected rather than a foreign language, it cannot include any of the courses used to satisfy the above requirements; it must consist of a coherent unit of work in one subject considered a special skill for economists, and it must include at least one course above the 200's level.

Each student must pass the preliminary examination in economic theory before taking the field examination. Students choose from among the following: Industrial Organizations, International Economics, Macro/Money, and Public Economics. This field is then augmented with other course offerings.

Special Facilities. Computer time and assistance are available at the University Computer Center. In addition, there is a PC lab in the Department for use by graduate students. Research opportunities may be available in connection with faculty projects or at the Connecticut Center for Economic Analysis. Some students publish scholarly articles in partnership with faculty.

COURSES OF STUDY

ECON 300. **Independent Study in Economics**

1-3 credits. Independent Study.

ECON 301W. **Topics in Economic History**

3 credits. Lecture.

Focuses on critical episodes and salient turning points in the history of European, American, and Third World economic development; emphasis on institutional and technological factors. Evaluates different approaches.

ECON 305. **European Economic History**

3 credits. Lecture.

The economic development of Europe from the Industrial Revolution to World War I. Emphasis on the

economic and social factors that led to the industrialization of Europe.

ECON 306. American Economic History
3 credits. Lecture

The growth and development of the American economy and the evolution of its economic institutions from the colonial period to the present. Assessment of agriculture, industry, transportation, commerce, finance, government, and population; and of their interaction with the physical environment, technology, public policy, and the world economy.

ECON 308. Microeconomics I
3 credits. Lecture.

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

ECON 309. Macroeconomics I
3 credits. Lecture.

Survey of the field: its historical foundations and development, conceptual framework, and application to current macroeconomic problems.

ECON 310. Econometrics I
3 credits. Lecture.

Construction, estimation, and interpretation of economic behavioral and technical equations using data that are passively generated by a system of simultaneous, dynamic and stochastic relations.

ECON 314. Mathematical Economics
3 credits. Lecture.

Optimization, comparative statics, envelope theorem, basic differential and difference equations.

ECON 316. Topics in Microeconomics
3 credits. Lecture.

Topics in microeconomic theory; students choose the material to be covered.

ECON 320W. History of Economic Thought to 1890
3 credits. Lecture.

Evolution of economic philosophy, doctrines, and techniques from the earliest analyses through the founding of neoclassical theory. Particular attention to the works of Smith, Ricardo, Malthus, Marx, and the early neoclassicals.

ECON 322W. History of Economic Thought from 1890
3 credits. Lecture.

The history and methodological underpinnings of modern economic theory. Topics include macroeconomics and business cycles; utility and demand theory; and industrial organization. Particular attention to Marshall and Keynes.

ECON 324. Seminar in Mathematical Economics
3 credits. Seminar. Prerequisites: ECON 314 and ECON 315.

First half - calculus of variations and optimal control theory; second half - student presentations on

journal articles and reports on students' own research.

ECON 330. Federal Finance
3 credits. Lecture.

Theories of government in the economy including general equilibrium, public choice and institutional economics. Government expenditures: budgeting, cost-benefit studies and analysis of specific expenditure programs. Taxation: equity and efficiency criteria for evaluating taxes, with application to major sources of revenue; public debt.

ECON 332. State and Local Finance
3 credits. Lecture.

Taxes and expenditures in a federal system, with particular emphasis on intergovernmental relationships. Rationale for federalism, problems of public choice, and tax incidence analysis.

ECON 334. Fiscal Policy
3 credits. Lecture.

Theory of government finance, with special emphasis on Federal expenditure and tax policies in pursuit of price stability and full employment. Emphasis on problems of collective choice, including the political business cycle and relations with the monetary authorities.

ECON 342. International Trade: Theory and Policy
3 credits. Lecture.

The economic aspects of international relations, including the pure theory of international trade and the instruments of commercial policy. Topics include comparative advantage; international economic policies; and regional economic integration.

ECON 343. International Finance: Theory and Policy
3 credits. Lecture.

Theoretical and historical analysis of international finance, including balance-of-payments adjustments, foreign-exchange markets, international capital flows, and the effectiveness of macroeconomic policies in open economies.

ECON 346. Monetary Theory and Policy
3 credits. Lecture.

Theoretical analysis of the role of money in the economy, including general equilibrium and monetarist frameworks, the demand for and supply of money, channels of monetary influence, and determinants of long-term and short-term interest rates. Problems of monetary policy, such as selection of instruments and targets, use of discretionary policy, and stability of the money multiplier.

ECON 347. Issues in Monetary Theory and Policy
3 credits. Lecture. Prerequisite: ECON 346.

Contemporary theoretical and policy issues in money, such as portfolio theory, the money supply process, the mechanics of policy implementation, "crowding out," dynamic macro models, disequilibrium macro models, and rational expectations.

ECON 348. Economic Development Policy
3 credits. Lecture.

The role of government in the economic development of underdeveloped countries. Topics include: alternative paradigms of development and the resulting place for government in the economy; the theory, institutions, and policies of government in planning, fiscal, and monetary concerns; analysis of policy instruments influencing international trade and financial flows; and the influence of international organizations on the development process.

ECON 350. Economic Development
3 credits. Lecture.

An examination of the problems facing the less developed nations. Comparisons of alternative paradigms of economic development (orthodox to political economy) and the strategies and policies they imply.

ECON 351. Economic Growth and Fluctuations
3 credits. Lecture.

Economic growth and business cycles in the economically advanced countries, with emphasis on both theory and evidence.

ECON 354. Environmental Economics
3 credits. Lecture. Prerequisite: ECON 308 or ARE 325.

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

ECON 355. Seminar in Development and Growth
3 credits. Seminar.

A continuation of Economics 350. Topics include agriculture and industry in development, investment criteria, essentials of developing planning, the promotion of domestic saving and fixed investment, foreign aid, improvements in international trade, and human capital formation.

ECON 359. Urban and Regional Economics
3 credits. Lecture.

Theoretical and empirical analysis of urban and regional systems in developed and developing economies. Special emphasis on the spatial characteristics and problems of metropolitan markets for housing, transportation services, productive factors, and final products; land-use controls, housing subsidies, public transit, and other forms of public sector intervention.

ECON 375. The Labor Market
3 credits. Lecture.

A thorough examination of the labor market.

Topics include human capital, wage determination, public policy, and money wage rates.

ECON 377. Collective Bargaining

3 credits. Lecture.

Examines the role of unions; unions and wages; public sector bargaining; bargaining models; and trends in union membership.

ECON 381. Industrial Organization

3 credits. Lecture.

Survey of contemporary theory and models of the organization of industry. Topics include oligopoly; product differentiation; advertising; innovation; contestable markets; the financial theory of the firm; dynamic and evolutionary models; and transaction-cost economics.

ECON 382. Topics in Public Policy toward Industry

3 credits. Lecture.

Theories of economic regulation. U.S. antitrust policy. Regulation of natural monopolies in theory and practice. Health and safety regulation.

ECON 386. The Economics of Organization

3 credits. Lecture.

Surveys the modern agency, transaction-cost, and evolutionary theories of organization. Topics include measurement and monitoring costs, asset specificity, incomplete-contracts theory, the dynamic capabilities approach, and alternative organizations.

ECON 392. Comparative Economic Systems

3 credits. Lecture.

Comparison of alternative economic systems, with emphasis on socialism in the former Soviet Union and Eastern Europe. Prices, planning, and enterprise management under socialism. Special attention to the system of market socialism in the former Yugoslavia.

ECON 396. Applied Research Seminar

3 credits. Seminar.

A survey of research methods in economics and development of individual research projects.

ECON 397. Topics in Economics

3 credits. Seminar.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

ECON 400. Independent Study

1-3 credits. Independent Study.

Students pursue an in-depth study of an area of interest under the guidance of a faculty member.

ECON 411. Econometrics II

3 credits. Lecture. Prerequisite: STAT 314.

Theoretical underpinnings of standard econometric methods of estimation and testing of single-equation models.

ECON 412. Econometrics III

3 credits. Lecture. Completion of ECON 411 with a grade of B- or better.

Special topics from single-equation models; simultaneous equations models; full information maximum likelihood methods; and recent advances in econometrics.

ECON 414. Advanced Mathematical Economics I

3 credits. Lecture.

The application of matrix algebra and differential and integral calculus to statics, comparative statics, and optimization problems in economics.

ECON 415. Advanced Mathematical Economics II

3 credits. Lecture. Prerequisite: Completion of ECON 414 with a grade of B- or better.

The application of integral calculus, differential equations, difference equations, and convex sets to economic dynamics, linear programming, and non-linear programming.

ECON 418. Microeconomics II

3 credits. Lecture. Prerequisite: ECON 308 or ARE 325.

Microeconomic theory: contemporary economic analysis of decisions by consumers, producers, and other agents.

ECON 419. Macroeconomics II

3 credits. Lecture. Prerequisite: ECON 309.

A rigorous course in macroeconomic modeling with policy applications. Focuses primarily on developments in the current literature, analytical techniques, and macroeconomic models. Includes an introduction to stochastic dynamic models.

ECON 420. History of Economic Thought

3 credits. Lecture.

Advanced treatment of material in 320W and 322W.

ECON 428. Microeconomics III

3 credits. Lecture. Prerequisite: Completion of ECON 418 with a grade of B- or better.

Markets, general equilibrium theory, efficiency, and advanced topics in microeconomics.

ECON 429. Macroeconomics III

3 credits. Lecture. Prerequisite: Completion of ECON 419 with a grade of B- or better.

Stochastic modeling, recent developments in the literature, and policy applications. Topics may include real business cycle theory, new classical economics, neo-Keynesian theory and growth models.

ECON 435. Government Expenditures

3 credits. Lecture. Prerequisite: ECON 428.

Theory and evidence of government expenditure policy.

ECON 436. Government Revenues

3 credits. Lecture. Prerequisite: ECON 428.

Positive and normative analysis of alternative government resource uses.

ECON 442. Advanced International Trade: Theory and Policy

3 credits. Lecture. Prerequisite: ECON 428.

Advanced treatment of material covered in ECON 342.

ECON 443. Advanced International Finance: Theory and Policy

3 credits. Lecture. Prerequisite: ECON 429.

Advanced treatment of material covered in ECON 343.

ECON 446. Advanced Monetary Theory and Policy I

3 credits. Lecture. Prerequisite: ECON 429.

Advanced treatment of material covered in ECON 346.

ECON 447. Advanced Monetary Theory and Policy II

3 credits. Lecture. Prerequisite: ECON 446.

Advanced treatment of material covered in ECON 347.

ECON 481. Industrial Organization

3 credits. Lecture. Prerequisite: ECON 428.

Advanced treatment of material covered in ECON 381.

ECON 486. Economics of Organization

3 credits. Lecture.

Advanced treatment of material covered in ECON 386.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

EDUCATION

Dean: Professor Richard L. Schwab

Associate Dean: Professor Thomas C. DeFranco

The Neag School of Education offers graduate programs which lead to the degrees of Master of Arts and Doctor of Philosophy. In addition, the School of Education confers the Sixth-Year Diploma in Professional Education. Graduate courses in education are offered in the following academic departments: Curriculum and Instruction; Educational Leadership; Educational Psychology; and Kinesiology.

Master's degree study is available in most secondary school teaching areas as well as in agricultural, elementary, music, and special education teaching areas. In addition, the Teacher Certification Program for College Graduates (TCPG) is a 45-credit program beginning with two summer sessions followed by a full year of additional work, which culminates in the award of the M.A. degree and the University's recommendation for certification. Additional information is available at <<http://www.education.uconn.edu/>>.

Courses of study also are available for school service personnel in areas such as evaluation and measurement, guidance and counseling, educational technology, reading, school psychology, special education, supervision and curriculum development, technical education, and vocational education.

Additionally, master's-level study is available in a variety of areas including adult learning, counseling, curriculum and instruction, educational administration, educational psychology, educational studies, educational technology, kinesiology, and higher education and student affairs. For work leading to the master's degree in music education, also see course listings under the Department of Music.

A program leading to the Sixth-Year Diploma in Professional Education provides an opportunity for advanced students who have the master's degree to increase their professional competence through further study under the guidance of a faculty member. Inquiries and requests for admission to the Sixth-Year Program should be directed to the Office of the Dean, Neag School of Education, 249 Glenbrook Road, Unit 2064, Storrs, Connecticut 06269-2064.

The Ph.D. degree is offered in the following fields of study: adult learning, curriculum and instruction, educational administration, educational psychology, educational studies (not accepting new students at this time), educational technology, kinesiology, professional higher education administration (not accepting new students at this time), and special education. The Ed.D. degree is offered in the field of educational leadership.

Admission Requirements for the Master of Arts Degree. Applicants must have specific preparation for teaching adequate to meet the minimum professional requirements for obtaining a bachelor's degree through the Neag School of Education. College graduates with outstanding undergraduate records, but without such preparation, may apply for admission and if admitted, are expected to make up any deficiencies. Applicants wishing to specialize in elementary education must have completed an appropriate concentration of

elementary education courses; applicants wishing to specialize in kinesiology should have an undergraduate major or the equivalent in kinesiology or in physical or recreation service education.

Applicants may be required to submit scores for the General Test of the Graduate Record Examinations and/or the Miller Analogies Test.

Admission Requirements for the Ph.D. Degree. The Doctor of Philosophy degree program is intended to give persons of unusual ability and promise the opportunity to become scholars in their areas of specialization. Only outstanding individuals whose experience and background will allow them to carry on a scholarly program and to work professionally at a level commensurate with the degree after its completion are accepted into the program.

Applicants to doctoral programs in education must submit scores for the Graduate Record Examinations General Test, except those applying for admission to the Ed.D. program. In addition, applicants to some programs may be required to submit scores for the Miller Analogies Test. These tests must have been taken within the last five years. International students may have these test requirements waived by the Admissions Committee of a given program or deferred until after admission.

Special Facilities in the Neag School of Education. Several important services, facilities, and agencies contribute to the scholarship and research experiences of graduate students in education.

There are opportunities in the Reading-Language Arts center for graduate students to pursue research studies of the many problems affecting the teachers of reading at all grade levels. The University of Connecticut Center for Educational Policy Analysis serves to inform educational and public policy leaders about the development, analysis, and implementation of educational policies. The Center on Postsecondary Education and Disability educates preprofessionals and professionals in acquiring knowledge and skills and developing state-of-the-art practices in disability services. The Department of Kinesiology has laboratory facilities available for research in these areas: sport biomechanics, exercise physiology, sport disabilities, sport social sciences, and athletic training. In addition, the local public schools of Connecticut cooperate closely with the University and provide opportunities for internships, practica, and field studies.

Graduate Courses. Education courses are listed under the sponsoring departments. Reference should be made to the offerings of the Departments of Curriculum and Instruction; Educational Leadership; Educational Psychology; and Kinesiology.



CURRICULUM AND INSTRUCTION

Department Head: Professor Mary Anne Doyle

Professors: DeFranco, Goodkind, Irwin, and Leu

Associate Professors: Alfano, Hartman, Kaufman, Moss, Osborn, and Settlage

Assistant Professors: C. Bell, Glenn, Gort, Marcus, Olson, Reyes, and Rojas

Graduate programs in Curriculum and Instruction lead to degrees of Master of Arts in the field of education and Doctor of Philosophy. The Neag School of Education also confers a Sixth-Year Diploma in Professional Education. Master's and doctoral study is offered in bi-lingual and bi-cultural education, curriculum development, elementary education, and in most secondary school teaching fields. Students should consult the statement under Education for information pertaining to admission requirements and special facilities available in the Neag School of Education.

The Ph.D. in Educational Studies may be taken with a concentration in one of two areas: history and philosophy of education or social foundations of education (which include comparative and international education, and educational anthropology). **New students are not being admitted at this time.**

COURSES OF STUDY

EDCI 300. Independent Study in Education

1-3 credits. Independent Study.

Students requesting this course should have a significant background in education and should present to the instructor problems, well-defined and well laid out for investigation, which hold special interest for them and which will be pursued on the plan of advanced study.

EDCI 301. Lectures in Education

1 credit. Lecture.

A course in which staff members and authorities in education and related fields discuss selected problems.

EDCI 302. Teaching in the Affective Domain

3 credits. Lecture.

Study in the relationship between the affective and cognitive domains of education and how the affective domain influences student behavior in the learning process, self-awareness, and self-concept. Classroom activities, materials, and methods are featured.

EDCI 304. Foundations of Bilingual Education

3 credits. Lecture.

Study of the political, social and legal aspects of bilingual education, including principles of second language acquisition.

EDCI 305. Applied Learning Research for Instructional Leaders

3 credits. Lecture.

A study of learning principles and their manifestations in classroom settings; design and application of goals and objectives; instructional methods and programming which complement and extend learning style preferences and collective and individual needs.

EDCI 306. Personal Growth for Teachers

3 credits. Lecture.

This course is designed to assist classroom

teachers in developing a better understanding of self. It will provide techniques for coping with professional burnout, stress, conflicts, and depression, which can lead to revitalization, increased job satisfaction and better personal relationships among colleagues.

EDCI 307. Curricular Issues in Bilingual Education

3 credits. Lecture.

Current approaches, methods and techniques with respect to curricular issues in contemporary bilingual education programs.

EDCI 308. Teaching Writing in the Elementary School, Grades K-6

3 credits. Lecture.

A course for elementary teachers with emphasis on: teaching the writing process in persuasive, narrative and expository writing; evaluation of errors; developing appropriate curricular sequences; and research in the writing process.

EDCI 309. Special Topics in Bilingual Education

3-6 credits. Lecture.

In-depth study of current topics related to bilingual education programs.

EDCI 310. Curriculum Planning

3 credits. Lecture.

Examines teachers' issues and problems from real-life cases with theoretical perspectives and pedagogical methods.

†EDCI 311. Workshop in Education

1-3 credits. Practicum.

Professional personnel to work cooperatively on problems arising out of actual school situations.

EDCI 312. Bilingualism and Second Language Acquisition

3 credits. Lecture.

Developmental sequences and theories of first and second language acquisition.

EDCI 313. Bilingual Education and Bilingualism

3 credits. Lecture.

Current methods, strategies and techniques of reading in the mother tongue (L1); transfer of reading skills into English (L2); and, evaluation and adaptation of L1 and L2 reading materials. Principles of second language acquisition.

EDCI 314. Elementary School Curriculum

3 credits. Lecture.

Analysis of the elementary school curriculum. Emphasis on curriculum development and educational alternatives.

EDCI 315. Educational Linguistics

3 credits. Lecture.

Overview of the study of language and linguistics, and especially applied linguistics, with emphasis on

their implications for classroom teacher. Includes principles of second language acquisition.

EDCI 317. Language Diversity and Literacy

3 credits. Lecture.

Overview of issues and debates concerning the theory and practice of literacy development for non-native English speaking students in the United States. Includes principles of second language acquisition.

EDCI 318. Methods for Teaching Foreign Languages in the Elementary Schools

3 credits. Lecture.

An introduction to methods of teaching foreign languages in the elementary schools. Includes FLEX, FLES, and immersion approaches.

EDCI 319. Second Language Acquisition in the Elementary School-Age Student

3 credits. Lecture.

An introduction to current research related to second language acquisition in elementary school-age children, with emphasis on implications for foreign language instruction.

EDCI 322. Language Ideology and Education

3 credits. Lecture.

Interrelationship among language, ideology, education and society, including examination of issues of social classes, ethnicity, gender, social context, power, and politics. Also covered are literacy, language prescriptivism and standardization, language policy and discourse in critical perspective. Principles of second language acquisition.

EDCI 325. Introduction to Curriculum

3 credits. Lecture.

Philosophy, theory, and practice employed in curriculum development and change.

EDCI 326. Curriculum Laboratory

1-6 credits. Practicum.

Open to teachers and administrators seeking practical solutions to curriculum problems in elementary and secondary schools. Reorganization of courses, reorientation of the program of studies, articulation of administrative units, and development of new materials are considered in relation to the local situation. Students make individual studies of their specific problems, and group studies of related problems.

EDCI 327. Middle School Curriculum

3 credits. Lecture.

History, philosophy, and goals for middle school curriculum development, including intermediate and junior high schools.

EDCI 328. Secondary School Curriculum

3 credits. Lecture.

History, philosophy, and goals for secondary school curriculum development. Functions, recent developments, and varying approaches.

EDCI 329. Curriculum Development Processes

3 credits. Lecture.

A study of the processes, strategies, and techniques used to bring about planned curriculum development in any educational setting.

EDCI 330. Curriculum Theory and Design

3 credits. Lecture.

Elements and formation of theory and application in the curriculum field.

EDCI 331. Teaching the Elementary School Child

3 credits. Lecture.

Study of the development of the elementary school child, the relationship between theory and practice, balancing traditional expectations with current concerns, and the selection and implementation of successful learning experiences in both school and non-school settings.

EDCI 334. Teacher Effectiveness Strategies

3 credits. Lecture.

Strategies to increase the effectiveness of the classroom teacher, including improving the teacher-student relationship, developing self-awareness and self-evaluation, the relationship between theory and practice, effective formal/informal instructional and evaluation techniques, using today's technology, and improving communication with administrators, parents, and the public.

EDCI 335. Managing and Motivating Students in the Classroom

3 credits. Lecture.

Classroom management from the perspective of motivation theory. Whole group, as well as individualized, interventions for increasing students' task-attentiveness and academic interest.

EDCI 336. History of Education in the United States

3 credits. Lecture.

Development of educational ideas and practices in the United States from the colonial period to the present.

EDCI 339. History of Educational Thought

3 credits. Lecture.

Leading educational ideas and how these ideas influence theory and professional practice. The contributions of key individuals in the ancient, medieval and modern worlds are the basis for course organization.

EDCI 341. Evaluation in Vocational and Technical Education

3 credits. Lecture.

Theories of evaluation; survey of practices and role of evaluation in educational programs; development of instruments and procedures for appraising educational programs and individual achievement.

EDCI 342. Occupational Experience Programs

3 credits. Lecture.

Theory of occupational adjustment; design of experience programs; community cooperation; labor legislation, integration with school programs; and role of coordinator.

EDCI 343. Introductory Reading Clinic

3 credits. Practicum.

Clinical practice in instruction of persons with corrective reading disabilities.

EDCI 344. Career Education: Theory and Practice

3 credits. Lecture.

The need for and rationale of career education. Strategies and processes for implementing career education concepts and practices in schools and other educational settings.

EDCI 345. Principles and Philosophy of Vocational and Technical Education

3 credits. Lecture.

Descriptive and normative principles of vocational and technical education with attention to their special, economic, psychological and political bases as a philosophical rationale.

EDCI 346. Business Office Automation

1-3 credits. Lecture.

Business office automation. Word processing and related practices. Teaching techniques.

EDCI 347. Program Planning and Curriculum Development in Vocational and Technical Education

3 credits. Lecture.

Analysis of vocational/technical program planning and curriculum development theory, with emphasis on principles and current issues influencing program decisions.

EDCI 348. Experimentation in Music Education

3 credits. Lecture.

Application of experimental techniques to a problem of learning or pedagogy in music.

EDCI 349. Administrative Applications in Vocational Education

1 credit. Lecture.

The application of administrative theories to programs of vocational education.

EDCI 351 The Teaching and Learning of Mathematics in the Secondary School

3 credits. Lecture.

An examination of current approaches to the teaching and learning of mathematics in the secondary school. Emphasis will be placed on issues surrounding content knowledge, curriculum, pedagogy, epistemology, assessment, and technology with respect to recent national initiatives and instructional techniques impacting on the secondary school mathematics curriculum.

EDCI 352. Curricula in Mathematics Education

3 credits. Lecture.

Exploration of significant curricula in mathematics education for teachers and supervisors of mathematics. Emphasis is placed on research and development related to content and techniques.

EDCI 353. Instructional Strategies in Vocational and Adult and Human Resources Education

3 credits. Lecture.

Innovative approaches to the improvement of learning; instructional techniques, materials and media.

EDCI 354. Teaching Science in the Middle and Secondary School

3 credits. Lecture.

Materials and advanced methods in the teaching of science in grades 7-12.

EDCI 355. Research and Trends in Vocational and Technical Education

3 credits. Lecture.

The identification of issues and trends including analysis of selected studies in vocational and technical education.

EDCI 356. Comparative and International Education

3 credits. Lecture.

Education and educational systems in comparative and international perspective, with emphasis on the interaction of educational institutions with other social, cultural and political institutions in society.

EDCI 357. Multicultural Education

3 credits. Lecture.

Interrelationships between education and various sociocultural aspects of cultural diversity and cultural pluralism, including language acquisition and diversity.

EDCI 359. Philosophical Analysis in Education

3 credits. Lecture.

Introduction to philosophical analysis of significant educational concepts.

EDCI 360. Latinos and U.S. Education

3 credits. Lecture.

Conditions of schooling Latinos in the U.S. educational system via an historical and economic context, including principles of second language acquisition. Policy issues and theoretical discussions of underachievement. Relationship between dominant and subordinate cultures and their effect on classroom discourses.

EDCI 362. The Teaching of Reading

3 credits. Lecture.

An overview of process and program; theoretical models of the reading, guidelines for a total school reading program, definition of terminology and principles of instruction. Analysis of available material made when appropriate. Intended as a background

course for teachers with no previous course work or experience in teaching reading.

EDCI 363. The Teaching and Learning of Mathematics in the Elementary School

3 credits. Lecture.

This course will investigate the teaching and learning of mathematics in the elementary school. Emphasis will be placed on issues surrounding content knowledge, curriculum, pedagogy, epistemology, assessment, and technology with respect to national initiatives and instructional techniques impacting elementary school mathematics.

EDCI 364. Teaching Elementary and Middle School Social Studies

3 credits. Lecture.

A study of curriculum alternatives, techniques of individual and small-group instruction, evaluation and the development of teaching materials.

EDCI 365. Qualitative Methods of Educational Research

3 credits. Lecture.

Purposes and nature of qualitative research, including selected techniques for conducting various types of qualitative and naturalistic research in educational settings.

EDCI 366. The Teaching and Learning of Mathematics in the Middle School

3 credits. Lecture.

This course will investigate the teaching and learning of mathematics in the middle school. Emphasis will be placed on issues surrounding content knowledge, curriculum, pedagogy, epistemology, assessment, and technology with respect to national initiatives and instructional techniques impacting middle school mathematics.

EDCI 367. Problems in the Teaching of Science

3 credits. Lecture.

Theories of teaching science with emphasis on studies of research related to current problems.

EDCI 369. The Teaching and Learning of Mathematical Problem Solving

3 credits. Lecture.

This course will focus on the processes involved in mathematical thinking and mathematical problem solving. Classroom discussions will address those aspects associated with expert problem solving-domain knowledge, problem solving skills, metacognition (belief and issues of control), and aesthetic judgments. Students will have an opportunity to discuss and solve various types of mathematics problems and develop instructional strategies to teach and assess mathematical problem solving at the middle and secondary school levels.

EDCI 370. Trends in Social Studies Curricula

3 credits. Lecture.

New curricula and developments. For teachers and supervisors of social studies.

EDCI 371. Introduction to Critical Pedagogy

3 credits. Lecture.

Theory and practice in teaching for social justice with an emphasis on issues of class, race, gender and ethnicity.

EDCI 372. Literacy in the Secondary School

3 credits. Lecture.

Process and problems unique to literacy needs in the secondary school. Emphasis on differentiated instruction for students with diverse backgrounds and abilities.

EDCI 373. Addressing Individual Needs and Talents in the Heterogeneous Classroom

3 credits. Seminar.

Instructional and managerial techniques that can be used in the grade level classroom to meet the individual learning needs and talents of all students. Strategies for improving the effectiveness of large group, individual and small group instructional practices. Current and promising practices, as well as relevant research.

EDCI 374. Materials and Methods in the Teaching of Elementary School Science

3 credits. Lecture.

A systematic examination of major science and curriculum program for the elementary school, the selection and design of materials, the development of teaching techniques.

EDCI 375. Media Literacy in an Information Age

3 credits. Lecture.

A study of the growing field of media literacy and the media's influence upon our culture and education. Includes major principles, development of media analysis skills, and integration with the school curriculum.

EDCI 377. Environmental Education

3 credits. Lecture.

An exploration of state, national, and international environmental issues and instructional approaches for developing student awareness, knowledge, and concern for the environment, K-12. Includes classroom and field study.

EDCI 379. Enhancing Classroom Curriculum with Computers and Electronic Media

3 credits. Laboratory.

Effective use of microcomputers and other electronic media to strengthen and enhance classroom instruction in the basic content and skill areas. Emphasis upon specific curriculum applications of technology rather than on its basic operation, mechanics, and programming.

EDCI 380. Writing for Educational Publications

3 credits. Lecture.

Designing, writing, editing, and marketing material for professional publication.

EDCI 381. Practicum

1-6 credits. Practicum. Open primarily to master's and Sixth-Year students.

The implementation and application of theory in the student's area of specialization.

EDCI 383. Introduction to Microcomputers in the Classroom

3 credits. Laboratory.

An introductory skills-centered approach to using microcomputers in the classroom as the object and medium of instruction.

EDCI 384. Seminar

1-3 credits. Seminar. Open primarily to master's and Sixth-Year students.

Analysis of the issues and research in the field of education.

EDCI 386. Teaching Literature to Adolescents

3 credits. Lecture.

A study of competing theories of literary response with an emphasis on implications for the teaching of literature and research on the teaching of literature. Includes some reading of literature for young adults.

EDCI 387. Teaching Composition (7-12)

3 credits. Lecture.

A study of composition theory, with an emphasis on implications for the teaching of writing and research on the teaching of writing.

EDCI 388. TCPG Seminar I: Student Teaching Seminar

3 credits. Seminar. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Analysis of instructional practice in the clinical setting. Relationship of instruction to theory, and implications for instructional evaluation, are emphasized.

EDCI 389. TCPG Seminar II: Teacher as Professional

3 credits. Seminar. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Culminating seminar experience in the TCPG program.

EDCI 390. Social and Multicultural Foundations of Education

3 credits. Lecture. Open to students in the Teaching Certification Program for College Graduates, others with permission.

An introduction to the social and multicultural foundations of contemporary public education in U.S. society. Includes discussion of the nature, organization and purposes of public education in a democratic society, cultural diversity in U.S. schools and society, the role of the classroom teacher, professional ethics, and contemporary issues in U.S. education.

EDCI 391. Learning Theories

3 credits. Lecture. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Introduction to learning theories as they are applied to educational contexts. Topics include instructional objectives, behavioral analysis, social cognitive theory, cognitive psychology, social emotional development, and cognitive development.

EDCI 392. Methods of Instruction and Evaluation

3 credits. Lecture. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Selection and organization of learning experiences, instructional activities and materials, and methods of instruction. Course activities include a combination of lecture and seminar experiences.

EDCI 393. Meeting the Needs of Exceptional Learners

3 credits. Lecture. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Introduction to the characteristics of and educational programming for students with exceptionalities.

EDCI 394. Reading and Literacy in the Content Areas

3 credits. Lecture. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Effective use of reading and writing to help students learning content material. Includes selection of reading materials that are appropriate for individual students with diverse reading abilities, understanding reading diagnosis provided by other professionals, using reading material in ways that facilitate comprehension and learning, and using written assignments to increase understanding and recall.

EDCI 395. Subject Area Methods

3 credits. Lecture. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Selection and organization of learning experiences, instructional activities and materials, and methods of instruction related to the subject area. Course activities include a combination of lecture and seminar experiences, as well as extensive practice teaching.

EDCI 396. TCPG Directed Student Teaching

9 credits. Clinical. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Supervised student teaching in a subject-specific content area.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. **Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. **Special Readings (Master's)**
Non-credit.

GRAD 399. **Thesis Preparation**
Non-credit.

EDCI 400. **Diagnostic and Prescriptive Teaching of Mathematics**
3 credits. Lecture.

An introduction to the basic models and techniques for diagnosis of learning problems in mathematics, utilizing the case study approach.

EDCI 401. **Theoretical Foundations of Teaching English**
3 credits. Lecture.

A sociocognitive perspective on teaching the English language arts, including the historical, sociological, linguistic, and psychological foundations of teaching English.

EDCI 402. **International Perspective on Bilingual Education**
3 credits. Lecture.

Education of speakers of non-dominant languages in comparative and international perspective. Emphasis on issues of educational policy, curricula, teacher education, and evaluation as these relate to the schooling of cultural and linguistic minority populations in different societies.

EDCI 404. **Teaching English as a Second Language**
3 credits. Lecture.

An examination of current research on the acquisition and learning of English as a second language (ESL) in school settings. Critical issues in the application of research on ESL to the bilingual classroom are discussed.

EDCI 405. **Mathematics Learning Clinic**
3 credits. Lecture.

Diagnosis of learning problems of underachievers in mathematics. Planning and applying procedures to help them overcome learning problems.

EDCI 409. **Research in Bilingual Education**
3 credits. Seminar. Prerequisite: EDCI 307.

Analysis of research in bilingual education, methods of research and design and implementation of research studies in bilingual education.

EDCI 410. **Seminar**
1-6 credits. Seminar.

Cooperative study of developments and problems in the student's area of specialization.

EDCI 413. **Assessment of Bilingualism**
3 credits. Seminar.

Principles of assessment for bilingual learners,

including language proficiency and dominance, (bi)literacy development, and academic content knowledge. Current assessment approaches for bilingual learners in different context (e.g., bilingual, ESL classes) and for various purposes (e.g., screening, placement, evaluation). Principles of second language acquisition.

EDCI 414. **Advanced Issues in Bilingual Education**
3 credits. Seminar. Prerequisite: EDCI 307.

Critical contemporary issues and topics related to bilingual education programs in the United States.

EDCI 418. **Research in Science Education**
3 credits. Lecture.

An analysis of current research in science education. Emphasis on evaluation of research as well as the design and implementation of research.

EDCI 421. **Advanced Issues in Second Language Acquisition**
3 credits. Seminar.

Advanced clinically-based seminar focusing on research issues and practice in second language acquisition.

EDCI 422. **Social and Political Context Bilingual Education**
3 credits. Seminar. Prerequisite: EDCI 307.

Advanced seminar addressing the social and political context of contemporary bilingual education programs from a critical perspective.

EDCI 423. **Learning Theories for Mathematics Instruction**
3 credits. Lecture. Prerequisite: EPSY 335.

This course will examine various learning theories and their influence on mathematics instruction. In particular, this course will be concerned with understanding the processes involved in mathematical thinking, the impact of learning theory on mathematics instruction, expert-novice models of mathematical behavior, and ways to enhance mathematics learning in the classroom.

EDCI 424. **Research in Mathematics Education**
3 credits. Lecture.

Analysis of research in mathematics education, methods of research, and design and research studies.

EDCI 425. **Teaching Reading and Writing in Middle and Junior High School**
3 credits. Lecture.

Process and problems unique to reading and writing needs in the middle and junior high school. Emphasis on the development of reading and writing strategies as well as diagnostic teaching methods appropriate to this level.

EDCI 427. **Teaching Reading in the Content Areas**
3 credits. Lecture.

Emphasis upon the adaptation of materials, reading skills and study strategies applicable to the content areas; functional techniques for incorporating reading into subject matter instruction; the role of reading personnel within school settings.

EDCI 428. **Supervision and Administration of the School Music Program**
3 credits. Lecture.

Programming, scheduling, housing as they apply to music in the schools; of community demands, public relations and legal commitments; of types of supervisory and in-service organization.

EDCI 429. **Curriculum Construction in School Music**
3 credits. Lecture.

Developing courses and music activities as resource units.

EDCI 430. **Seminar in International Education**
3 credits. Seminar.

Concentrated study of culture and education in a major geographical region such as Africa, Asia, or Latin America; or cross-cultural studies of educational issues.

EDCI 431. **Sociocultural Theories for Educators**
3 credits. Seminar.

The study of selected sociocultural theories and their application in education

EDCI 432. **Contemporary Educational Theories**
3 credits. Seminar.

Examination of the work of selected major contemporary educational theorists, as well as of significant trends and developments in modern education.

EDCI 435. **Research in Multicultural Education**
3 credits. Lecture.

Advanced study in the processes and findings of research in multicultural education.

EDCI 436. **Educational Ethnography**
3 credits. Seminar.

Methodology and content of socio-cultural case studies dealing with education in a variety of cultural contexts.

EDCI 437. **Advanced Methods of Qualitative Research**
3 credits. Lecture.

Field-based methods of collecting data in qualitative research studies in educational settings, coding and analysis of qualitative data, use of computer programs to analyze data, and methods and procedures for ensuring trustworthiness in qualitative research.

EDCI 454. Teaching Children's Literature in the Elementary School

3 credits. Lecture.

Literature for elementary school children, techniques for developing interest in independent and recreational reading.

EDCI 455. Research in Curriculum

3 credits. Lecture.

An intensive inquiry into the nature and types of research in curriculum development, and evaluation of research designs in curriculum. Primarily for doctoral candidates.

EDCI 460. Practicum

1-6 credits. Practicum.

The implementation and application of theory in the student's area of specialization.

EDCI 462. Teaching Reading and Writing in the Primary Grades

3 credits. Lecture.

Processing unique to beginning reading and writing with emphasis on emerging literacy and promoting literacy development.

EDCI 463. Teaching the Language Arts

3 credits. Lecture.

Teaching integrated language arts including oral and written communication, creative language, and spelling development with an emphasis on current research.

EDCI 465. Problems of School Music

3 credits. Lecture.

Analysis and evaluation of music curricula, procedures for presenting materials, and means of reaching objectives.

EDCI 467. Problems in the Teaching of Mathematics

3 credits. Lecture.

Selection and use of current materials and basic concepts in modern mathematics, solutions to practical problems are considered.

EDCI 470. Classroom Assessment and Correction of Reading Difficulties

3 credits. Lecture.

Types of reading difficulties and the remediation methods appropriate for use by the classroom teacher.

EDCI 471. Clinical Diagnosis and Correction of Reading Difficulties

3 credits. Lecture.

Severe reading disabilities and clinical methods of remediation utilizing the case study approach.

EDCI 476. Advanced Reading/Language Arts Clinic

6 credits. Practicum. Prerequisite: EDCI 471.

For prospective reading/language arts specialists. A laboratory course in planning and implementing remedial reading/language arts instruction for

persons with severe or complex reading and writing disabilities.

EDCI 478. Design, Management, and Supervision of Reading Programs

3 credits. Lecture. Prerequisites: EDCI 471 and EDCI 476

Designing, supervising and evaluating reading programs on a school and system-wide basis.

†GRAD 495. Doctoral Dissertation Research

1-9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

EDUCATIONAL LEADERSHIP

Department Head: Professor Barry G. Sheckley

Professors: Rallis and Schwab

Associate Professors: Johnson, Miller, Saddlemire, Saunders, and Streifer

Assistant Professor: Bell, Cobb, Haas, Kehrhahn, and Wilson

Graduate programs in the Department of Educational Leadership lead to degrees of Master of Arts in the field of Education, Doctor of Education, and Doctor of Philosophy. The Neag School of Education also confers a Sixth-Year Diploma in Professional Education. Students should consult the statement under Education for information pertaining to admission requirements and special facilities available in the Neag School of Education.

The Sixth-Year Diploma Program in Educational Administration – University of Connecticut Administrator Preparation Program (UCAPP) is a special two year administrator certification program preparing people for school leadership positions. For additional information, contact the Department Office. This program is offered at the Hartford, Storrs, and Stamford locations.

The Ph.D. in Adult Learning program prepares professionals in adult learning and development and vocational education. Emphasis may be in leadership, program development, and research as it applies to professional roles in government, education, and industry. Major advisors are: A.A. Bell, M. T. Kehrhahn, and B. G. Sheckley.

The Ed.D. in Educational Leadership is a practitioner-oriented degree program designed to serve the needs of professional school leaders. The Ed.D. is cohort-based and builds upon the Department's Executive Leadership program

The Ph.D. in Educational Administration is organized around knowledge of the broad field of educational administration and emphasis upon one or two management areas based upon the student's career objectives. Students are admitted usually once per year, depending on location. Classes are held in three locations — Hartford, Stamford, and Storrs. Students must have a Sixth-Year Diploma in Professional Education or its equivalent for admission to this program. Major advisors are C. Cobb, P. E. Johnson, S. F. Rallis, R. L. Schwab, and P. A. Streifer.

The Ph.D. in Professional Higher Education Administration usually is taken with an emphasis in general administration or student affairs administration. Other emphases may be provided on the basis of the individual's career objectives. **New students are not being admitted at this time.**

COURSES OF STUDY

EDLR 300. Independent Study in Education

1-3 credits. Independent Study.

Students requesting this course should have a significant background in education and should present to the instructor problems, well-defined and well laid out for investigation, which hold special interest for them and which will be pursued on the plan of advanced study.

EDLR 301. Lectures in Education

1 credit. Lecture.

A course in which staff members and authorities in education and related fields discuss selected problems.

EDLR 302. Assessment, Evaluation, and Research in Student Affairs I

3 credits. Lecture. Open to students enrolled in the Higher Education and Student Affairs master's degree program.

The role of assessment and evaluation to address current student affairs issues in higher education settings. Focus on skill development in problem identification, research question formulation, qualitative design, interview protocol development, and critique and applications of professional literature.

EDLR 303. Assessment, Evaluation, and Research in Student Affairs II

3 credits. Discussion. Prerequisite: EDLR 302.

Open to students enrolled in the Higher Education and Student Affairs master's degree program.

Application of assessment and evaluation research methodologies to address genuine problems in student affairs contexts. Focus on development of theoretical framework, quantitative methods, reporting results, and formulating recommendations for improving practice and policy.

EDLR 304. Adult and Experiential Learning

3 credits. Lecture.

How experience enhances learning. Reflection. Problem solving. Analogical mapping. Deliberate

practice. Development of expertise. Design of staff/professional development.

EDLR 305. Structured Group Interventions in Student Affairs

3 credits. Discussion. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Basic approaches to structured group work in relation to goals, objectives, and group dynamics. Implications of group approaches to the personal and educational development of students and staff in Student Affairs

EDLR 306. Workplace Learning

3 credits. Lecture.

Trends in workplace learning and workforce development. Conceptual models of performance improvement and transfer of training. Focus on individual, work team, and organizational variables related to learning, performance, and transfer of training.

EDLR 307. Resource Management in Student Affairs Administration

3 credits. Discussion. Open only to students enrolled in the Higher Education and Student Affairs master's degree program or consent of the instructor.

Analysis of higher education resource development and management with an emphasis on issues in student affairs administration; including, financial management and analysis, human resource management, and management of information technology resources.

EDLR 308. Leadership Challenges in Higher Education

3 credits. Discussion. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Application of leadership theory to challenges faced by higher education professionals. By developing critical thinking and problem solving skills, students will learn to identify a crisis, provide leadership for crisis management, and utilize methods of managing communication regarding incidents.

EDLR 309. Influences on Adult Learning

3 credits. Lecture.

Interaction of person and environment. Culture. Role of environment. Situational barriers. Motivation. Self-regulation. Personality. Gender. Life transitions. Self-directed learning.

EDLR 310. Development of Programs for Adult and Human Resource Education

3 credits. Lecture.

Program development for adult learners; emphasis on collaborative planning, needs assessment, effective learning strategies, transfer of training, evaluation, principles of good practice.

†**EDLR 311. Workshop in Education**

1-6 credits. Lecture.

Professional personnel to work cooperatively on problems arising out of actual school situations.

EDLR 312. Alcohol and Other Drugs and their Influence on Higher Education

3 credits. Discussion. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Examination of alcohol and other drug issues in higher education, substance abuse, and modalities of intervention for individual students. Includes current research on the complexity of environmental, cultural, and political issues of alcohol and other drug uses on college campuses.

EDLR 313. The Small College Experience

3 credits. Discussion. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Seminar designed to explore and understand a unique form of Higher Education, the American Small College, from various perspectives including president, faculty, students, and student affairs professionals. Primary emphasis on the small, residential, liberal arts college, though other small college settings will be discussed.

EDLR 315. Teacher Leadership and Organizations

3 credits. Lecture.

Teachers' role in providing leadership that extends beyond the walls of the individual classroom and includes collaboration with other adults.

EDLR 317. The College Student

3 credits. Lecture. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Characteristics of today's college students. Student behavior theory. Impact of college on students.

EDLR 318. Seminar in Higher Education

3 credits. Seminar. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Seminar designed to promote the integration of the core curriculum and practitioner experiences of the Master's degree program in Higher Education and Student Affairs and to prepare students for their transitions to a professional position within student affairs upon graduation.

EDLR 319. The Law, Ethics, and Decision-Making in Student Affairs

3 credits. Seminar. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Survey of case law and statutory provisions related to higher education with a focus on student affairs administration. Students will develop an understanding of ethical decision making and its application to relevant student affairs scenarios.

EDLR 321. Introduction to Student Services in Higher Education

3 credits. Open to Students in Professional Higher Education Administration, others with permission.

A survey of student services and personnel

functions in higher education, including an examination of philosophies, goals, objectives and procedures.

EDLR 322. College Student Development: Programs and Services

3 credits. Lecture.

History and philosophy of student personnel work related to contemporary and projected student developmental programs and services. Rights, freedoms and responsibilities of students in relation to the college.

EDLR 323. Administration of Student Affairs in Higher Education

3 credits. Lecture. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

Administration of student affairs and services and applications of student development theory in the college community.

EDLR 325. Issues in Student Affairs Administration

3 credits. Lecture. Open to Students in Professional Higher Education Administration, others with permission.

An examination of issues which affect the new student affairs administrator. Topics vary per semester.

EDLR 324. Higher Education in Film

3 credits. Seminar. Open to students enrolled in the Higher Education and Student Affairs master's degree program, and to others with consent of the instructor.

An exploration of the portrayals of higher education in film, this course will establish a theoretical base for evaluating film and apply the constructs as a means for understanding the college experience. Focus on applications of film as a tool for student learning and programming.

EDLR 326. Curriculum Laboratory

1-3 credits. Lecture.

Open to teachers and administrators seeking practical solutions to curriculum problems in elementary and secondary schools. Reorganization of courses, reorientation of the program of studies, articulation of administrative units, and development of new materials are considered in relation to the local situation. Students make individual studies of their specific problems, and group studies of related problems.

EDLR 337. Professional Development

3 credits. Lecture.

Using research on how adults learn best and principles of human resource development to implement effective, job-imbedded professional development programs. Using professional development to advance organizational goals. Examination of best practices.

EDLR 339. Women, Education and Social Change

3 credits. Seminar.

Examination of the lives of girls and women as students, teachers and academics. Emergence of

teaching as a hierarchically sex-segregated profession. Effect of gender on the status and organization of the profession. Changing women's roles and social ideologies as related to women's educational aspirations, career achievement and leadership.

EDLR 340. Time Management and Personal Organization

3 credits. Lecture.

Principles and practices of time management. Including interdisciplinary studies relating time usage to organizational behavior and personal effectiveness.

EDLR 349. Social Issues in Education

3 credits. Seminar.

Education as a distinctive social institution, emphasizing systemic theoretical perspectives and specific features of educational settings. Special attention to structural factors affecting equality of educational opportunity.

EDLR 350. Budgeting and Resource Management

3 credits. Lecture.

Analysis of educational budget formats: program, capital, function, objective and zero based; budget planning, procedures, forms, documents, codes; political-economic issues in educational budgeting; case studies of program budgeting and site-based budgeting in education; cost reduction and analysis; resource management research.

EDLR 355. Business Administration of Educational Organizations

3 credits. Lecture.

Business management of schools, including budgeting and accounting, office management, salaries and benefits, energy and plant operation, transportation, enrollment forecasts, investments, debt services, program audits, computer services, and fiscal-legal issues.

EDLR 360. Leadership in Adult/Human Resources Education

2 credits. Lecture.

Assessing and understanding individual leadership style. Analyzing individual style within context of selected leadership theories. Relating leadership to organizational ambiguity and paradox.

EDLR 361. Administrative Applications in Adult/Human Resources Education

1 credit. Lecture.

Administrative theory applied to adult and human resource education programs.

EDLR 365. Program Evaluation for School Improvement

3 credits. Lecture.

Program evaluation issues critical to effective school leadership.

EDLR 370. Personnel Evaluation

3 credits. Lecture.

Issues critical to the design and implementation of effective personnel evaluation programs.

EDLR 372. Improving Teacher Evaluation Practice

3 credits. Lecture.

Improving the teacher evaluation skills of principals and department heads through guided practice experiences that allow them to reflect on what they are doing now in light of promising alternatives.

EDLR 375. Educational and Professional Needs of Women

3 credits. Lecture.

Research relevant to women in academic and corporate sectors related to mid-life transitions, sex-specific differentials, dual career and multiple role demands, leadership style, academic and corporate mentoring, and issues facing non-traditional and re-entry students.

EDLR 376. Research Issues in Adult and Vocational Education

3 credits. Seminar. Prerequisite: EPSY 309.

Current research topics in adult and vocational education. Research designs and conceptual rationales for investigative studies.

EDLR 377. Improving Adult Life-Skill Competencies

3 credits. Lecture.

Designed for professionals in the public, private and community sectors working with diversely prepared or culturally unique populations. Emphasis is upon the development of strategies and materials for assisting adults needing to improve literacy skills, functional competencies, and self-concept.

EDLR 378. Contemporary Educational Policy Issues

3 credits. Lecture.

Study of current educational policy issues.

EDLR 379. Community Education Principles and Programs

3 credits. Lecture.

Foundation and development of community education and community school and its programs.

EDLR 380. Educational Planning

3 credits. Lecture.

An overview of the educational planning process and its relationship to the concepts of systems and futurism. Attention will be given to specific planning models and techniques such as needs assessment, PERT, PPBS, MBO, delphi, ZBB, and cost benefit analysis.

EDLR 381. Practicum: Administrative Field Experience

1-6 credits. Practicum. Intended primarily for Sixth-Year students.

This course will provide an opportunity for educators who wish to become administrators of educational organizations to become familiar with the

functions and tasks that certified administrators perform.

EDLR 382. Administration of Educational Organizations

3 credits. Lecture.

Introduction to underlying constructs from the social and behavioral sciences that are basic to the administration of educational organizations. Emphasis will be placed on the nature and characteristics of organizations, interpersonal relationships, decision-making, authority, and leadership.

EDLR 384. Seminar

3 credits. Lecture. Open primarily to Master's and Sixth-Year students.

Analysis of the issues and research in the field of education.

EDLR 388. Planning Educational Facilities

3 credits. Lecture.

Analysis of the process for planning educational facilities both (1) in the planning necessary to develop a long-range plan for educational facilities for a community, and (2) the planning of a specific educational facility to include the development of educational specifications. Emphasis will be placed on projecting student enrollment and planning for facilities. Educational facilities will be visited.

EDLR 389. Effective Departmental Leadership

3 credits. Lecture.

Concepts and practices required of departmental leaders in today's secondary schools.

EDLR 390. Supervision of Educational Organizations

3 credits. Lecture.

Supervision models; teacher selection and induction; teacher evaluation; staff development and organizational change.

EDLR 391. The School Principalship (K-12)

3 credits. Lecture.

Roles and functions of the principal, problem solving, decision-making, school culture, curriculum leadership.

EDLR 393. Leading toward a Multicultural Educational Environment

3 credits. Lecture. Open only to students enrolled in the Higher Education and Student Affairs master's degree program.

American higher education continually struggles with issues of difference, particularly racial, ethnic, gender, ability, religion, sexual orientation, and other cultural differences. Course participants are challenged to reflect on their personal experiences and examine their values, beliefs, and attitudes with regard to multicultural difference as a means to deepen a critical understanding of multicultural issues in higher education.

EDLR 396. Human Resources Administration

3 credits. Lecture.

Study of personnel management in education, including current laws, policies, practices and problems such as recruitment, tenure, promotion, retirement; performance evaluation; motivation; salary, benefits, welfare; staff development; data collection; layoff procedures; grievances; contract administration.

EDLR 397. Legal Aspects of Education

3 credits. Lecture.

Legal status of public schools; legal rights and responsibilities of administrators, parents, students, school board members, and teachers.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

EDLR 405. Issues in Teacher Assessment and Evaluation

3 credits. Lecture.

Critical review and analysis of current issues and emerging methodologies in teacher assessment and evaluation.

EDLR 406 Collective Bargaining in Education

3 credits. Lecture.

This course concerns resolving conflict through self-help, negotiations and arbitration, understanding the Teacher Negotiations Law and methods of dealing with impasses under the law. The course also deals with preparing for negotiations by teacher unions and boards of education.

EDLR 410. Seminar

1-3 credits. Seminar.

Cooperative study of developments and problems in the student's area of specialization.

EDLR 411. Seminar in the History of K-12 Education Reforms, 1890-Present

3 credits. Seminar.

Seminar examining the history of K-12 education reforms from the 1890's to the present day.

EDLR 420. Data Driven Decision Making for Schools

3 credits. Seminar.

The purpose of this course is to provide school leaders with the knowledge necessary to improve instructional programs and make better policy by

relying on data driven decisions and to provide school leaders with a working knowledge of data driven decision-making strategies and tools. The course meets in seminar/lab format with students working on data driven problems, analyses and developing access plans as a result. Students work on several case studies and a major project of personal, professional significance.

EDLR 421. Financial and Human Resources Management in Education I

3 credits. Seminar.

This course directs students to resources needed to provide essential personnel and financial management services in a school system. The course also develops leadership skills necessary to guide the establishment of learning communities within the school and the professional development of a school system's faculty and staff. The course is designed to stimulate participation in an analytic process of examining problems and issues that are grounded in the major conceptual, theoretical, and empirical literature on human resource development/human systems learning and financial and business management. It is especially concerned with people in school organizations and their learning.

EDLR 422. Inquiry and Research in Educational Leadership I: Foundations, Design, and Use

3 credits. Seminar. Open to students in the Ed.D. program in Educational Leadership.

Explicates knowledge production through systematic inquiry in education, including processes, questions, and strategies used to conduct meaningful research in schools. Explores the intersection of theory and practice with emphasis placed on the critical analysis and interpretation of the research literature to the practice of school leadership.

EDLR 423. Inquiry and Research in Educational Leadership I: Implementation, Analysis, and Discovery

3 credits. Seminar. Open to students in the Ed.D. program in Educational Leadership.

A continuation of Understanding, Inquiry and Research in Educational Leadership I. Elaborates the strategies and tools used to conduct meaningful research in schools with emphasis in the actual conduct of research in school settings. Explores the link between research findings and the improvement of practice.

EDLR 424. Leadership for Teaching and Learning: The Role of the Leader in School Improvement

3 credits. Seminar.

Explores leadership skills required to improve instruction and student learning in the school and district. Students develop and apply models to address an instruction/achievement issue in practice.

EDLR 425. Legal Issues in Human Resources Administration for School Leaders

3 credits. Seminar.

Provides legal bases for human resources decision-making through reading of primary source materials (statutes, administrative decisions, judicial decisions) and related materials, and related class discussion. Provides students with practical experience in analysis and advocacy in human resource disputes, through mock negotiations, writing model briefs and conducting mock hearings.

EDLR 427. Resources Management. II

3 credits. Seminar

Students will apply the principles of financial and human resources management to advanced educational leadership positions.

EDLR 428. Policies for Improvement: Mobilizing School and Community

3 credits. Seminar.

Advanced seminar explores perspectives on the policy environment for school improvement. Students identify policy issues, collect data, conduct analyses, and propose actions.

EDLR 429. Legal Issues in Organizational Management

3 credits. Seminar. Open to students in the Ed.D. program in Educational Leadership.

The legal process and understanding of legal issues in education involving students, teachers, and boards of education.

EDLR 430. Organizational Behavior in Educational Administration

3 credits. Lecture.

Advanced course focusing on interdisciplinary research about organizations, leadership behavior, and management processes.

EDLR 431. Organizational Learning

3 credits. Lecture.

Group and collective learning in organizational settings, with an emphasis on adaptive and generative learning processes.

EDLR 432. Psychological Foundations of Education

3 credits. Lecture.

Learning and related psychological theories and their implications for curriculum, teaching methods, and other aspects of educational practices.

EDLR 440. The Student and the Law

3 credits. Lecture.

A study of the legal status of students in today's school with specific emphasis on pupil control, pupil welfare, and pupil attendance.

EDLR 442. Research Methods in Educational Leadership

3 credits. Lecture. Open only to students enrolled in Ph.D. programs offered by the Department of Educational Leadership.

Research methods for investigative studies in adult learning and educational leadership.

EDLR 443. Research Seminar in Adult and Vocational Education

1 credit. Seminar.
Advanced research issues in adult learning.

EDLR 445. Strategic Applications of Adult Learning

3 credits. Seminar. Prerequisites: EDLR 304, EDLR 306, EDLR 309, and EDLR 431. Open to students in the Adult Learning graduate program.
Case study analysis and live case study consultation to develop innovative approaches to adult learning to address the challenges of employee development in corporate, education, public sector, and private sector settings

EDLR 460. Practicum

1-9 credits. Practicum.
The implementation and application of theory in the student's area of specialization.

EDLR 471. Seminar: School District Executive Leadership

3 credits. Seminar.
Seminar and practicum experiences focusing on leadership and policy issues facing school superintendents, central office administrators, and senior state education agency officials.

EDLR 472. Seminar: Leadership and School Organizations

3 credits. Seminar.
Study of organizations and leadership from the perspective of the humanities and the social and behavioral sciences.

EDLR 473. Economics of Education

3 credits. Seminar.
Education as an investment, efficiency, productivity, finance, consumer choice, race, gender, and related issues. All types and levels of education.

EDLR 474. Educational Administration Issues and Research

3 credits. Seminar. Prerequisites: EPSY 309, EPSY 313, and EPSY 441.
Designing educational research studies; current topics in school administration. This course ordinarily meets for ten full days for special research activities.

EDLR 476. Development of Educational Partnerships

3 credits. Seminar.
Forming Educational Partnerships; schools and families; early intervention programs; initiating contacts and fostering links with social service agencies, the juvenile justice system, the medical community, higher education institutions and business and industry; youth training and apprenticeships; restructuring schools to link services.

EDLR 477. Educational Policy and Politics

3 credits. Seminar.
Study of educational policy; the politics of educational administration; and the processes of

policy formulation, implementation and analysis. Specific educational policy areas are examined.

EDLR 478. School District Policy, Politics, and Governance

3 credits. Seminar.
Study of educational policy and school governance; the politics of educational administration; and the processes of district policy formulation, implementation and analysis. Specific school district policy and governance issues are examined.

EDLR 482. Computer Applications in Higher Education Administration

3 credits. Lecture.
Use of the computers in management, evaluation and related college and university operations.

EDLR 483. College Teaching

3 credits. Lecture.
Theory and practice of teaching and learning in colleges and universities. Research on college teaching. Models for assessment and evaluation.

EDLR 486. Economics and Finance of Higher Education

3 credits. Seminar.
External and internal aspects of college and university funding. Models for effective management of funds.

EDLR 488. Area and Regional Planning in Higher Education

3 credits. Lecture.
Planning models for area and regional development. Planning for institutional viability. Topics on planning and higher education demography.

EDLR 489 Teacher Education.

3 credits. Lecture.
An examination of programs and trends in teacher education including curriculum, student recruitment and selection. This course is intended for graduate students preparing for a career in teacher education or for administrative responsibilities in an institution of higher education which prepares teachers.

EDLR 490. History and Philosophy of Higher Education

3 credits. Seminar.
Historical developments and philosophies of higher education. Special attention to higher education in America.

EDLR 494. Higher Education: Issues, Problems, and Trends

3 credits. Lecture.
Current issues, problems, and trends in higher education.

EDLR 495. Organization and Administration of Higher Education

3 credits. Lecture.
Applications of theories of higher education administration. Models of governance and planning. Models for management under various constraints.

EDLR 496. The Community College

3 credits. Lecture.
Sociological and economic changes affecting the community college movement; a survey of the problems in organization, administration, and curriculum.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

EDUCATIONAL PSYCHOLOGY

Department Head: Professor Sally M. Reis
Professors: Behuniak, Brown, Karan, Kehle, Leu, McGuire, Reis, S. Shaw, and Swaminathan
Associate Professors: Bray, Chafouleas, Gavin, Gubbins, Hannafin, O'Connell, Pérusse, Rogers, Scott, Siegle, and Young
Assistant Professors: Alfano, Colbert, Kelleher, Little, Madaus, McCoach, and Schrader

Graduate study in the Department of Educational Psychology (<http://www.epsy.uconn.edu>) leads to the Master of Arts degree in the field of education, the Sixth-Year Diploma in Professional Education conferred by the Neag School of Education, and the Doctor of Philosophy either in the field of study of Educational Psychology, Educational Technology, or Special Education.

Ph.D. in Educational Psychology. The Ph.D. in Educational Psychology may be taken with concentrations in the areas of Cognition/Instruction, Counseling Psychology, Gifted and Talented Education, and School Psychology.

The Ph.D. in the area of Measurement, Evaluation and Assessment (MEA) prepares graduates to become leaders in educational measurement, program evaluation, large-scale and classroom-based assessment practice, and educational statistics and research methods. The program integrates theory and practice to promote the scientific uses of measurement within the field of education and related disciplines. Coursework emphasizes the development of professional competencies within the area of MEA, and focuses on current and emerging topics including instrument development, measurement theory and applications, multilevel modeling, item-response theory, sampling methods, and educational assessment. Faculty support strong student/faculty interactions to promote research excellence and the development of significant contributions to the field. Contact A. O'Connell at Unit 2064 for more information.

The Ph.D. in the area of Counseling Psychology is intended to prepare counseling psychologists who work as professors, supervisors, researchers, and licensed practitioners. The program of study is individualized based on matching faculty/student interests but follows the scientist-practitioner model and includes a balanced emphasis on counseling and psychological theories, research, assessment, and training in applied counseling skills. Mandatory bi-monthly seminars including all doctoral students and all full-time faculty are an integral part of the program and are intended to promote a mutually supportive community of scholars that are actively addressing critical issues in the field. All doctoral students are expected to teach at least two master's-level courses; to make presentations at state, regional, and/or national professional conferences; and to collaborate with faculty and their peers on research studies resulting in publishable manuscripts. Doctoral students are also involved in all aspects of the master's/sixth-year program. This program leads to state certification as a school counselor, and supervised practicum and internship experiences in partnership with urban and suburban schools with students of all age levels are an integral part of the curriculum. Contact O. Karan at Unit 2064 for more information.

The Ph.D. in the area of School Psychology is accredited by both the American Psychological Association and the National Association of School Psychologists. The Master's/Sixth Year program also is accredited by the National Association of School Psychologists. The program adheres to the scientist-practitioner model of graduate education which assumes that the effective practice of school psychology is based on knowledge gained from established methods of scientific inquiry. Emphasis is on the preparation of competent practitioners who are skilled and dedicated researchers who will contribute to the knowledge base in school psychology. In addition, the program is designed to acquaint students with the diversity of theories and practices of school psychology, allowing the student sufficient intellectual freedom to experiment with different delivery systems and various theoretical bases. The atmosphere is intended to foster student-faculty interaction, critical debate, and respect for theoretical diversity of practice, thus creating a more intense and exciting learning experience. The faculty believe that such an environment encourages and reinforces the student's creativity and intellectual risk-taking that are fundamental in the further development of the professional practice of school psychology. Contact T.J. Kehle at Unit 2064 for more information.

The Ph.D. in the area of Cognition/Instruction bridges the gap between psychological theory and research and educational practice. The program emphasizes instructional psychology, learning technology, and research practice, and theoretical perspectives on literacy, technology and instruction. The program includes course work on instructional theories and models from cognitive psychology, learning, instructional technology, cognition, literacy and technology, and research methods. Additionally, research experiences are provided both at the University as well as in more applied settings. Contact the Coordinator, Cognition/Instruction Program at Unit 2064 for additional information.

The Ph.D. in the area of Gifted and Talented Education prepares individuals for leadership roles as gifted education program coordinators, curriculum development specialists, regional or state gifted education agency directors, and for positions as teachers and researchers in higher education settings. The program of study includes course work on strategies and program models for developing student talent, field experiences in school settings, and research investigations that provide worthwhile and creative contributions to the literature. Contact E. J. Gubbins at Unit 3007 for more information.

Ph.D. in Educational Technology. The Ph.D. in Educational Technology emphasizes the study of the use of various media to promote learning and instruction. Special emphasis is placed on research, and development and design of instruction based on the latest instructional technologies. Students completing the program may work in academic or in training settings.

Ph.D. in Special Education. The Ph.D. in general Special Education is an individualized program, containing a number of emphases, including study in teacher education, transition, behavioral disorders, school reform, learning disabilities, literacy, developmental disabilities, and secondary and postsecondary education and services for students with disabilities, among others. Our commitment is to inspire and prepare professionals in special education to create and broaden opportunities for individuals with disabilities. Students are encouraged to develop their interests in educating learners at risk across a wide range of disabilities incorporating a lifespan perspective. The doctoral program is designed to enhance independent thinking and leadership qualities through an individualized program embedded in a thorough knowledge of theory and the existing literature and culminating in active research to guide, direct, and inform the field. Contact J. McGuire at Unit 2064 for more information.

COURSES OF STUDY

EPSY 300. Independent Study in Education

1-3 credits. Independent Study.

Students requesting this course should have a significant background in education and should present to the instructor problems, well-defined and well laid out for investigation, which hold special interest for them and which will be pursued on the plane of advanced study.

EPSY 301. Lectures in Education

1 credit. Lecture.

A course in which staff members and authorities in education and related fields discuss selected problems.

EPSY 302. Group Processes in Counseling

3 credits. Lecture.

Experiential and theoretical introduction to group process and dynamics.

EPSY 303. HIV/AIDS Counseling

3 credits. Lecture.

Provides professional counselors and students of counseling with: (1) a current knowledge base concerning HIV and AIDS; (2) counseling theory related to terminal illness and death and dying; (3) educational, sociological, psychological, and counseling interventions related to the prevention and spread of HIV/AIDS; and (4) counseling intervention skills in working with infected individuals and the friends, partners, and children and family members of individuals who are HIV positive or who have AIDS. The course format consists of lectures, small group discussion/interaction, and in-class demonstrations/role-play.

EPSY 304. Group Dynamics

3 credits. Lecture.

Basic group dynamics from a cultural and gender perspective. Application to various group orientations and settings. Group experience is integral.

EPSY 305. Foundations and Contents of School Counseling

3 credits. Lecture.

Basic philosophical and professional premises of the counseling profession. History of counseling profession, counselor's roles and functions, role of research/theory in counseling, and professional ethics. Individual group, and preventive counseling approaches.

EPSY 306. Human Diversity

3 credits. Lecture.

The needs, functioning, and contributions of individuals defined as exceptional. The spectrum of services across the age span and contemporary issues in service delivery, are surveyed.

EPSY 307. Curriculum Issues in Special Education

3 credits. Lecture.

Program and curriculum planning for students with moderate to mild disabilities with particular attention given to relating individual education plans to school curricula.

EPSY 308. Instruction for Students with Special Needs in the Mainstream

3 credits. Lecture.

Focus on planning for and working with students with special needs in schools.

EPSY 309. Quantitative Methods in Research I

3 credits. Lecture.

Quantitative procedures and analysis of computer output including descriptive and inferential statistics through one-way analysis of variance.

EPSY 311. Workshop in Education

1-3 credits. Lecture.

Professional personnel to work cooperatively on problems arising out of actual school situations.

EPSY 312. Principles of Career Development in Counseling

3 credits. Lecture.

Career development and career psychology. Adolescents and adults.

EPSY 313. Quantitative Methods in Research II

3 credits. Lecture.

Quantitative procedures and analysis of computer output including factorial analysis of variance, analysis of covariance, and multiple regression.

EPSY 314. Pupil Behavior: Studies in Clinical Diagnosis

3 credits. Lecture.

Diagnosis of school problems, report writing for school purposes, and an analysis of needs for referral.

EPSY 315. Professional Orientation of School Counseling

3 credits. Lecture.

Principles and practices of pupil personnel work in educational institutions including all aspects of pupil personnel services; the role of the school counselor as a pupil personnel worker; and as a consultant on teacher-pupil relations.

EPSY 316. Counseling: Theory and Practice

3 credits. Lecture/Laboratory. Prerequisite: EPSY 315.

Contemporary theories and practices of essential helping skills.

EPSY 317. Interactive Learning Environments

3 credits. Lecture. Prerequisites: EPSY 343 and EPSY 335.

This course is a broad overview of the interactive learning environments (ILEs) that are being used in Education. It will introduce students to current research in development and implementation of ILEs.

EPSY 318. Curriculum and Instruction for Students with Severe Disabilities

3 credits. Lecture.

Teacher competencies in curriculum design and implementation for students with severe disabilities.

EPSY 319. Program Design and Implementation for Individuals with Severe Disabilities

3 credits. Lecture.

Management competencies in the design and implementation of programs for individuals with severe disabilities.

EPSY 322. Working with Families Who Have Children with Special Needs

3 credits. Lecture.

Educational issues and strategies in understanding and working with families who have children with disabilities.

EPSY 323. Intervention and Assessment Procedures for Infants and Toddlers Who Are At-Risk

3 credits. Lecture.

This course addresses the development of young children who have disabilities or who are at-risk for disabilities.

EPSY 325. Gender Role Conflict Issues for Helping Professionals

3 credits. Lecture.

Intensive review of gender role socialization in a workshop setting, emphasizing men's and women's gender role conflicts across the life span. Lectures, readings, discussions, self assessments, and media are used to explicate core concepts and themes.

EPSY 326. Curriculum Laboratory

1-6 credits. Practicum.

Reorganization of courses, reorientation of the program of studies, articulation of administrative units, and development of new materials are considered in relation to the local situation. Students make individual studies of their specific problems, and group studies of related problems.

EPSY 327. Clinical Experiences in Integrated Settings

1-6 credits. Practicum.

An intensive supervised clinical experience that provides opportunities for students to plan and deliver integrated programs for students with and without special needs. A cooperative venture between the School of Education and the Professional Development Centers (public schools).

EPSY 328. Community Integration of People with Disabilities

3 credits. Lecture.

Trends in the integration of children and adults with disabilities into their communities. An overview of services to persons with disabilities by public and private agencies.

EPSY 329. Transition Planning for Students with Disabilities

3 credits. Lecture.

An examination of relevant legislation and recommended practices related to person-centered transition planning for students with disabilities in post-school and adult life, including postsecondary education, employment, community participation, and independent living.

EPSY 330. Issues in Postsecondary Disability Services

3 credits. Lecture.

An examination of issues relating to the assurance of equal educational access for students with disabilities in postsecondary settings.

EPSY 331. Developmental Foundations of Exceptionality

3 credits. Lecture.

An exploration of the link between normative theory and research in child development with assessment, understanding, and intervention for children and youth with exceptionalities.

EPSY 333. Instructional Strategies and Adaptations for Students with Special Learning Needs

3 credits. Lecture.

Principles and practices for the provision of effective instruction for students with special learning needs.

EPSY 334. Individual Differences in Learners

3 credits. Lecture.

Foundations for individual differences among elementary and secondary school pupils.

EPSY 335. Learning: Its Implication for Education

3 credits. Lecture.

Nature and types of learning, transfer of training, motivation, nature of instructional outcomes, with particular attention to individual differences among elementary and secondary school pupils.

EPSY 336. Individual Pupil Assessment

3 credits. Lecture.

Diagnosis and prescription for children with special learning and behavioral disabilities, including administration, scoring and interpretation of pupil assessment instruments.

EPSY 337. Preventing Drug and Alcohol Abuse in the Schools

1 credit. Seminar.

Identification and treatment of at-risk students for drug and alcohol abuse in the schools.

EPSY 338. Intellectual Assessment

3 credits. Lecture. Prerequisite: EPSY 342, which may be taken concurrently, and enrollment in the School Psychology program.

Administration of the standard instruments of intellectual assessment and synthesis of the test information into an assessment report.

EPSY 339. Assistive Technology for Curriculum Access

3 credits. Lecture.

This course will explore the range of assistive technology devices and software for curriculum access from the preschool through secondary environments.

EPSY 341. Principles and Methods in Educational Research

3 credits. Lecture.

Methods of research in education designed for Master's level students.

EPSY 342. Educational Tests and Measurements

3 credits. Lecture.

The development of measurement and evaluation techniques.

EPSY 343. Introduction to Educational Technology

3 credits. Lecture.

Instructional applications of productivity software and educational technology.

EPSY 344. Construct of Evaluation Instruments

3 credits. Lecture.

The theory and construction of assessment instruments in the affective domain.

EPSY 345. Computer Methods in Educational Research

2 credits. Laboratory. Prerequisite: EPSY 309.

Introduction to the UConn mainframe and microcomputers, data preparation and verification, Job Control Language, XEdit procedures, and SPSS-X.

EPSY 346. Multivariate Analysis in Education

3 credits. Lecture.

An extension of EPSY 313. Practical emphasis on multiple regression, canonical correlation, multivariate analysis of variance and covariance, discriminant function analysis, and factor analysis.

EPSY 347. Methods of Inquiry

3 credits. Lecture.

Fundamentals of qualitative and quantitative research in education.

EPSY 348. Suicide Prevention in the Schools

1 credit. Seminar.

Covers the incidence, extent, and treatment strategies for the prevention of suicide among young people in the schools.

EPSY 349. Procedures for the Education of Individuals with Disordered Behavior

3 credits. Lecture.

Approaches for adapting programs to the behavioral, social and emotional needs of exceptional learners.

EPSY 350. Considerations in the Provision of Assistive Technology

3 credits. Lecture.

Emphasis will be on the consideration of assistive technology in the educational environment and will encompass the scope of activities involved in considering whether assistive technology is needed for a student to receive a free and appropriate education. This course is a required prerequisite for all other course work in the assistive technology emphasis.

EPSY 351. Assistive Technology for Access

3 credits. Lecture. Prerequisite: EPSY 350.

This course will provide an introduction to alternate access to the computer as a tool for the performance of educational tasks. Included will be an exploration of alternate and adaptive pointing and keyboard devices as well as software to enhance accessibility and productivity for persons with motor impairment, sensory challenges, and cognitive difficulties. Emphasis in the course will be on

assistive technology solutions and applications for persons with significant disabilities in the educational environment.

EPSY 352. Assist Technology across the Lifespan

3 credits. Lecture.

This course will focus on a holistic approach to the application of assistive technology across environments and across the lifespan. Included will be a description of universal design and environmental adaptations to increase access to community, vocational, educational, and recreational pursuits. Legal mandates of the ADA regarding physical and programmatic access will be presented. Assistive Technology solutions for environmental control, recreational pursuits and personal management will be overviewed. This is intended to be a final course for the sequence and will incorporate a summative case review.

EPSY 353. Assistive Technology for the Struggling Learner

3 credits. Lecture. Prerequisite: EPSY 350.

This course will explore the use of assistive technology tools across a continuum of low to mid to high tech aid in the efficiency, organization, and productivity of the struggling learner.

EPSY 354. Learning with Technology

3 credits. Lecture.

Uses a problem-based design format to integrate learning theory and principles with educational technology to develop an integrated lesson plan in a content area. Students select meaningful authentic problems to integrate.

EPSY 355. Professional Seminar in Cognition and Instruction

1 credit. Seminar.

A professional seminar designed to present topics, paradigms, models, and theories in the various fields of educational psychology. The current research programs of the graduate faculty in Cognition and Instruction are presented for discussion in a seminar format.

EPSY 356 Instructional Design

3 credits. Lecture.

Overview of the field of instructional design: instructional theories, prescriptive models, instructional strategies, issues and trends as they relate to the comprehensive development of instructional systems.

EPSY 357. Community Living and Employment Options for People With Disabilities

3 credits. Lecture.

The contemporary approaches by which employment and community living options are matched with the choices and preferences of individuals with disabilities.

EPSY 358. Applied Behavior Analysis

3 credits. Lecture.

Introduction to theories and application of behavioral techniques.

EPSY 359. Theories of Learning, Cognition and Instruction

3 credits. Lecture.

Behavioral and cognitive psychology as it applies to instruction.

EPSY 360. Introduction to Gifted Education and Talent Development

3 credits. Lecture.

Issues encountered in developing giftedness and talents in students: the nature of exceptional abilities, the history of special provisions, major scientific studies dealing with superior abilities, and contemporary educational systems and models.

EPSY 361. Responding to Violence in the Schools

1 credit. Seminar.

Addresses how incidences of violence in the schools can be prevented, contained, and kept at a minimum with prevention programs, and immediate interventions to contain incidents of violence.

EPSY 363 Language and Literacy for Students with Cognitive Disabilities

3 credits. Lecture.

EPSY 365. Creativity

3 credits. Lecture.

The identification of creative thinking and problem solving and the development and implications of creativity training materials and teaching strategies.

EPSY 366. Improving Students' Thinking Skills

3 credits. Lecture.

Designed for teachers and administrators who wish to acquire more information about current research, trends and practices within the field of thinking skills instruction. An overview of the field, with special emphasis on research-based practices, major programs, and models for the improvement of thinking skills.

EPSY 367. Coordination and Articulation of Gifted Education Programs

3 credits. Lecture.

Coordination and articulation of enrichment programs between and among schools. Planning and developing both academic and art programs, budget preparation, staff selection and evaluation, staff development, scheduling and community relations.

EPSY 368. Social and Emotional Components of Giftedness and Talent Development

3 credits. Lecture.

Review of current research on affective growth and potential adjustment problems of gifted and talented youth. Vocational concerns, self-concept, self-esteem, and the teacher's role in preventing or remediating affective problems related to giftedness.

EPSY 369. Policy, Law, and Ethics in Special Education

3 credits. Lecture.

The impact of policy and law on the professional role of special educators.

EPSY 370. Developing Schoolwide Enrichment Programs

3 credits. Lecture.

An overview of the theory and research behind and components within the Schoolwide Enrichment Model. Practical techniques for implementing the model in classrooms and school districts.

EPSY 371. School-Based Systems Interventions

3 credits. Lecture.

Examination of current professional issues, theoretical models, and research related to the design interventions.

EPSY 373. Strategies for Differentiating the Grade Level Curriculum

3 credits. Lecture.

Instructional and managerial techniques for use within or between classrooms to address learning differences among students. Strategies for improving academic achievement and success of diverse learners. Current and promising practices, as well as relevant research.

EPSY 374. Software Design and Evaluation

3 credits. Lecture.

This course provides students with the knowledge and experience in design and evaluation of educational software.

EPSY 375. Web-Based Learning

3 credits. Lecture. Prerequisites: EPSY 317, EPSY 335, EPSY 343, and EPSY 356.

Design, development, delivery and evaluation of web-based instruction.

EPSY 381. Practicum

1-6 credits. Practicum. Open to master's and Sixth-Year students.

The implementation and application of theory in the student's area of specialization.

EPSY 383. Grant Writing

3 credits. Lecture.

The grant procurement process is covered from identifying funding sources through initial grant management with a focus on actually writing a grant proposal.

EPSY 384. Seminar

3 credits. Seminar. Open to master's and Sixth-Year students.

Analysis of the issues and research in the field of education.

EPSY 387. Administration and Supervision of Special Education

3 credits. Lecture.

EPSY 388. Pupil Personnel Services

3 credits. Lecture.

The course addresses all areas of pupil personnel services other than special education. Emphasis is on administration of pupil personnel programs in public schools.

EPSY 392. Rehabilitation Psychology

3 credits. Lecture. Prerequisite: EPSY 328.

The field of rehabilitation is going through a paradigm shift which is having profound influences on the roles and functions of rehabilitation psychologists and other professionals. Examines the key factors responsible for these changes and the implications these changes have for rehabilitation professionals.

EPSY 394. Multi-Cultural Parent-Professional Alliances

3 credits. Lecture.

Alliance-building processes between helping professionals and parents. Multi-cultural relationship development.

EPSY 395. Ethics in Educational and Professional Psychology

3 credits. Lecture.

Explores the nature of professional virtue in psychology and related educational and human service disciplines.

EPSY 396. Directed Student Teaching for Students in the Teacher Certification Program for College Graduates

9 credits. Clinical. Open to students in the Teaching Certification Program for College Graduates, others with permission.

Supervised student teaching in special education.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

EPSY 401. Advanced Group Processes

3 credits. Lecture.

Participant/observers in a basic group course. Processing and analyzing of group processes.

EPSY 403. Group Facilitation

3 credits. Lecture.

Lead groups, receive feedback and study group dynamics and leadership.

EPSY 405. Program Evaluation

3 credits. Lecture. Prerequisites: EPSY 309, EPSY 313, and EPSY 441.

An overview of quantitative and qualitative procedures used in the evaluation of educational programs. Current trends and practical applications are stressed.

EPSY 406. Sampling Designs and Survey Research Methods in Education

3 credits. Lecture. Prerequisite: EPSY 313.

Probability and non-probability sampling, single- and multi-stage sampling, sampling errors, design effects, unit-of-analysis concerns, confidentiality/anonymity issues, questionnaire design, interview procedures, item development, question format, ethics.

EPSY 410. Doctoral Seminar

1-3 credits. Seminar.

Cooperative study of developments and problems in the student's area of study.

EPSY 412. Advanced Theories and Techniques in Career Development

3 credits. Lecture.

An extensive and intensive survey of the major career development theories with an emphasis on the applicability of the theories in psychological career counseling. Models and methods of career counseling will be reviewed and integrated from the different theoretical perspectives.

EPSY 415. Appraisal Procedures in Counseling

3 credits. Laboratory. Prerequisites: EPSY 312 and EPSY 342.

Use of instruments for estimating abilities, achievements, interest and personality; interpretation of appraisal procedures in counseling.

EPSY 416. Counseling: Advanced Practice

3 credits. Lecture. Prerequisite: EPSY 316.

Continuing the work begun in EPSY 316; to strengthen and extend helping skills.

EPSY 417. Social Cognition

3 credits. Lecture.

Theory, research, and applications of social cognitive theory.

EPSY 418. Situated Cognition

3 credits. Seminar. Prerequisites: EPSY 356, EPSY 335, and EPSY 359.

Theory, research and applications of situated cognition and situated learning.

EPSY 426. Counseling Interventions: Assessment, Design, and Implementation

3 credits. Lecture. Prerequisites: EPSY 341 and EPSY 447.

The design, implementation and evaluation of counseling intervention with a focus on the crises and issues faced by clients who seek counseling.

EPSY 429. Cross-Cultural Counseling

3 credits. Lecture. Prerequisites: EPSY 316 and EPSY 416.

Theories, skills and practices of counseling with culturally different persons in mental health settings.

EPSY 430. Consultation Theories and Practices

3 credits. Lecture.

Theories and practices of professional consultation with an emphasis on actual interventions in schools, corporations and social service agencies.

EPSY 434. Advanced Educational Technology

3 credits. Lecture.

Readings, research and development of instructional materials using applications of advanced educational technology.

EPSY 436. Measurement Theory and Application

3 credits. Lecture.

An advanced course in measurement and evaluation. The course emphasizes current issues in measurement and the scientific procedures reflected in the literature that suggest alternative solutions to these issues.

EPSY 437. Item Response Theory

3 credits. Lecture.

An advanced course in educational and psychological testing theory. This course emphasizes the principles and processes of the most sophisticated approach to educational test construction and scoring available today.

EPSY 438. Instructional Psychology
3 credits. Seminar. Prerequisites: EPSY 342, EPSY 356, and EPSY 359.

An advanced course relating theories of cognition, behaviorism and instructional design. Topics include thinking, problem solving, the development of expertise and both automatic and controlled processing.

EPSY 439. Measurement in Cognitive Psychology

3 credits. Lecture.

Review of theory and research related to the measurement of variables in cognitive psychology such as domain knowledge, strategy knowledge, and motivation. Specific emphasis will be placed on the use of statistical theories and tools employed to study the reliability and validity of test scores. These tools include: generalizability theory, factor analysis, item response theory, and multidimensional scaling.

EPSY 440. Logistic and Hierarchical Linear Models

3 credits. Lecture.

In-depth coverage of specialized topics in educational statistics including logistic regression and hierarchical linear models.

EPSY 441. Methods and Techniques of Educational Research

3 credits. Lecture. Prerequisites: EPSY 341 (or master's level educational research class), and EPSY

309, and EPSY 313, OR consent of the instructor.

A survey of the principal methods employed in the investigation of educational problems, including problem formulation, stating hypotheses, sampling, instrument design, types of research methods and design principles.

EPSY 447. Field Work in Counseling and Personnel

3 credits. Practicum.

Supervised experience in counseling and related practices in schools and agencies with a concurrent supervisory seminar.

EPSY 448. School Psychology and Counseling Internship

3 credits. Practicum.

Post practicum experience in school psychology or counseling psychology under the supervision of a fully trained professional for the duration of one school year.

EPSY 459. Curricular Options for High Ability Learners

3 credits. Lecture.

Curriculum theory and techniques with special attention to the development of instructional materials.

EPSY 460. Doctoral Practicum

1-6 credits. Practicum.

The implementation and application of theory in the student's area of specialization.

EPSY 468. Doctoral Internship in Counseling and School Psychology

3 credits. Practicum.

Intensive, one year supervised experience in a counseling or school psychology setting totaling 1,500 or 2,000 hours of service.

EPSY 482. Design and Production of Multimedia Presentations

3 credits. Lecture.

Students will prepare presentations using slides, motion pictures, audiotapes and overhead transparencies; and will explore application of other technological developments to multimedia uses.

EPSY 484. Video Design for Learning

3 credits. Lecture.

Advanced principles of the video medium and its application to the learning process, instructional message design and the implementation of existing and emerging video delivery systems.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

KINESIOLOGY

Department Head: Professor Carl M. Maresh

Professors: Armstrong, Kraemer, and Yiannakis

Associate Professors: Casa and VanHeest

Assistant Professors: Bruening, Burton, and Volek

Clinical Assistant Professor: Graham

The Department of Kinesiology offers graduate programs leading to the degrees of Master of Arts in the field of Education and Doctor of Philosophy in the field of Kinesiology. Students should consult the statement under Education for information pertaining to admissions requirements.

The majority of graduate courses given during the academic year are taught afternoons or in the evenings. Full-time master's degree students must attend at least one summer session to accumulate in one calendar year the minimum of 30 credits required for graduation. Master's degree programs emphasizing exercise science are two-year programs and require a master's thesis.

COURSES OF STUDY

EKIN 300. Independent Study

1-6 credits. Independent Study.

EKIN 301. Theory and Methods of Research

3 credits. Lecture.

Theoretical and empirical foundations of quantitative and qualitative research in sport and leisure science including research design, implementation and statistical analysis.

EKIN 308. Management of Sport Services

3 credits. Lecture.

Management processes and practices involved in operating sport organizations.

EKIN 311. Exertional Heat Stroke

3 credits. Seminar.

An in-depth examination of pathophysiology, prevention, recognition, treatment, and return to play considerations for exertional heat stroke, with a secondary emphasis on all exertional heat illnesses.

EKIN 312. Sport Marketing

3 credits. Lecture.

This course examines the application of marketing principles to collegiate and professional sport, event promotions, and commercial and public organizations.

EKIN 314. Analysis of Professional Sport

3 credits. Discussion.

This course will acknowledge the complexity and scope of the sport industry while specifically addressing professional sport.

EKIN 315. Analysis of Amateur Sport
3 credits. Discussion.

This course will acknowledge the complexity and scope of the sport industry while addressing all segments of amateur sport including, intercollegiate athletics, youth sport, and community sport and recreation.

EKIN 316. Current Research and Issues in Athletic Training
3 credits. Seminar.

Acquaint students of athletic training with the recent research in the field, the components of conducting and publishing research in this field, and preparation for research endeavors at the graduate level. Also, we will cover relevant issues/policies/laws related to athletic training that are currently being regionally or nationally debated, discussed, and/or implemented.

EKIN 350. Research Techniques and Experimental Designs in Exercise Science
3 credits. Lecture.

This course will give the student an understanding of research designs and methods in exercise science when examining different research topics related to human, animal and cell culture models.

EKIN 360. Exercise Metabolism
3 credits. Lecture.

Influence of aerobic and anaerobic exercise on energy metabolism and the utilization of nutrients, as viewed from the perspectives of physiology, a variety of sports, heredity, maturation, and disease.

EKIN 362. Thermal Physiology
3 credits. Lecture.

Detrimental effects which exercise in the heat and dehydration have on: cardiovascular function, strength, endurance, fluid-electrolyte balance, disposition, and heat tolerance.

EKIN 364. Scientific Presentations
3 credits. Lecture.

Skills required for: writing scientific articles/abstracts, reviewing manuscripts, and presenting results at scientific meetings.

EKIN 366. Scientific Instrumentation
3 credits. Lecture.

Scientific instruments in the Human Performance Laboratory. Development of skills necessary to perform analyses on these instruments.

EKIN 367. Laboratory Analytical Techniques
3 credits. Laboratory. Open only to graduate students in Kinesiology.

Analytical methods utilized in exercise science laboratories.

EKIN 368. Physiology of Stressful Environments
3 credits. Lecture.

Exercising and resting responses/adaptations/illnesses to high altitude, cold, hyperbaric, polluted, and zero gravity environments. The acute and chronic effects of electromagnetic radiation fields and sleep deprivation will also be studied.

EKIN 377. Legal Aspects of Sport
3 credits. Lecture.

Tort law principles specific to sport, fitness and recreational activities.

EKIN 378. Biomechanical Analysis of Sport Performance
3 credits. Lecture.

Quantitative research in sport motion, two-dimensional and three-dimensional analysis, kinematic and kinetic analysis, instrumentation (videography, computer systems).

EKIN 381. Sport Sociology
3 credits. Lecture.

The structure and function of sport as an institution, including issues and controversies involving gender, race, and intercollegiate, professional, and children's sports.

EKIN 382. Psychological Aspects of Sport
3 credits. Lecture.

The behavioral variables that affect an individual's performance in sport.

EKIN 384. Seminar
3 credits. Seminar.

Issues and research in the biological and social science fields.

EKIN 387. Sport and Socialization
3 credits. Lecture. Prerequisite: EKIN 381.

Processes and theoretical bases for individual involvement in sport, learning through sport, and disengagement from sport.

EKIN 388. Sport Facility and Event Management
3 credits. Lecture.

This course will examine all aspects of the management of sport facilities and events, including development, planning, staffing, operations, and evaluation.

EKIN 390. Internship
6 credits. Practicum.

The application and implementation in a work situation of theories and practices related to the student's area of specialization.

EKIN 392. Muscle Physiology in Exercise and Sport
3 credits. Lecture.

Structural, morphological and biochemical changes in muscle with exercise and training.

EKIN 393. Physiology of Human Performance
3 credits. Lecture.

Selected physiological principles related to exercise stress, including related laboratory experience.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

EKIN 404. Organizational Theory in Sport
3 credits. Discussion. Instructor consent required. Open only to doctoral students.

This course will expose students to some critical areas of management and the theories associated with these areas.

EKIN 405. Organizational Behavior in Sport
3 credits. Discussion. Instructor consent required. Open only to doctoral students.

The course is a discourse on theories related to behavior of individuals and groups in sport and exercise organizations.

EKIN 406. Current Research in Sport Management
3 credits. Discussion. Instructor consent required. Open only to doctoral students.

This course is focused on research in the field of sport management. Each week one or more researchers will present their completed work, studies in progress, or proposed research.

EKIN 410. Seminar
1-6 credits. Seminar.

Cooperative study of developments and problems in the student's area of specialization.

EKIN 416. Advanced Sport Sociology
3 credits. Lecture.

Advanced topics in sport sociology and sport psychology with special emphasis on those models and theoretical perspectives that are associated with generating significant research in the area.

EKIN 460. Practicum
1-6 credits. Practicum.

The implementation and application of theory in the student's area of specialization. Primarily for doctoral students.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

ELECTRICAL ENGINEERING

Department Head: Professor Robert Magnusson
Professors: Anwar, Bansal, Bar-Shalom, Enderle, Fox, Jain, Javidi, Luh, Pattipati, Taylor, and Willett
Professor-in-Residence: DeMaria
Research Professor: Boggs
Associate Professors: Ayers, Donkor, and Zhu
Assistant Professors: Chandy, Escabi, Fei, B. Wang, L. Wang, and Zhou

Several areas of study and research leading to M.S. and Ph.D. degrees are offered: Electronics and Photonics, Biomedical Engineering, and Information, Communication, and Decision Systems. Students may also choose to pursue an M.S. degree in Electrical Engineering without a concentration.

The significant involvement of the Department of Electrical and Computer Engineering in interdisciplinary programs is indicative of the broad scope of its basic interests and activities. Admission to one of the programs does not require an undergraduate degree in electrical engineering. It is quite common for graduate students with undergraduate degrees in other fields of engineering or in biology, mathematics, physics, psychology, or statistics to hold fellowships, assistantships, and part-time instructorships in the Department of Electrical and Computer Engineering. This mixing of faculty and graduate students with a variety of backgrounds integrates diverse ideas into departmental research projects.

Research and education in information, communication, and decision systems include people-machine systems, societal and transportation systems, multivariable system theory, digital control systems, digital and optical signal processing, optical computing, image analysis and processing, optoelectronic neural networks computer-aided design, estimation theory, adaptive control, stochastic communication and control, and coding theory. Activities in electronics and photonics include research in diffractive optics, optoelectronics, sensor technology, electro-optics, quantum electronics, semiconductor lasers, semiconductor heterojunctions with application to integrated circuits, electronic materials, antenna design, microwave technology, and high voltage engineering. Separate listings should be consulted for information concerning biomedical engineering as well as for collaborative fields such as computer science and engineering, and materials science.

Special Requirements for the Ph.D. Program. Admitted students must submit evidence of capacity for independent study in the form of a master's thesis or comparable achievement.

For information regarding fellowships, assistantships, and part-time instructorships, the applicant should address the chairperson of the Biomedical Engineering Graduate Admissions Committee, Information, Communication, and Decision Systems Graduate Admissions Committee, or the Electronics and Photonics Graduate Admissions Committee, depending upon the major interest of the applicant. The address in every case is 371 Fairfield

Road, Unit 2157, Room 450, Storrs, Connecticut 06269-2157

Special Facilities. Departmental facilities include the following research laboratories: Biomedical Instrumentation Laboratory, Cyber Laboratory, Electrical Insulation Research Laboratory, Central Laboratory for Imaging Research, Micro/Opto-electronics Research Laboratory, Nanophotonics Laboratory, Optical Signal Processing/Computing Laboratory, Manufacturing Systems Laboratory, and the Photonics Research Laboratory. These laboratories contain a variety of computers and workstations, interface facilities, a clean room with semiconductor growth and characterization facilities, MBE and MOVPE facilities, and other specialized equipment. Fellowships, assistantships, and part-time instructorships are available. For more information, visit <www.engr.uconn.edu/ece/>.

COURSES OF STUDY

Registration restrictions: In addition to the listed prerequisites, approval of the Department head and instructor is required for non-degree students for registration in all courses.

ECE 300. Special Topics in Electrical and Systems Engineering

1-3 credits. Lecture.

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

ECE 301. Introduction to System Theory

3 credits. Lecture. Recommended preparation: ECE 202.

Modeling and analysis of linear systems. Introduction to functions of a complex variable. Linear algebra with emphasis on matrices, linear transformations on a vector space, and matrix formulation of linear differential and difference equations. State variable analysis of linear systems. Transform methods using complex variable theory, and time-domain methods including numerical algorithms.

ECE 302. Linear Multivariable System Design

3 credits. Lecture. Prerequisite: ECE 301.

Observability and controllability. Application of canonic forms in system design. Methods of pole placement. Observer design. Noninteracting multivariable systems.

ECE 307. Dielectric and Magnetic Materials Science

3 credits. Lecture.

The macroscopic and microscopic views of dielectric and magnetic materials. Theories of spontaneous polarization and magnetization. Applications of anisotropic materials. Non-linear dielectrics at radio and optical frequencies. Superconductivity and superconducting magnets.

†ECE 311. Seminar

1 credit. Seminar.

Presentation and discussion of advanced electrical engineering problems.

ECE 313. Applied Probability and Stochastic Processes

3 credits. Lecture.

Statistical methods for describing and analyzing random signals and noise. Random variables, conditioning and expectation. Stochastic processes, correlation, and stationarity. Response of linear systems to stochastic inputs. Applications.

ECE 314. Information Theory

3 credits. Lecture. Prerequisite: ECE 313.

Basic concepts: entropy, mutual information, transmission rate and channel capacity. Coding for noiseless and noisy transmission. Universal and robust codes. Information-theoretic aspects of multiple-access communication systems. Source encoding, rate distortion approach.

ECE 316. Digital Signal Processing

3 credits. Lecture.

Discrete-time signals and systems. The z -transform. The Discrete Fourier Transform (DFT). Convolution and sectioned convolution of sequences. IIR and FIR digital filter design and realization. Computation of the DFT: The Fast Fourier Transform (FFT), algorithms. Decimation and interpolation. Parametric and nonparametric spectral estimation. Adaptive filtering. Finite word length effects.

ECE 317. Advanced Signal Processing

3 credits. Lecture. Prerequisites: ECE 313 and ECE 316.

Wiener filter theory. Linear prediction. Adaptive linear filters: LMS and RLS algorithms, variants, lattice structures and extra-fast implementation. Convergence properties. High resolution spectral estimation. Hidden Markov models, Monte-Carlo methods for signal processing. Multiresolution decomposition and wavelets. Blind methods.

ECE 318. Neural Networks for Classification and Optimization

3 credits. Lecture.

This course provides students with an understanding of the mathematical underpinnings of classification techniques as applied to optimization and engineering decision-making, as well as their implementation and testing in software. Particular attention is paid to neural networks and related architectures. The topics include: Statistical Interference and Probability Density Estimation, Single and Multi-layer Perceptions, Radial Basis Functions, Unsupervised Learning, Preprocessing and Feature Extraction, Learning and Generalization, Decision Trees and Instance-based Classifiers, Graphical Models for Machine Learning, Neuro-Dynamic Programming.

ECE 320. Independent Study in Electrical Engineering

1-6 credits. Independent Study.

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

ECE 322. Modern Manufacturing System Engineering

3 credits. Lecture.

Issues and methods in modern manufacturing systems. Integrated product and process development. Design for quality, on-line quality control and improvement, reliability during product development, and design for testability. Computer-aided production management, production planning and scheduling, and optimization-based planning and coordination of design and manufacturing activities. Targeted toward students, professional engineers, and managers who want to have an impact on the state-of-the-art and practice of manufacturing engineering, and to improve manufacturing productivity

ECE 327. Fuzzy and Neural Approaches to Engineering

3 credits. Lecture. Prerequisite: ECE 301.

Fuzzy sets, applications to fuzzy logic and fuzzy control, and concepts and methodologies for fuzzy optimization. Fundamental models of neural networks, learning rules, and basic recurrent networks for optimization. The integration of fuzzy systems with neural networks. Examples from engineering applications.

ECE 329. Computational Methods for Optimization

3 credits. Lecture. Prerequisite: ECE 301.

Computational methods for optimization in static and dynamic problems. Ordinary function minimization, linear programming, gradient methods and conjugate direction search, nonlinear problems with constraints. Extension of search methods to optimization of dynamic systems, dynamic programming.

ECE 330. Optimal Control Systems

3 credits. Lecture. Prerequisite: ECE 301.

Optimization techniques for linear and nonlinear systems. Calculus of variations, dynamic programming, and the Pontryagin maximum principle. Computational methods in optimal control.

ECE 331. Nonlinear System Theory

3 credits. Lecture. Prerequisite: ECE 301.

Stability of time-varying nonlinear systems. Liapunov's direct method. Describing functions. Popov's stability criterion. Adaptive control.

ECE 332. Information, Control, and Games

3 credits. Lecture. Prerequisites: ECE 301 and ECE 313.

Problems of static and dynamic optimization where more than one decision maker is involved, each having own payoff and access to different information. Review of elementary decision and control theory, non-cooperative games, cooperative games, bargaining models, differential games, team decision theory, Nash games, Stackelberg games (leader-follower problems). Introduction to large-scale systems and hierarchical control.

ECE 333. Man-Machine Systems Analysis

3 credits. Lecture. Prerequisites: ECE 301 and ECE 313.

Role of the human as a decision and control element in a feedback loop. Mathematical models of human control characteristics and instrument monitoring behavior. Effects of human limitations upon overall task performance. Parallel discussion of measurement and experimental techniques. Validation of theoretical results by comparisons with existing human response data.

ECE 334. Experimental Investigation of Control Systems

3 credits. Lecture. Prerequisites: ECE313 and ECE331.

A study of experimental techniques and advanced design of control systems.

ECE 335. Advanced Computer Networks and Distributed Processing Systems

3 credits. Lecture. This course and CSE 330 may not both be taken for credit.

Design and evaluation of distributed computer communication and processing systems. Case studies, development of suitable queuing and other models to describe and evaluate design problems such as capacity assignment, concentration and buffering, network topology design, routing, access techniques, and line control procedures.

ECE 336. Stochastic Models for the Analysis of Computer Systems and Communication Networks

3 credits. Lecture. Prerequisite: ECE 313.

Continuous and discrete-time Markov chains and their applications in computer and communication network performance and reliability evaluation. Little's theorem and applications; review of stochastic processes; simple Markovian queues; open, closed, and mixed product-form networks; computational algorithms for closed and mixed product form networks; flow-equivalence and aggregation; M/G/1 queue with vacations and applications to time-division and frequency-division multiplexing; reservations and polling; multi-access communication; reliability and performability models of computer systems.

ECE 337. VLSI Fabrication Principles

3 credits. Lecture.

Semiconductor materials and processing, emphasizing compound semiconductors, optoelectronic materials, shallow devices, and fine-line structures. Semiconductor material properties; phase diagrams; crystal growth and doping; diffusion; epitaxy; ion implantation; oxide, metal, and silicide films; etching and cleaning; and lithographic processes.

ECE 338. Semiconductor Devices and Models

3 credits. Lecture.

Band theory, conduction in semiconductors, carrier statistics, deep levels, impurities with multiple charge states, heavy doping effects, non-uniform doping. Non-

equilibrium processes, carrier scattering mechanisms, the continuity equation, avalanche multiplication, carrier generation, recombination, and lifetime. P-n junctions, non-abrupt junctions, various injection regimes, and device models. Metal semiconductor junctions, current transport mechanisms, and models. BJT, JFET, MESFET, and MOSFET, and device models.

ECE 339. Fundamentals of Opto-Electronic Devices

3 credits. Lecture.

Absorption and emission mechanisms in direct and indirect semiconductors. Semiconductor optoelectronic devices such as light-emitting diodes, injection lasers, photocathodes, solar cells, and integrated optics.

ECE 340. Electronic Materials

3 credits. Lecture. Prerequisite: ECE 245 or MMAT 313.

Physical and electronic properties, and device applications of disordered materials including amorphous semiconductors, liquid crystals, bubble-memory magnetic materials. Applications of amorphous semiconductors including xerography and solar cells.

ECE 341 MOS Device and VLSI Fundamentals

4 credits. Lecture.

Physics of MOS capacitors and transistors, derivation of V-I relation expressing subthreshold, threshold, and saturation region behavior; short-channel effects in scaled-down transistors; scaling laws; VLSI fabrication technologies; design and layout gates and gate arrays; physics, device layout and design of semiconductor memories including static and dynamic RAMs. Laboratory emphasizes introduction to nonvolatile RAMs; computer aids in VLSI design; schematic capture, SPICE simulation, layout of custom IC's, and VHDL.

ECE 342. Electronic Theory of Semiconductors

3 credits. Lecture.

Topics include crystallography, energy bands in crystals, effective mass theorem, virtual energies and miniband formation in finite and infinite superlattice, electronics and holes in electric and magnetic fields, crystal vibrations (phonons), and theory of conduction in semiconductors.

ECE 345. Nanotechnology

3 credits. Lecture.

Nanoelectronic and optoelectronic devices: Quantum confinement in 1D, 2D and 3D (quantum wells, wires, and dots) structures; density of states and carrier density in low-dimensional structures; fabrication methodology for quantum wire transistors and lasers; single-electron transistors/tunneling devices; growth and characterization of nanostructured materials with grain sizes in the range of 10-50 nm. Organic monolayers: Langmuir-Blodgett monolayers, Self-Assembled monolayers, Multi-layer structures, technological applications of organic thin films.

ECE 346. Microwave Techniques

3 credits. Lecture.

A theoretical analysis of microwave components, systems, and measuring techniques. Scattering matrix analysis is applied to microwave devices having two or more ports.

ECE 348. Electromagnetic Wave Propagation

3 credits. Lecture. Prerequisite: ECE 207 or PHYS 306.

Engineering application of Maxwell's field theory to electromagnetic wave propagation in various media. Reflection, refraction, diffraction, dispersion, and attenuation. Propagation in sea water and in the ionosphere.

ECE 349. Antenna Theory and Applications

3 credits. Lecture.

Analysis and synthesis of antenna systems including electric- and magnetic-dipole, cylindrical, helical, reflector, lens, and traveling-wave antennas. Theory of arrays including patterns, self and mutual impedances.

ECE 350. Advanced Optoelectronics

3 credits. Lecture. Prerequisite: ECE 339.

Review of optoelectronic devices and integrated circuit (IC) technologies (analog and digital); logic gates; self-electro-optic devices (SEEDs), microlasers, Fabry-Perot (F-P) etalons and optoelectronic IC (OEICs); modulators: F-P modulators (absorptive and refractive), spatial light modulators (SLMs) and their applications; bistable devices; bistable laser amplifiers, resonant tunneling transistor lasers, and polarization bistability; optical interconnects; architectural issues and optical processors based on S-SEED, optical neural networks, and other devices.

ECE 351. Advanced Semiconductor Devices

3 credits. Lecture.

Fundamental properties of heterostructures, strained-layer superlattices, NIPI structures, multiple quantum well, quantum wire, and quantum dot structures. Operation, modelling of the electrical characteristics, design, and applications of HBJT, HEMT, and resonant tunneling devices. Second-order effects in submicron MOSFETs and MESFETs.

ECE 352. Transport in Semiconductors

3 credits. Lecture. Prerequisite: ECE342 or PHYS 322.

Topics include theory of energy bands in crystals; carrier scattering; the Boltzman equation and its approximations; low field transport; high field effects; transport in heterojunctions; quantum effects; and Monte Carlo simulation.

ECE 353. Fundamentals of Photonics

3 credits. Lecture.

Principles of optics including rays, waves, beams, electromagnetics, polarization and statistics. Basic postulates, simple optical components, graded index and matrix optics, monochromatic waves, interference, polychromatic light, Gaussian beams and

propagation, diffraction, Fourier transforms, holography, dispersion and pulse propagation, polarizing devices and applications. Concepts of coherence and partial coherence as applied to various light sources in optical experiments and systems.

ECE 354. Optical Systems Engineering

3 credits. Lecture.

Design and analysis of paraxial optical systems, including stable and unstable laser resonators, and the propagation of geometric beams, Gaussian beams, and plane waves through complex optical systems. Topics include ray optics; ray matrices; polarization of light; diffraction theory; the connection between geometrical optics and diffraction; and performance analysis.

ECE 355 Optical Waveguides

3 credits. Lecture.

Propagation of electromagnetic waves in dielectric slab and fiber waveguides as described by geometrical ray optics and normal mode analysis. Integrated optic guides, step and graded index fiber guides. Single mode vs. multimode transmission, coupling, and other system considerations.

ECE 356. Optoelectronic Devices

3 credits. Lecture.

Optoelectronic devices as applied to fiber optic communications, optical switching and interconnects. Semiconductor laser devices, including dc, ac smallsignal, ac large signal, and noise with emphasis upon analytical models. Vertical cavity devices and technology. Semiconductor optical amplifiers, waveguide and vertical cavity modulators, photodetectors, optical switches, receivers and transmitters. Techniques for OE integration and the relevance of bipolar and field-effect devices for monolithic integration. Technologies for optoelectronic integration for telecom and datacom optical interconnect. WDM techniques for optical networks.

ECE 357. Advanced Numerical Methods in Scientific Computation

3 credits. Lecture. Prerequisite: ECE 301.

Development, application and implementation of numerically stable, efficient and reliable algorithms for solving matrix equations that arise in modern systems engineering. Computation of matrix exponential, generalized inverse, matrix factorizations, recursive least squares, eigenvalues and eigenvectors, Lyapunov and Riccati equations.

ECE 358. Nonlinear Optical Devices

3 credits. Lecture. Prerequisite: ECE 353.

Wave propagation in nonlinear media, generation of harmonics in optical materials, optical parametric processes, stimulated emission and scattering processes. Device modeling and application of fiber and semiconductor lasers, optical amplifiers and modulators. Electro-optic, acousto-optic, and magneto-optic devices. Soliton generation and propagation.

ECE 359. Advanced VLSI Design

3 credits. Lecture. Recommended preparation: ECE 249 and ECE 252 (or equivalent).

Advanced concepts of circuit design for digital VLSI components in state of the art MOS technologies. Emphasis is on the circuit design, optimization, RTL design, synthesis, and layout of either very high speed, high density or low power circuits and systems for use in applications such as micro-processors, signal and multimedia processors, memory and periphery. Other topics include challenges facing digital circuit designers today and in the coming decade, such as the impact of scaling, deep submicron effects, interconnect, signal integrity, power distribution and consumption, and timing.

ECE 361. Communication Theory

3 credits. Lecture. Prerequisite: ECE 313.

Design and analysis of digital communication systems for noisy environments. Vector representation of continuous-time signals; the optimal receiver and matched filter. Elements of information theory. Quantization, companding, and delta-modulation. Performance and implementation of common coherent and non-coherent keying schemes. Fading; intersymbol interference; synchronization; the Viterbi algorithm; adaptive equalization. Elements of coding.

ECE 362. Estimation Theory and Computational Algorithms

3 credits. Lecture. Prerequisites: ECE 301 and ECE 313.

Estimation of the state and parameters of noisy dynamic systems with application to communications and control. Bayesian estimation, maximum-likelihood and linear estimation. Computational algorithms for continuous and discrete processes, the Kalman filter, smoothing and prediction. Nonlinear estimation, multiple model estimation, and estimator Kalman, multiple model estimation, and estimator design for practical problems.

ECE 363. Stochastic Control

3 credits. Lecture. Prerequisite: ECE 301 or ECE313.

Methods of decision-making and control in a stochastic environment. Elements of utility theory. Principle of optimality and deterministic dynamic programming. Stochastic dynamic programming. Control of dynamic systems with imperfect state information. Certainty equivalence and the control's dual effect. Sequential hypothesis testing. Passive and active stochastic adaptive control algorithms. Decentralized control methods.

ECE 364. Linear Program and Network Flows

3 credits. Lecture. Prerequisite: ECE 301.

Computational methods for linear programming with special emphasis on sequential and parallel algorithms for Network Flow Problems. Standard and canonical forms of linear programming, revised Simplex methods, basis updates, decomposition methods, duality, shortest paths, minimal spanning trees, maximum flows, assignment problems, minimum cost network flows, and transportation problems.

ECE 365. Advanced Signal Detection

3 credits. Lecture.

Focus on discrete-time detection of signals in noise which is not necessarily Gaussian. Topics include: classical Neyman-Pearson and Bayes theory, efficacy and asymptotic relative efficiency; some canonical noise models; quantized detection; narrowband signal detection; distance measures and Chernoff bounds; sequential detection; robustness; non-parametric detection; continuous-time detection and the Karhunen-Loève expansion.

ECE 366. Optical Information Processing

3 credits. Lecture.

Two-dimensional signal processing using optical techniques. Topics include: review of two-dimensional linear system theory; scalar diffraction theory, Fresnel and Fraunhofer diffraction; Fourier transforming and imaging properties of lenses; image formation; frequency analysis of optical imaging systems; modulation transfer function; two-dimensional spatial filtering; coherent optical information processing; frequency-domain spatial filter synthesis; holography, Fourier and nonlinear holograms.

ECE 368. Wireless Communication

3 credits. Lecture. Prerequisites: ECE 316 and ECE 361.

Introduces basic concepts in wireless communication and networks with emphasis on techniques used in the physical layer of current and future wireless communication systems. Covers channel modeling, modulation, spread spectrum techniques, multiuser communication theory, wireless network protocols, and current cellular and PCS systems. Special topics in equalization and array signal processing are included.

ECE 369. Pattern Recognition and Neural Networks

3 credits. Lecture.

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

ECE 370. Biomedical Instrumentation I

3 credits. Lecture. Prerequisite: ECE 313.

Origins of bioelectric signals; analysis and design of electrodes and low-noise preamplifiers used in their measurement. Statistical techniques applied to the detection and processing of biological signals in noise, including the treatment of nerve impulse sequences as stochastic point processes. Methods of identifying the dynamic properties of biosystems.

ECE 372. Communication and Control in Physiological Systems

3 credits. Lecture.

Processing, transmission, and storage of information in nerve systems. Mechanisms of neuro-sensory reception, coding and signal-to-noise ratio enhancement. Analysis of invertebrate and vertebrate

visual systems. Neural spatio-temporal filters in feature extraction and pattern recognition. Analysis of control systems and regulators associated with vision: e.g., gaze control, accommodation, pupil area, and intra-ocular pressure.

ECE 373. Biomedical Instrumentation Laboratory

3 credits. Laboratory.

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

ECE 374. Digital Image Processing

3 credits. Lecture. Prerequisite: ECE 241 or ECE 247.

Problems and applications in digital image processing, two-dimensional linear systems, shift invariance, 2-D Fourier transform analysis, matrix Theory, random images and fields, 2-D mean square estimation, optical imaging systems, image sampling and quantization, image transforms, DFT, FFT, image enhancement, two-dimensional spatial filtering, image restoration, image recognition, correlation, and statistical filters for image detection, nonlinear image processing, and feature extraction.

ECE 377. Engineering Problems in the Hospital

3 credits. Lecture.

Given in collaboration with staff from the University's School of Medicine and from hospitals in Hartford. Aim is to familiarize the student with engineering problems in a modern hospital. Role of the small computer in the hospital; implanted pacemakers; heart catheterization. Students are expected to investigate and solve an engineering problem associated with clinical medicine as a semester project.

ECE 378. Biomedical Imaging

3 credits. Lecture.

Fundamentals of detection, processing and display associated with imaging in medicine and biology. Topics include conventional and Fourier optics, optical and acoustic holography, optical and digital image enhancement, ultrasonography, thermography, isotope scans, and radiology. Laboratory demonstrations will include holography and optical image processing.

ECE 379. Advanced Ultrasonic Imaging Technique

3 credits. Lecture. Prerequisite: EE 378.

Introduction to advanced techniques of ultrasonic image formation for biomedical applications. Introduction to acoustic wave propagation. A,B,C,M and Doppler ultrasonic imaging modes. Interaction of ultrasound with biological tissues. Acoustical holography. Ultrasonic transducer design and calibration. Transducer arrays. Ultrasound detection modes. Laboratory demonstrations will include Schlieren visualization of ultrasound fields and transducer calibration techniques.

ECE 380. Medical Imaging Systems

3 credits. Lecture. Also offered as BME 360.

Medical imaging principles and systems of x-ray, ultrasound, optical tomography, magnetic resonance imaging, positron emission tomography. The students are required to have the courses of instrumentation, signal analysis using Fourier Transform and Laplace transform. Students are also required to have advanced mathematics on differential equations and matrix calculations.

†**GRAD 395. Master's Thesis Research**
1 - 9 credits.†**GRAD 396. Full-Time Master's Research**
3 credits.†**GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.**GRAD 398. Special Readings (Master's)**
Non-credit.**GRAD 399. Thesis Preparation**
Non-credit.†**GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.†**GRAD 496. Full-Time Doctoral Research**
3 credits.†**GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.**GRAD 498. Special Readings (Doctoral)**
Non-credit.**GRAD 499. Dissertation Preparation**
Non-credit.

ENGINEERING

Dean: Professor Amir Faghri*Associate Dean for Academic Affairs:*

Associate Professor Ian Greenshields

Associate Dean for Research and Outreach:

Professor Theodore Bergman

Master of Engineering Degree Program. The School of Engineering, in addition to the master's and doctoral degree programs described elsewhere in this *Catalog*, offers the M.Engr. degree with areas of concentration in: Civil and Environmental Engineering, Chemical Engineering, Computer Science and Engineering, Electrical and Systems Engineering, Mechanical Engineering, and Metallurgy and Materials Engineering.

The M.Engr. degree is designed to meet the needs of practicing engineering professionals who are employed full-time. Work toward this degree program can be completed on-site at company or at other convenient locations. The required curriculum consists of 28 graduate credits and completion of a project.

In addition to the general admission requirements of the Graduate School, the following also are required: verbal, quantitative, and analytical scores from the Graduate Record Examinations; evidence of demonstrated competence in the discipline, including but not limited to undergraduate research or field experience; and, whenever possible, a personal interview by a potential graduate advisor.



The courses listed below are of common interest to students in various engineering disciplines and is taught by faculty from the various departments within the School of Engineering. Other engineering courses are listed under the sponsoring departments. Reference should be made to the offerings of the Departments of Chemical Engineering, Civil and Environmental Engineering, Computer Science and Engineering, Electrical and Systems Engineering, Mechanical Engineering, and Metallurgy and Materials Engineering and to the interdisciplinary offerings in applied mechanics, biomedical engineering, environmental engineering, fluid dynamics, and polymer science.

COURSES OF STUDY

ENGR 300. Special Topics in Engineering
1-6 credits. Lecture.

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

ENGR 311. Professional Communication and Information Management

3 credits. Lecture.

Development of the advanced communication skills as well as information management required of engineers and engineering managers in industry, government, and business. Focus on (1) the design and writing of technical reports, articles, proposals and memoranda that address the needs of diverse organizational and professional audiences; (2) the preparation and delivery of organizational and

technical oral and multimedia presentations and briefings; (3) team building skills with an emphasis on communications; and (4) knowledge management.

ENGR 312. Engineering Project Planning and Management

3 credits. Lecture.

This course provides a methodology for managing engineering projects. Topics include project lifecycle, strategic planning, budgeting, and resource scheduling. Course work also includes work estimating, evaluating risk, developing the project team, project tracking and performing variance analysis. Case studies are used as class and homework assignments to focus the class on the topics presented.

ENGLISH

Department Head: Robert Tilton

Director of Graduate Studies: Jean Marsden

Professors: Anselment, Barreca, Benson, Biggs,

Bloom, Bradfield, Charters, Eby, Higonnnet,

Hogan, Hollenberg, Marsden, MacLeod,

Makowsky, Meyer, Miller, Murphy, Peterson,

Pickering, Riggio, Sonstroem, and Wilkenfeld

Associate Professors: Bercaw Edwards, Breen, Brown,

Coundouriotis, Fairbanks, Hart, Hasenfratz,

Hufstader, Jambeck, Lynch, Mahoney, Manning,

Pelizzon, Phillips, Recchio, Roden, Sánchez-

Gonzalez, Shea, Turley, and Winter

Assistant Professors: Burke, Duane, Kneidel, Semenza, Smith, and Spencer

The Department of English offers courses in English language and composition theory, criticism, and literature written in English. Special research projects and courses of study in comparative literature, medieval studies, American studies, and linguistics are available in course sequences administered cooperatively with other departments. Comparative literature courses of study are conducted in cooperation with the Department of Modern and Classical Languages. The Medieval Studies Program is conducted in cooperation with the language department and the Departments of Art, Dramatic Arts, History, and Philosophy. The area of concentration in American Studies is offered in cooperation with the Departments of History, Political Science, and Sociology.

English courses numbered in the 300's series normally are broad studies of literary schools, periods, and topics and are open to both doctoral and master's candidates. Enrollment is limited to ten students. Seminars are numbered in the 400's series and are designed primarily for doctoral students, although they are open to a limited number of master's candidates. Enrollment in the seminars is limited to eight students. Independent study is available under English 400, a reading course normally open only to doctoral candidates.

Admission to the M.A. and Ph.D. Programs. All applications for admission, together with letters, personal statement, writing sample and the Graduate Record Examination scores (for both General and Subject tests) should reach Storrs by **February 1 to be competitive for teaching assistantships and fellowships.** There is no special application for teaching assistantships. Those **not** requesting a teaching assistantship should have all materials sent by April 1.

The M.A. Program. Plan A requires the completion of fifteen credits of course work and nine credits of thesis work. Plan B requires the completion of twenty-four credits of course work and a written examination, which is taken near or at the close of course studies. Students select three subject areas in which to be examined. The examination is designed to test critical ability and awareness of literary history and theory.

The Ph.D. Program. Ordinarily, the plan of study is expected to contain twenty four credits of full-time graduate course work beyond the master's degree. Before writing the dissertation, students

take a series of preliminary examinations in selected literary subject areas.

Special Facilities. Library collections include "little magazines" and alternative press publications, the Charles Olson archives, and extensive Short Title Catalogue holdings. The English Department sponsors the Connecticut Writing Project, a program for teachers at all levels throughout the State. Funds endowing the Department's Aetna Professorship in Writing make possible a variety of innovative courses as well as prizes for outstanding student essays. Student creativity is encouraged in the yearly Wallace Stevens Poetry Prize competition, judged by a leading poet in a special presentation at Storrs. Faculty edit the journals *The Eighteenth Century: Theory and Interpretation*, *LIT*, and *MELUS* (Multi-ethnic Literature of the United States). Recent distinguished Visiting Professors have included Andrew Gurr, Derek Pearsall, and James Simpson.

COURSES OF STUDY

ENGL 300. Theory and Teaching of Writing

3 credits. Lecture. Open to graduate students in English, others with permission.

An exploration of the relationship between the theories and practice of writing, with attention given to recent classroom practices in composition.

ENGL 301. Approaches to Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

An introduction to practical criticism. The nature of literature; the use of biography, psychology, and other background subjects in literary criticism; problems in literary history and analysis.

ENGL 302. Myth, Archetype and Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

A study of myth and archetype in relation to literature of various genres and periods.

ENGL 303. Children's Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

A study of Children's Literature from the aesthetic, historic, psychological and sociological points of view. Major themes and genres. Standards of literary criticism.

ENGL 304. The Bible as Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

A study of major themes and literary characteristics of writing from the Hebrew Bible and New Testament. The Bible's relevance to modern literary criticism.

ENGL 305. Advanced Research Methods

1 credit. Lecture.

An introduction to advanced research in the humanities. History of and recent developments in

humanities-based research; the use of electronic databases and traditional material resources; the collection and organization of materials; the formulation of an argument; the forms of professional academic writing.

ENGL 306. Professional Development in English

2 credits. Practicum. Prerequisite: ENGL 305

Advanced training in such activities as dissertation writing, attending conferences, publishing book reviews and scholarly articles, and seeking employment in academe. Includes practical instruction on revising a seminar paper for publication.

ENGL 308. History of the English Language

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

The development of the sounds, forms, order, and vocabulary of Standard English; an introduction to the methods of modern descriptive linguistics, and to the application of linguistic fact and theory to the teaching of English.

ENGL 309. Old English

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

A study of the language and literature of pre-conquest England.

ENGL 310. Chaucer

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 315. Medieval Literature

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

A study of medieval literature, exclusive of Chaucer.

ENGL 323. The English Drama to 1642

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

A survey of English drama from the beginnings until 1642. The plays of Marlowe, Kyd, Greene, Dekker, Middleton, Ben Jonson, Beaumont and Fletcher, Webster, Massinger and others are studied.

ENGL 325. Elizabethan Literature

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

A study of major writers and literary traditions of the sixteenth century, exclusive of the drama.

ENGL 326. Seventeenth-Century Literature

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 329. Milton

3 credits. Lecture. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 330. Shakespeare

3 credits. Lecture. Open to graduate students in English, others with permission

ENGL 335. Restoration and Eighteenth Century Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 336. Later Eighteenth Century Literature

3 credits. Lecture. Open to graduate students in English, others with permission

ENGL 337. Romantic Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 338. Studies in Victorian Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 340. American Literature I

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 341. American Literature II

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 350. World Literature in English

3 credits. Lecture. Open to graduate students in English, others with permission.

Selected works of colonial and post-colonial literature from Africa, South Asia, the Caribbean, Australia, New Zealand, Canada, etc.

ENGL 360. Modern British Writers

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 365. Irish Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 371. Literary Criticism

3 credits. Lecture. Open to graduate students in English, others with permission.

A study of the major documents of literary criticism and theory from Plato and Aristotle to the present.

ENGL 375. Women and Literature

3 credits. Lecture. Open to graduate students in English, others with permission.

Feminist approaches to literature by and about women.

ENGL 379. Modern Poetry: Problems Critical Analysis

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 380. Modern Fiction

3 credits. Lecture. Open to graduate students in English, others with permission.

ENGL 383. Non-Fiction Prose

3 credits. Lecture. Open to graduate students in English, others with permission.

Study of autobiography, familiar essay, and related genres.

ENGL 385. Rhetoric and Composition Theory

3 credits. Lecture. Open to graduate students in English, others with permission.

Classical and contemporary rhetorical theory, current research in composition.

ENGL 389. Modern Drama

3 credits. Lecture. Open to graduate students in English, others with permission

ENGL 400. Independent Study

1-6 credits. Independent Study.

A reading course normally open only to doctoral candidates.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

ENGL 406. Seminar in Beowulf

3 credits. Seminar. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 408. Seminar in the English Language

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 415. Seminar in Medieval Literature

3 credits. Seminar. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 423. Seminar in Renaissance Literature

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 426. Seminar in Seventeenth-Century Literature

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 430. Seminar in Shakespeare

3 credits. Seminar. Open to graduate students in English, others with permission. May be repeated for a total of six credits with a change in content.

ENGL 432. Seminar in Eighteenth-Century Literature

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 435. Seminar in Romantic Literature

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 436. Seminar in Victorian Literature

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 440. Seminar in American Literature

3 credits. Seminar. Open to graduate students in English, others with permission. With a change of topic, this course may be repeated to a maximum of 15 credits.

ENGL 471. Seminar in Literary Theory

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 475. Seminar in Women and Literature

3 credits. Seminar. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 479. Seminar in Modern Poetry

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 480. Seminar in Modern Fiction

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 483. Seminar in Non-Fiction Prose

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 484. Creative Writing Workshop

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 485. Seminar in Rhetoric and Composition Theory

3 credits. Seminar. Open to graduate students in English, others with permission.

ENGL 496. Seminar in Major Authors

3 credits. Seminar. Open to graduate students in English and Medieval Studies, others with permission.

ENGL 497. Special Topics in Language and Literature

1-3 credits. Seminar. Open to graduate students in English and Medieval Studies, others with permission.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

ENVIRONMENTAL ENGINEERING

Interim Program Director: Associate Professor

Amvrossios Bagtzoglou

Professors: Cetegen, Helble, Or, Robbins, Torgersen, and Wood

Associate Professors: Abboud, Anagnostou, Bagtzoglou, Erkey, Holmén, Liu, Noll, Ogden, Schulthess, and X. Yang

Assistant Professors: Kim, MacKay, and Wang

Adjunct Professor: Grasso

Adjunct Associate Professors: Curtis, Smets, and White

Environmental Engineering is an interdisciplinary field concerned with the scientific and technological aspects of environmentally related processes and systems. Environmental engineers play a critical role in assessing the impacts of existing contamination problems, devising strategies for managing polluted ecosystems, developing new guidelines for the treatment and disposal of wastes, and modifying manufacturing and other activities to minimize the generation of pollutants. Environmental engineers apply scientific principles to these areas in order to improve environmental quality, to protect public health, and to promote the advancement of sustainable development.

The Environmental Engineering graduate program emphasizes the mastery of fundamental scientific and socioeconomic principles. Graduate education in Environmental Engineering provides students with a sound foundation in basic engineering concepts, and the technological training and research expertise necessary to apply these concepts to the solution of a variety of problems.

Environmental Engineering degree programs are offered as an interdisciplinary Field of Study through the School of Engineering. Because of Environmental Engineering's broad scope and association with other University departments and research institutes, it offers a wide range of academic focus areas based in the natural and engineering sciences. We offer three focus areas of study: (i) biogeochemical processes (BGC), (ii) air pollution and atmospheric processes (ATM), and (iii) hydrogeosciences engineering (HGS). Active research areas include:

- biochemical and physiochemical processes in environmental systems,
- combustion and air pollution,
- environmental geophysical techniques,
- environmental interfacial processes,
- groundwater modeling and remediation,
- vadose zone hydrology,
- surface hydrological processes and land atmosphere interactions,
- pollution prevention, and
- environmental biotechnology

The graduate program offers Master of Science and Doctor of Philosophy degrees in Environmental Engineering. Student plans of study are flexible, comprehensive in nature, and are designed to meet the needs of the individual student.

Admission to Degree Programs. In addition to the basic admission requirements of the Graduate School, applicants must submit Graduate Record

Examination scores with their application. Sound undergraduate preparation in science and/or engineering is required for entrance to the degree programs. Admission is offered on a competitive basis to highly qualified individuals who show promise for distinguished professional and/or academic careers. Limited remedial coursework for non-engineering prospective students is required. For more details, please visit our website at <<http://www.engr.uconn.edu/environ>>.

The M.S. Program. There are no special requirements for admission to the master's program beyond those of the Graduate School. Most entering students have an accredited engineering degree or have taken preparative engineering course work. Selection of the Plan A (thesis) or the Plan B (non-thesis) option is made after consultation with the advisory committee. The primary objective of the master's program is to develop the students' understanding of the subject matter either through an emphasis on research (Plan A) or through a comprehensive understanding of a more general character (Plan B).

The Ph.D. Program. Admission to the doctoral program is based upon a careful assessment of the student's potential for significant, creative research in Environmental Engineering. There are no special requirements for admission to the doctoral program beyond those of the Graduate School. The student's plan of study is arranged in consultation with an advisory committee. Doctoral students must pass a general examination by the end of the second year of study.

Facilities. Students in the Environmental Engineering program have access to numerous state-of-the-art laboratories and facilities through the School of Engineering and associated University departments and institutes. These resources include: the Biotechnology Center, the Center for Biochemical Toxicology, the Center for Environmental Health, the Combustion/Air Pollution Laboratory, the Environmental Research Institute, the Environmental Processes Laboratory, the Geographic Information Systems Institute, the Hydraulics Laboratory, the Institute of Water Resources, the Marine Sciences Institute, the Pollution Prevention Research & Development Center, and the Unit Operations Laboratory.

The Environmental Research Institute (ERI) is the major center coordinating environmental engineering research at the University. ERI's mission is to develop technology-based solutions to existing and emerging environmental concerns – particularly regarding the management of hazardous wastes and the advancement of pollution prevention technologies. In order to accomplish this mission, ERI supports a wide variety of complementary teaching and public service activities. Administered through the School of Engineering, ERI contains well equipped analytical chemistry, environmental chemistry, and engineering laboratories focused on methods development and advanced analyses.

Graduate students within the School of Engineering also have access to a wide range of computing facilities. A laboratory of Unix-based SUN computers including Sun Series 3 Workstations and Sun SparcStations is available to students in the environmental field. Peripheral hardware includes line and laser printers, image scanners, slide makers and large plotters. The School of Engineering also houses

a series of computing laboratories containing IBM PC and Apple Macintosh computers. Large scale computing facilities are available through the University mainframe system consisting of an IBM 3090 with vector processing.

COURSES OF STUDY

Environmentally relevant courses are offered by a number of departments. In addition, visiting professors and adjunct faculty routinely offer graduate courses in their areas of expertise.

ENVE 300. Environmental Engineering Chemistry - I

3 credits. Lecture. Also offered as CE 390.

Quantitative variables governing chemical behavior in environmental systems. Thermodynamics and kinetics of acid/base coordination, precipitation/dissolution, and redox reactions.

ENVE 301. Environmental Engineering Chemistry - II

3 credits. Lecture. Also offered as CE 490.

Environmental organic chemistry: ideal and regular solution thermodynamics; linear free energy relations; estimation of vapor pressure, solubility, and partitioning behavior, abiotic organic compound transformations; chemical fate modeling.

ENVE 302. Advanced Environmental Engineering Laboratory

3 credits. Lecture/Laboratory. Also offered as CE 391.

Analysis of water and waste water. Experimental laboratory and plant investigation of water, wastewater and industrial waste treatment processes.

ENVE 303. Advanced Soil Chemistry

3 credits. Lecture. Also offered as PLSC 378.

Physical chemical characteristics of soil minerals and soil organic matter, and their reactivity with compounds present in the aqueous and vapor phase. Topics include: modern spectroscopic surface analyses, soil organic matter and its interactions with metals, redox reactions, solubility, derivation of ion-exchange equations, and kinetics of soil reactions.

ENVE 304. Probabilistic Methods in Engineering Systems

3 credits. Lecture. Also offered as CE 304.

Common probabilistic models used in engineering and physical science design, prediction, and operation problems; derived distributions, multivariate stochastic models, and estimation of model parameters; analysis of data, model building and hypothesis testing; uncertainty analysis.

ENVE 305. Transportation and Air Quality

3 credits. Lecture. Also offered as CE 305.

Mobile source emissions models in theory and practice. Regulatory framework. Emissions control technology. Field and laboratory measurement techniques. Roadway dispersion modeling. Current topics in mobile source emissions.

ENVE 306. Biodegradation and Bioremediation

3 credits. Lecture. Also offered as CE 394.

Biochemical basis of the transformation of key organic and inorganic pollutants; quantitative description of kinetics and thermodynamics of pollutant transformation; impact of physiochemical and ecological factors on biotransformation.

ENVE 310. Environmental Transport Phenomena

3 credits. Lecture. Also offered as CE 389.

Movement and fate of chemicals: interfacial processes and exchange rates in environmental matrices.

ENVE 311. Environmental Systems Modeling

3 credits. Lecture. Also offered as CE 405.

Modeling pollutants in natural surface waters. Advective, dispersive, and advective-dispersive systems. Modeling water quality, toxic organic and heavy metals pollution.

ENVE 313. Hydroclimatology

3 credits. Lecture. Also offered as CE 313.

This course focuses on the physical principles underlying the spatial and temporal variability of hydrological processes. Topics include atmospheric physics and dynamics controlling the water/energy budgets; global water cycle, its dynamics, and causes of variability/changes; occurrence of drought and flood; climate teleconnections and their hydrological application; hydrological impact of global changes; quantitative methods in hydroclimatic analysis.

ENVE 314. Environmental Monitoring

3 credits. Lecture. Also offered as CE 314.

Introduction to complexities and challenges associated with acquisition of information on environmental processes and characteristics of natural systems. Hands-on experience with selection of measurement strategy and sensing technology; sampling network and protocol design; and deployment, acquisition and interpretation of measurements in natural systems.

ENVE 315. Unsaturated Flow and Transport

3 credits. Lecture. Also offered as CE 315.

Modern approaches to water flow and solute transport in partially-saturated porous media including media characterization (review); unsaturated flow in porous media (governing equations, hydraulic functions, numerical and analytical solution methods); solute transport in unsaturated media (convection dispersion, transfer functions, solutions); modeling and observational scales; coupled water flow and solute transport (model applications); special topics (preferential flow, effects of spatial variability, stochastic aspects of flow and transport, gas exchange and transport measurement methods).

ENVE 316. Vadose Zone Hydrology

3 credits. Lecture. Also offered as CE 316.

Theoretical and experimental elements of primary physical and hydrological properties of porous media and processes occurring in partially-saturated soils. Practical experience in measurement and interpretation of hydrological information and methods of analysis for vadose-zone related environmental problems.

ENVE 320. Ground Water Assessment and Remediation

3 credits. Lecture. Also offered as CE 410.

Quantitative evaluation of field data in assessing nature and extent of groundwater contamination. Subsurface control and remediation. Case studies.

ENVE 321. Environmental Physicochemical Processes

3 credits. Lecture. Also offered as CE 387.

Reactor dynamics, applications of interfacial phenomena and surface chemistry, processes for separation and destruction of dissolved and particulate contaminants. Scholarly reviews.

ENVE 322. Environmental Biochemical Processes

3 credits. Lecture. Also offered as CE 388.

Major biochemical reactions; stoichiometric and kinetic description; suspended and attached growth modeling; engineered biotreatment systems for contaminant removal from aqueous, gaseous, and solid streams; process design.

ENVE 323. Contaminant Source Remediation

3 credits. Lecture. Also offered as CE 411.

Regulatory framework. Soil clean-up criteria. Treatment technologies: soil vapor extraction, solidification - stabilization, soil washing - chemical extraction, hydrolysis - dehalogenation, thermal processes, bioremediation. Risk analysis.

ENVE 324. Industrial Waste Management and Regulation

3 credits. Lecture. Also offered as CE 392.

Origin and characteristics of industrial wastes. Engineering methods for solving industrial waste problems.

ENVE 325. Wastewater Engineering for Unsewered Areas

3 credits. Lecture. Also offered as CE 403.

Management, planning and design criteria. Recycling, water consumption reduction, soil clogging and treatment methods. Pollutional loads and treatability of each pollutant.

ENVE 326. Solid Waste Engineering

3 credits. Lecture. Also offered as CE 404.

Methods of collection, transport and disposal, design of solid waste treatment, disposal and recycle systems, management, pollution effects, literature research.

ENVE 340. Combustion and Air Pollution Engineering

3 credits. Lecture. Also offered as ME 346.

Review of thermodynamics and chemical equilibrium. Introduction to chemical kinetics. Studies of combustion processes, including diffusion and premixed flames. Combustion of gases, liquid, and solid phases, with emphasis on pollution minimization from stationary and mobile systems. Air pollution measurement and instrumentation.

ENVE 341. Advanced Combustion

3 credits. Lecture. Also offered as ME 351.

Review of thermodynamic properties, transport properties, conservation equations of multicomponent reacting gas. Introduction to chemical kinetics. Classification of combustion waves. Deflagrations, detonations and diffusion flames. Ignition phenomena, droplet and spray combustion and some aspects of turbulent combustion.

ENVE 342. Seminar in Combustion Generated Pollution

3 credits. Seminar. Prerequisite: ME 351 or ENVE 341. Also offered as ME 352.

A study of the mechanism of production of pollutants such as nitrogen oxides, carbon monoxide, sulphur dioxide, soot and unburned hydrocarbons from power plants such as stationary gas turbines, internal combustion engines, and jet engines. Emphasis will be placed on current research problems and recent advances in combustor designs.

ENVE 343. Transport and Transformation of Air Pollutants

3 credits. Lecture. Also offered as CE 408.

Transport and deposition of gaseous and aerosol pollutants; chemical formation and reactions of oxidants and acidic compounds.

ENVE 382. Advanced Fluid Mechanics I

3 credits. Lecture. Also offered as CE 332.

Dimensional analysis; vector analysis, circulation and vorticity; irrotational motion and velocity potential; two-dimensional flow and stream function; complex variable theory; conformal mapping; airfoils; sources and sinks; free streamline flow; water waves; three-dimensional flow.

ENVE 383. Advanced Fluid Mechanics II

3 credits. Lecture. Also offered as CE 334.

Turbulent boundary layer. Dimensional analysis. Free shear flows. Flows in pipes and channels. Boundary layers on smooth and rough surfaces.

ENVE 384. Open Channel Hydraulics

3 credits. Lecture. Also offered as CE 338.

Unsteady, nonuniform flow; energy and momentum concepts; flow control; de St. Venant equations; unsteady flow modeling of channels and natural rivers.

ENVE 385. Hydrometeorology

3 credits. Lecture. Also offered as CE 383.

Global dynamics of aquatic distribution and circulation. Hydrologic cycle, atmospheric circulation, precipitation, interception, storage, infiltration, overland flow, distributed hydrologic modeling, and stream routing.

ENVE 386. Hydraulic Machinery and Transients

3 credits. Lecture. Also offered as CE 384.

Pumps and turbines. Surging, water hammer, cavitation, hydraulic machinery for hydroelectric plants, water supply, irrigation, and river navigation.

ENVE 387. Hydraulic Structures

3 credits. Lecture. Also offered as CE 385.

River regulation and development. Hydroelectric plants, storage and turbines, canals, locks, and penstocks, dams, regulation of power, flood control, navigation and irrigation.

ENVE 388. Groundwater Flow Modeling

3 credits. Lecture. Also offered as CE 406.

Basics of modeling with Finite Difference and Finite Element Methods. Modeling flow in saturated and unsaturated zones. Model calibration and validation. Parameter estimation. Treatment of heterogeneity. Basic geostatistics. Modeling surface-groundwater interactions. Application to field sites.

ENVE 389. Ocean Engineering I

3 credits. Lecture. Also offered as CE 401.

Dynamics of the ocean, including waves, tides and currents; shore processes and protection works; chemical and physical characteristics of seawater; estuarine flushing, mixing and diffusion; sedimentation; engineering applications.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

ENVE 400. Seminar in Environmental Sciences and Engineering

1-4 credits. Seminar. Also offered as CE 400.

Extended discussions on presentations contributed by staff, students and outside speakers. A certificate of completion will be issued from the Environmental Engineering Program.

ENVE 432. Environmental Quantitative Methods

3 credits. Lecture. Also offered as CE 432. This course and NRME 432 may not both be taken for credit.

Topics on natural resources and environmental data analysis: random variables and probability distributions, parameter estimation and Monte Carlo simulation, hypothesis testing, simple regression and curve fitting, wavelet analysis, factor analysis; formulation and classification of optimization problems with/without constraints, linear programming; models

for time series; solution of ordinary differential equations with Laplace transforms and Euler integration; solution of partial differential equations with finite differences; basics of modeling.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

FLUID DYNAMICS

Fluid dynamics is concerned with the engineering aspects of fluid mechanics in the broadest sense. It encompasses fundamental theory of perfect and viscous flows, compressible and heated flows, magnetohydrodynamics and plasma jets, free-surface flows in oceans and natural water courses, laminar and turbulent flows, and the vast number of practical applications which make fluid motions useful.

The Ph.D. Program. The student's plan of study is arranged in consultation with his or her advisory committee to develop competence in fluid dynamics. Since it is possible to emphasize theoretical, applied or experimental research, the student must develop a balance within his or her program consonant with his or her stated objectives. The remaining courses should be of an interdisciplinary nature from the departments in geological, biological, and marine sciences, engineering, chemistry, mathematics, physics, and others which the student and the committee feel are pertinent to the student's program.

About half the total credits should be taken in courses oriented toward the engineering aspects of fluid dynamics. The remainder of the program should consist of related courses preferably in two or more supporting areas considered appropriate in the student's objectives. These may include any courses in solid mechanics, including continuum mechanics, elasticity, plasticity, vibrations and structural or soil mechanics; also any courses in thermodynamics, heat transfer, power plants, process dynamics or reaction kinetics. Related courses in electrical engineering could include those in field theory, networks, computer science, and systems. Fundamental studies in chemistry, mathematics, physics, and statistics constitute an important part of the related course work.

This program is the joint responsibility of the Departments of Civil Engineering and Mechanical Engineering. Inquiries concerning the program may be addressed to these departments.

GEOGRAPHY

Department Head: Professor Dean Hanink
Professors: Berentsen, E. Cromley, R. Cromley, and MacKinnon

Associate Professors: Cooke and Vias
Assistant Professor: Daniels

The Department of Geography offers a program leading to the M.A. and Ph.D. degrees. The master's program provides study of the theory and methods of analysis of human and physical features of the earth's surface. Students take a small number of core courses in research methods and design, and select an area of specialization for the remainder of their course work. Examples of common specializations include geographic information systems (GIS) and computer graphics, environmental management and planning, and urban and regional analysis. Other specializations in areas of the faculty's expertise are possible. Students, working with their advisors, have a good opportunity to select courses which best fit their intellectual interests and professional needs.

Candidates for the M.A. may pursue either Plan A, completion of twenty-four credits of course work (exclusive of any credits earned for GRAD 395, 396, or 397) and a thesis, including its oral defense; or Plan B, completion of thirty credits of course work (exclusive of any credits earned for GRAD 395, 396, or 397), a scholarly research paper, and a comprehensive final examination assessing mastery of the field and the ability to integrate the knowledge acquired. The program of course work for all students consists of two parts: (1) a required core, and (2) elective advanced course work. All students in the program are expected to complete a proseminar and three required courses covering an introduction to GIS, research design, and quantitative methods. The quantitative methods requirement may be fulfilled by completing one of the following: (1) GEOG 342; (2) GEOG 343; or (3) GEOG 242 and either GEOG 333 or GEOG 382. Elective advanced course work is selected from Geography Department offerings in related areas including GIS, regional analysis and policy, physical environmental systems, and urban and social analysis. Students are encouraged to select courses from related disciplines such as Economics, Civil Engineering, Geology, and Natural Resources Management and Engineering.

For Ph.D. students, required course work consists of the methodological core of one course each in GIS, spatial statistics, research design and the development of geographic thought. The substantive core consists of six credits in 400's-level Geography courses not including GEOG 413 or GEOG 415. To ensure adequate preparation for teaching, all students take a one-credit practicum course, GEOG 415, with a faculty member who has regular teaching responsibilities in the appropriate area. Finally, the student completes at least 12 credits of additional graduate-level course work in a cognate area in Geography and at least six credits of course work from a related field outside the department.

The dissertation topic is chosen by the student and major advisor, in consultation with the advisory committee. After the appropriate course work has been completed, a general examination with both written and

oral sections is administered. The written section of the examination is given first. The oral section is given no later than two weeks after the conclusion of the written section and only to students who have passed the written portion of the general examination. Doctoral degree students must submit a dissertation proposal for approval.

The Department recommends that applicants for admission to the graduate program have a strong background in Geography or a related discipline. Students must submit GRE scores and international applicants must also supply TOEFL scores.

Graduate Certificate in Geographic Information Systems. The Certificate Program is designed to recognize completion of a focused set of courses for graduate students and other professionals seeking expertise in the field of Geographic Information Systems (GIS). GIS are computer systems for integrating and analyzing spatial data. These systems, and the science behind their development and use, are the topics covered in the required coursework. GIS and related technologies are used in a wide range of applications in the public and private sectors. The elective coursework provides students with the opportunity for graduate study in fields where GIS are used.

The Certificate is earned upon the completion of twelve credits of coursework beyond the B.A. or B.S. degree. Students in the Certificate Program are required to complete Geography 301 and Geography 303, plus additional courses in Geography or a related field. The additional courses must be taken at the graduate (300 or 400) level. The exception is NRME 238 which is accepted for credit. A student's program of study for the Certificate may include only one course numbered Geography 325. Students develop a program of study with the assistance and approval of the Certificate Program Coordinator. To earn the Certificate, a student must pass all courses counted toward the Certificate with a grade of B- or better in each course and an overall GPA for the 12 credits of 3.0 or greater. All coursework for the Certificate must be completed at the University of Connecticut.

Application to the GIS Certificate Program is made through the Graduate School of the University of Connecticut. Students applying for admission to or already enrolled in a graduate degree program in Geography or another field of study at the University of Connecticut may apply for admission to the Certificate Program. Non-degree students may also apply for the program. All students applying for admission to the Certificate Program must have a B.A. or B.S. degree from an accredited institution. Official transcripts and a personal statement of interest in the program must be submitted with the application. Information on the Graduate Certificate in Geographic Information Systems can be obtained from Graduate Certificate Program Coordinator, Department of Geography Unit 4148, University of Connecticut, Storrs, Connecticut 06269-4148.

Special Facilities. The program is supported both by in-house facilities and external contacts. The department maintains a full range of graphics laboratories. These include both research and teaching laboratories equipped with NT workstations, laser printers, plotters, and digitizers as well as regular computer terminals and printers linked to the University's Computer Center and well equipped microcomputer lab. These facilities are complemented by research and practicum

opportunities in a wide range of external agencies with whom collaborative relations have been established by means of the department's experience with internship programs.

COURSES OF STUDY

GEOG 301. Fundamentals of Geographic Information Systems

1-3 credits. Lecture.

An introduction to numerical procedures for the machine compilation of spatial data including methods of data acquisition and the theory and design of GIS storage and retrieval systems.

GEOG 302. Interactive Cartographics in Geographic Information Systems

3 credits. Lecture.

Interactive programming for the display of spatial data and the design of computer generated maps.

GEOG 303. Application Issues in Geographic Information Systems

3 credits. Lecture. Prerequisite: GEOG 301 or GEOG 246.

The study of operational and management issues in geographic information systems (GIS). Ways in which traditional planning and management theories and techniques can be implemented in GISs are examined. Topics include problems of data exchange standards, implementation of GIS in an institutional setting including benchmarking a GIS, applications of GIS in various fields, social impacts and legal aspects of GIS. Practical work includes analytical exercises using GIS culminating in an application project.

GEOG 311. Research Design

3 credits. Seminar.

A survey of research methods in geography. Topics include spatial sampling, hypothesis construction and testing and geographic modeling.

GEOG 315. Internship in Geography

1-6 credits. Practicum.

A fieldwork internship program under the direction and supervision of the geography staff. Students will be placed in agencies or industries where their academic training will be applied. One 8-hour work day per week (or its equivalent) for the host agency during the course of the semester will be necessary for three academic credits. A written report will be required.

GEOG 325. Special Problems in Geography

1-6 credits. Independent Study.

GEOG 330. Advanced Fluvial Geomorphology

3 credits. Lecture. Not open to students who have passed GEOG 230.

Research methods for analyzing fluvial forms and processes. Theoretical discussion of factors controlling open-channel flow, sediment transport, channel morphology, adjustments of rivers to environmental changes and human impacts. River

management and restoration strategies. Requires one weekend field trip.

GEOG 333. Location Analysis

3 credits. Lecture.

Issues and approaches in location analysis. Topics include location theory and models, impacts of locational choice, systems analysis, evaluation of service areas, land use allocation, accessibility and locational conflict. Implications for planning and public policy.

GEOG 334. Regional Development and Policy

3 credits. Seminar. Not open to students who have passed GEOG 388.

A study of theory and practice in regional development and planning. Emphasis on evaluation of regional problems and public policies designed to resolve them, with a primary focus on the United States.

GEOG 337. Economic Geography of Environmental Issues

3 credits. Seminar. Not open to students who have passed GEOG 387.

Seminar on theory and applications of economic geography to environmental issues. Location theories and spatial interaction models are considered from local to international scales of analysis.

GEOG 342. Spatial Data Analysis

3 credits. Seminar.

Univariate statistics focused on the use of spatial statistics, including geostatistics in geographical research. Problems specific to spatial data analysis are addressed.

GEOG 343. Spatial Statistics and Modeling

3 credits. Seminar. Prerequisite: GEOG 342.

Advanced study in the methods and practice of multidimensional statistics and spatial modeling.

GEOG 350. Fundamental Geographic Concepts for Educators

3 credits. Lecture.

Basic geographic concepts critical for effective teaching in the K-12 environment. Development of materials/curricula for the classroom.

GEOG 354. Contemporary Europe: A Geography

3 credits. Lecture.

An introduction to the peoples, countries, and landscapes of Europe (excluding the republics of the former U.S.S.R.). Emphasis on the economic, political, and social forces both maintaining national identities and shaping a united Europe.

GEOG 355. Geography of Latin America

3 credits. Lecture.

Advanced integrative study of physical, historical, social, political and economic geography of Latin America. Particular emphasis on patterns, processes

and problems of spatial economic change in the region.

GEOG 358. Geography of Africa

3 credits. Lecture.

Advanced study of problems of economic, political, social and spatial integration in Africa. Focus on past and contemporary patterns of change (including associated conflicts) examined within the context of the broader global economy.

GEOG 374. Planning and Land Use

3 credits. Lecture.

Contrasting approaches to planning, with an emphasis on legal and political issues in communities and organizations.

GEOG 380. Geographical Analysis of Social Issues

3 credits. Seminar.

Focus on geographical perspectives toward research on selected social issues, with an emphasis on methods of behavioral analysis and relevant social geographical concepts such as social space, activity spaces and time-space budgets, and diffusion.

GEOG 382. Computer Applications in Spatial Analysis

3 credits. Lecture.

An advanced seminar in the design of computer programs for solving problems in spatial analysis. Students receive a thorough knowledge of FORTRAN and related graphic subroutine libraries necessary to implement individual projects.

GEOG 383. Advanced Urban Geography

3 credits. Seminar.

Analysis of social and economic patterns within urban areas, with emphasis on individualized research. The implications for planning are stressed.

GEOG 384. Advanced Economic Geography

3 credits. Seminar.

Problems involved in analyzing spatial variations of selected economic variables. Emphasis on location theory with view toward integrating geographic viewpoint and economic concepts.

GEOG 385. Advanced Physical Geography

3 credits. Seminar.

Problems involving the application of physical processes in our changing environment.

GEOG 386. Environmental Evaluation and Assessment

3 credits. Lecture.

Concepts and methods of environmental analysis in contemporary geography. Emphasis on the ecological impact of human activities and on the evaluation and assessment of existing and future environments.

GEOG 387. Seminar in Environmental Restoration

3 credits. Seminar.

Research issues relating to restoration of natural environments including rivers, wetlands, coastal areas, grasslands and forests. Theoretical discussions of restoration ecology, as well as applied discussions of management and engineering concerns. History of environmental restoration; relevant policy debates; specific case studies of river, wetland, coastal, grassland, and forest restoration.

†GRAD 395. **Master's Thesis Research**
1-9 credits.

†GRAD 396. **Full-Time Master's Research**
3 credits.

†GRAD 397. **Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. **Special Readings (Master's)**
Non-credit.

GRAD 399. **Thesis Preparation**
Non-credit.

GEOG 401. **Locational Models and Spatial Systems**
3 credits. Seminar.

Study of the locational models used to examine the arrangement of human and physical systems in space.

GEOG 402. **Locational Methods and Spatial Systems**
3 credits. Seminar.

Study of the locational methods used to examine the arrangement of human and physical systems in space.

GEOG 403. **Advanced Topics in Spatial Analysis**
3 credits. Seminar.

GEOG 404. **Advanced Topics in Regional Analysis**
3 credits. Seminar.

GEOG 405. **Advanced Topics in Population Geography**
3 credits. Seminar.

GEOG 406. **Advanced Topics in Urban Geography**
3 credits. Seminar.

GEOG 407. **Advanced Topics in Geography of Public Policy**
3 credits. Seminar.

GEOG 408. **Advanced Topics in Economic Geography**
3 credits. Seminar.

GEOG 409. **Advanced topics in Physical Geography**
3 credits. Seminar.

GEOG 410. **Advanced Topics in Environmental Geography**
3 credits. Seminar.

GEOG 413. **Themes in Geographic Thought**
3 credits. Seminar.

Examination of the historical development of geography since the early nineteenth century. Emphasis on the last century of intellectual developments that have led to the emergence of contemporary geography as a research discipline.

†GEOG 415. **Practicum in College Teaching in Geography**
1 credit. Practicum. Prerequisite: Graduate status in Geography.

Guided development of college-level instruction. Drafting of course objectives, selection of texts, development of course and lecture outlines, selection of grading mechanisms, and incorporating feedback for improvement of instruction.

†GRAD 495. **Doctoral Dissertation Research**
1-9 credits.

†GRAD 496. **Full-Time Doctoral Research**
3 credits.

†GRAD 497. **Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. **Special Readings (Doctoral)**
Non-credit.

GRAD 499. **Dissertation Preparation**
Non-credit.

GEOLOGICAL SCIENCES

Professors: Cormier, Joesten, Robbins, Thorson, Torgersen, and Visscher
Associate Professors: Byrne, Crespi, and Liu

Adjunct Assistant Professor: Day-Lewis

Programs leading to M.S. or Ph.D. degrees in the Geological Sciences are offered.

Programs are designed to provide each student with a broad background in the physical sciences and with the specialization necessary for careers in geology, geophysics, and environmental geoscience.

Research opportunities are available in most of the traditional subdisciplines, including hydrogeology, geochemistry, marine geology, sedimentation, exploration geophysics, geomorphology, glacial geology, structural geology, mineralogy, petrology, seismology, and others.

Graduate research is often supported by the U.S. Environmental Protection Agency, the U.S. Geological Survey, the National Science Foundation, the Connecticut Department of Environmental Protection, and other government agencies. Students also benefit from program collaborations with the Environmental Research Institute, the Institute of Water Resources, Marine Sciences Institute, Institute of Materials Science, the Center for Environmental Health, and the Transportation Research Institute, among others. Scientists from outside the University frequently serve on graduate student advisory committees. Most graduate students in residence receive financial support. As Graduate Assistants, they either help support the teaching mission or assist with faculty research that is supported by external funds.

In addition to applicants with a Bachelor's degree in geology or geophysics, applicants with undergraduate degrees in related disciplines are encouraged to apply, provided that they have a broad undergraduate background in the physical sciences or engineering. Students with degrees in the agricultural sciences, environmental management, and science education also are encouraged to apply. Students with an undergraduate degree in mathematics may wish to apply for admission to pursue study in geophysics.

Students working toward an M.S. degree have the option of following either Plan A (with thesis) or Plan B (non-thesis). Together with their graduate advisory committee, each student develops an individualized plan of study that is tailored to meet their needs and objectives. Students pursuing the Plan B option may do so either full-time or part-time.

Special Facilities. Equipment and facilities available for graduate student research include: fully automated electron microprobe, automated X-ray fluorescence equipment, optical emission and infrared absorption spectrographic instruments, gas chromatograph, single crystal and powder X-ray diffraction equipment, high pressure-high temperature experimental petrology laboratory, sedimentation laboratory, power auger, water-level monitoring gauges, field gas chromatograph, field flame ionization and photoionization detectors, full range of equipment for field water quality sample collection and analysis; geophysical equipment including a three component broadband digital

seismograph, magnetometer, gravimeter, refraction seismograph, electrical resistivity unit, terrain conductivity meter, global positioning system, electronic total station, and extensive computing facilities including SUN workstations. The facilities of the Marine Sciences Institute (research vessels, ultra clean analytical chemistry laboratory), the Institute of Materials Science (transmission electron microscope, automated single-crystal x-ray diffractometer), the Environmental Research Institute (Analytical Chemistry Laboratory), and the Computer Applications and Research Center also are available to graduate student research.

COURSES OF STUDY

†GEOL 301. Introduction to Research in the Geological Sciences

2 credits. Lecture.

Development of speaking skills by oral presentation of short reviews and critiques of journal papers. Development of technical writing skills by preparation of a review paper in the first semester. Preparation and defense of three proposals for thesis research in second semester. Required of all first year graduate students in Geology and in Geophysics.

GEOL 305. Special Problems in Geology

1-6 credits. Independent Study. May be repeated to a maximum of 9 credits with a change of content.

Advanced study and research in geology.

GEOL 308. Phase Equilibria, Kinetics and Transport in Rock Systems

3 credits. Lecture.

Thermochemical and topological analysis of multicomponent equilibria involving solids and fluids. Quantitative modeling of the crystallization of magmas, kinetics of metamorphic reactions, transport of matter and energy through rocks and deposition of ore minerals.

GEOL 309. Mathematical Models in Geology

3 credits. Lecture.

Introduction to the mathematical analysis of geological problems.

GEOL 312. Applied Geologic Mapping

6 credits. Practicum.

Advanced surveying and techniques of 3D mapping using electronic total stations, GPS and Geodetic-grade GPS instrumentation. Environmental field geophysics; GPR, resistivity, seismic, magnetic and microgravity surveys. Petrologic, geochemical and geophysical core logging for geotechnical and exploration applications. Field sampling for assay and environmental geochemistry. Detailed geological outcrop mapping. Mine and subsurface geologic mapping.

GEOL 314. Igneous Petrology

4 credits. Lecture/Laboratory. This course is not open for credit to students who have passed GEOL 214 or 335.

Introduction to igneous rocks, physical and

chemical principles governing their formation. Fluid mechanics of magmas, heat transfer, thermodynamics, phase equilibria, isotope geochemistry, and the relation of magmatism to plate tectonics. Optical microscopy, x-ray fluorescence, and electron microprobe analysis. Prepare a paper suitable for publication in a scientific journal.

GEOL 315. Metamorphic Petrology

3 credits. Lecture/Laboratory

Interpretation of mineralogical, chemical, and textural features of metamorphic rocks in terms of the physical conditions and dynamic processes operating in the Earth's crust. Thermodynamic description of phase equilibria in fluid-rock systems. Kinetics, mass and energy transport in metamorphic processes. Petrographic and x-ray analytical techniques.

GEOL 317. Advanced Structural Geology

3 credits. Lecture/Laboratory.

Application of finite and incremental strain analyses using advanced geometric techniques. This course integrates field studies of deformed rocks with theoretical understanding and quantitative analysis.

GEOL 318. Topics in Sedimentation and Diagenesis

3 credits. Lecture.

GEOL 322. Mineralogical Applications of Crystal Chemistry

3 credits. Lecture.

Bond theory, crystal structural prediction, properties of materials, phase equilibria prediction, element distribution and related topics.

GEOL 323. Glacial Processes and Materials

3 credits. Lecture/Laboratory.

Reconstruction of former glaciers and the interactive processes leading to the character and distribution of unconsolidated surface materials in glaciated regions. Techniques for interpreting subsurface unconsolidated materials.

GEOL 326. Modern Methods of Geological Analyses I

1-3 credits. Lecture.

Principles, capabilities, and limitations of some of the modern methods of field and laboratory investigation in the solution of geological problems.

GEOL 327. Modern Methods of Geological Analyses II

1-3 credits. Lecture.

Principles, capabilities, and limitations of some of the modern methods of field and laboratory investigation in the solution of geological problems.

GEOL 328. Applied Geophysics for Geologists and Engineers

3 credits. Lecture.

Introductory survey of surface and borehole geophysical methods and their application to hydrogeologic, environmental monitoring, and

geotechnical engineering studies. Laboratory involves geophysical field measurement, data reduction and geologic interpretation.

GEOL 334. Nature of Rock Deformation

3 credits. Lecture/Laboratory.

Study of the mechanics of continuous rock deformation, emphasizing current theoretical and analytical approaches.

GEOL 340. Advanced Sedimentary Petrology

4 credits. Lecture/Laboratory.

Topics and emphasis vary from year to year. Mineral composition, texture, and structure of major sedimentary rock types; relation to tectonic elements, provenance, and depositional sites.

GEOL 344. Environmental Geology

3 credits. Lecture/Laboratory.

Application of geology to environmental needs and problems; after problems; includes investigations into the utilization of natural resources for land use planning, development, and management.

GEOL 351. Aqueous Geochemistry

3 credits. Lecture.

Application of physical chemistry theory to problems in geochemistry of the earth's surface waters.

GEOL 352. Seminar in Structural Geology

3 credits. Lecture.

Readings and discussion of recent advances in structural geology.

GEOL 353. Seminar in Tectonics

3 credits. Lecture.

Readings and discussions of recent advances in tectonics.

GEOL 355. Advanced Hydrogeology

3 credits. Lecture.

Transport processes in groundwater systems. Mathematical methods in groundwater hydrology. Water quality and resource evaluation.

GEOL 356. Groundwater Modeling

3 credits. Lecture/Laboratory.

Numerical techniques for modeling flow and contaminant transport in groundwater systems. Model design, calibration, visualization, verification and sensitivity analysis. Application to field sites.

GEOL 357. Field Methods in Hydrogeology

1-6 credits. Lecture/Laboratory.

Field methods associated with ground water and contamination assessments.

†GEOL 360. Seminar on Current Topics in Geology

1 credit. Seminar.

GEOL 361. Seminar in Mineralogy

4 credits. Seminar.

Readings and discussions of current literature in

mineralogy. For graduate and advanced students in Geology or related fields.

GEOL 362. Seminar in Petrology

3 credits. Seminar.

Readings and discussions of recent advances in all aspects of metamorphic and igneous petrology.

GEOL 365. Fundamentals of Seismology

3 credits. Lecture.

Theory of elasticity applied to wave propagation; equations of motion; reflection and refraction of elastic waves; wave propagation in homogeneous media; surface waves.

GEOL 368. Marine Geology

3 credits. Lecture.

Relationships between physical and chemical processes and the occurrence and distribution of rock types and compositions in the oceanic environment.

GEOL 369. Seminar in Geophysics

1-6 credits. Seminar.

Readings and discussions of recent advances in geophysics.

GEOL 370. Advanced Seismology

3 credits. Lecture. Prerequisites: MATH 310 and MATH 311, which may be taken concurrently.

Elastic wave propagation in plane layered media; seismogram synthesis by ray parameter integration, ray approximations, and mode summation; earthquake source representations.

GEOL 371. Advanced Plate Tectonics

3 credits. Lecture.

The course introduces students to techniques used in analyzing plate motions on a sphere, including poles of rotation and instantaneous and finite motions. The course integrates geologic data and analytical techniques with a rigorous understanding of plate motions and provides students with a global understanding and appreciation of the Earth

GEOL 372. Sediment Transport

3 credits. Lecture.

The mechanics of sediment transport with particular emphasis on the processes governing transport in coastal and estuarine areas. Initiation of motion for cohesive and noncohesive materials, bed and suspended load transport, bed forms, sediment-flow interactions modeling considerations.

GEOL 374. Physics of the Earth

3 credits. Lecture.

The composition, structure, and dynamics of the earth's core, mantle, and crust inferred from observations of seismology, geomagnetism, and heat flow.

GEOL 375. Geophysical Inverse Theory

3 credits. Lecture.

Fitting geophysical model parameters to data. Topics include model uniqueness, resolution, and error estimation.

GEOL 376. Fundamentals of Planetary Science

3 credits. Lecture.

Evolution of the solar system, celestial mechanics, tidal friction, internal composition of planets, black-body radiation, planetary atmospheres.

GEOL 377. Exploring and Engineering Seismology

3 credits. Lecture/Laboratory.

Theory of elasticity applied to wave propagation; equations of motion; reflection and refraction of elastic waves; velocity analysis and fundamental petrophysics; and principles of detecting subsurface interfaces and structures.

GEOL 378. Applied and Environmental Geophysics

3 credits. Lecture/Laboratory.

Potential theory (gravity, static electricity and magnetic fields), electromagnetic coupling, Maxwell's equations; electromagnetic wave propagation; principles of detection of subsurface interface and structures by geophysical methods.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

GEOL 400. Special Topics in Geophysics

1-6 credits. Seminar.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

HISTORY

Department Head: Professor Altina L. Waller

Professors: Brown, Buckley, Costigliola, Davis, Goodheart, Gross, Roe, Shoemaker, Silvestrini, and Spalding

Associate Professors: Azimi, Baldwin, Blatt, Caner, Cygan, Dayton, Dintenfass, Gouwens, Meyer, Ogbar, Olson, Omara-Otunnu, Schafer, Wang, and Watson

Assistant Professors: Campbell, Overmyer-Velázquez, Pappademos, Rozwadowski, Sreenivas, and Woodward

The Department of History offers study leading to the degrees of Master of Arts and Doctor of Philosophy. Master's students have flexibility in selecting courses in accordance with their interests and professional goals. Doctoral students may undertake work in four broad areas: medieval European, modern European, United States, and Latin American history. Students also have the opportunity to enroll in related courses offered by other departments.

Admission to the M.A. Program. Three letters of recommendation, preferably from members of the academic profession, along with a writing sample and personal statement from the applicant, are required. Graduate Record Examinations scores on the General Tests also are required. Applicants wishing to begin the program in the fall semester must submit their applications and all supporting documents before April 15; applicants for financial aid should submit all materials by January 15. Applicants wishing to begin in the spring semester must submit their applications before November 1. Applicants are expected to have adequate preparation (a minimum of twenty-one credits of history above the freshman level, including courses in both United States and European history), an average of at least B in undergraduate history courses, and preparation in related fields of the social sciences and humanities.

Departmental Requirements for the Ph.D. Students who have a master's degree in history, or are working for one, and whose graduate work shows sufficient promise may apply for admission to the doctoral program, submitting a transcript of at least one semester's work at the master's level. All applicants for admission to the doctoral program follow the same procedures for admission as required of an applicant to the master's program. New doctoral students are expected to begin full-time study during the year for which they are admitted.

Students pursuing the doctorate with an area of concentration in medieval or modern European history must demonstrate their reading competence in two European languages. Students in United States and Latin American history as well as those emphasizing modern British history must demonstrate reading competence in at least one foreign language. Additional competency may be required by the major advisor, depending on the student's research area.

Applicants admitted with a master's degree are expected to submit evidence of proficiency in at least one foreign language early in their first semester of work. The entire language requirement must be completed before a student takes the general examination.

A doctoral student in history must complete a minimum of one year of full-time study in residence beyond the master's degree, consisting of two consecutive semesters of a full-time graduate program (i.e., 24 credits of course work or the equivalent) at the Storrs campus. A graduate assistant, whose academic program proceeds at half the rate of the full-time student, fulfills the residence requirement with two years of such service.

Other requirements, particularly regarding the areas for the general examination, are described in the pamphlet, Graduate Programs in History, which may be obtained from the Department.

Special Facilities. The Homer Babbidge Library has in the past few years greatly expanded its materials in United States, Latin American, and European history. The Dodd Center, which houses the Archives and Special Collections Department of the Babbidge Library as well as the Oral History Center, has extensive holdings. These include the Hispanic History and Culture Collections (with Spanish and Latin American newspapers, and a unique Puerto Rican collection); the Alternate Press Collection, and the Nuremberg Trial papers (within the Thomas J. Dodd papers). The Department also has access to the library and facilities of the Munson Institute for Maritime History at Mystic Seaport. In addition to these resources, several major libraries and archives within a one-hundred-mile radius of the University are accessible for research purposes.

Web Site and E-mail. *Web page*—www.history.uconn.edu; *e-mail*—histadm1@uconnvm.uconn.edu.

COURSES OF STUDY

HIST 300. Independent Study in History
1-6 credits. Independent Study.

†**HIST 301. Independent Reading Course**
3 credits. Independent Study.
This course is designed for the doctoral student who has completed the equivalent of at least one semester of full-time study to meet the residence requirement.

HIST 302. Special Topics in History
3 credits. Seminar.

HIST 307. Special Topics in the History of Science
3 credits. Seminar. May be repeated for credit with a change in content.

HIST 310. The French Revolution
3 credits. Seminar.

An intensive study of the intellectual, social, economic, political, and military events of the period and of their impact upon the world, as well as upon French history.

HIST 311. Nineteenth Century France
3 credits. Seminar.

HIST 315. Topics in Ancient Civilization
3 credits. Seminar.

HIST 316. Topics in Medieval History
3 credits. Seminar.

HIST 323. State and Society in Europe since 1800
3 credits. Seminar.

Relationship between social change and state formation in Western Europe from c. 1800 to the mid-20th century; industrialization, class, social identities, nationalism, and imperialism.

HIST 324. Europe in the Nineteenth and Twentieth Centuries
3 credits. Seminar.

HIST 325. Social and Intellectual History of Europe in the Nineteenth and Twentieth Centuries
3 credits. Seminar.

HIST 326. Topics in Central European History, 1790-1918
3 credits. Seminar.

HIST 327. Topics in Imperialism
3 credits. Seminar.

HIST 328. Collaborative Colloquium
3 credits. Lecture.
Comparative/collaborative study of topics in different areas and/or periods.

HIST 330. Topics in New England History
3 credits. Seminar.

HIST 331. The American Revolution
3 credits. Seminar.

HIST 332. American Maritime History
3 credits. Seminar.
A study of the development of American mercantile enterprise from colonial times and its relationship to American political, economic, and cultural history. The course includes lectures, readings, and extensive use of the facilities at Mystic Seaport. It is given at Mystic Seaport under the joint auspices of the University of Connecticut and the Frank C. Munson Institute of American Maritime Studies.

HIST 333. Topics in the History of American Women
3 credits. Seminar.

HIST 334. Topics in Colonial American History
3 credits. Seminar

HIST 335. Society and Culture in the Civil War Era, 1830-1880
3 credits. Seminar.

The social, economic, political and cultural forces, including gender, race, and class, that shaped the Civil War and its aftermath.

HIST 336. Topics in the History of Urban America
3 credits. Seminar.

HIST 337. Topics in American Social and Cultural History, 1600-1876
3 credits. Seminar.

Major themes in the recent scholarship of social and cultural history: community and communication; family and gender; race, class, and industrialization; religion; and slavery.

HIST 338. United States in the Early National Period and the Age of Jackson, 1787-1840
3 credits. Seminar.

HIST 339. Topics in Black History
3 credits. Seminar.

HIST 340. Introduction to Historical Museum Work I
3 credits. Lecture.

A study of historical agencies and museums. Laboratory work and field trips are included.

HIST 341. Introduction to Historical Museum Work II
3 credits. Lecture.

A study of historical agencies and museums. Laboratory work and field trips are included.

HIST 342. Theories of History
3 credits. Seminar.

The principles and problems underlying the study of history; and a survey of the history of historical writing and of various schools of historical interpretation.

HIST 345. Topics in American Family History
3 credits. Seminar.

HIST 347. United States in the Age of Reform, 1877-1924
3 credits. Seminar.

HIST 348. The United States from the 1920s to the 1960s
3 credits. Seminar.

HIST 349. Topics in the History of American Foreign Relations
3 credits. Seminar.

HIST 351. Topics in Russian History
3 credits. Seminar.

HIST 356. Germany in the Nineteenth and Twentieth Centuries
3 credits. Seminar.

HIST 361. England From 1066 to 1307
3 credits. Lecture.

HIST 362. Topics in Modern British History
3 credits. Seminar.

HIST 366. Topics in Italian History
3 credits. Seminar.

HIST 370. Western Europe in the Fifteenth and Sixteenth Centuries
3 credits. Seminar.

HIST 373. Europe in the Seventeenth Century
3 credits. Lecture.

HIST 374. Europe in the Eighteenth Century
3 credits. Seminar.

HIST 375. Topics in Nineteenth Century European Diplomacy
3 credits. Seminar.

HIST 376. War and Revolution in the Twentieth Century
3 credits. Seminar.

HIST 381. Topics in Latin American History
3 credits. Seminar.

HIST 382. The Historical Literature of Latin America
3 credits. Seminar.

HIST 386. Topics in Twentieth-Century China
3 credits. Lecture.

HIST 387. East Asian History
3 credits. Lecture.
Topics in modern Chinese and Japanese history with emphasis on Chinese thought and politics.

HIST 390. Seminar in American Maritime Studies
3 credits. Seminar.
A seminar involving reading and research on selected topics in American maritime studies. Open only to students who have previously taken History 332 or to advanced students who are concurrently enrolled in History 332. This course is given at Mystic Seaport under joint auspices of the University of Connecticut and the Frank C. Munson Institute of American Maritime History.

HIST 391. Administration of Archives and Manuscripts
3 credits. Seminar/Practicum.
An overview of the history and development of the American archival profession, including basic archival theory and methodology. Emphasizes principles of collection, organization, and reference service for historical manuscripts and archives.

HIST 392. Advanced Practice in Archival Management
3 credits. Seminar. Prerequisite: HIST 391.
Advanced practice in archival management, such as appraisal, records management, access, and public

programs. Application of archival principles through specific projects relating to processing, appraisal, public outreach, and reference service.

†**GRAD 395. Master's Thesis Research**
1 - 9 credits.

†**GRAD 396. Full-Time Master's Research**
3 credits.

†**GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†**HIST 400. Investigation of Special Topics**
1-6 Credits. Independent Study.

HIST 401. Introduction to Historical Research
3 credits. Seminar.

Introduction to the sources and methods of professional historians. Finding primary sources (qualitative and quantitative), evaluating them for accuracy and usefulness, organizing data, and writing exercises based on the sources. Students must produce a proposal (fully annotated) for a major research paper to be written in the subsequent semester.

HIST 402. Historical Research and Writing
3 credits. Independent Study.

A research seminar for students in the M.A. and Ph.D. programs in history.

HIST 420. Research Seminar in Medieval History
3 credits. Seminar.

†**GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.

†**GRAD 496. Full-Time Doctoral Research**
3 credits.

†**GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

HUMAN DEVELOPMENT AND FAMILY STUDIES

Dean: Professor Charles M. Super
Professors: Anderson, Blank, Harkness, McDowell, O'Neil, Rigazio-DiGilio, Sabatelli, and Wisensale
Associate Professors: Arms, Asencio, Britner, Brown, Garey, Goldman, Mulroy, and Sheehan
Assistant Professors: Descartes, Donorfio, Doucet, Farrell, Gibson, Strong, and Weaver

Graduate courses and research opportunities are offered leading to the Master of Arts degree and Doctor of Philosophy degree in Human Development and Family Studies. Available study areas include, but are not restricted to, gerontology, childhood, life span development, family interaction, and marital and family therapy. Courses are offered in early childhood, adolescence, gerontology, life span development, psychosocial and cognitive development, marital and family interaction, family life education, and marriage and family therapy.

Students' individual programs of study can be developed in conjunction with faculties in related areas and may include offerings from departments and schools throughout the University. Graduate students are encouraged to elect supervised fieldwork and research projects in nearby community agencies.

Students studying marital and family therapy are required to complete clinical practicums in the Center for Marriage and Family Therapy and in selected mental health and family therapy agencies. Such study is designed to fulfill the academic requirements needed to achieve Connecticut licensure and clinical membership in the American Association for Marriage and Family Therapy, which requires twelve continuous months of practicum placement. Students studying marital and family therapy at the doctoral level must have completed the necessary Master's level prerequisites before taking advanced course work and fulfilling the required 9-12 month internship in an approved agency.

Admission to the M.A. Program. It is desirable for applicants to have a fundamental background in the social sciences and a basic understanding of research procedures. Application forms should be obtained from and be returned directly to the Graduate Admissions Office. In addition, applicants must present results of the General Test of the Graduate Record Examinations (GRE), a personal statement describing themselves and their reasons for pursuing a degree in the School of Family Studies, and at least three letters of recommendation to the Graduate School, University of Connecticut, 438 Whitney Road Extension, Unit 1006, Storrs, Connecticut 06269-1006. This information may also be sent via e-mail to <gradschool@uconn.edu>.

Admission to the Ph.D. Program. A prospective student must hold a bachelor's or master's degree from a college or university of approved standing. It is desirable, but not mandatory, that the applicant's previous work include undergraduate or graduate study in the areas of Human Development and Family Studies or related behavioral and social science. Applicants must show promise of superior achievement in research. Application forms should be obtained from and returned directly to the Graduate Admissions Office. In addition, applicants must submit the results of the General Test of

the Graduate Record Examinations (GRE), personal statements describing themselves and their reasons for pursuing a doctorate at the School of Family Studies, professional writing samples, and at least three letters of recommendation from members of the academic profession. These materials should be sent directly to the Graduate School, University of Connecticut, 438 Whitney Road Ext, Storrs, CT 06269-1006. This information may also be sent via e-mail to <gradschool@uconn.edu>. Complete applications and all supporting documents must be received no later than January 15. Students ordinarily are admitted to the program to start classes in the fall semester.

Special Facilities. Applied activities of the School of Family Studies are housed in the Human Development Center (HDC). The HDC affords students and faculty observation and video taping facilities in its laboratories, therapy, and testing rooms. It also provides opportunities for conducting community-based program evaluation and data analysis services. The following Centers are housed within the HDC: the Center for Applied Research, the Child Development Laboratories, and the Center for Marital and Family Therapy.

The Center for Applied Research (CAR) is a joint venture with the Cooperative Extension System. Its purpose is to provide assistance to state and community based agencies in the development, delivery, and evaluation of human service programs. The CAR strives to create a supportive relationship with its clients and offers assistance at every level of the evaluation process. Technical assistance is provided by graduate students and faculty. The Center is also a research training facility. It offers opportunities for graduate students to learn about the research and publication process under the mentorship and guidance of experts in the field of human development, family studies and applied research.

The Child Development Laboratories (CDL) offer full-day and half-day programs for children from six weeks to six years of age. The CDL's mission is to train students who will be working with young children, facilitate faculty and student research in child development, and serve as a model center for providing quality programs for young children. The CDL's laboratories provide facilities for observation, research, student projects, and field placements for other departments.

The Center for Marital and Family Therapy (CMFT) is a training facility for graduate intern therapists enrolled in the Master's Program for Marriage and Family Therapy in the School of Family Studies. The CMFT offers a range of therapeutic services which are available to university faculty, staff and their families, undergraduate or graduate students, and any individual or family living in the greater northeastern Connecticut area. These services include individual therapy, family therapy, marital or relationship therapy, and therapy for parenting or child-related problems. The CMFT also offers seminars for mental health professionals, family life enrichment programs, and support and therapy groups. Consultation services and on-site training are available to other departments within the University, as well as to outside community agencies.

The School of Family Studies is also the site for several university-wide resources. The Center on Aging and Human Development (CAHD) coordinates gerontology education programs, research, and service activities. The CAHD offers a limited number of fellowships to pursue gerontological research. Fellowships are awarded on a competitive basis and are open to full-time graduate students in all departments and programs. In addition,

the center offers a 12 credit certificate program in Gerontology. This certificate program is open to students in masters or doctoral programs in a wide range of academic disciplines. Professionals working in the field of aging who have satisfactorily completed an undergraduate degree program also may apply to the certificate program.

The Center for the Study of Culture, Health, and Human Development (CHHD) is a resource for faculty and graduate students from various disciplines including Allied Health, Anthropology, Education, Family Studies, Nursing, Nutritional Sciences, Pediatrics, and Psychology. Focusing on the scientific understanding and active promotion of healthy human development in its cultural context, the Center houses several major research projects and manages the university-wide Graduate Certificate in Culture, Health, and Human Development.

The Ronald and Nancy Rohrer Center for the Study of Parental Acceptance-Rejection is a collaborative enterprise with the School of Social Work. Its mission is to conduct basic and applied research on the dynamics and consequences of interpersonal acceptance-rejection, with special emphasis on the parent-child relationship. Collaborative research with scholars around the world is a hallmark of the Center's activities.

COURSES OF STUDY

HDFS 300. Independent Study in Human Development and Family Relations

1-6 credits. Independent Study. May be repeated to a maximum of 12 credits with a change in content.

Advanced study for qualified students who present suitable projects for intensive, independent investigation in human development and family relations.

HDFS 301. Seminar

1 credit. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Seminar in professional orientation to the field of human development and family relations.

HDFS 302. Special Topics in Human Development and Family Studies

1-3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission. With a change of topic, students may enroll up to four times for a maximum of 12 credits.

In-depth investigation of a recent issue of human development and family studies.

HDFS 303. Research Methods in Human Development and Family Studies I

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Family and human development procedures, research experience related to analyzing interpersonal interaction and developmental processes.

HDFS 304. Qualitative Research Methods in Human Development and Family Studies

3 credits. Seminar. Open to graduate students in

Human Development and Family Studies, others with permission. Prerequisite: HDFS 303.

Philosophical bases of qualitative research in the social sciences; developing qualitative strategies; including: existential-phenomenological, intensive interviews, participant observation, and textual analysis.

HDFS 305. Research Methods in Human Development and Family Studies II

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Advanced family and human development research methods; research design and underlying methodological issues in analyzing interpersonal interaction and developmental processes.

HDFS 306. Research Practicum

1-6 credits. Practicum. May be repeated to a maximum of 24 credits.

Supervised research in Family Studies.

HDFS 308. Practicum in University Teaching of Human Development and Family Studies

3 credits. Practicum.

Supervised teaching of undergraduate courses in HDFS.

HDFS 315. Models and Concepts of Lifespan Human Development

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission

Overview of approaches to understanding human development across the lifespan. Emphasis on models that cross disciplinary boundaries to explore development in social and cultural contexts.

HDFS 320. Programs for Young Children

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Day care, preschool, and related programs for young children and their families; developmental theory in these programs, conceptual models and approaches, and evaluation issues.

HDFS 325. Gender Role Issues for Helping Professionals

3 credits. Lecture.

Intensive review of gender role socialization in a workshop setting, emphasizing men's and women's gender role conflicts across the life span. Lectures, readings, discussions, self assessments, and media are used to explicate core concepts and themes.

HDFS 330. Current Topics in Early Childhood Education

1-6 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission. With a change of topic, may be repeated once for credit.

In-depth investigation of a current issue in early childhood education (e.g., emergent literacy, diversity), with focus on recent research and application to classroom practice. Includes classroom observation and laboratory observation.

HDFS 331. Prevention, Intervention, and Public Policy

3 credits. Seminar.

Survey course of the theory, practice and science of primary prevention of human problems. Prevention concepts and case studies are presented. Students give analysis and critique of course content and develop personal and professional perspectives on prevention practice and possible social policy initiatives.

HDFS 335. Administration and Leadership in Early Childhood Programs

3 credits. Seminar.

Critical issues in early childhood program administration, leadership, ethics, management, and advocacy.

HDFS 340. Aging: Personality and Social Interaction

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Patterns of adjustment to aging; continuity versus change in personality, role changes, and family relations of the elderly.

HDFS 341. Aging: Physiological, Cognitive and Perceptual Changes

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Psychophysiological changes in old age; psychobiological theories of aging, age changes in cognition, perception and learning, and impact of physical health on performance.

HDFS 342. Aging in the Family

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Theory, research and social issues affecting older families, developmental changes within aging families which impact on patterns of social interaction and support.

HDFS 344. Housing for the Elderly

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Housing types, adaptive accommodations, and emerging patterns of choice occurring in American society during middle-age and late adulthood; effects of economic and social changes as related to decision making by individuals about private and public living arrangements; design of research and evaluation methodology.

HDFS 345. Aging Policy and Programs

3 credits. Lecture. Open to graduate students in

Human Development and Family Studies, others with permission.

Existing programs at Federal, State, and Community levels as currently deployed under various Titles of the Older Americans Act, Social Security, Medicare, and Medicaid; program objectives, scope, costs, and levels of delivery as they relate to identified needs of present and future groups of the elderly; use of policy-determining data and program evaluation methodologies.

HDFS 347. Social Gerontology

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Societal aspects of aging, including the social psychological concomitants of adjustments, changing roles, and systems of social relationships.

HDFS 348. Adaptation and Development in Adulthood

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Young adulthood through middle-age with particular attention on transition episodes; stability and change in adult personality with attention to familial and other social relationships.

HDFS 351. Foundations of Marriage and Family Therapy

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Theoretical foundations of marriage and family therapy; basic principles of therapy, interactional patterns of marital dyads and families under stress; professional and ethical issues relevant to the practice of marriage and family therapy.

HDFS 354. Marriage Therapy

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission. Prerequisite: HDFS 351 which can be taken concurrently.

Marital interaction and therapy. Theory and technique of contemporary therapeutic approaches.

HDFS 356. Family Therapy

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission. Prerequisite: HDFS 351 which can be taken concurrently.

Contemporary clinical conceptualizations of family interaction, major contributions to the development of family therapy as a unique discipline. Issues and problems commonly confronted in conducting family therapy.

HDFS 359. Case Seminar in Marriage and Family Therapy

3 credits. Seminar. Prerequisites: HDFS 351 and either HDFS 354 or HDFS 356. HDFS 362 should be taken concurrently.

Specialized professional issues and professional problems in the practice of marriage and family therapy. Case material.

HDFS 361. Introduction to Clinical Practice and Professional Issues

3 credits. Lecture/Clinical. Open to graduate students in Human Development and Family Studies, others with permission. Prerequisite: HDFS 351 which can be taken concurrently.

Clinical practice in the Center for Marital and Family Therapy and in approved clinical training centers. Classwork and supervised clinical practice required. Professionalism, ethics, confidentiality, therapeutic techniques, and procedures required for clinical practice.

HDFS 362. Practicum in Marriage and Family Therapy

1-6 credits. Practicum. Open to graduate students in Human Development and Family Studies, others with permission. Prerequisites: HDFS 361 and either HDFS 354 or HDFS 356. May be repeated to a maximum of 24 credits.

Supervised group experience in marriage and family therapy related to clinical practice in the Center for Marital and Family Therapy or other approved clinical training centers.

HDFS 363. Individual Supervision in Marriage and Family Therapy

1-6 credits. Independent Study. Open to graduate students in Human Development and Family Studies, others with permission. Prerequisites: HDFS 361 and either HDFS 354 or HDFS 356. May be repeated to a maximum of 24 credits.

HDFS 364. Clinical Assessment and Practice

3 credits. Seminar.

Diagnosis and treatment of dysfunctional marital and family relationship patterns, nervous and mental disorders; major family therapy assessment methods and instruments.

HDFS 365. Human Development and Family Studies over the Life Span

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Individual and family development; family interaction, reciprocity and change in social role behaviors and attitudes of family members over the life span.

HDFS 369. Gender Role Transitions and Conflicts Over the Lifespan

3 credits. Lecture.

The identification and study of men's and women's gender role transitions and conflicts over the lifespan using psychosocial theory. Developmental stages and tasks are critically analyzed using psychological, sociological, multicultural, and gender role theories and research.

HDFS 377. Human Sexuality

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Human sexual behavior and attitudes.

HDFS 380. Special Issues in Family Development

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Theory, research and practice applied to special issues in human development and family relations over the life span.

HDFS 381. Cultural Issues in Child Development

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

An examination of the cognitive, social, and emotional development of children from a cultural perspective. Emphasis placed on infancy, socialization, theories of cognitive development, and schooling.

HDFS 382. Universals in Human Behavior

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission. With a change of content, may be repeated once for credit.

Evidence regarding cross cultural universals in human behavior: culture, social and emotional behavior, cognitive behavior and development, language and language acquisition.

HDFS 383. Seminar on Parent-Child Relations in Cross-Cultural Perspective

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Research and theory regarding the antecedents and effects of major dimensions of parental behavior on child development in the U.S.A. and cross-culturally, parental warmth, control, punishment, and their interactions.

HDFS 384. Advanced Seminar in Theories of Human Development

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Theoretical positions influencing the field of human development and empirical evaluation of these positions.

HDFS 385. Seminar in Advanced Child Development

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Development of the child within the family setting.

HDFS 386. Seminar on Adolescent Development

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Adolescent development; understanding the various forces related to adolescent behavior.

HDFS 387. Parent Education

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Planning, implementation, and evaluation of parent education programs for individuals and groups. Development and use of materials for such programs.

HDFS 388. Supervised Field Work in Family Development

1-6 credits. Clinical. Instructor consent required.

Work in a community agency related to the field of family development.

HDFS 390. Theories and World Views Informing Marriage and Family Therapy

3 credits. Lecture.

Underlying theories and conceptualizations informing marriage and family therapy.

HDFS 391. Patterns and Dynamics of Family Interaction

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Readings and research concerning the family, stressing interpersonal processes and communication.

HDFS 393. Close Relationships

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Formation, maintenance, and dissolution of close relationships across the life span; relationships like courtship, marriage, parent-child, and friendships.

HDFS 394. Methods and Materials of Family Life Education

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission.

Recent research, publications, films, programs, and teaching techniques in the field of family development and counseling with families.

HDFS 395. Theories of Family Development

3 credits. Seminar. Open to graduate students in Human Development and Family Studies, others with permission.

Concepts and theories in the area of family development.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

HDFS 410. Family Therapy Research

3 credits. Lecture. Open to graduate students in Human Development and Family Studies, others with permission. Prerequisite: HDFS 303.

Family therapy research methods; research design and methodological issues in analyzing treatment interventions, family interaction processes, and change.

HDFS 420. Family Therapy Supervision

3 credits. Seminar.

Major models and methods of marriage and family therapy supervision; ethical and legal responsibilities faced by marital and family therapy supervisors. Development of perceptual, conceptual, and executive skills needed to supervise and train practitioners in the field of marriage and family therapy.

HDFS 430. Advanced Family Therapy

3 credits Seminar. Prerequisites: HDFS 351 and HDFS 356.

Current trends and issues in the field of family therapy; integration of clinical theory, research, and practice.

HDFS 495. Internship in Marital and Family Therapy

1-6 credits. Clinical.

Nine to twelve month period of full-time clinical experience in a cooperating institution. Open only with consent of instructor to students of advanced standing in marital and family therapy. Offered at approved clinical training centers. The student assumes a full range of professional responsibilities associated with practice of marital and family therapy. Minimum of 500 hours of direct client contact and receipt of 100 hours of supervision.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

INTERNATIONAL STUDIES

Executive Director: Professor Boris E. Bravo-Ureta

Associate Executive Director: Associate Extension

Professor Elizabeth Mahan

Emiliana Pasca Noether Professor of Italian History:

Professor John Davis

UNESCO Chair for Human Rights: Associate Professor

Amii Omara-Otunnu

Professors: Aschkenazy, Benson, Berentsen,

Berthelot, Boster, Boyer, Bravo-Ureta, Buckley,

Chazdon, Cosgel, Costigliola, Gordon,

Handwerker, Hanson, Healy, Linnekin, López,

Masciandaro, Pagoulatos, Roe, Schensul, Sheckley,

Silander, Silvestrini, Spalding, Stephens,

Talvacchia, Vengroff, and Zirakzadeh

Associate Professors: Bouchard, Celestin, Chinchilla,

Coundouriotis, Dalmolin, Erickson, Gabany-

Guerrero, Gomes, Gouwens, Greeley, Guénoun,

Kimenyi, Kingstone, Larson, Leach, Lefebvre,

Liu, Mahan, Martínez, McBrearty, McNeece,

Pardo, Phillips, Randolph, Schafer, Scruggs, Seda

Ramirez, Snyder, Sterling-Folker, Travis, Von

Hammerstein, Watson, and Weidauer

Assistant Professors: Bayulgen, Caner, Gambarota,

Gaztambide-Geigel, Hertel, Loss, Melehy,

Overmyer-Velázquez, and Pappademos

Study is offered leading to the degree of Master of Arts in the field of International Studies. Students may pursue a general program emphasis or pursue one of four areas of concentration: African Studies, European Studies, Italian History and Culture, or Latin American Studies. Offered also is a dual program which combines the master's degree in International Studies with the Master of Business Administration degree.

The M.A. in International Studies. The master's degree program is available in two plans: Plan A requires a minimum of 21 credits of course work plus a thesis; Plan B requires 30 credits of course work plus a comprehensive exam. Course work must be distributed over three academic disciplines. Students are required to demonstrate proficiency in appropriate languages adequate both for conversation and research. Scores from the General Test of the Graduate Record Examination and three letters of recommendation are required for admission. As each program (African Studies, European Studies, Italian History and Culture, Latin American Studies, and the general program) has additional guidelines regarding required and elective courses, language proficiency, and comprehensive examinations, to fully understand program requirements students must contact area studies Centers or the Office of International Affairs.

Information concerning the African Studies concentration may be obtained from the Center for Contemporary African Studies (Unit 1182). Information concerning the European Studies and Italian History and Culture concentrations may be obtained from Professor John Davis, Director, Center for European Studies (Unit 1182). Information regarding the Latin American concentration may be obtained from Associate Professor Peter Kingstone, Director of the Center for Latin American and Caribbean Studies (Unit 1161). Information concerning other areas of emphasis may be obtained

from the Associate Executive Director of the Office of International Affairs (Unit 1182).

M.A. in International Studies and M.B.A.

The dual M.A. & M.B.A. degree program consists of 72 credits of course work distributed between International Studies and Business Administration. The M.B.A. portion of the program consists of 42 credits in business, plus fifteen credits of electives. The M.A. portion of the program comprises 30 credits of course work, of which 15 credits count as electives in the M.B.A. portion.

The M.A. program is available in two plans: Plan A requires a minimum of 21 credits of course work, plus a nine credit thesis; Plan B requires 30 credits of course work, plus a comprehensive examination. M.A. students must also demonstrate language proficiency sufficient for conversation and to conduct research in an appropriate second language. Students in the M.A. program select either an area of concentration or an interdisciplinary field of study as the focus of their work.

When completing the application form, applicants to the joint M.A. in International Studies and M.B.A. must indicate clearly as Degree Sought that pursuit of the "Dual M.A. in International Studies and M.B.A. Program" is intended. Applicants are expected to provide three letters of recommendation and scores from both the Graduate Management Admissions Test (GMAT) and from the General Test of the Graduate Record Examinations (GRE).

For information about the M.B.A. program, students should write to the Director of the M.B.A. Program, School of Business Administration (Unit 1041-041MBA).

Special Facilities. The Centers for Contemporary African Studies, European Studies, and Latin American and Caribbean Studies encourage and promote programs and multidisciplinary research in their respective areas.

Concerning the study of Latin America, library resources are especially strong for the study of Mexico, the Southern Cone, and the Caribbean. The Thomas J. Dodd Research Center has a number of special collections that are particularly strong in relation to the area studies programs. The Latin American Survey Data Bank in the Roper Center for Public Opinion Research maintains and acquires historical and current national-level surveys from throughout the region.

The Latin American Studies programs at the University of Connecticut, Brown University, the University of Massachusetts, Amherst, and Yale University constitute the Latin American Studies Consortium of New England. Consortium partners arrange occasional faculty exchanges. Students in all four programs may use the libraries of other Consortium members without charge, and may attend classes at the other universities.

The Center for European Studies coordinates small funded exchanges of graduate students between the University of Connecticut and German universities.

COURSES OF STUDY

International Studies

INTS 301. Seminar in International Studies

3 units. Seminar.

This seminar combines the various disciplines that constitute International Studies into three core units: (1) Social sciences; (2) Humanities; and (3) Development Studies (development economics and administration). Area Studies faculty from relevant departments will conduct the individual seminar sessions. The seminar has three goals: (1) to introduce concepts and theoretical issues of the fields in each of the core units; (2) to introduce research approaches and the formulation of research questions in each of the core units; and (3) to help students develop analytical thinking and writing skills in an interdisciplinary context. These goals form the basic structure of the three units and will be met through a combination of reading, discussion, short papers, presentations, and research exercises. Library research and on-line resources are also covered.

INTS 310. Independent Study

1-6 credits. Independent Study. Instructor consent required. May be repeated to a maximum of 15 credits with a change of content.

African

AFRI 300. Independent Study

1-9 credits. Independent Study.

AFRI 301. Seminar in African Studies

3 credits. Seminar.

Interdisciplinary introduction to graduate level study of Africa.

AFRI 305. Special Topics in African Studies

1-9 credits. Seminar.

European

ES 300. Independent Study in European Studies

1-6 credits. Independent Study.

Latin American

LAMS 300. Special Topics

1-6 credits. Independent Study.

LAMS 310. Independent Study

1-6 credits. Independent Study. Instructor consent required. May be repeated to a maximum of 15 credits with a change of content.

LAMS 360. Seminar on Latin American Business

3 credits. Lecture.

Latin American business practices and operations. U.S. and transnational business in Latin America.

LAMS 370. Latin American Popular Culture

3 credits. Seminar.

Culture, subcultures, and culture industries in Latin America. Conditions which affect the mass production, dissemination and reception of entertainment products. Reading knowledge of Portuguese or Spanish required.

LAMS. 380 Latin American Studies Project

3 credits. Independent Study.

Independent, interdisciplinary research project culminating in a written paper, developed by the student under the supervision of a committee consisting of a first and second reader. The first reader will be the major advisor on the project. This course is intended to be the capstone course for the master's degree, to be taken after all other course requirements are completed.

LAMS 390. Seminar in Latin American Studies

3 credits. Seminar.

Interdisciplinary introduction to graduate level study of Latin America.

All Areas

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

JUDAIC STUDIES

Field of Study Coordinator: Professor Arnold Dashefsky

Professor: Aschkenasy

Associate Professors: S. Johnson and S. Miller

Adjunct Associate Professor: Elukin

Interdisciplinary work leading to the degree of Master of Arts in Judaic Studies is offered by the Departments of History, Modern and Classical Languages, and Sociology. This degree is administered by the Center for Judaic Studies and Contemporary Jewish Life, which is housed in the Thomas J. Dodd Research Center. Since the program in Judaic Studies is intended to provide a synthesis of broad areas of Jewish culture and thought as a basis for constructive research in specialized aspects of Jewish civilization, students normally are required to include in their programs courses offered by the supporting departments.

Admission to the Degree Program. The Judaic Studies Admissions Committee considers applications for admission to the master's program. An undergraduate major in the area is not necessarily required, but, before admission, students must show evidence of adequate preparation.

The M.A. Program. Work leading to the degree of Master of Arts in Judaic Studies may be undertaken either with Plan A (with thesis) or Plan B (without thesis). In either case, course work in Judaic Studies is to be distributed among several departments, and the student's advisory committee is composed of representatives of these departments. The M.A. degree is offered in consortial relationship with the University of Hartford and draws on faculty from neighboring colleges and universities.

Courses of Study. Course offerings and faculty are listed under Judaic Studies and Hebrew as well as the cooperating and supporting departments referred to above: History, Modern and Classical Languages and Sociology. The Committee for Judaic Studies organizes a number of colloquia featuring staff members and visiting lecturers and encourages graduate students to attend. Two years of college-level Hebrew language instruction (or its equivalent) is required in order to receive the Master's degree.

Support. Stipends are available through the Center for Judaic Studies and Contemporary Jewish Life.

COURSES OF STUDY

JUDS 300. Topics in Biblical Studies

3 credits. Lecture. With a change in content, this course may be repeated to a maximum of six credits.

Topics in the historical, literary and philosophical study of the Bible with special emphasis on current methodological issues.

JUDS 301. Hebrew Wisdom Literature

3 credits. Seminar. Also offered as Hebrew 301.

Systematic examination of classical wisdom texts in the Hebrew Bible and Rabbinic Literature focusing on their contribution to world ethical literature. Taught in English.

JUDS 303. Religion of Ancient Israel

3 credits. Lecture.

Significant aspects of the religion of ancient Israel: The God-human relationship, the origins of good and evil, law and covenant, kingship, prophecy, ritual and morality, repentance and redemption. Taught in English.

JUDS 305. Bible and Archaeology

3 credits. Lecture.

Chronological and cultural structure of the Ancient Near East from the third millennium (3000 BCE) through the beginnings of the Byzantine period (4th century CE) with an emphasis upon the textual information presented by the Bible.

JUDS 311. History and Literature of Talmudic Palestine

3 credits. Seminar.

A discussion of select topics and texts pertaining to religious, social, and political currents in Talmudic Palestine. Taught in English.

JUDS 313. Israel and the Ancient Near East

3 credits. Lecture.

History, literature, religion and archaeology of the Ancient Near East emphasizing the role Israel played within the context of Mesopotamia and Egyptian history and culture.

JUDS 315. Ancient Jewish Fictions

3 credits. Lecture.

Hellenistic Jewish Literature in the context of ancient fictions.

JUDS 325. Seminar on the Holocaust: Philosophical and Historical Issues

3 credits. Seminar. Prerequisite: at least 6 credits of Judaic Studies graduate courses

Study of philosophical and historical issues related to the occurrence and analysis of the Holocaust.

JUDS 343. Seminar on American Jewry

3 credits. Seminar.

Applications of sociological theory and methods to the analysis of American Jewry.

JUDS 351. Seminar on Modern Jewish Philosophy

3 credits. Seminar. Prerequisite: at least 6 credits of Judaic Studies graduate courses.

Study of the principal issues and figures in Jewish philosophy from the Enlightenment to the present. Topics considered include the nature (and possibility) of Jewish philosophy, the concepts of God, nature, and the world, the status of religious knowledge, law and practice, the concept of election in relation to the people and land of Israel. Thinkers to be considered and read include Moses Mendelssohn, Solomon Maimon, S.R. Hirsch, Hermann Cohen, Franz Rosenzweig, Ahad Ha'am, Martin Buber, Emanuel Levinas, A.J. Heschel, and Joseph Soloveitchik.

JUDS 353. Modern European Jewish History

3 credits. Lecture.

Selected topics in Modern European Jewish History between the Enlightenment and the establishment of the State of Israel.

JUDS 355. Topics in Jewish Ethics

3 credits. Lecture.

Topics in Jewish ethics as reflected in literature and history, including social ethics, political ethics, economic and business ethics, sexual ethics, medical and bioethics, and others.

JUDS 390. Independent Study

3 credits. Independent Study.

JUDS 397. Special Topics in Judaic Studies

3 credits. Seminar.

†GRAD 395. Master's Thesis Research

1-9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

LINGUISTICS

Department Head: Professor Diane Lillo-Martin*Professors:* Boskovic and van der Hulst*Associate Professors:* Calabrese, Sharvit, and Snyder*Assistant Professor:* Beck

The Department of Linguistics offers study leading to the degrees of Master of Arts and Doctor of Philosophy, emphasizing theoretical research in syntax, semantics and phonology and experimental research in child language acquisition.

Admission Requirements. All applicants must submit a sample research paper (such as a thesis or term paper) written in English. It is strongly recommended that this paper be on a topic in linguistics. This research paper and three letters of recommendation are to be sent directly to the Department of Linguistics.

Application forms for admission may be obtained by writing to the Department of Linguistics or the Graduate Admissions Office.

Suitable undergraduate major fields include linguistics, cognitive science, computer science, languages, mathematics, philosophy, and psychology. Applicants are required, however, to have completed some prior course work in formal generative grammar.

Special Facilities. Resources for experimental research in child language acquisition include the excellent facilities at the University's Child Development Laboratories, as well as the Department's own Psycholinguistics Laboratory. Federal research grants to faculty members, and a long-standing association with Haskins Laboratories in New Haven, Connecticut, also provide significant research opportunities for doctoral students.

COURSES OF STUDY

LING 300. Survey of Modern Linguistic Theory

3 credits. Lecture.

The fundamental ideas of linguistics. For advanced students in other disciplines.

LING 301. Formal Foundations for Linguistic Theory

3 credits. Seminar. Open to graduate students in Linguistics, others with permission.

The bases of formal models of syntax and semantics. Languages as sets of sentences; the Chomsky hierarchy of language types; truth; quantification; Logical Form.

LING 304. Investigation of Special Topics

1-6 credits. Independent Study.

LING 305. Research Seminar in Language and Psychology

1 credits. Seminar. Open to graduate students in Linguistics, others with permission. Also offered as PSYC 305.

LING 306. Field Methods in Linguistics

3 credits. Seminar. Prerequisites: LING 308, LING 314, and LING 321.

Collection and analysis of linguistic data from native consultants.

LING 308. Phonology I

3 credits. Seminar. Open to graduate students in Linguistics, others with permission.

The analysis of sound patterns in languages within a generative framework: distinctive features, segmental and prosodic analysis, word formation, the theory of markedness.

LING 309. Phonology II

3 credits. Seminar. Prerequisite: LING 308.

The analysis of sound patterns in languages within a generative framework: distinctive features, segmental and prosodic analysis, word formation, the theory of markedness.

LING 310. Experimental Phonetics I

3 credits. Seminar. Open to graduate students in Linguistics, others with permission.

Physiology and acoustics of speech production; speech perception; analysis and synthesis of speech; experimental approaches to issues in phonology.

LING 311. Experimental Phonetics II

3 credits. Seminar. Prerequisite: LING 310.

Physiology and acoustics of speech production; speech perception; analysis and synthesis of speech; experimental approaches to issues in phonology.

LING 312. Problems in Experimental Phonetics

3 credits. Seminar. Prerequisite: LING 311.

Analysis and synthesis of speech with reference to acoustic and articulatory correlates of distinctive features.

LING 314. Linguistic Phonetics

3 credits. Seminar. Prerequisite: LING 310.

Articulatory and auditory phonetics: comparative analysis of speech sounds in a wide variety of languages; practice in production and perception: transcription.

LING 315. Problems in Phonology

3 credits. Seminar. Prerequisite: LING 309.

Advanced work in phonology.

LING 321. Syntax I

5 credits. Seminar. Open to graduate students in Linguistics, others with permission.

Transformational analysis within a Chomskyan framework; deep structure, surface structure, universal conditions on the form and application of transformational rules.

LING 322. Syntax II

3 credits. Seminar. Prerequisite: LING 321.

Transformational analysis within a Chomskyan framework; deep structure, surface structure, universal conditions on the form and application of transformational rules.

LING 323. The Acquisition of Syntax

3 credits. Seminar. Prerequisite: LING 321.

Relationship between the syntax of children's language and linguistic theory.

LING 324. Readings and Research in Syntax

3 credits. Seminar. Prerequisite: LING 322.

Examination and discussion of classic articles in syntactic theory; presentation of ongoing student research.

LING 325. Problems in Syntax

3 credits. Seminar. Prerequisite: LING 322.

Advanced work in syntax.

LING 327. Comparative Syntax

3 credits. Seminar. Prerequisite: LING 322.

Cross-linguistic study of syntactic structure; implications for linguistic theory.

LING 330. Language Contact

3 credits. Seminar. Prerequisites: LING 308 and LING 321.

Study of linguistic systems from the data of languages in contact: acquisition, bilingualism, interference.

LING 332. Methods in Acquisition

3 credits. Seminar. Prerequisite: LING 323.

Experimental methods for first language acquisition research.

LING 333. Readings and Research in Acquisition

3 credits. Seminar. Prerequisite: LING 323.

Lectures and discussion of classic and current articles in first language acquisition; presentation of ongoing student research.

LING 334. Topics in Acquisition

3 credits. Seminar. Prerequisite: LING 323.

Current topics in first language acquisition research.

LING 335. Second Language Acquisition

3 credits. Lecture.

Current research on theories of second language acquisition. Differences between first and second language development, including views on the availability of universal grammar. Linguistic input and the effect of age of immersion in a second language. Research methodologies and their validity will be discussed. Pedagogical implications derivable from this research will be addressed. Student research component.

LING 340. Historical Linguistics

3 credits. Seminar. Prerequisites: LING 309 and LING 322.

Introduction to the theories and techniques of studying linguistic change. The comparative method of reconstructing languages. Internal reconstruction. Rule change.

LING 341. Morphology

3 units. Lecture. Prerequisite: LING 308 or 321, or consent of the instructor.

Introduction to morphological analysis and to the methods of linguistic segmentation. The Lexicon. The relationships between Phonology and Morphology and between Syntax and Morphology. The nature of clitics.

LING 351. Structure of a Selected Language

3 credits. Seminar. Prerequisites: LING 308 and LING 321.

Phonological and syntactic problems of a given language.

LING 360. Seminar in General Linguistics

3 credits. Seminar. Prerequisites: LING 308 and LING 321.

Topics in general linguistics at an advanced level.

LING 361. Reading and Script

3 credits. Seminar. Open to graduate students in Linguistics, others with permission.

Linguistic and psychological aspects of written language.

LING 370. Semantics

3 credits. Seminar. Prerequisite: LING 301.

Theories of meaning and reference. Formal treatment of meaning in a generative grammar.

LING 371. Psychological Models for Syntax and Semantics

3 credits. Seminar. Open to graduate students in Linguistics, others with permission.

Psychological reality of syntactic and semantic structures. Models of sentence production, sentence perception, and comprehension.

LING 372. Topics in Semantics

3 credits. Seminar. Prerequisite: LING 370.

Current topics in semantic research.

LING 373. Semantics Seminar

3 credits. Seminar. Prerequisite: LING 370.

Classical and recent literature and current research in semantics.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

LING 405. Theories of Language

3 credits. Seminar. Prerequisites: LING 309 and LING 322.

Theories about the nature of language from the beginnings of linguistic science to the present.

LING 410. Studies in Experimental Phonetics

3 credits. Seminar. Prerequisites: LING 309 and LING 311.

Reports and critical discussion of selected topics in the literature.

†LING 411. General Exam Workshop

3 credits. Seminar.

Weekly forum for second-and third-year doctoral students to present and receive feedback on their research for General Examination papers. Regular presentations and participation in discussions required. Previous completion of three semesters of full-time course work in Linguistics recommended. Open to graduate students in Linguistics, others with permission.

†LING 412. Professional Methods

1 credit. Seminar.

Practice in writing abstracts for academic conferences. Preparation for academic job market: C.V.s, letters of application, interviews, job talks. Previous completion of three semesters of full-time graduate course work in Linguistics recommended. Open to graduate students in Linguistics, others with permission.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

MARINE SCIENCES

Department Head: Professor Ann Bucklin

Professors: Bohlen, Dam, Fitzgerald, Joesten,

Kremer, Mason, Monahan, O'Donnell,

Torgersen, Visscher, and Whitlatch

Associate Professors: Byrne, Edson, Lin, McManus,

Skoog, and Ward

Assistant Professors: Vlahos and Whitney

The Department of Marine Sciences offers study and research programs leading to the degrees of Master of Science and Doctor of Philosophy in the field of oceanography. Areas of special interest include biological, chemical, geological and physical oceanography and marine geophysics.

Because of the varied training of students and the interdisciplinary nature of marine sciences, plans of graduate study are flexible and broad in scope, and are designed to meet the needs of the individual student. The department offers several courses which are used as a core curriculum in the study of marine sciences, in addition to an array of other offerings in specific areas of the field.

Master of Science. For admission, a bachelor's degree in a related science normally is required and there are no special requirements for admission beyond those of the Graduate School. Selection of a Plan A (thesis) or Plan B (course work) degree normally is made after consultation with the student's advisory committee. Since the faculty conduct laboratory and field research programs, most students complete a research project.

Doctor of Philosophy. Students entering the doctoral program normally have a master's degree in a related science. Specific course requirements for the Ph.D. degree in oceanography are established by the student's advisory committee. Depending upon the student's committee, a foreign language or a related area of study (e.g., statistics, computer science) outside the student's major program emphasis is required. Upon passing the written portion of the general examination, the student takes an oral examination, which covers the field of oceanography.

The Department also actively participates in several interdisciplinary academic programs at the M.S. and Ph.D. level:

Biological Sciences. Certain members of the faculty also are members of the Department of Ecology and Evolutionary Biology. Work in marine ecology, botany, and evolution is available.

Marine Geophysics. Appointments of several Department faculty allow work in marine geophysics, geology and sedimentology.

Special Facilities and Educational Opportunities. The Department maintains laboratories in Groton, Connecticut. Research vessels, an ultra-clean analytical chemistry laboratory and seawater facilities are available through the Marine Sciences and Technology Center. Additional facilities are provided by biological sciences, Sea Grant, geology/geophysics, the National Undersea Research Center, the Coast Guard Research and Development Center, and the Sea Research Foundation.

COURSES OF STUDY

MARN 325. Radiotracer Applications in Natural Systems

3 credits. Lecture.

Applications of radiotracers in the environment for environmental engineers, environmental scientists, geologists, hydrologists and oceanographers. Use of radionuclides in the interpretation and quantification of aqueous transport processes. The interaction of geochemistry, mass transport and flux balances in Earth, ocean and environmental systems.

MARN 331. Marine Phytoplankton Ecology and Physiology

3 credits. Lecture.

The physiology of marine phytoplankton, environmental factors affecting their growth and photosynthesis in the ocean, the oceanographic processes responsible for the temporal and spatial distributions of phytoplankton biomass and production, and current topics in phytoplankton research.

MARN 332. Marine Zooplankton

3 credits. Lecture. Prerequisite: EEB 244 or EEB 245 or MARN 380.

The role of bioenergetics, life history, population and community dynamics and their role in biogeochemical cycles of protozoan and metazoan marine zooplankton.

MARN 336. Biogenic Fluxes in the Oceans

3 credits. Lecture. Prerequisite: MARN 380

Processes regulating the export of organic matter from the surface of the ocean to the sea bed. New and export production; role of the biotic and abiotic processes in downward transport of particulate and dissolved organic matter; current topics of research on the biological pump.

MARN 351. Aqueous Geochemistry

3 credits. Lecture.

Application of chemical theory to rock-water interaction and the geochemistry of the Earth's aqueous systems.

MARN 365. Molecular Approach to Biological Oceanography

3 credits. Lecture/Laboratory.

Principles and technology in nucleic acid purification and manipulation, DNA fingerprinting, gene cloning and sequencing, phylogenetic analysis, and detection of gene expression (mRNA and protein). Application examples in marine ecological studies.

MARN 368. Marine Geology

3 credits. Lecture.

Relationships between physical and chemical processes and the occurrences and distribution of rock types and compositions in the oceanic environment.

MARN 370. Dynamic Physical Oceanography

3 credits. Lecture.

Global energy balance. General circulation in the oceans and atmosphere. Thermodynamics and stability. Fundamental fluid mechanics. Surface gravity waves. Geophysical fluid mechanics. Tides and other long waves. Theories of global circulation.

MARN 371. Chemical Oceanography

3 credits. Lecture.

The role of the oceans in the major global biogeochemical cycles of carbon, sulfur, nutrients, gases and trace elements. Studies include reaction rates, chemical speciation, equilibria, solubility, oxidation-reduction, absorption, complexation and their effects on the composition of sea water and the transfer of substances at the Earth's surface.

MARN 372. Sediment Transport

3 credits. Lecture.

The mechanics of sediment transport with particular emphasis on the processes governing transport in coastal and estuarine areas. Initiation of motion for cohesive and noncohesive materials, bed and suspended load transport, bed forms, sediment-flow interactions, modeling considerations.

MARN 376. Estuarine Circulation

3 credits. Lecture.

The physical characteristics of estuaries, river and tidal interactions, turbulence and mixing, salt balance, circulation dynamics, mass transport and flushing, modeling considerations.

MARN 377. Ocean Waves

3 credits. Lecture. Prerequisite: MARN 370.

General methods of wave analysis; surface gravity waves; tidal wave dynamics; internal waves and tides; planetary, edge and topographic Rossby waves.

MARN 378. Advanced Dynamical Oceanography

3 credits. Lecture. Prerequisite: MARN 370.

Ocean thermodynamics; dynamics of rotating; homogeneous fluids; ocean circulation; western boundary currents; the thermocline, oceanic fronts.

MARN 379. Seminar in Chemical Oceanography

3 credits. Lecture.

Readings and discussions of current literature in chemical oceanography. For graduate and advanced students in oceanography or related fields.

MARN 380. Biological Oceanography

3 credits. Lecture.

An advanced course in biological processes in oceanic and coastal waters. Emphasis is on empirical and theoretical concepts of marine ecosystem dynamics, primary and secondary production and detrital cycling.

MARN 382. Coastal Pollution and Bioremediation

3 credits. Lecture/Laboratory.

Overview of processes and compounds leading to

pollution in the nearshore marine environment. The impact of pollution on the marine foodweb and its response is emphasized. Alleviation of pollution through metabolism of organisms, including bacteria, seagrasses and salt marshes.

MARN 385. Marine and Atmospheric Processes of Global Change

3 credits. Lecture.

Fundamentals of marine and atmospheric processes in global biogeochemistry. Evaluation of atmospheric, biological and chemical processes that contribute to global change.

MARN 386. Marine Bioorganic Chemistry

3 credits. Lecture/Laboratory.

Over view of the molecular basis of metabolic and bioenergetic pathways and processes with emphasis on life in the marine environment. Synthesis of marine natural products. Laboratory demonstrations of selected molecular and physiological techniques used in oceanography.

MARN 390. Mathematical Models in Marine Sciences

2 credits. Lecture. Prerequisite: 9 graduate credits in Marine Science.

Examples of the formulation of quantitative models of marine systems with a review of some particularly useful mathematical methods (differential equations, operational methods, numerical solution techniques), emphasizing the computation of predictions.

MARN 391. Mathematical Models in Marine Sciences: Practicum

2 credits. Practicum.

Individual term projects relating to mathematical modeling in the marine sciences.

MARN 395. Independent Study

1 credit. Independent Study.

A reading course for those wishing to pursue special work in marine sciences. It may also be elected by undergraduate students preparing to be candidates for degrees with distinction. Designate the field of special interest by use of the appropriate section symbol.

MARN 397. Research

1-3 credits. Independent Study.

Conferences and laboratory work covering selected fields of marine sciences.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

MARN 410. Special Topics in Marine Science

1-6 credits. Lecture.

MARN 441. Ecology of Marine Invertebrates

3 credits. Lecture.

Functional responses of organisms to abiotic factors in the marine environment (light, temperature, salinity, oxygen tension, intertidal exposure).

MARN 443. Marine Systems Ecology

4 credits. Lecture/Laboratory.

Effects of biotic and abiotic parameters on the structure and function of marine ecosystems. Techniques for the analysis of energetics, nutrient cycles, and trophic characteristics in both theoretical and applied problems. Field trips are required.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

MATERIALS SCIENCE

Director: Professor Harris L. Marcus

Associate Director: Professor Fotios

Papadimitrakopoulos

Distinguished Professor: Brody

Professors: Best, Braswell, Budnick, Coughlin, Cutlip, Galligan, Goldberg, Greene, Hines, Huang, Jain, Kattamis, Kessel, Knox, Marcus, Morral, Papadimitrakopoulos, Pease, Reifsnider, L. Shaw, M. Shaw, Stwalley, Suib, Sung, Tanaka, and Weiss

Associate Professors: Aindow, Burkhard, Parnas,

Seery, and Sotzing

Assistant Professors: Alpay, Asandei, Dobrynin, Huey,

Ramprasad, Utz, Wei, and Zhu

Research Professors: Boggs, Gell, and Scola

Work leading to the degrees of Master of Science and Doctor of Philosophy is offered in the interdisciplinary field of materials science through the Departments of Chemical Engineering, Chemistry, Electrical Engineering, Geology and Geophysics, Metallurgy and Materials Engineering, and Physics, as well as departments in the biological sciences.

The M.S. Program. There are no special requirements for admission to the master's program beyond those of the Graduate School. Selection of Plan A (thesis) or Plan B (non-thesis) is made after consultation with the advisory committee.

The Ph.D. Program. Admission to the doctoral program is based upon a careful assessment of the student's potential for creative research in materials science. There are no special requirements for the doctoral program beyond those of the Graduate School.

Special Facilities. The Institute of Materials Science, organized in 1965, aids in the development and coordination of the graduate programs in materials science. In addition to the laboratories of the participating academic departments, the Institute provides special laboratories for alloy chemistry, optical studies, magnetic susceptibility, electron paramagnetic resonance, nuclear magnetic resonance, ion implantation, microprobe analyses, electron microscopy, crystal growth, mechanical properties, optical microscopy, metallography, solidification, chromatography, low-temperature studies, X-ray diffraction, soft X-ray spectroscopy, surface studies, surface modification, ultrasonics, IR, UV, and VUV spectroscopy, nanotechnology, and polymer research. A multi-million-dollar building houses these and additional laboratories and facilities designed for graduate research in the materials sciences.

Extensive capability for computational materials science is available within the Institute of Materials Science and other University facilities.

Areas of concentration within the Materials Science field of study are offered in Alloy Science, Biomaterials, Corrosion Science, Crystal Science, Dental Materials, Metallurgy, and Polymer Science.

COURSES OF STUDY

Course offerings are listed under the departments referred to above. The Institute of Materials Science

also sponsors visiting professors and adjunct professors from industry in these departments, who usually offer graduate courses in their areas of expertise. In addition, the Institute sponsors a colloquium series of outstanding speakers representing various study areas in materials science not specifically covered by the regular faculty.

MATHEMATICS

Department Head: Professor Michael Neumann

Professors: Abe, Abikoff, R.F. Bass, Blei, Choi, DeFranco, Dunne, Gine, Glaz, Grochenig, Gui, Haas, Koltracht, Lerman, Madych, McKenna, Neumann, Olshevsky, Ravishanker, Sidney, Spiegel, Tollefson, Turchin, Vadiveloo, Vinsonhaler, and Vitale

Associate Professors: Bridgeman, Hernandez, Leibowitz, Peters, Russell, and Wang

Assistant Professors: Conrad, Gordina, Kaufmann, Solomon, Teplyaev, and Terwilleger

The Department of Mathematics offers work leading to the M.S. and Ph.D. degrees. The master's program permits a student to emphasize pure and applied mathematics, actuarial science, or numerical methods, with some course work taken in other departments if desired. A professional master's degree program in Applied Financial Mathematics also is offered. Advanced study at the Ph.D. level is offered in the areas of algebra and number theory, applied mathematics, classical and functional analysis, computational linear algebra, differential geometry, logic, and topology. See the details below.

The Department is one of the few offering graduate study in actuarial science and financial mathematics. Admission requirements differ slightly for this option. For details, write to the Department of Mathematics.

The M.S. Program. A sound undergraduate major in mathematics, including courses in modern algebra and advanced calculus, normally is required for entrance to the master's program. The Department recommends that students select Plan B. Further details concerning the master's (and Ph.D.) program may be obtained by writing directly to the Department of Mathematics.

It is recommended that entering graduate students applying for financial aid take the Subject Test in Mathematics of the Graduate Record Examinations.

The Ph.D. Program. Students are admitted to the Ph.D. program only after demonstrating ability and evidence of special aptitude for research in mathematics in their prior work. Although no specified number of course credits is required for the Ph.D., usually at least 24 credits of course work beyond the master's level is considered necessary. Students must satisfy the doctoral foreign language requirement of the Graduate School. Doctoral students also are expected to possess computer skills necessary for mathematics research. During the first two to three years of the student's course work, comprehensive examinations covering the major areas of mathematics must be passed. The Ph.D. dissertation contains results of original research in mathematics and makes a substantial contribution to the field. A student normally writes a dissertation in an area in which the Department has faculty actively engaged in research. Such areas are: Fourier analysis, harmonic analysis, complex analysis, Riemann surfaces, algebraic topology, topological measure theory, probability theory, low dimensional topology, abelian groups, rings, group rings, discrete groups, number theory, functional analysis, representation theory, logic, computability theory, ordinary and

partial differential equations, numerical analysis, approximation theory, differential geometry, numerical linear algebra and matrix theory, inverse problems, tomography, wavelet theory, mathematical physics, and actuarial science. Further details concerning the Ph.D. (and Master's) program and faculty research interests may be obtained by writing directly to the Department of Mathematics or by visiting the website: <www.math.uconn.edu>.

Special Facilities. The Homer Babbidge Library has extensive holdings of mathematics books and journals. Subscriptions to numerous mathematical journals are maintained and housed in the Mathematics Department Library.

A weekly colloquium featuring visiting lecturers is conducted during the academic year. Colloquia and seminars at neighboring institutions are also held on a regular basis. Because of the easy access to these institutions, there is considerable scholarly interaction.

COURSES OF STUDY

MATH 300. Investigation of Special Topics

1-6 credits. Lecture.

Students who have well defined mathematical problems worthy of investigation and advanced reading should submit to the department a semester work plan.

MATH 301. Introduction to Modern Analysis

3 credits. Lecture.

Metric spaces, sequences and series, continuity, differentiation, the Riemann-Stieltjes integral, functions of several variables.

MATH 303. Measure and Integration

3 credits. Lecture. Prerequisite: MATH 301.

Lebesgue measure and integration, differentiation, L_p spaces. Banach spaces, general theory of measure and integration.

MATH 304. Mathematical Modeling

3 credits. Lecture.

Development of mathematical models emphasizing linear algebra, differential equations, graph theory and probability. In-depth study of the model to derive information about phenomena in applied work.

MATH 305. Computerized Modeling in Science

4 credits. Lecture.

Development and computer-assisted analysis of mathematical models in chemistry, physics, and engineering. Topics include chemical equilibrium, reaction rates, particle scattering, vibrating systems, least squares analysis, quantum chemistry and physics.

MATH 307. Introduction to Geometry and Topology I

3 credits. Lecture. Prerequisite: MATH 301, which may be taken concurrently.

Topological spaces, connectedness, compactness, separation axioms, Tychonoff theorem, compact-open topology, fundamental group, covering spaces,

simplicial complexes, differentiable manifolds, homology theory and the De Rham theory, intrinsic Riemannian geometry of surfaces.

MATH 308. Introduction to Geometry and Topology II

3 credits. Lecture. Prerequisite: Math 307.

Topological spaces, connectedness, compactness, separation axioms, Tychonoff theorem, compact-open topology, fundamental group, covering spaces, simplicial complexes, differentiable manifolds, homology theory and the De Rham theory, intrinsic Riemannian geometry of surfaces.

MATH 309. Optimization

3 credits. Lecture.

Theory of linear programming: convexity, bases, simplex method, dual and integer programming, assignment, transportation, and flow problems. Theory of nonlinear programming: unconstrained local optimization, Lagrange multipliers, Kuhn-Tucker conditions, computational algorithms. Concrete applications.

MATH 310. Introduction to Applied Mathematics I

3 credits. Lecture.

Banach spaces, linear operator theory and application to differential equations, nonlinear operators, compact sets on Banach spaces, the adjoint operator on Hilbert space, linear compact operators, Fredholm alternative, fixed point theorems and application to differential equations, spectral theory, distributions.

MATH 311. Introduction to Applied Mathematics II

3 credits. Lecture.

Banach spaces, linear operator theory and application to differential equations, nonlinear operators, compact sets on Banach spaces, the adjoint operator on Hilbert space, linear compact operators, Fredholm alternative, fixed point theorems and application to differential equations, spectral theory, distributions.

MATH 313. Numerical Analysis and Approximation Theory I

3 credits. Lecture. Prerequisite: MATH 301, which may be taken concurrently.

The study of convergence, numerical stability, roundoff error, and discretization error arising from the approximation of differential and integral operators.

MATH 314. Numerical Analysis and Approximation Theory II

3 credits. Lecture. Prerequisite: MATH 313.

The study of convergence, numerical stability, roundoff error, and discretization error arising from the approximation of differential and integral operators.

MATH 315. Abstract Algebra I

3 credits. Lecture.

A study of the fundamental concepts of modern

algebra: groups, rings, fields. Also selected topics in linear algebra.

MATH 316. Abstract Algebra II

3 credits. Lecture. Prerequisite: MATH 315.

A study of the fundamental concepts of modern algebra: groups, rings, fields. Also selected topics in linear algebra.

MATH 318. Modern Matrix Theory and Linear Algebra

3 credits. Seminar.

The LU, QR, symmetric, polar, and singular value matrix decompositions. Schur and Jordan normal forms. Symmetric, positive-definite, normal and unitary matrices. Perron-Frobenius theory and graph criteria in the theory of non-negative matrices.

MATH 319. Topics in Scientific Computation

3 credits. Lecture.

MATH 321. Topics in Algebra

3 credits. Lecture. Prerequisite: MATH 316.

Advanced topics from group theory, abelian groups, rings and homological algebra, Lie algebras, algebraic groups, group rings, combinatorics.

MATH 322. Probability Theory and Stochastic Processes I

3 credits. Lecture. Prerequisite: MATH 303.

Convergence of random variables and their probability laws, maximal inequalities, series of independent random variables and laws of large numbers, central limit theorems, martingales, Brownian motion. Contemporary theory of stochastic processes, including stopping times, stochastic integration, stochastic differential equations and Markov processes, Gaussian processes, and empirical and related processes with applications in asymptotic statistics.

MATH 323. Probability Theory and Stochastic Processes II

3 credits. Lecture. Prerequisite: MATH 322.

Convergence of random variables and their probability laws, maximal inequalities, series of independent random variables and laws of large numbers, central limit theorems, martingales, Brownian motion. Contemporary theory of stochastic processes, including stopping times, stochastic integration, stochastic differential equations and Markov processes, Gaussian processes, and empirical and related processes with applications in asymptotic statistics.

MATH 324. Advanced Financial Mathematics

3 credits. Lecture.

An introduction to the standard models of modern financial mathematics including martingales, the binomial asset pricing model, Brownian motion, stochastic integrals, stochastic differential equations, continuous time financial models, completeness of the financial market, the Black-Scholes formula, the fundamental theorem of finance, American options, and term structure models.

MATH 325. Ordinary Differential Equation
3 credits. Lecture. Prerequisite: MATH 303.

Existence and uniqueness of solutions, stability and asymptotic behavior. If time permits: eigenvalue problems, dynamical systems, existence and stability of periodic solutions.

MATH 326. Partial Differential Equations
3 credits. Lecture. Prerequisite: MATH 340.

Cauchy Kowalevsky Theorem, classification of second order equations, systems of hyperbolic equations, the wave equation, the potential equation, the heat equation in \mathbb{R}^n .

MATH 327. Topics in Applied Analysis I
3 credits. Lecture.

Advanced topics from the theory of ordinary or partial differential equations. Other possible topics: integral equations, optimization theory, the calculus of variations, advanced approximation theory.

MATH 328. Topics in Applied Analysis II
3 credits. Lecture.

Advanced topics from the theory of ordinary or partial differential equations. Other possible topics: integral equations, optimization theory, the calculus of variations, advanced approximation theory.

MATH 329. Introduction to Representation Theory

3 credits. Lecture. Prerequisite: MATH 315.

Semi-simple rings, Jacobson radical, density theory, Wedderburn's Theorem, representations and characters of groups, orthogonality relations, Burnside's theorem.

MATH 330. Algebraic Number Theory

3 credits. Lecture. Prerequisite: MATH 316.

Valuations, p -adic and local fields, ideal theory of Dedekind domains, cyclotomic extensions, units in algebraic number fields.

MATH 332. Topics in Analysis I

3 credits. Lecture.

MATH 333. Topics in Analysis II

3 credits. Lecture. Prerequisite: MATH 332.

MATH 335. Mathematical Logic I

3 credits. Lecture. Prerequisite: MATH 315.

Predicate calculus, completeness, compactness, Lowenheim-Skolem theorems, formal theories with applications to algebra, Godel's incompleteness theorem. Further topics chosen from: axiomatic set theory, model theory, recursion theory, computational complexity, automata theory and formal languages.

MATH 336. Topics in Mathematical Logic

3 credits. Lecture. Prerequisite: Math 335. May be repeated for credit with a change in content.

Topics include, but are not restricted to, Computability Theory, Model Theory, and Set Theory.

MATH 337. Topics in Geometry and Topology I

3 credits. Lecture.

Advanced topics from uniform spaces, topological groups, Lie groups, fiber spaces, theory of submanifolds, PL topology, differential topology, cohomology operations, complex manifolds, Riemannian manifolds, transformation groups, fixed point theory.

MATH 338. Topics in Geometry and Topology II

3 credits. Lecture. Prerequisite: MATH 337.

Advanced topics from uniform spaces, topological groups, Lie groups, fiber spaces, theory of submanifolds, PL topology, differential topology, cohomology operations, complex manifolds, Riemannian manifolds, transformation groups, fixed point theory.

MATH 340. Complex Function Theory I

3 credits. Lecture. Prerequisite: MATH 301.

An introduction to the theory of analytic functions, with emphasis on modern points of view.

MATH 341. Topics in Complex Function Theory

3 credits. Lecture. Prerequisite: MATH 340. May be repeated for credit to a maximum of 12 credits with a change in content and consent of the instructor.

Advanced topics of contemporary interest. These include Riemann surfaces, Kleinian groups, entire functions, conformal mapping, several complex variables, and automorphic functions, among others.

MATH 342. Finite Element Solution Methods I

3 credits. Lecture.

Numerical solution of elliptic, parabolic and hyperbolic partial differential equations by finite element solution methods. Applications.

MATH 343. Finite Element Solution Methods II

3 credits. Lecture. Prerequisite: MATH 342

Numerical solution of elliptic, parabolic and hyperbolic partial differential equations by finite element solution methods. Applications.

MATH 347. Tensor Calculus I

3 credits. Lecture.

An introduction to tensor algebra and tensor calculus with applications chosen from the fields of the physical sciences and mathematics.

MATH 348. Tensor Calculus II

3 credits. Lecture. Prerequisite: MATH 347.

An introduction to tensor algebra and tensor calculus with applications chosen from the fields of the physical sciences and mathematics.

MATH 352. Introduction to Complex Variables

3 credits. Lecture. Not open to students who have passed MATH 252. Not open for graduate credit toward degrees in Mathematics.

Functions of a complex variable, integration in the complex plane, conformal mapping.

MATH 354. Functional Analysis I

3 credits. Lecture. Prerequisites: MATH 303 and MATH 316.

Normed linear spaces and algebras, the theory of linear operators, spectral analysis.

MATH 355. Functional Analysis II

3 credits. Lecture. Prerequisite: MATH 354.

Normed linear spaces and algebras, the theory of linear operators, spectral analysis.

MATH 357. Differential Geometry

3 credits. Lecture.

An introduction to the study of differentiable manifolds on which various differential and integral calculi are developed. A special emphasis is placed on the global aspects of modern differential geometry.

MATH 360. Mathematical Pedagogy

1 credit. Seminar. Open to graduate students in Mathematics, others with consent of instructor. May not be used to satisfy degree requirements in mathematics.

The theory and practice of teaching mathematics at the college level. Basic skills, grading methods, cooperative learning, active learning, use of technology, classroom problems, history of learning theory, reflective practice.

MATH 365. Financial Mathematics I

3 credits. Lecture. Not open to students who have passed MATH 285Q

The mathematics of measurement of interest, accumulation and discount, present value, annuities, loans, bonds, and other securities.

MATH 366. Introduction to Operations Research

3 credits. Lecture. Not open to students who have passed MATH 286, STAT 286, or STAT 356.

Introduction to the use of mathematical and statistical techniques to solve a wide variety of organizational problems. Topics include linear programming, project scheduling, queueing theory, decision analysis, dynamic and integer programming and computer simulation.

MATH 369. Financial Mathematics II

3 credits. Lecture. Not open to students who have passed MATH 289.

The continuation of MATH 365. Measurement of financial risk, the mathematics of capital budgeting, mathematical analysis of financial decisions and capital structure, and option pricing theory.

MATH 373. Algebraic Topology I

3 credits. Lecture. Prerequisite: MATH 316 and MATH 307, which may be taken concurrently.

Complexes, homology and cohomology groups, homotopy theory.

MATH 374. Algebraic Topology II

3 credits. Lecture. Prerequisite: MATH 373.

Complexes, homology and cohomology groups, homotopy theory.

MATH 375. Analysis

3 credits. Lecture.

Introduction to the theory of functions of a real variable. Not open for graduate credit toward degrees in Mathematics. Not open to students who have passed MATH 273.

MATH 377. Applied Analysis

3 credits. Lecture. Not open to students who have passed MATH 277. May not be used for credit for Mathematics graduate degrees.

Convergence of Fourier Series, Legendre and Hermite polynomials, existence and uniqueness theorems, two point boundary value problems and Green's functions.

MATH 378. Introduction to Partial Differential Equations

3 credits. Lecture.

Solution of first and second order partial differential equations with applications to engineering and science.

MATH 381. Fourier Analysis

3 credits. Lecture. Prerequisites: MATH 303 and MATH 341.

Foundations of harmonic analysis developed through the study of Fourier series and Fourier transforms.

MATH 382. Fourier Analysis on Groups

3 credits. Lecture. Prerequisites: MATH 303 and MATH 341.

MATH 385. Vector Field Theory I

3 credits. Lecture.

Vector algebra and vector calculus with particular emphasis on invariance. Classification of vector fields. Solution of the partial differential equations of field theory.

MATH 386. Vector Field Theory II

3 credits. Lecture. Prerequisite: MATH 385.

Vector algebra and vector calculus with particular emphasis on invariance. Classification of vector fields. Solution of the partial differential equations of field theory.

MATH 387. Actuarial Mathematics I

3 credits. Lecture. Prerequisite: MATH 285 or MATH 365, which may be taken concurrently. Not open to students who have passed MATH 287.

Survival distributions, claim frequency and severity distributions, life tables, life insurance, life annuities, net premiums, net premium reserves, multiple life functions, and multiple decrement models.

MATH 388. Actuarial Mathematics II

3 credits. Lecture. Prerequisite: MATH 387. Not open to students who have passed MATH 288.

Survival distributions, claim frequency and severity distributions, life tables, life insurance, life annuities, net premiums, net premium reserves, multiple life functions, and multiple decrement models.

MATH 390. Graduate Field Study Internship
1-3 credits. Practicum
Participation in internship and paper describing experiences.

MATH 392. Advanced Topics in Actuarial Mathematics I
3 credits. Lecture.
Survival models, mathematical graduation, or demography.

MATH 393. Advanced Topics in Actuarial Mathematics II
3 credits. Lecture.
Credibility theory or advanced theory of interest.

MATH 394. Survival Models
3 credits. Lecture. Prerequisite: MATH 387.
Analysis, estimation, and validation of lifetime tables.

MATH 395. Risk Theory
3 credits. Lecture.
Individual risk theory, distribution theory, ruin theory, stoploss, reinsurance and Monte Carlo methods. Emphasis is on problems in insurance.

†**GRAD 395. Master's Thesis Research**
1 - 9 credits.

†**GRAD 396. Full-Time Master's Research**
3 credits.

†**GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

MATH 401. Seminar in Current Mathematical Literature
1-6 credits. Seminar.
Participation and presentation of mathematical papers in joint student faculty seminars. Variable topics.

†**MATH 410. Seminar in Algebra**
1-6 credits. Seminar. Prerequisite: MATH 316.

†**MATH 430 Seminar in Geometry**
1-6 credits. Seminar. Prerequisite: MATH 357.

†**MATH 435. Seminar in Mathematical Logic**
1-6 credits. Seminar. Prerequisite: MATH 335.

†**MATH 450. Seminar in Analysis**
1-6 credits. Seminar.

MATH 460. Computers in Mathematical Research
1 credit. Lecture.

†**MATH 470. Seminar in Topology**
1-6 credits. Seminar. Prerequisite: MATH 374.

†**MATH 471. Seminar in Set Theory**
1-6 credits. Seminar. Prerequisite: MATH 307.

†**MATH 480. Seminar in Applied Mathematics**
1-6 credits. Seminar.

†**GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.

†**GRAD 496. Full-Time Doctoral Research**
3 credits.

†**GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

MECHANICAL ENGINEERING

Department Head: Professor Ranga Pitchumani
Professors: Bergman, Cetegen, Faghri, Jordan, Kazerounian, Olgac, Reifsnider, Sammes, and Zhang
Associate Professors: Bennett, Bzymek, Chiu, Jeffers, and Murphy
Assistant Professors: Ilies, Renfro, and Tufeci
Faculty in Residence: Barber, Barbir, Crow, Huang

The Department of Mechanical Engineering offers study leading to the degree of Master of Science (Plans A and B) and Doctor of Philosophy in mechanical engineering. It also cooperates with other departments to provide doctoral study in other areas (see "Applied Mechanics," "Biomedical Engineering," and "Fluid Dynamics"). Non-degree students may register for courses in the Department of Mechanical Engineering with the approval of the department head. Financial support in the form of graduate teaching or research assistantships is offered to our top full-time graduate students on a competitive basis.

Masters and Doctoral Programs. Students working toward the M.S. and Ph.D. degrees in mechanical engineering may choose, in consultation with their advisory committee, from a wide selection of courses in this and other departments. Doctoral students are required to take a qualifying examination early in the program. Guidelines for course selection and the department's requirements for the Masters and Ph.D. degrees are explained in the Mechanical Engineering Graduate Handbook, http://www.engr.uconn.edu/~me_dgs/gradhandbook.pdf.

The research and course offerings in the Systems and Mechanics area focus on new applications of the fundamental principles in the areas such as mechanics of materials, viscoplasticity, fracture mechanics, nanomechanics, fuel cells, nonlinear dynamics and vibration, stability, automation, computer-aided design, kinematics, lubrication, manufacturing, and optimization.

The research and course offerings in the Thermofluids area include classical and statistical theories of thermodynamics, studies of conduction, convection, and radiation, compressible flow, advanced fluid dynamics, turbulence, and multiphase heat transfer and fluid flow. Engineering applications of the fundamental principles to many systems, processes, and devices, such as gas turbines, thermal manufacturing, fuel cells, micro- and nanoscale systems, and combustion, are treated.

For the latest on the faculty profiles and the research activities, visit the Department's website, <http://www.engr.uconn.edu/me>.

Facilities. The laboratories of the Department of Mechanical Engineering are equipped with several major facilities as well as ancillary equipment. A list of Mechanical Engineering laboratories and facilities may be found at the Department website, <http://www.engr.uconn.edu/me>.

COURSES OF STUDY**ME 300. Independent Study in Mechanical Engineering**

3 credits. Independent Study.

Individual exploration of special topics as arranged by student and instructor.

ME 301. Macroscopic Equilibrium Thermodynamics I

3 credits. Lecture.

Review of zeroth, first and second laws of thermodynamics, development of equilibrium thermodynamics from a postulatory viewpoint, examination of thermodynamic potentials and equilibrium states, stability of thermodynamic systems including implications on phase and chemical equilibrium. Thermodynamic availability analysis.

ME 302. Macroscopic Equilibrium Thermodynamics II

3 credits. Lecture. Prerequisite: ME 301.

Review of zeroth, first and second laws of thermodynamics, development of equilibrium thermodynamics from a postulatory viewpoint, examination of thermodynamic potentials and equilibrium states, stability of thermodynamic systems including implications on phase and chemical equilibrium. Thermodynamic availability analysis.

ME 303. Macroscopic Non-equilibrium Thermodynamics I

3 credits. Lecture. Prerequisite: ME 302.

A study of the laws and equations applicable to non-equilibrium processes of a very general nature; this will include the conservation laws, entropy law and entropy balance, the phenomenological equations. Onsager's relations and the fluctuation dissipation theorem. Selected application of the foundations will include heat conduction, diffusion and cross effects, viscous flow and relaxation phenomena, and discontinuous system processes.

ME 304. Macroscopic Non-equilibrium Thermodynamics II

3 credits. Lecture. Prerequisite: ME 303.

A study of the laws and equations applicable to non-equilibrium processes of a very general nature; this will include the conservation laws, entropy law and entropy balance, the phenomenological equations. Onsager's relations and the fluctuation dissipation theorem. Selected application of the foundations will include heat conduction, diffusion and cross effects, viscous flow and relaxation phenomena, and discontinuous system processes.

ME 305. Basic Concepts of Continuum Mechanics

3 credits. Lecture.

An introductory course in the theory of continuum mechanics. Development of physical principles using cartesian tensors. Concepts of stress, strain and motion. Basic field equation for the Newtonian fluid and the elastic solid.

ME 307. Engineering Analysis I

3 credits. Lecture.

Matrix algebra, indicial notation and coordinate transformations. Cartesian and general vectors and tensors, vector and tensor calculus. Partial differential equations: Fourier series, solution procedures to boundary value problems in various domains. Application to the mechanics of continuous media.

ME 308. Engineering Analysis II

3 credits. Lecture.

Calculus of variations including transversality conditions, constraints, Lagrange multipliers, Rayleigh-Ritz and Galerkin methods. Integral transform techniques including Laplace, Fourier, Hankel, and Mellin transforms, Integral equations.

ME 311. Statistical Thermodynamics

3 credits. Lecture.

A microscopic development of thermodynamics including statistical ensembles, quantum statistical mechanics, and a comparison of various molecular models.

ME 312. Laminar Viscous Flow

3 credits. Lecture.

Derivation of the Navier Stokes Equation. Exact solutions of the Navier Stokes Equation. Derivation of laminar boundary layer equations for plan and axially symmetric flow. Methods of solution of the laminar boundary layer equations including Blasius solution, momentum integral method and Falkner-Skan similarity solutions. Application to the flow over plates and bodies of various shapes. Jets and wakes.

ME 313. Flow of Compressible Fluids I

3 credits. Lecture.

Equations of motion of a compressible fluid. Quasi-one-dimensional flow including effects of friction, heat addition, and normal shocks. Two and three dimensional flows. Velocity potential and stream function. Small perturbation theory. Subsonic pressure correction formulas. Kelvin and Crocco Theorems. Method of characteristics for steady and unsteady, rotational and irrotational flows. Curved and oblique shock waves. Shock tube theory.

ME 314. Flow of Compressible Fluids II

3 credits. Lecture. Prerequisite: ME 313.

Equations of motion of a compressible fluid. Quasi-one-dimensional flow including effects of friction, heat addition, and normal shocks. Two and three dimensional flows. Velocity potential and stream function. Small perturbation theory. Subsonic pressure correction formulas. Kelvin and Crocco Theorems. Method of characteristics for steady and unsteady, rotational and irrotational flows. Curved and oblique shock waves. Shock tube theory.

ME 315. Hypersonic Aerodynamics

3 credits. Lecture. Prerequisite: ME 313.

Hypersonic small disturbance theory; similarity laws. Newtonian, shock-expansion and blast-wave theories of hypersonic flow. Aerodynamic shapes for

minimum hypersonic drag. Physical properties of real gases; shock waves in real gas flow.

ME 317. Aerothermal Analysis

3 credits. Lecture. Prerequisite: ME 313.

High-speed, viscous compressible flow. Equations of motion. Thermodynamic and transport properties of high temperature gases. Blunt body heating. Boundary layer equations and transformations. Hypersonic boundary layers with heat and mass transfer. Reference enthalpy methods.

ME 318. Computational Methods of Viscous Fluid Dynamics

3 credits. Lecture.

An advanced course on integral and finite-difference methods of solution of the parabolic and elliptic equations of viscous fluid flow. Method of weighted residuals; Crank-Nicolson; Dufort-Frankel; Peaceman-Rachford alternating direction method; truncation error analysis; stability. Applications to boundary layer and heat transfer problems. A background of FORTRAN programming and numerical analysis is necessary.

ME 320. Special Topics in Mechanical Engineering

1-3 credits. Lecture

Classroom and/or laboratory courses in special topics as announced in advance for each semester. The field of study or investigation is to be approved by the Head of the Department before announcement of the course.

ME 321. Conduction Heat Transfer

3 credits. Lecture.

Mathematical development of the fundamental equations of heat conduction in the steady and unsteady state, with or without internal heat generation or absorption. Study of exact and approximate methods used in the solution of heat conduction boundary value problems. Analytical, graphical, numerical and experimental evaluation of the temperature field in conducting media.

ME 323. Convection Heat Transfer

3 credits. Lecture.

A study of heat transfer to laminar and turbulent boundary layers for both compressible and incompressible fluids. Free convection heat transfer is also investigated.

ME 324. Radiation Heat Transfer

3 credits. Lecture. Prerequisite: ME 307.

Fundamentals of radiative emission (black body behavior and Planck's law), surface properties (emissivity, absorptivity, reflectivity, and transmissivity), electromagnetic theory for prediction of radiative properties, development of the methods of solution for radiant energy interchange between surfaces and in enclosures with and without absorbing, emitting, and scattering media present.

ME 326. Heat and Mass Transfer in Multi-Phase Systems

3 credits. Lecture.

The mechanics of heat and mass transfer and fluid flow with phase change, i.e., condensation, nucleate and film boiling, freezing, melting, sublimation, and ablation. Adiabatic and diabatic flow of multi-phase fluids in single or multi-component systems.

ME 327. Applied Solar Energy
3 credits. Lecture. Prerequisite: ME 321.

Study of the technology and economics of solar energy conversion to useful forms. Review of heat transfer and energy storage. Collector design and performance analysis. System design of water heaters and space heating/cooling systems. Review of wind power, wave power, ocean thermal energy conversion and satellite solar power systems.

ME 331. Analytical and Applied Kinematics
3 credits. Lecture.

Analytical methods of coordinate transformation and two and three dimensional motion, analysis of relative motion and relative freedom through kinematics connections, study of finite and instantaneous properties of motion, study of the geometry of single and multi-parameter engineering curves, surfaces and motions. Application in the analysis and design of linkages and mechanisms.

ME 335. Principles of Optimum Design
3 credits. Lecture. Not open to students who have passed ME 334.

Engineering modeling and optimization for graduate students in all areas of engineering. Problem formulation, mathematical modeling, constrained and unconstrained optimization, interior and boundary optima constraint interaction, feasibility and boundedness, model reduction, sensitivity analysis, linear programming, geometric programming, nonlinear programming, and numerical methods in optimization.

ME 337. Advanced Optimum Design
3 credits. Lecture. Prerequisite: MATH 272Q, ME 334, or ME335

Advanced techniques in engineering design and process modeling optimization for graduate students in all areas of engineering. Review of theories of multi-variable constrained and unconstrained optimization, and computational techniques in nonlinear programming, structured programming, including integer programming, quadratic programming, genetic algorithms, theories of multivariable optimization from calculus of variations, computational techniques in functional optimization.

ME 338. Turbines and Centrifugal Machinery

3 credits. Lecture. Prerequisite: ME 313.

Theory, design and performance of centrifugal and axial flow machinery including turbines, blowers, fans, compressors, superchargers, pumps, fluid couplings and torque converters. A detailed study of the mechanics of the transfer of energy between a fluid and a rotor.

ME 342. Reaction Engines

3 credits. Lecture. Prerequisite: ME 313.

Dynamics of gas flow, including heat addition of friction. Thermodynamic analysis of ram-jets, gas turbines and rockets and their components. Principles of propulsion systems. Nuclear, thermoelectric, ionic, and high energy propulsion devices.

ME 344. Advanced Internal Combustion Engines

3 credits. Lecture. Prerequisite: ME 251 or ME 301

An analytical study of the factors influencing the operation and performance of the internal combustion engine. Spark-ignition and compression ignition engine theory. Emphasis on the latest analytical and experimental developments.

ME 346. Combustion and Air Pollution Engineering

3 credits. Lecture.

Review of thermodynamics and chemical equilibrium. Introduction to chemical kinetics. Studies of combustion processes, including diffusion and premixed flames. Combustion of gases, liquid, and solid phases, with emphasis on pollution minimization from stationary and mobile systems. Air pollution measurement and instrumentation.

ME 347. Environmental Engineering

3 credits. Lecture. Prerequisite: ME 250 or ME 301.

Design and arrangement of heating, air conditioning and refrigeration equipment and controls to meet comfort and industrial process requirements.

ME 349. Modern Computational Mechanics

3 credits. Lecture.

An advanced course in Computational Mechanics with emphasis on modeling problems using Finite Differences and Finite Element techniques. Projects include initial value problems, ordinary differential equations and partial differential equations. Course evaluation is made by the successful completion of several assigned projects.

ME 351. Advanced Combustion

3 credits. Lecture. Prerequisite: either ME 234 and ME 250 or ME 346

Review of thermodynamic properties, transport properties, conservation equations of multicomponent reacting gas. Introduction to chemical kinetics. Classification of combustion waves. Deflagrations, detonations and diffusion flames. Ignition phenomena, droplet and spray combustion and some aspects of turbulent combustion.

ME 352. Seminar in Combustion Generated Pollution

3 credits. Lecture. Prerequisite: either ME 351 or ENVE 341.

A study of the mechanism of production of pollutants such as nitrogen oxides, carbon monoxide, sulphur dioxide, soot and unburned hydrocarbons from power plants such as stationary gas turbines, internal combustion engines, and jet engines. Emphasis will be

placed on current research problems and recent advances in combustor designs.

ME 356. Computer Graphics for Design
3 credits. Lecture.

A practical study of interactive computer graphics as applied to engineering design. Graphics hardware, interactive techniques, transformations, remote graphic systems, and stand-alone minicomputer based systems are discussed emphasizing their application in engineering design. Practical experience is gained through assignments involving various graphics systems.

ME 357. Wave Propagation in Continuous Media

3 credits. Lecture. Prerequisite: ME 305.

General dynamical equations for linear elastic media including both solids and fluids. Wave propagation in elastic rods, plates, cylinders, and semi-infinite and infinite solids. Rayleigh and Love waves; Layered media; reflection and refraction.

ME 358. Theory of Elasticity

3 credits. Lecture. Prerequisite: ME 305.

The mathematical theory of linear elasticity. The theory of torsion of prismatic members. Two-dimensional elasticity problems. Thermal stress. Variational methods.

ME 359. Tribology

3 credits. Lecture.

The theory of fluid film lubrication, including hydrodynamic, externally pressurized and squeeze film mechanisms of load support in bearings. Fixed and pivot pad thrust bearings; air bearings; journal bearings. Elastohydrodynamic lubrication; boundary lubrication; liquid and solid lubricants. Direct solid contact and rolling element contact bearings. Theories of wear. Design considerations in lubrication and wear.

ME 360. Dynamics

3 credits. Lecture.

Three-dimensional particle and rigid-body mechanics. Particle kinematics. Newton's laws, energy and momentum principles. Systems of particles. Rigid body kinematics, coordinate transformations. Rigid body dynamics, Euler's equations. Gyroscopic motion. Lagrange's equations.

ME 361. Advanced Dynamics

3 credits. Lecture. Prerequisite: ME 360.

Variational principles of mechanics: Lagrange's equations, Hamilton's principle. Hamilton-Jacobi theory, canonical transformations, integrability. Introduction to special relativity, applications to orbital problems. Current topics in analytical dynamics.

ME 362. Mechanical Vibrations I

3 credits. Lecture.

Variational principles, Lagrange's equation. Equations of motion for multi-degree of freedom systems. Free vibration eigenvalue problem: modal analysis. Forced solutions: general solutions, resonance, effect of damping, and superposition. Vibrations of continuous systems: vibration

frequencies and mode shapes for strings, bars, membranes, beams, and plates. Experimental methods and techniques.

ME 363. Mechanical Vibrations II

3 credits. Lecture. Prerequisite: ME 362.

Variational mechanics, Hamilton's principle, and energy formulations for linearly inelastic bodies. Eigenvalue and boundary-value problems. Non-self adjoint systems. Approximate methods: Ritz and Galerkin. Gyroscopic systems. Nonconservative systems. Perturbation theory for the eigenvalue problem. Dynamics of constrained systems.

ME 364. Mechanics of Composites and Laminates

3 credits. Lecture. Prerequisite: either ME358 or CE 324

Review of elasticity theory. Average theorems. Effective constitutive relations for heterogeneous media. Variational bounding. Isotropic elastic composites fiber reinforced and laminated materials.

ME 365. Fatigue in Mechanical Design

3 credits. Lecture. Not open to students who have passed ME 228.

Design calculation methods for the fatigue life of engineering components, fundamentals of fracture mechanics. Crack initiation and crack propagation fatigue lives. Neuber analysis, multiaxial stress, cyclic stress-strain behavior, mean and residual stress effects. Selected current research topics, advanced research and design projects.

ME 367. Principles of Machine Tool Design

3 credits. Lecture.

The basic principles and philosophies in the design of precision machine tools. Mathematical theory and precision machine tools. Mathematical theory and physics of errors. The building up of error budget and the mapping of geometric and thermal errors. Design case study of a precision machine tool. Discussion of various types of sensors and actuators, bearings, and transmissions. System design considerations.

ME 369. Theory of Plasticity

3 credits. Lecture.

Introduces the physical basis for inelastic behavior and various mathematical descriptions for non-linear deformation. Provides an overview of plastic deformation in metals, including the role of dislocation behavior in strain hardening and strengthening. Detailed topics include yield surfaces, flow rules, hardening rules and introduction to viscoplastic modeling; emphasis is on finite element computer-based implementation of the concepts and their use in predicting the behavior of structures.

ME 371. Predictive Machinability

3 credits. Lecture.

Precision machining. Micromechanics in precision machining. Theories of energy dissipation in machining. Models for material-removal mechanisms. Models for interaction between cutting tool edge and

workpiece. Precision machining of advanced materials. Tribological aspects in precision machining. Surface integrity. Machining tool positioning control and concept of minimum depth of cut.

ME 372. Theory and Design of Automatic Control Systems

3 credits. Lecture.

Design features of a closed loop control system. Laplace domain analysis of electromechanical, pneumatic, hydraulic, thermal, and mechanical systems. Computer simulation of dynamic responses using software tools. Stability issues, Routh analysis, root locus, Bode and Nyquist analyses are addressed. An open-ended, hands-on design project from a current research topic is assigned.

ME 373. Physical Acoustics

3 credits. Lecture.

The basic principles of the generation and propagation of sound. Mathematical theory of vibration and sound, including single and multi-dimensional waves in stationary and moving media. Physical properties of sound waves; propagation of sound in confined and free space; refraction, reflection, and scattering from strong and weak inhomogeneities.

ME 374. Underwater Sound

3 credits. Lecture.

The propagation of sound in sea-water, including effects of temperature and salinity gradients. Transducers. Flow noise.

ME 375. Advanced Analysis and Design of Mechanisms

3 credits. Lecture. Prerequisite: either ME 224 or ME 331.

Kinematic analysis and synthesis of planar and spatial linkages with lower pairs. Type and number synthesis. Finite position and higher order design. Unified treatment of position, path-angle and function generation problems. Approximation synthesis and optimization. Defect elimination and performance evaluation, introduction to commercial software.

ME 376. Robotic Manipulators

3 credits. Lecture. Prerequisite: either ME 224 and ME 230 or ME 372.

Modeling of 3-D industrial robots; kinematic and dynamic analysis of manipulators. Manipulation techniques. Design workspace and performance criteria. Review of control techniques. Hardware requirements. On-line and off-line optimal trajectory planning.

ME 377. Non-Linear Vibrations

3 credits. Lecture.

Vibrations of non-linear single-degree-of-freedom systems. Singular points. Liapunoff function. Approximation techniques. Stability. Self-excited vibrations. Vibrations of non-linear multi-degree-of-freedom systems.

ME 378. Random Vibrations

3 credits. Lecture. Prerequisite: ME 363 and MATH 231.

Introduction to theory of sets. Statistical preliminaries. Fourier transforms. Random vibrations of single-degree-of-freedom and two-degree-of-freedom systems. Random vibrations of systems with distributed mass. Theories of failure.

ME 379. Advances in Control Systems Design

3 credits. Lecture. Prerequisite: ME 230 or ME 372 or ME 307.

Review of the state space design concepts for control systems. Mathematical modeling of dynamic systems. Lagrange's and Newton's representations. Decentralized or linearized control. Variable structure systems. Sliding mode control of nonlinear systems and discussions of constraint control cases. Time-delayed systems. Stability-based analysis and synthesis. Engineering applications. Open-ended control system design projects.

ME 380. Finite Element Methods in Applied Mechanics I

3 credits. Lecture. Also offered as CE 366. This course and CE 363 may not both be taken for credit.

Formulation of finite elements methods for linear static analysis. Development of two and three dimensional continuum elements, axisymmetric elements, plate and shell elements, and heat transfer elements. Evaluation of basic modeling principles including convergence and element distortion. Applications using commercial finite element programs.

ME 381. Finite Element Methods in Applied Mechanics II

3 credits. Lecture. Also offered as CE 367.

Formulation of finite elements methods for modal and transient analysis. Development of implicit and explicit transient algorithms. Stability and accuracy analysis. Formulation of finite element methods for material and geometric nonlinearities. Development of nonlinear solution algorithms. Applications using commercial finite element code.

ME 383. Marine Vehicle Hydrodynamics

3 credits. Lecture.

Potential flow. Modifications to potential theory which take account of real fluid effects, such as skin friction, separation, and surface wave resistance. Hydrodynamic considerations in hull design.

ME 384. Marine Vehicle Propulsion and Control

3 credits. Lecture. Prerequisite: ME 383.

Requirements of propulsion equipment for surface and submerged vehicles: internal combustion engines, turbines, nuclear power plants. Propellor theory. Control of buoyancy for submersibles. Maneuverability.

ME 385. Submersible Structures

3 credits. Lecture. Prerequisite: ME 305.

Design of pressure vessels. Methods of stiffening of shell structures. Requirements imposed by the underwater environment.

ME 386. Computer Integrated Manufacturing Systems

3 credits. Lecture. Not open to students who have passed ME 221.

Topics in Computer Integrated Manufacturing (CIM) including the fundamentals of automated manufacturing systems; production economics; Just-In-Time (JIT) and Shop Floor Control (SFC) techniques; Computer Numerical Control (CNC) and off-line programming; Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), and release and control of the engineering and manufacturing of new products. Advanced design and research projects.

ME 387. Design and Engineering Production Systems

3 credits. Lecture. Not open to students who have passed ME 222

Design and engineering functions of production systems. Decision-Making Process, Economic Analysis, Demand Forecasting, Product and Process Design, Optimization and Linear Programming, Integrated Production and Inventory Control, Production Scheduling, Critical Path Methods (CPM), Program Evaluation and Review Technique (PERT), and Statistical Quality Control. Advanced design and research projects.

ME 392. Advanced Measurement Techniques

1-3 credits. Lecture.

A critical examination of measurement techniques. Principles of operation of various instruments. Estimates of accuracy, precision, and resolution of measurements. Intended primarily for students contemplating experimental theses. When possible, specific topics covered will be structured to the needs of the class.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†ME 401. Graduate Seminar

0 credits. Seminar.

Presentations by invited guest speakers on topics of current interest in various Mechanical Engineering and allied fields.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

MEDIEVAL STUDIES

Interdisciplinary work leading to the degrees of Master of Arts and Doctor of Philosophy in medieval studies is offered by the Departments of Art, English, History, Modern and Classical Languages, and Philosophy. Since the program in medieval studies is intended to provide a synthesis of broad areas of medieval culture and thought as a basis for constructive research in specialized aspects of cultural and intellectual history, students normally are required to include in their programs courses offered by the supporting departments.

Admission to Degree Programs. The Medieval Studies Admissions Committee accepts students either to the master's or Ph.D. program. An undergraduate major in the area of study is not necessarily required, but before admission students must give evidence of adequate preparation to work in their proposed area of emphasis.

The M.A. Program. Work leading to the degree of Master of Arts in medieval studies may be undertaken under either Plan A (with thesis) or Plan B (without thesis). In either case, course work in medieval studies should be distributed among several departments, and the student's advisory committee is composed of representatives of three departments.

The Ph.D. Program. Approximately one half of the course work required for the degree of Doctor of Philosophy in medieval studies should be in the department of emphasis, the remaining half to be taken in two or more other cooperating departments. In addition to the Graduate School's requirements for the doctorate, reading examinations in three foreign languages, normally French, German, and Latin, are required of all students in the program. It is expected that the student will pass these examinations immediately upon admission and in no case later than the end of the first year of study in the Ph.D. program. The student's advisory committee will consist of representatives of three different cooperating departments.

Courses of study. Course offerings and staff are listed under the cooperating and supporting departments referred to above. The Committee for Medieval Studies organizes a number of colloquia open to graduate students, featuring staff members or visitors.

Support. University Predoctoral Fellowships and graduate assistantships for teaching or research are available through cooperating departments for qualified students in the medieval studies program. Other support available for graduate students is described under "University Fellowships and Other Aid."

Major Advisors: J. Givens, art history; D. Caner and R. Travis, Classics and Ancient Mediterranean Studies; C. D. Benson, F. Biggs, R. Hasenfratz, and T. J. Jambeck, English; S. Olson, history; A. Berthelot, French; M. Masciardo, Italian; and B. Liu, Spanish.

METALLURGY AND MATERIALS ENGINEERING

Department Head: Professor Leon L. Shaw

Distinguished Professor: Brody

Professors: Gell, Kattamis, and Marcus

Associate Professor: Aindow

Assistant Professors: Alpay, Huey, Ramprasad, and Wei

The goal of the graduate program in Metallurgy and Materials Engineering, through its coursework and research programs, is to provide students with a comprehensive understanding of modern materials and to prepare for positions of leadership in engineering, research and development. Graduate instruction is offered which leads to the degrees of Master of Science and Doctor of Philosophy. Degree candidates can undertake study in the field of Metallurgy and Materials Engineering or in areas within the field of Materials Science such as biomaterials (see also the program description under "Materials Science"). Emphasis is placed on the relationships between the structure and properties of engineering materials, thermodynamics of materials, phase equilibria, mechanical behavior, electronic behavior and microstructural characterization. The main aspects of these subjects are covered in 6 designated core courses (see the descriptions for courses MMAT 301, 305, 309, 311, 317 and 322 below). Several other departments in the University offer courses in related disciplines, and students are encouraged to include one or more of these courses in their plans of study.

Requirements for the M.S. There are no special requirements for the admission to the master's program beyond those of the Graduate School. Selection of Plan A (thesis) or Plan B (course work) is made after consultation with the advisory committee. Students are required to complete 3 of the 6 graduate core courses as part of their coursework requirements.

Requirements for the Ph.D. Admission to the doctoral program is based upon a careful assessment of the students potential for creative research in metallurgy and materials engineering. Applicants for this program will normally have first completed an outstanding master's degree program. Students are required to complete all 6 of the graduate core courses as part of their coursework requirements, and to pass a General Examination based on these topics.

Special Facilities. The Department of Metallurgy and Materials Engineering is housed within the Institute of Materials Science. A comprehensive range of modern research equipment is available, including facilities for melting and casting of alloys, mechanical processing and heat treating, mechanical testing, electrical testing, processing and testing of ceramics and composites, transmission electron microscopes, scanning electron microscopes, x-ray diffraction apparatus, surface analysis equipment, thermal analysis equipment, and extensive spectrometry facilities (nuclear magnetic resonance, infra-red / Raman and ultra-violet).

COURSES OF STUDY

MMAT 301. Thermodynamics of Materials

3 credits. Lecture.

Classical thermodynamics with emphasis on solutions and phase equilibria. Applications to unary and multicomponent, reacting and nonreacting, homogeneous and heterogeneous systems, including development of phase diagrams.

MMAT 303. Diffusion in Solids

3 credits. Lecture. Prerequisite: MMAT 301.

Laws of Diffusion for binary and multicomponent systems, as well as for single and multi-phase systems. Diffusivity measurements and prediction. Modeling of interdiffusion with regard to diffusion couples, high temperature coatings, and gas-solid reactions using equation-solving and finite-difference software.

MMAT 305. Transformation in Alloys

3 credits. Lecture.

Thermodynamics, kinetics and crystallography of phase transformations. Nucleation and growth kinetics. Order-disorder, ferroelectric, and ferromagnetic transformations.

MMAT 307. Solidification of Metals and Alloys

3 credits. Lecture. Prerequisite: MMAT 301.

Thermodynamic and kinetic principles of solidification. Control of structure and properties of pure and multicomponent materials through casting and solidification processes. Application of solidification principles to shaped casting, continuous casting, crystal growth and particulate processes.

MMAT 308. Plasticity of Solids

3 credits. Lecture.

Basic concepts of dislocations and other defects; relationship between basic deformation, thermal processes, and observable macroscopic properties. Strengthening mechanisms, e.g., solid solution hardening, dispersion hardening, and work hardening.

MMAT 309. Transport Phenomena in Materials Science and Engineering

3 credits. Lecture.

Mechanisms and quantitative treatment of mass, energy, and momentum transfer will be discussed in the context of materials science and engineering applications. Increasingly complex and open-ended applications will be used to illustrate principles of fluid flow; heat conduction, radiation, and diffusion.

MMAT 310. Mechanical Behavior of Ceramics and Composites

3 credits. Lecture.

Physical and chemical properties of brittle fracture; strength; toughness; contact damage; microstructural toughening mechanisms; micromechanics; wear and fatigue; initiation of defects and flaws; elevated temperature creep; reliability and lifetime prediction; designing with ceramics and composites.

MMAT 311. Mechanical Properties of Materials

3 credits. Lecture.

Mechanics of deformation and fracture; dislocation theory; strength of ductile and brittle materials; toughness; strengthening mechanisms; toughening mechanisms; creep mechanisms; fatigue crack initiation and propagation; reliability and lifetime prediction.

MMAT 313. Theory of the Solid State

3 credits. Lecture.

Modern theory of metals. Review of quantum theory, elementary wave mechanics, the free electron theory of metals, and the elementary band theory of solids. Crystallography, specific heat, dielectrics, magnetism, electrical conductivity.

MMAT 316. Fracture and Fatigue of Materials

3 credits. Lecture.

Ductile and brittle fracture, fatigue, stress corrosion, and creep rupture. Failure analysis.

MMAT 317. Electronic and Magnetic Properties of Materials

3 credits. Lecture.

Crystal structures and interatomic forces, lattice vibrations, thermal, acoustic, and optical properties. Semiconductors, dielectric properties, magnetism, and magnetic properties, superconductivity. Device applications.

MMAT 318. Thin Films and Protective Coatings

3 credits. Lecture.

Anodic and thermal formation of oxide layers; vapor deposition of metals and non-metals; electro-deposition; metallizing. Properties of films and coatings; dependence on impurity levels and environment. Alloy and coating design.

MMAT 320. Investigation of Special Topics

3 credits. Lecture.

Special courses or individual readings.

MMAT 321. Crystallography and Diffraction

3 credits. Lecture.

Introduction - diffraction of light. Crystal structure, symmetry and space groups. The reciprocal lattice. Diffraction of x-rays, electrons and neutrons. Kinematical diffraction - structure analysis and the effects of imperfections. Dynamical scattering effects. Experimental methods and applications in Materials Science.

MMAT 322. Materials Characterization

3 credits. Lecture.

A review of the principal experimental methods used to reveal the microstructure and chemistry of materials. Diffraction techniques: x-ray, electron, neutron and proton scattering. Photon probes: photon

microscopies, x-ray topography and XPS. Electron probes: SEM, TEM, EDX, EELS, AES. Atom and ion probes: RBS, SIMS, FIM, PIXE. Scanned probe microscopies.

MMAT 323. Transmission Electron Microscopy

3 credits. Lecture. Prerequisite: MMAT 322 or consent of instructor.

Electron beam-specimen interactions. Basics of electron microscopes. Diffraction: theory, types of patterns and interpretation. Imaging: diffraction contrast, phase contrast and other techniques. Spectrometry: x-ray microanalysis and electron energy-loss spectrometry.

MMAT 325. Equilibrium Relationships in Multi-Phase Systems

3 credits. Lecture. Prerequisite: MMAT 301.

Thermodynamics of phase equilibria and phase diagram prediction for binary, ternary and n-component systems. Interpretation of phase diagram sections and projections. Application of multicomponent phase diagrams to alloy and process design..

MMAT 334. Structure and Defects in Materials

3 credits. Lecture.

Structure of amorphous and vitreous materials. Crystallography: translation symmetry and lattices, point and space groups, use of the International Tables for Crystallography, examples of simple crystal structures. Defects in materials: point defects, line defects, planar defects, homophase and heterophase interfaces. Distributions of structure and defects: an introduction to microstructure.

MMAT 335. High Temperature Materials

3 credits. Lecture.

Strength-determining factors in advanced alloys, ceramics and composites. Role of material chemistry and microstructure. High temperature creep and crack growth. Oxidation. Thermomechanical behavior.

MMAT 337. Materials Processing

3 credits. Lecture.

Principles of powder preparation. Colloidal processing. Powder characterization. Consolidation and sintering of metals and ceramics. Microstructural evolution. Composites and coatings processing. Structure-property relations.

MMAT 343. Corrosion

3 credits. Lecture.

Mechanisms, characteristics and types of corrosion. Test methods and evaluation of corrosion resistance. Suitability of metals, ceramics, and organic materials in corrosive environments. Oxidation and other high temperature gas-metal reactions.

MMAT 344. Electrode Kinetics Measurements Laboratory

3 credits. Lecture.

The art and science of electrochemical measurements including potentiostatic, galvanostatic and linear polarization; determination of Tafel constants and limiting diffusion currents; electrode preparation and cell design. Applications of these techniques to metal corrosion, etching, electropolishing, electroplating and metallurgical analyses by both experiments and independent student projects.

MMAT 345. Theory of Electrochemical Processes

3 credits. Lecture.

Theory and measurement of irreversible electrochemical processes at metal electrolyte interfaces. Mixed potential theory. Mass transport phenomena. Apparatus, techniques, and interpretation of experimental measurements. Applications to metallographic etching, phase extraction and electroanalytical techniques. Scientific development of corrosion-resistant alloys.

MMAT 349. Biomaterials

3 credits. Lecture.

For students with background in physical science and little or no background in biology. Molecular biology. Mineralized tissues. Cardiovascular system. Selected special topics in biological materials.

MMAT 362. Atomistic Computer Simulation of Materials

3 credits. Lecture.

Application of atomistic computer simulation to the study of structural materials. Classical models of atomic interactions: pair potentials, chemical bonding forces, embedded atom method and angular potentials. Molecular dynamics and Metropolis algorithms. Constraints on dynamics to control temperature, pressure and boundary conditions. Techniques for analyzing simulation results.

MMAT 364. Advanced Composites

3 credits. Lecture.

Mechanical properties, analysis and modeling of composite materials. The properties treated include stiffness, strength, fracture toughness, fatigue strength and creep resistance as they relate to fiber, whisker, particulate, and laminated composites.

MMAT 366. Alloy Casting Processes

3 credits. Lecture.

Principles and practices of alloy solidification and casting processes are discussed and applied in the context of sand, investment, permanent mold and die casting; continuous and direct chill casting; electroslog and vacuum arc remelting; crystal growth; rapid solidification; and laser coating.

MMAT 393. Seminar

0 credits. Seminar.

MMAT 394. Seminar

0 credits. Seminar.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†MMAT 401. Graduate Seminars in Metallurgy and Materials Engineering
1 credit. Seminar.

Presentations by invited guest speakers on topics of current interest in various areas of Metallurgy and Materials Engineering.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

MODERN AND CLASSICAL LANGUAGES

Department Head: Associate Professor Norma Bouchard

Professors: Berthelot, DalMolin, Gordon, Guénoun, Masciandaro, and Miller

Associate Professors: Celestin, Chinchilla, Gomes, Johnson, Liu, McNeece, Pardo, Travis, von Hammerstein, and Weidauer

Assistant Professors: Finger, Gambarota, Loss, Seda, Urios-Aparisi, and Wagner

The Department offers courses in literature and philology leading to the degrees of Master of Arts and Doctor of Philosophy in French, German, Italian, and Spanish. Programs are available in Comparative Literary and Cultural Studies in cooperation with the Department of English and in Medieval Studies in cooperation with the Departments of Art, English, History, and Philosophy (see *Comparative Literary and Cultural Studies* and *Medieval Studies*). There also is supporting work in Greek and Latin. Seminars numbered in the 400's are designed chiefly for doctoral students, but master's students occasionally are admitted.

Admission. All applicants are urged, and some may be required, to submit results of the Graduate Record Examinations for both the General Test and the Subject Test in their field. In the modern languages, applicants are expected to be able to participate in seminars at the graduate level conducted in the foreign languages.

The M.A. Program. Applicants normally are expected to have a bachelor's degree or its equivalent in the language. Students with insufficient undergraduate preparation may be accepted provisionally, but they are required to make up deficiencies before being admitted to regular graduate status. A research methodology course and a minimum of one semester of teaching experience are required of all M.A. candidates in German. M.A. students in German who emphasize philology are required to take at least two literature courses; students emphasizing literature or German studies are required to take at least one philology course. Candidates in Spanish are required to take the course in concepts of literary criticism. All master's candidates must pass a written and/or oral final examination.

Special Requirements for the Ph.D. Doctoral candidates are expected to demonstrate competence in reading scholarly material in two additional languages other than English, as designated by their advisory committees. For candidates in French, these normally are Latin and German.

Students in Spanish are required to present or to take a course in concepts of literary criticism.

In German, a research methodology course and a minimum of one semester of teaching experience at the college level are required of all doctoral candidates.

Library Facilities. The Homer Babbidge Library contains outstanding collections of texts and commentaries in the literature of the French Renaissance and a fine collection of texts in the literature of the Spanish Golden Age. The Latin American Collection is particularly strong in the

Mexican, Chilean, and Argentine areas. There is a fine collection of German literature of the eighteenth, nineteenth, and twentieth centuries, and the collection of modern drama is outstanding. In addition, the Library houses an extensive collection of videotapes of German literary and cultural materials, and facilities for viewing them. Holdings in Italian literature and in intellectual history are extensive, especially in the modern period. The Risorgimento pamphlet collection stands out as one of the best available outside of Italy. Other holdings in modern and classical languages are sufficient for the pursuit of scholarly research in all languages and literatures offered.

COURSES OF STUDY

Classics: Latin

CAMS 301. Special Topics in Latin Literature

1-6 credits. Lecture

CAMS 305. Vergil

3 credits. Lecture.

CAMS 306. Roman State

3 credits. Lecture.

CAMS 307. Ovid and Elegiac Poets

3 credits. Lecture.

CAMS 308. Lucretius

3 credits. Lecture.

CAMS 309. Tacitus

3 credits. Lecture.

CAMS 310. Cicero's Philosophical Works

3 credits. Lecture.

CAMS 311. Later Latin

3 credits. Lecture.

Authors from c. 180 A.D. to and including Isidore of Seville (560-636).

CAMS 312. Latin Epigraphy

3 credits. Lecture.

Selected remains of Latin, from all periods, inscribed on durable materials.

CAMS 313. Roman Comedy

3 credits. Seminar.

CAMS 328. Advanced Latin Composition

3 credits. Lecture.

French

FREN 301. Seventeenth-Century Poetry

3 credits. Lecture.

FREN 302. The Seventeenth-Century Theatre

3 credits. Seminar.

FREN 303. The Novel in the Seventeenth Century

3 credits. Lecture.

FREN 304. Seventeenth-Century French Thought

3 credits. Lecture.

Religious and Libertin thinkers: Gassendi, Descartes; the Moralists: Pascal, La Rochefoucauld, La Bruyère.

FREN 305. The First Two Generations of the French Enlightenment

3 credits. Lecture.

FREN 306. The Later French Enlightenment

3 credits. Lecture.

FREN 307. Problems in French Literature or Philology

1-3 credits. Lecture.

FREN 308. Old French Paleography and Textual Edition

3 credits. Lecture. Prerequisite: FREN 352

FREN 309. Provençal Language and Literature

3 credits. Lecture.

FREN 310. Introduction to French Philology

3 credits. Lecture.

FREN 311. Aesthetic Trends in Twentieth-Century French Literature

3 credits. Seminar.

FREN 351. French Historical Grammar

3 credits. Lecture.

FREN 352. Old French Language

3 credits. Lecture.

FREN 353. Old French Literature

3 credits. Lecture.

FREN 357. The French Novel in the Eighteenth Century

3 credits. Lecture.

FREN 359. Romantic Poetry and Drama

3 credits. Lecture.

FREN 361. French Poetry in the Second Half of the Nineteenth Century

3 credits. Seminar.

FREN 362. French Contemporary Poetry

3 credits. Seminar.

FREN 366. French Contemporary Drama

3 credits. Lecture.

FREN 369. The French Novel in the First Half of the Nineteenth Century

3 credits. Seminar.

Stendhal, Balzac, and the romantic novelists.

FREN 370. The French Novel in the Second Half of the Nineteenth Century

3 credits. Lecture.

Flaubert, Zola, and their contemporaries.

FREN 373. The French Contemporary Novel

3 credits. Seminar.

FREN 376. The Prose of the French Renaissance

3 credits. Seminar.

FREN 377. The Poetry of the French Renaissance

3 credits. Lecture.

FREN 380. Seminar in Francophone Literature

3 credits. Seminar.

The study of the literature from the French-speaking world outside of France (Quebec, the Antilles, West Africa, the Maghreb) against the background of colonial and post-colonial history. May be repeated for credit with change of topic.

FREN 381. Study of French Style

3 credits. Lecture.

Problems of French style and writing of critical papers.

FREN 400. Seminar on Chretien de Troyes

3 credits. Lecture. Prerequisite: FREN 353.

FREN 401. Seminar on Villon

3 credits. Lecture. Prerequisite: FREN 353.

German**GERM 305. Studies in Germanic Philology and Linguistics**

3 credits. Seminar.

Study of a coherent body of material related to older Germanic languages; to diachronic or synchronic phonology, morphology, syntax, and lexicology of Germanic languages; or to other areas of theoretical or applied linguistics.

GERM 306. Topics in Germanic Philology and Linguistics

1 credit. Seminar.

Focus on a specific topic, problem, controversy, research methodology, etc. in Germanic philology and linguistics.

GERM 314. German Studies

3 credits. Seminar.

Exploration of the field of German Studies as an "interdiscipline"; analysis of a coherent body of

material drawn from the social sciences, humanities, natural sciences, or other fields that helps to illuminate the German-speaking world.

GERM 315. Topics in German Studies

1 credit. Seminar.

Focus on a particular theme (e.g. "revolution," or "family and society"), approach (e.g. critical theory, or feminist interpretations), genre (e.g. lyric, or autobiographical essay), skill (e.g. research methodology) or other aspect of German studies.

GERM 322. Studies in German Literature I

3 credits. Seminar.

Study of a coherent body of texts drawn from the period from the beginnings of German literature to approximately 1700.

GERM 332. Studies in German Literature II

3 credits. Seminar.

Study of a coherent body of texts drawn from the period from approximately 1700 to 1890.

GERM 345. Studies in German Literature III

3 credits. Seminar.

Study of a coherent body of texts drawn from the period from approximately 1890 to the present.

GERM 360. Research Methodology

3 credits. Seminar.

Introduction to the methods of literary research and bibliography.

GERM 365. German Film Studies

3 credits. Seminar.

Study of a coherent body of films and related materials (e.g. fiction, theory, reviews) organized to illuminate particular themes (e.g. representations of postwar Germany), relationships (e.g. between films and literature or film and social context), cinematic styles (e.g. Expressionism), etc.

GERM 367. Topics in German Film Studies

1 credit. Seminar.

Focus on a particular film, filmmaker, film genre, controversy, etc.

GERM 368. The German-Speaking World

3 credits. Lecture.

Landeskunde of the German-speaking world. The physical geography as well as cultural heritage, traditions, and contemporary customs of Austria, Germany, Switzerland, and other German-speaking regions of the world.

GERM 369. Topics in Landeskunde of the German-Speaking World

1 credit. Seminar.

Focus on a specific topic or problem related to diachronic or contemporary Landeskunde of Austria, Germany, Switzerland, or another German-speaking region of the world.

GERM 375. Advanced Conversation and Composition

3 credits. Lecture.

Practice in oral and written expression, with an emphasis on current idiomatic usage, grammatical structure, and stylistics

GERM 376. Rhetoric and Writing

3 credits. Seminar.

In-depth introduction to the rhetorical resources of the German language; extensive analysis of spoken and written language; application of knowledge in students' own writing and speaking.

GERM 377. Topics in Rhetoric and Writing

1 credit. Seminar.

GERM 378. Preparation for Certification of Proficiency in German

0 credits. Lecture.

Development of students' proficiency in speaking, listening, reading and writing German in preparation for either the Mittelstufenprüfung or Oberstufenprüfung.

GERM 380. German Language Methodology

3 credits. Lecture.

Exploration and analysis of a range of theories, issues, and problems in German instruction. Focus on the nature of language acquisition, methods, and implications for practice.

GERM 381. Topics in German Language Methodology

1 credits. Seminar.

Focus on such special areas as content-based instruction, language for specific purposes (LSP), instructional technologies, development of teaching materials, proficiency, testing techniques, etc.

GERM 385. German Literary Criticism and Theory

3 credits. Seminar.

Systematic study of literary criticism, including such topics as the contributions of particular critical approaches to the understanding of significant German-language literary works; the philosophies, implicit or explicit, underlying various critical approaches; and the German contribution to international critical discourse.

GERM 388. Topics in German Literature

1 credit. Seminar.

Focus on a specific topic, problem, controversy, methodology, etc. in German literature studies or criticism.

GERM 390. Independent Study

1-6 credits. Independent Study.

GERM 395 Capstone in German Studies and Language Methodology

1 credit. Seminar.

Review and synthesis of material studied and skills acquired; design and implementation, in close consultation with graduate faculty, of a capstone project.

GERM 410. Seminar in Germanic Philology and Linguistics
3 credits. Lecture.

GERM 420. Seminar in Medieval Literature
3 credits. Seminar.

GERM 430. Seminar in Sixteenth- and Seventeenth-Century Literature
3 credits. Seminar.

GERM 440. Seminar in Eighteenth-Century Literature
3 credits. Seminar.

GERM 450. Seminar in Nineteenth-Century Literature
3 credits. Seminar.

GERM 460. Seminar in Twentieth-Century Literature
3 credits. Seminar.

GERM 465. New Forms of the German Novel in the Twentieth Century from Rilke to Handke
3 credits. Lecture.

Innovations in representative novels of the twentieth century, such as Malte Laurids Brigge, Schlafwandler, Mann ohne Eigenschaften, Stiller, Blechtrommel, Der Prozess, and Der lange Brief zum kurzen Abschied.

GERM 480. Investigation of Special Topics
1-6 credits. Lecture.

Hebrew

HEB 301. Hebrew Wisdom Literature
3 credits. Seminar.

Systematic examination of classical wisdom texts in the Hebrew Bible and Rabbinic Literature focusing on their contribution to world ethical literature. Taught in English.

HEB 303. Religion of Ancient Israel
3 credits. Lecture.

Significant aspects of the religion of ancient Israel: The God-human relationship, the origins of good and evil, law and covenant, kingship, prophecy, ritual and morality, repentance and redemption. Taught in English.

HEB 311. History and Literature of Talmudic Palestine
3 credits. Seminar.

A discussion of select topics and texts pertaining to religious, social, and political currents in Talmudic Palestine. Taught in English.

HEB 390. Independent Study
3 credits. Independent Study.

HEB 397. Special Topics
3 credits. Seminar.
Investigation of special topics in Hebrew literature and civilization.

Italian

ILCS 315. Introduction to Contemporary Literary Studies
3 credits. Lecture.

Contemporary methods and fields of literary analysis. Paradigms of literary studies and overview of Marxist, Freudian, Feminist, Historicist, and Culturalist criticism.

ILCS 330. The Literature of the Origins
3 credits. Lecture.

Poets and poetical schools of the Duecento from the Franciscans to the Sicilians and the "Dolce stil nuovo."

ILCS 331. Seminar on Early Religious Literature
3 credits. Lecture.

From St. Francis to the Fioretti. The Franciscan and mystical tradition, hagiographic folklore (Passavanti, Cavalca), St. Catherine and early religious humanism.

ILCS 332. Seminar on Petrarch
3 credits. Seminar.

The works of Francesco Petrarca; their relevance to humanism and to subsequent European lyrical poetry.

ILCS 333. Seminar on Boccaccio
3 credits. Seminar.

The Italian lyrics and narrative poems, the Decameron and its seminal importance for prose fiction, the scholarly Italian and Latin works.

ILCS 334. Seminar on Machiavelli
3 credits. Seminar.

The principal objective of this course is twofold: 1) to analyze and assess the political thought and the theater of Machiavelli as represented, respectively, in the Prince and the Discourses, and in the comedies Mandragola and Clizia and in the Favola (Belfagor arcidiavolo); and 2) to discuss Machiavelli's influence beyond Italy (e.g., on authors such as Christopher Marlowe, Shakespeare, Ben Jonson, and Francis Bacon). Special attention will be given to Machiavelli's unique relation to Renaissance Humanism, to his unconventional concept of virtue and his redefinition of the ethics of politics, and to his view of the statesman as artist.

ILCS 335. Baroque Literature
3 credits. Lecture.

The beginnings of baroque literary style and its ramifications in the seventeenth century.

ILCS 337. Theories and Methods of Modern Criticism I
3 credits. Lecture.

Aesthetic problems from Vico to the present day.

ILCS 338. Theories and Methods of Modern Criticism II
3 credits. Lecture.

Modern semiotics, textual and historical criticism, stylistics.

ILCS 339. Seminar on Modern Literature
3 credits. Seminar.

One leading writer from the last two centuries.

ILCS 340. Divina Commedia
3 credits. Seminar.

ILCS 341. Dante: Minor Works
3 credits. Seminar.

The Vita Nuova and the Rime. The doctrinal treatises (De Vulgari Eloquentia, Convivio, De Monarchia.)

ILCS 342. Seminar on Italian Theatre from Renaissance to Romanticism
3 credits. Lecture.

Major figures and developments from Poliziano and Machiavelli to Goldoni, Alfieri and Manzoni.

ILCS 345. Studies in Italian Literature or Philology
1-6 credits. Lecture.

ILCS 346. Italian Literature of the Quattrocento
3 credits. Lecture.

The literary and philosophical currents of Renaissance humanism.

ILCS 347. Italian Chivalric Poetry
3 credits. Lecture.

ILCS 348. Literature of the Cinquecento I
3 credits. Lecture.

Acme and wane of the Renaissance in the sixteenth century. Prose of Machiavelli, Guicciardini, Castiglione, Cellini, Vasari, and Bandello.

ILCS 349. Literature of the Cinquecento II
3 credits. Lecture.

Acme and wane of the Renaissance in the sixteenth century. Poetry of Bembo and the Petrarchists, Michelangelo's lyrics, Della Casa, Ariosto's minor works, Tasso's verse and drama, and the rise of Aristotelian criticism.

ILCS 350. Literature of the Settecento
3 credits. Lecture.

Major figures of the eighteenth century enlightenment. Vico, Alfieri, Goldoni, Parini.

ILCS 351. Literature of Romanticism

3 credits. Lecture.

Neoclassicists versus innovators: Monti, Foscolo, Leopardi, Berchet, Manzoni, De Sanctis.

ILCS 352. Modern Italian Poetry I

3 credits. Lecture.

Post-romantic masters through the twentieth century experiments: e.g., the Crepuscolari, Futurists, Hermeticists.

ILCS 353. Modern Italian Poetry II

3 credits. Lecture.

Post-romantic masters through the twentieth century experiments: e.g., the Crepuscolari, Futurists, Hermeticists.

ILCS 354. Masters of Twentieth-Century Fiction

3 credits. Lecture.

Pirandello, Svevo, Moravia, Pavese, Vittorini.

ILCS 355. Introduction to Italian Philology

3 credits. Lecture.

Italian linguistic geography, neo-linguistics of Bartoli, areal linguistics, Dante's *De Vulgari Eloquentia*, the "Questione della lingua." Croce's theory of language.

ILCS 359. Modern Drama

3 credits. Lecture.

Major figures from D'Annunzio to Pirandello, Betti, and present-day playwrights.

Portuguese

PORT 301. Studies in Portuguese and Brazilian Literature

3 credits. Seminar.

The major poets, novelists, dramatists, and essayists from Portugal and Brazil.

Romance Languages

ROML 395. Applied Linguistics for Teachers of Romance Languages

3 credits. Seminar.

Spanish

SPAN 320. Independent Study

1-6 credits. Independent Study.

SPAN 321. Theatre of the Golden Age

3 credits. Lecture.

A study of the origin, formation and development of the Spanish *comedia*. Representative works of Lope de Vega, Calderón, Tirso de Molina, and Alarcón will be

analyzed with special emphasis on individual characteristics.

SPAN 322. History of the Spanish Language

3 credits. Seminar.

The development of Castilian and its relation to its congeners in the Iberian Peninsula and Hispanic America.

SPAN 323. Concepts of Literary Criticism

3 credits. Seminar.

A practical approach to the theories and methods of literary criticism with particular reference to Hispanic literature.

SPAN 325. Cervantes

3 credits. Lecture.

A study of the life and works of Cervantes with special emphasis on *Don Quixote*.

SPAN 328. Medieval Spanish Literature (1100-1350)

3 credits. Lecture.

Major works in prose and poetry from 1100-1350 in medieval Iberia.

SPAN 329. Medieval Spanish Literature (1350-1500)

3 credits. Lecture.

Major works in prose and poetry written in Spain from 1350-1500.

SPAN 332. Spanish Poetry of the Renaissance

3 credits. Seminar.

Analysis of the currents of Spanish poetry from Bosc n to Fray Luis de León.

SPAN 333. Spanish Poetry of the Golden Age

3 credits. Lecture.

Analysis of the currents of Spanish poetry from Cervantes to Calderón.

SPAN 334. Modern Spanish-American Poetry

3 credits. Seminar.

Selected poets and movements in Spanish America from the late nineteenth century to the present.

SPAN 335. The Theatre in Spanish America

3 credits. Lecture.

The works of selected dramatists, with emphasis on the modern period.

SPAN 336. Colonial Latin American Literature

3 credits. Lecture.

Study of particular aspects of colonial literary production: religious and secular historiography; humanist thought in the colonies, poetry, and society; literature and the Baroque city; political and scientific thought.

SPAN 350. The Essay in Spanish America

3 credits. Seminar.

The Spanish-American essay as a literary genre and a vehicle of ideas. Reading in the works of the chief essayists of the Spanish-American nations.

SPAN 351. The Novel in Spanish America

3 credits. Seminar.

The development of the genre in Spanish America and selected readings in the works of its chief exponents.

SPAN 354. Nineteenth-Century Poetry and Drama

3 credits. Lecture.

Study of the poetry and drama of the nineteenth century with special emphasis on romantic poetry and post-romantic drama.

SPAN 355. The Nineteenth-Century Spanish Novel and Essay

3 credits. Seminar.

A study of the essays of Larra and Ganivet, as well as the nineteenth-century novel. Special emphasis will be placed on the post-romantic novel.

SPAN 356. Twentieth-Century Novel and Essay

3 credits. Seminar.

Selected works either of authors from 1895 to 1936, or of authors from 1936 to the present.

SPAN 357. Twentieth-Century Drama and Poetry

3 credits. Seminar.

Selected works and authors from 1900 to the present.

SPAN 358. Prose of the Renaissance

3 credits. Lecture.

Principal aesthetic and ideological currents. The novel and works of the mystic and ascetic writers.

SPAN 359. Prose of the Golden Age

3 credits. Lecture.

The picaresque novel and the chief works of Quevedo, Graci n and Saavedra Fajardo.

SPAN 400. Seminar on Lope de Vega

3 credits. Seminar.

A study of the life and works of Lope de Vega with special emphasis on his *comedia*.

SPAN 402. Studies in Spanish-American Literature

3 credits. Lecture.

SPAN 403. Studies in Spanish Literature

3 credits. Lecture. May be repeated for up to nine credits with a change of topic.

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All Master's and Doctoral Fields

†GRAD 395. Master's Thesis Research
1-9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies
(Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†GRAD 495. Doctoral Dissertation
Research
1-9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies
(Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

MOLECULAR AND CELL BIOLOGY

Department Head: Professor Philip L. Yeagle

Associate Department Head: Professor Lawrence E. Hightower

Professors: Albert, Benson, Birge, Chen, Freake, Geary, Gogarten, Kendall, Knecht, Leadbetter, Lynes, Marcus, Sekellick, Strausbaugh, Wood, Yang, and Zinn

Associate Professors: Beck von Bodman, Bouvier, Burkhard, Cole, Fodor, Gage, Giardina, Goldhamer, Lee, McGrane, Noll, R. O'Neill, Ovtchinnikov, Reiter, Rosenberg, Silbart, Teschke, Vinopal, Visscher, and Zhang

Assistant Professors: Alexandrescu, Graf, Nelson, M. O'Neill, Rasmussen, Robinson, Schienman, Tian, and Townsend

Adjunct Professors: Craig, Kondo, Laue, and Oates

Adjunct Associate Professors: Klei, Perdrizet, and Philo

Adjunct Assistant Professors: Arnold, Geiger, and Ladd

Molecular and Cell Biology emphasizes research in the following areas: (1) *Biochemistry* – protein transport through membranes, receptor/ligand interactions, biochemical signalling, transcriptional and translational regulation, protein folding, molecular chaperones and response to stress; (2) *Biophysical Chemistry* – enzyme mechanisms, x-ray structural and kinetic analyses of enzymes, structure of membrane interactive peptides and proteins, macromolecular interactions, mechanisms of virus assembly; (3) *Cell and Developmental Biology* – signal transduction, cytoskeleton and cell motility, hormones and morphogenesis, mechanisms of immune function, stress responses, molecular virology and interferons; (4) *Genetics* – organization and regulation of genes and gene families in microbial, plant, virus and animal model systems; genome analysis; molecular evolution; chromosome structure and function; developmental genetics; transposable genetic elements and gene transfer; genetic responses to stress; applied genetics; (5) *Microbiology* – microbial diversity and ecology, evolution, genetics and physiology, microbial biotransformations; (6) *Plant Cell and Molecular Biology* – biological clocks in plants, membrane function, regulation of carbon fixation, cell wall synthesis, plant stress responses, and plant physiology.

Interdisciplinary Study

Applied Genomics. The professional M.S. degree program in Applied Genomics trains scientists with interdisciplinary competency in genetics, molecular biology, and computational analysis. The program provides substantial cross-training elements for successful performance in a business or corporate environment. The program has its foundations in the existing strengths of more than 20 faculty members, campus-wide, who conduct genomics-related research and training. Additional information is available at the Professional Science Master's website: <<http://www.smasters.uconn.edu>>.

Applied Microbial Systems Analysis. A professional M.S. degree program in Applied Microbial Systems Analysis is offered.

Neurosciences. This is an interdisciplinary area of concentration. Neuroscience is concerned with the structural and functional characteristics of the nervous system and its relation to the adaptive physiology and behavior of the organism. Students in this program may approach the full range of neuroscience studies through courses and research at the cellular, systemic, and organismic levels. A particular strength of the area is the analysis of behavior, its development, and its neurological bases. This area of concentration is offered in the fields of study of biobehavioral science, pharmaceutical science, physiology and neurobiology, and psychology. Application is made to the preferred field of study, but the applicant must be acceptable to the Neuroscience Committee.

Marine Sciences. Research and teaching facilities for marine sciences are located at the Avery Point campus of the University of Connecticut, and on the main campus in Storrs. Major areas of research include the ecology, physiology, behavior, and systematics of marine organisms; physical and chemical oceanography; sedimentology; and climatology. Recirculating sea water systems are available for maintaining marine organisms over extended periods for research. Direct inquiries to: Department Head, Marine Sciences, University of Connecticut at Avery Point, Groton, Connecticut 06340-6043.

Biotechnology Program. The Master of Science degree program in Biotechnology (Plan B) is interdisciplinary and is administered in the Department of Molecular and Cell Biology. A description of the program is available on the Molecular and Cell Biology page of the University website. Information can be obtained by contacting Rene Bruce (Unit 3125, Storrs, CT 06269-3125; 860-486-4329). Contact Dr. Robert T. Vinopal with further questions by mail at the above address or by e-mail at <vinopal@uconnvm.uconn.edu>.

Materials Science. The Department of Molecular and Cell Biology also cooperates with other departments in offering masters' degree programs in materials science. Members of this department serve as advisors for the Ph.D. program in polymer science. For information, write to Dr. Peter Burkhard, Unit 3136, Storrs, Connecticut 06269-3136.

The Institute of Cellular and Molecular Biology was created to bring together members of the faculty and graduate students interested in cellular and molecular biology. The aim of the Institute is to demonstrate the relationship between the separate disciplines by providing a broad theoretical and technical background in cellular and molecular biology.

COURSES OF STUDY

MCB 301. Biochemistry
5 credits. Lecture/Laboratory.

Metabolism of carbohydrates, lipids, amino acids, proteins, and nucleic acids, including regulation, and to the structure and function of biological macromolecules. Provides suitable preparation for advanced course work in biochemistry, biophysics, and other areas of molecular biology. Graduate students with considerable laboratory experience may arrange to

take only the lecture portion of this course as Biology: MCB 396 with consent of instructor.

MCB 302. Biochemistry Laboratory

3 credits. Lecture/Laboratory.

Theory and application of modern techniques for the separation and characterization of biological macromolecules, including several types of liquid chromatography, liquid scintillation spectrophotometry and SDS polyacrylamide gel electrophoresis. Each student will carry out individual projects using selected techniques.

MCB 303. Biophysical Chemistry I

3 credits. Lecture.

Thermodynamics, electrostatics of polar molecules and ionic solutions, dielectric constants, conductance, acid-base equilibria, molecular interactions.

MCB 304. Biophysical Chemistry II

3 credits. Lecture.

The physico-chemical behavior of biological macromolecules, their interactions, the forces involved, and the physical methods for studying such systems.

MCB 307. Biophysical Techniques

3 credits. Laboratory.

Laboratory experience in the characterization of macromolecules in solution. Methods such as velocity- and equilibrium-sedimentation, density determination, refractometry and light scattering are covered.

MCB 308. Theory of Biophysical Techniques

3 credits. Lecture.

The characterization of biological macromolecules (i.e., proteins and nucleic acids) in solution is important to the biotechnology and pharmaceutical industries. Hydrodynamic methods (i.e., diffusion, electrophoresis, sedimentation, light scattering, and viscosity) for molecular size and shape, and spectroscopic methods (such as circular dichroism) for more detailed structure.

MCB 311. Enzyme Structure and Function

3 credits. Lecture.

Information at the molecular level derived from protein chemistry, equilibria, kinetics and X-ray diffraction.

MCB 312. Foundations of Structural Biochemistry

3 credits. Lecture.

Comprehensive introduction to the molecular aspects and dynamics of structural biochemistry. Examination of nucleic acid, protein, and lipid structures including current topics in conformation and folding, enzyme kinetics, nucleic acid stability, ligand/receptor binding, and bioenergetics. Overviews of experimental strategies used to study macromolecular structure and interactions.

MCB 313. Structure and Function of Biological Macromolecules

3 credits. Lecture.

Correlation of three-dimensional molecular architecture with biochemical function in proteins, nucleic acids, and large assemblies such as viruses and ribosomes. Folding motifs and domains; molecular ancestry/homology; molecular recognition at the atomic level, as in DNA/protein complexes; structural basis of enzyme specificity and catalysis. Structure prediction from sequence; principles of structure determination by x-ray diffraction, NMR and CD spectroscopies, and electron microscopy. X-ray laboratory and graphics demonstrations.

MCB 314. Current Topics in Cell Biology

1-2 credits. Lecture.

Discussion of papers from recent literature. Topics include cytoskeletal function, cell motility, gene expression, and signal transduction, with special focus on their relationship to development, the immune system, and cancer.

MCB 315. X-ray Structure Analysis

3 credits. Lecture.

The determination of three-dimensional atomic-level structure by diffraction methods. Small-angle solution scattering. Protein crystallography.

MCB 316. Experiments in Bacterial Genetics

3 credits. Laboratory.

Experiments in bacterial genetics emphasizing genetic manipulations using modern techniques for mutant isolation, DNA characterization and cloning. These include the use of transposons, DNA isolation, restriction analysis, gel electrophoresis, PCR and DNA sequencing. Each student conducts an independent project.

MCB 317. Biosynthesis of Nucleic Acids and Proteins

3 credits. Lecture.

Mechanisms of protein and RNA synthesis in prokaryotes and eukaryotes. Topics such as RNA processing, gene splicing, and control of protein and RNA synthesis are discussed.

MCB 319. X-ray Diffraction Laboratory

3 credits. Laboratory.

Analysis of low- and high-angle X-ray data from both synthetic and biological macromolecules in amorphous and crystalline states.

MCB 321. Molecular Biology and Genetics of Prokaryotes

3 credits. Lecture.

Molecular genetics of bacteria, archaeobacteria, and their viruses. Transcription and replication of DNA, transformation, transduction, conjugation, genetic mapping, mutagenesis, regulation of gene expression, genome organization. Recommended preparation: a course in general microbiology.

MCB 322. Human Disease and Development of Therapeutic Agents

3 credits. Lecture.

Molecular basis of human disease and strategies for developing therapeutic treatments. Applications of genetic, cellular, and biochemical information in treating different disease states. Especially appropriate for students interested in biomedical research and the health professions.

MCB 323. Experiments in Molecular Genetics

3 credits. Laboratory.

Modern methods in molecular genetics applied to a research goal. Use of polymerase chain reaction, bacteriophage library screening, molecular cloning, nucleic acid hybridizations, and DNA sequence determinations to isolate and characterize a eukaryotic gene.

MCB 325. Structure and Function of Biological Membranes

3 credits. Lecture.

Overview of cell membrane structure and function based on a foundation of physical and biochemistry principles. Topics include lipid bilayers, vesicles and liposomes, cholesterol, membrane protein structure and function, transport, membrane fusion, receptors, drug/membrane interactions and membranes in cell regulation.

MCB 326. Genetic Engineering and Functional Genomics

3 credits. Lecture.

Methods and applications of genetic engineering, including gene manipulation and transfer techniques in prokaryotes and eukaryotes. Emphasis on the application of recombinant DNA technology in the elucidation of gene function. Recent technological developments in molecular genetics and the societal issues related to these developments will also be addressed. Students will prepare a grant application or other written assignment.

MCB 327. Laboratory Techniques in Functional Genomics

1 credit. Laboratory.

Molecular biological techniques utilized in gene discovery and in the functional characterization of genes in animal development. Taught as a series of short modules, each focusing on a different set of techniques. With a change of content, this course may be repeated for credit.

MCB 331. Developmental Biology

3 credits. Lecture.

Principles of embryogenesis, pattern formation, and cell differentiation. Focus is on molecular and cellular aspects of development in several experimental systems, including the mouse, nematode, fruit fly, and frog. Students will write a paper or present a talk on selected topics.

MCB 332. Molecular and Genetic Approaches to Developing Systems

2 credits. Lecture.

Topics of current interest in developmental biology are presented with related developmental and genetic background information.

MCB 333. Plant Metabolism

3 credits. Lecture

Biochemistry and physiology of the principal metabolic systems of plants.

MCB 334. Human Metabolism and Disease

2 credits. Lecture

A thorough analysis of the inter-relationships of metabolic pathways in connection with human health and disease, including inherited metabolic diseases and the role of hormones in metabolic pathways.

MCB 335. Protein Folding

3 credits. Lecture.

In-depth examination of protein folding in vitro and in vivo. Kinetics and thermodynamics of protein folding and assembly; chaperones in folding and misfolding; misfolding in human disease and biotechnology. Experimental methods used to study protein folding, including NMR, mutagenic and spectroscopic techniques.

MCB 336. Industrial Microbiology

3 credits. Lecture/Laboratory.

Biology of industrial microorganisms, including their physiology, selection, and biochemical and genetic manipulation. Primary and secondary metabolite biosynthesis and production. Pollution microbiology and biodegradation.

MCB 338. Techniques in Structural Biology

2 credits. Lecture.

A short course to introduce graduate students and selected undergraduates to modern techniques in structural biology. Each course offering covers a specific technique: NMR, computational and graphical analysis of biomolecules, X-ray crystallography, analytical ultracentrifugation, spectroscopy, calorimetry, and others.

MCB 339. Graduate Seminar in Biochemistry

1 credit. Seminar.

MCB 340. Virology

3 credits. Lecture.

Biological, biochemical, genetic, and physical characteristics of viruses, with an emphasis on molecular and quantitative aspects of virus-cell interactions.

MCB 343. Molecular Analysis of Development

3 credits. Lecture.

An analysis of the mechanisms of morphogenesis and differentiation with special emphasis on molecular aspects.

†MCB 349. Molecular Genetics

3 credits. Lecture.

A course of lectures on the molecular basis of heredity. The nature and properties of hereditary materials, including replication, mutation, recombination, and repair.

MCB 350. Genetics of Microorganisms

3 credits. Lecture.

Basic genetic processes in microorganisms including homologous and nonhomologous recombination, chromosome mechanics, and mutation; genome organization; transposable elements, their uses in genetic analyses and their role in microbial evolution.

MCB 352. Problems in Genetics of Eukaryotes

3 credits. Lecture.

Consideration of such problems as chromosomal organization, mechanisms of meiotic drive, epigenetic inheritance, chromosome distribution, and transposable elements in model genetic organisms.

MCB 353. Eukaryotic Molecular Biology

2 credits. Seminar.

Considerations of the molecular and cellular biology of eukaryotes with emphasis on current literature. Presentations by faculty and students.

MCB 354. Molecular Aspects of Genetics

2 credits. Lecture.

Integration of the biological effects, molecular structure, expression, and evolution of genes and genomes.

MCB 355. Cellular and Molecular Immunology

2 credits. Lecture.

Genetic, biochemical, and cellular control of the immune system, addressing such topics as antigen recognition, immune regulation, stress and immunity, apoptosis, and signal transduction.

MCB 356. Animal Cell Culture Laboratory

5 credits. Laboratory

Lecture and laboratory covering basic aspects of cell culture in vitro, including mammalian, avian, fish and insect cells. Laboratory procedures include: preparation of complex and synthetic media; mass and single cell culture; primary and established cell cultures; large scale growth of cells; culture contaminants; cell preservation; growth factors; measurement of cell growth and viability; cell cloning; cell synchrony; cell cycle analysis; karyotyping; mutant isolation; cell fusion/hybridomas; culture of specialized cells; virus propagation; production of specialized cell products; toxicity testing; cell transformation/immortalization; DNA transfection.

MCB 359. Genetics of Higher Plants

2 credits. Lecture.

Use of tools of molecular genetics to address problems in the biochemistry, cell biology, and physiology of higher plants. Topics covered include organ development, signal transduction, carbon

partitioning, plant-microbe interactions, and plant genome projects.

MCB 370. Current Advances in Epigenetics

1 credit. Seminar. This course can be repeated to a maximum of three credits. Also offered as ANSC 370.

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

MCB 371. Current Topics in Molecular Evolution and Systematics

1 credit. Lecture.

Current concepts, ideas and techniques in the field of molecular evolution, and theoretical problems peculiar to the phylogenetic analysis of molecular data.

MCB 372. Computer Methods in Molecular Evolution

3 credits. Lecture.

Practical aspects of molecular data analyses. Databank searches, sequence alignments, statistical analyses of sequence data. Parsimony, distance matrix, and spectral analysis methods. Students compile and analyze a data set of their choice.

†MCB 374. Graduate Seminar

1 credit. Seminar.

MCB 379. Microbial Physiology

3 credits. Lecture.

Topics in microbial cell organization, growth, and intermediary metabolism with emphasis on specialized physiological adaptations.

MCB 380. Advanced Cell Biology

3 credits. Lecture.

Integrative approach to the study of eukaryotic cell biology emphasizing structure, function, and dynamics of the cytoskeleton, membrane, and extracellular matrix.

MCB 381. Mechanisms of Bacterial Pathogenicity

3 credits. Lecture.

An in-depth examination of several host-parasite relationships as models of disease states.

MCB 382. Physiological Genetics of Bacteria

3 credits. Lecture.

The use of mutants in investigating metabolic pathways and homeostic mechanisms in bacteria,

with extensive reference to *Escherichia coli* and its genetic map.

MCB 383. Biotechnology Seminar

1 credit. Seminar.

Current topics in biotechnology.

MCB 384. Fermentation and Separation Technology Laboratory

3 credits. Lecture/Laboratory.

Introduction to techniques used for industrial mass culture of prokaryotic and eukaryotic cells and methods used to extract useful products from these cultures.

MCB 393. Special Topics in Cellular and Molecular Biology

2 credits. Seminar.

Consideration of selected topics in cellular and molecular biology. Presentations are made by invited speakers. Each session is preceded by a discussion of readings related to the subject matter of the presentation.

†MCB 394. Seminar in Microbiology

1 credit. Seminar

Discussion of current topics in microbiology.

MCB 395. Independent Study

1 credit. Independent study.

A reading course for those wishing to pursue special work in biology. It may also be elected by undergraduate students preparing to be candidates for degrees with distinction.

MCB 396. Investigation of Special Topics

1-6 credits. Seminar.

Advanced study in a field within Molecular and Cell Biology.

MCB 397. Research

1-6 credits. Independent study.

Conferences and laboratory work covering selected fields of Molecular and Cell Biology.

†GRAD 395. Master's Thesis Research

1-9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†MCB 404. Special Topics in Genetics

2 credits

Intensive reading and discussion in current topics in genetics.

MCB 412. Advanced Plant Physiology

2 credits. Lecture.

Molecular bases of plant development, plant-environment interactions, transport processes, and photosynthate partitioning. The course covers the biochemical and biophysical foundations of plant physiology; emphasis is on the applications of molecular genetics and molecular biology techniques.

†GRAD 495. Doctoral Dissertation Research

1-9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

MUSIC

Interim Department Head: Professor Robert Thayer
Professors: Arm, Bass, Frogley, Junda, Miller, Renshaw, Stanley, and Stephens

Associate Professors: Kaminsky, Larrabee, McClain, Mills, Neelly, and Sacco

Assistant Professors: Ackley, Rice, and Squibbs

The Master's Program. Areas of concentration leading to the Master of Music degree are music education and performance (including an area of emphasis in conducting). Areas of concentration leading to the Master of Arts degree are historical musicology and theory.

Admission requirements in addition to those of the Graduate School are as follows: Applicants in historical musicology and theory are required to submit a writing sample, and Graduate Record Examination scores (General Test). All other applicants must submit GRE Revised Music Test scores or the University of Connecticut Graduate Theory Placement Exam. Applicants in performance, conducting, and music education are required to audition for admission. While a personal audition is preferred, a recorded audition may be submitted by applicants who find it prohibitive to travel to Storrs. In lieu of an audition, music education applicants may substitute a video recording of their recent teaching that demonstrates the applicant's personal musicianship.

The master's degree programs require a minimum of 24 credits for the M.A. and 30 credits for the M. Mus. A thesis is required for the Master of Arts program. Students in performance or conducting must present a public recital, and a final project of a type approved by the music faculty.

The D.M.A. Program. Areas of Concentration in conducting (instrumental, choral) and performance are offered. The program includes applied study, a minor field in theory or history, and electives suited to the student's objectives and needs. For specific information with regard to admission to the D.M.A. program, students should write to the Director of Graduate Studies in Music, Department of Music, Unit 1012, Storrs, Connecticut 06269-1012.

The Ph.D. Program. Areas of concentration are music theory and history, and music education. Plans of study are constructed through consultation between the student and advisory committee, so that the program is uniquely suited to the student's objectives and needs. For specific information with regard to admission to the Ph.D. program, students should write to the Director of Graduate Studies in Music, Department of Music, Unit 1012, Storrs, Connecticut 06269-1012.

Graduate Performer's Certificate. For information concerning the Graduate Performer's Certificate, write to the Department of Music, Unit 1012, Storrs, Connecticut 06269-1012.

Special Facilities. The Frank B. Cookson Music Library maintains an extensive collection of books, scores, and recordings. Listening facilities are available to students in the library. Unique research facilities include the department computer laboratory, the electronic music studio, the music education laboratory, and an extensive collection of Renaissance and Baroque instruments and replicas. The von der Mehden Recital Hall, seating 500, is used for student

and faculty performances and houses digital recording facilities. A concert hall seating 3,000 provides a full season of concerts, including performances by major symphony orchestras, chamber musicians and internationally known solo artists.

COURSES OF STUDY

MUSI 300. Investigation of Special Topics
1-3 credits. Independent Study. Open to graduate students in Music, others with permission.

MUSI 301. Research Procedures in Music Education
3 credits. Lecture.
Research methods and sources.

MUSI 302. Analytic Techniques
3 credits. Lecture.
Structure and style in works from the 18th through the 20th Centuries.

MUSI 305. Graduate Performing Ensemble
1 credit. Laboratory. Open to graduate students in Music, others with permission.
Symphony Orchestra, Symphonic Wind Ensemble, Concert Band, Concert Choir, Chamber Singers, University Chorale, Voices of Freedom Gospel Choir, Jazz Ensemble, Jazz Lab Band.

MUSI 306. Seminar in Opera Literature
3 credits. Seminar. Open to graduate students in Music, others with permission.
Literature of the opera from the Early Baroque to the present. Course content can change from a general survey to a study of selected works by a composer, or works in a specific country or style period.

MUSI 307. Seminar in Keyboard Literature
3 credits. Lecture. Open to graduate students in Music, others with permission.
Stylistic and performance problems in keyboard literature through Mozart. Course for advanced pianists.

MUSI 308. Seminar in Piano Literature
3 credits. Lecture. Open to graduate students in Music, others with permission.
Stylistic and performance problems in piano literature from Beethoven. Course for advanced pianists.

MUSI 309. Seminar in Woodwind Literature
3 credits. Seminar. Open to graduate students in Music, others with permission.
Historical development of the woodwind instruments; of representative solo and ensemble literature.

MUSI 315. Seminar in Suzuki String Pedagogy
2 credits. Seminar. Open to graduate students in Music, others with permission

Philosophy, repertoire and pedagogy of the Suzuki Method, including guided observation and supervised teaching.

MUSI 319. Notation and Performance Practice
3 credits. Lecture. Open to graduate students in Music, others with permission.

Notation, ornamentation, and instrumentation from the middle ages through the classic period.

MUSI 322. Experimental Research in Music
3 credits. Lecture. Open to graduate students in Music, others with permission.

Investigation of the problems and techniques employed in experimental studies of music.

MUSI 323. Applied Music
1-6 credits. Practicum. Open to graduate students in Music, others with permission.
The Applied Music Fee fee is charged all students receiving private instrumental, vocal, or conducting instruction. Participation in an appropriate major ensemble is required.

MUSI 324. Graduate Chamber Ensemble
1 credit. Laboratory. Open to graduate students in Music, others with permission.
Study and performance of chamber music for various ensembles.

MUSI 325. Opera Theater
1 credit. Lecture. Open to graduate students in Music, others with permission.
Study and performance of roles in major opera productions and/or work in production technique. May be repeated for credit.

MUSI 330. Advanced Instrumental Conducting
2 credits. Laboratory. Open to graduate students in Music, others with permission.
Score study, conducting, and rehearsal techniques of selected instrumental literature.

MUSI 331. Conducting Seminar
1 credit. Seminar.
Special topics in instrumental and choral conducting.

MUSI 332. Psychology of Music
3 credits. Lecture. Open to graduate students in Music, others with permission.
Psychoacoustical problems related to musical performance, composition, and appreciation.

MUSI 333. Foundations and Principles of Music Education
3 credits. Lecture.
Historical, sociological and philosophical foundations of music education in American elementary and secondary schools.

MUSI 340. Musical Skills for Teachers
2 credits. Lecture. Open to graduate students in Music, others with permission.

Aural, sight-singing and keyboard skills for public school music teachers.

MUSI 348. Schenkerian Theory and Analysis
3 credits. Lecture. Open to graduate students in Music, others with permission. Prerequisite: MUSI 302.

Readings and analytical projects based on the theories of Heinrich Schenker and his followers.

MUSI 353. Theory Seminar
3 credits. Seminar. Open to graduate students in Music, others with permission. Prerequisite: MUSI 302.
Analysis of specific styles and the work of particular theorists; variable topics.

MUSI 354. Advanced Analysis
3 credits. Lecture. Open to graduate students in Music, others with permission. Prerequisite: MUSI 302.
Methods and models of music analysis applied to selected works from the Middle Ages to the 20th Century.

MUSI 356. Theory Teaching
3 credits. Lecture. Open to graduate students in Music, others with permission.
New teaching strategies. Emphasis on aural training.

MUSI 357. Advanced Orchestration I
3 credits. Lecture. Open to graduate students in Music, others with permission.
Principles and techniques of scoring for the orchestra and band.

MUSI 358. Advanced Orchestration II
3 credits. Lecture. Open to graduate students in Music, others with permission.
Principles and techniques of scoring for the orchestra and band.

MUSI 359. History of Music Theory
3 credits. Lecture. Prerequisite: MUSI 302.
Speculative pedagogical and analytical thought on the music in theoretical treatises from antiquity to the twentieth century.

MUSI 364. Advanced Choral Techniques
2 credit. Seminar. Open to graduate students in Music, others with permission.
Score study, conducting, and rehearsal techniques of selected choral literature.

MUSI 365. Choral Literature to 1600
2 credits. Lecture. Open to graduate students in Music, others with permission.
Historical-analytical study of choral compositions: c. 1000 A.D. to 1600.

MUSI 366. Choral Literature from 1600 to 1800
2 credits. Lecture. Open to graduate students in Music, others with permission.

Historical-analytical study of choral compositions: 1600 to 1800.

MUSI 367. Choral Literature from 1800 to Present

2 credits. Lecture. Open to graduate students in Music, others with permission.

Historical-analytical study of 1800 to the present.

MUSI 372. Wind Band Literature

3 credits. Lecture. Open to graduate students in Music, others with permission.

Historical-analytical study of music for wind ensemble and symphony band.

MUSI 373. Orchestra Literature

3 credits. Lecture. Open to graduate students in Music, others with permission.

Historical-analytical study of orchestral literature.

MUSI 379. Atonal Theory and Analysis

3 credits. Lecture.

Set theoretic concepts and operations in applied twentieth-century music.

MUSI 391. Procedures in Historical Research

3 credits. Lecture.

A project-oriented approach to bibliographic tools and research methods applicable to the historical study of music.

MUSI 397. Recital

1 credit. Laboratory.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

MUSI 400. Tutorial in Music

1-3 credits. Independent Study.

Concentrated individualized study and research.

MUSI 411. Seminar: The Life and Works of Individual Composers

3 credits. Seminar. Open to graduate students in Music, others with permission.

MUSI 412. Seminar: Style Periods in Music History

3 credits. Seminar. Open to graduate students in Music, others with permission

MUSI 413. Seminar: History of Musical Forms

3 credits. Seminar. Open to graduate students in Music, others with permission.

Sonata, concerto, madrigal, motet or other musical forms.

MUSI 491. Seminar: Advanced Research Procedures in Musicology

3 credits. Seminar. Open to graduate students in Music, others with permission.

Critical reading and original research in recent historical musicology.

MUSI 497. Topics in Music Education

1-3 credits. Lecture. Open to graduate students in Music, others with permission.

Principles and advanced methods in the teaching of music.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

NATURAL RESOURCES

Department Head: Professor David B. Schroeder

Professors: Civco, Miller, and Robbins

Associate Professors: Barclay, Clausen, Meyer, Warner, and Yang

Assistant Professors: Ortega, Rudnicki, and Vokoun

The Department of Natural Resources Management and Engineering offers study leading to the Master of Science and Doctor of Philosophy degrees in Natural Resources: Land, Water, and Air.

The M.S. Program. The purpose of the program is to provide advanced study in one of the following specialty areas: atmospheric resources, earth resource information systems, fisheries management, water resources, and wildlife management. Both thesis (Plan A) and non-thesis (Plan B) options are available.

The Ph.D. Program. The purpose of the Ph.D. program is to educate scientists with a broad experience in natural resources and to prepare them to do independent research in one of the following specialties: air resources, earth resources, fisheries resources, water resources, and wildlife resources. The program requires at least 20 credits beyond the master's degree, exclusive of the related or supporting area. All Ph. D. candidates are required to take NRME 397 and NRME 401. Ordinarily, students enrolled in this program will have completed the master's degree. Students are required to have at least six credits of advanced work in a related or supporting area or have a competent reading knowledge of at least one foreign language appropriate to the general area of study. Candidates should be versed in natural resources management, science and technology, and analytical methods.

Special Facilities. The Department has state-of-the-art laboratories for atmospheric resources, aquatic resources, fisheries resources, terrestrial resources and the Laboratory for Earth Resources Information (LERIS). The Department also houses the Wildlife Conservation Research Center and the Connecticut Water Resources Institute. The Department manages the 4,000 hectare UConn Forest for teaching, research, and demonstration.

COURSES OF STUDY

NRME 325. Environmental Measurements and Instrumentation

3 credits. Lecture.

Principles that govern the selection and use of both field sensors and recording data systems for field research and environmental monitoring.

NRME 326. Water Transport in Soils

3 credits. Lecture.

Application of the principles of transport of water in soil for various physical properties of soils and fluids, initial conditions and boundary conditions. The differential equations describing the movement of energy and mass for both saturated and unsaturated flow conditions will be applied to soil evaporation and plant transpiration, infiltration and percolation of wetting fronts, and movement of tracers and chemical constituents of water. Both uniform flow and preferential flow will be examined.

NRME 328. Environmental Biophysics

3 credits. Lecture.

Gas laws and transport processes. Radiation environment. Momentum, heat, and mass transfer. Steady-state and transient energy balance. Microclimate of plants and animals. Physical and physiological interactions between plants/animals and their environment.

NRME 350. Principles of Nonpoint Source Pollution

3 credits. Lecture.

An advanced investigation of sources, impacts, modeling and management of nonpoint sources of water pollution.

NRME 352. GPS Surveying

3 credits. Lecture.

Theory and practice of global positioning system (GPS) surveying. Includes network design, control, geodetic coordinate systems, field collection of measurements, data processing, and interpretation of results.

NRME 353. Digital Terrain Modeling

3 credits. Lecture. Suggested preparation: NRME 252 (GIS), NRME 253 (Introduction to Geodesy) or equivalent.

Theory and practice of digital terrain modeling. Topics include topographic surveying, topographic surface modeling, derivative estimation, and selected applications of digital terrain models.

NRME 355. Advanced Ground Water Hydrology

3 credits. Lecture. Not open to students who have passed GEOL 355.

Covers ground water resource assessment, management and protection, understanding the flow of ground water in fractured rock, application of tracer studies in evaluating flow conditions.

NRME 356. Ground Water Modeling Applications

3 credits. Lecture. Not open to students who have passed GEOL 356.

Application of Modflow to ground water flow and contaminant problems. Well head protection modeling.

NRME 357. Field Methods in Hydrogeology

3 credits. Lecture. Not open to students who have passed GEOL 357.

Field methods associated with ground water and contamination assessments.

NRME 360. Advanced Fisheries Management

3 credits. Lecture.

Principles, practices, and current trends in fisheries science and management.

NRME 377. Natural Resource Applications of Geographic Information Systems

3 credits. Lecture.

The principles and applications of computer-assisted spatial data analysis in natural resources management will be covered. Both hypothetical and actual case studies of the use of geographic information systems (GIS) to solve natural resource problems will be discussed. Raster- and vector-oriented, microcomputer-based GIS software will serve as the hands-on tools for students.

NRME 378. Wildlife Ecology

1-6 credits. Lecture.

A discussion of the principles upon which wildlife conservation is based.

NRME 381. Wildlife Management

1-6 credits. Lecture/Laboratory.

The application of ecological principles as practiced by natural resource agencies throughout North America.

NRME 387. Geospatial Data Processing Techniques

3 credits. Lecture.

Research approaches and techniques in geospatial analysis, enabling students to pursue integrated research in earth resources data geoprocessing applications. A variety of computer-based tools, including remote sensing, geographic information systems (GIS), and global positioning satellite (GPS), will be utilized in the acquisition, analysis, and presentation of digital earth resource data and information.

NRME 392. Ecology of Fishes I

3 credits. Lecture.

Interrelationships of fishes and their environment.

NRME 393. Ecology of Fishes II

3 credits. Lecture.

Interrelationships of fishes and their environment.

†NRME 397. Graduate Seminar

1 credit. Seminar.

The mechanism of presenting and moderating a professional presentation. Topics include: presentation, organization, speaking skills, use of media technology, formulation of questions, and moderator activities.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

NRME 401. Research Methods in Natural Resources

3 credits. Lecture.

General research techniques, writing scientific articles and grant proposals, problem solving approaches, experimental design and modeling concepts, and research ethics.

NRME 402. Independent Study

1-3 credits. Independent Study

NRME 420. Micrometeorology I

3 credits. Lecture.

Study of basic processes of the atmospheric boundary layer including turbulent flow and the exchanges of heat, water vapor, and pollutants.

NRME 421. Micrometeorology II

3 credits. Lecture.

Study of current literature on processes in the atmospheric boundary layer

NRME 431. Small Watershed Modeling

3 credits. Lecture.

Mathematical modeling of hydrologic processes in small watersheds and aquatic systems. Solutions of mass balance and flow relationships. Investigation of dynamic relationships among variables. Examples include: infiltration, overland flow, channel routing, chemical transport and transformations, surface-subsurface interactions and biotic growth and degradation.

NRME 432. Environmental Data Analysis

3 credits. Lecture.

Topics on natural resources and environmental data analysis, including: random variables and probability distributions, parameter estimation and Monte Carlo simulation, hypothesis testing, simple regression and curve fitting, wavelet analysis, factor analysis; formulation and classification of optimization problems with and without constraints, linear programming; models for stationary and non-stationary time series; solution of ordinary differential equations with Laplace transforms and Euler integration; solution of partial differential equations with finite differences; basics of modeling.

†NRME 450. Teaching Practicum

3 credits. Practicum. May be repeated once for a total of six credits.

Doctoral students in the Natural Resources: Land, Water, and Air program take primary teaching responsibility for a course under the supervision of a faculty liaison.

NRME 461. Landscape Ecology

3 credits. Lecture.

Interdisciplinary focus on the effect of landscape pattern on environmental processes and conditions and the influence of disturbance and underlying geomorphology on landscape pattern. Consideration of landscape ecology principles in planning and management of pattern and processes in which conservation and production land uses are intermingled.

NRME 490. Natural Resources Colloquium

1-6 credits. Seminar.

Study and discussion of readings (journal articles, books, current research) on a selected topic in natural resources.

NRME 491. Natural Resources Seminar
1 credit. Seminar.

Active participation in weekly natural resources seminars given by invited speakers.

NRME 492. Special Topics in Natural Resources

1-3 credits. Lecture.

Advanced topics in the field of natural resources. Topics and credits to be published prior to the registration period preceding the semester offerings.

NRME 498. Special Topics in Natural Resources

1-3 credits. Lecture.

Advanced topics in the field of natural resources.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

NURSING

Dean: Professor Laura C. Dzurec

Assistant Dean: Kathleen Hiatt

Professors: Beck, Cusson, and Koerner

Associate Professors: Anderson, Engler, Hegedus, Jacobs, Kenefick, McDonald, Neafsey, Polifroni, Shelton, and Xu

Assistant Professors: Bassi, Daisy, Kwak, Nelson, and Shellman

The School of Nursing offers study leading to the Master of Science and Doctor of Philosophy degrees in nursing.

The M.S. Program. The plan of study includes nursing and supportive courses planned cooperatively by the advisory committee and the student. The program is accredited by the National League for Nursing and approval by the Commission on Collegiate Nursing Education.

The purpose of the master's program is to prepare advanced practice nurses with specialized knowledge, skills, and values. Graduates assume leadership roles in the health care system and advance practice and the discipline of nursing by applying existing knowledge and using a spirit of inquiry to examine and test knowledge. Areas of study include the following: clinical nurse leader, community health, acute care, neonatal, patient care services and systems administration, and primary care. Opportunity exists for dual degrees resulting in an M.P.H. and M.S. in Nursing for those students in the community health track. A dual degree option is also available for students resulting in an M.B.A. and M.S. in Nursing.

Each student completes a 15-credit core curriculum in theory, research, statistics, needs assessment and legal, regulatory and policy aspects of advanced nursing practice. Additional courses supportive to the core or selected area of emphasis are mutually agreed upon by the student and the three member advisory committee.

An accelerated master's program is available for nurses with diplomas or associate degrees or baccalaureate degrees in another field.

No student may take more than six (6) credits as a non-degree student. Both thesis (Plan A) and non-thesis (Plan B) options are available.

Admission Requirements for the M.S. Program.

In addition to those of the Graduate School, requirements for admission are: a baccalaureate in nursing or its equivalent and current nurse licensure in Connecticut, a three-credit undergraduate course in statistics completed with a grade of C or better, and comprehensive health assessment knowledge for professional nursing PRAXIS including a three-credit course or its equivalent for students enrolling in individual specialty tracks. Two years of experience *prior* to applying to the graduate program is required for those interested in the neonatal specialty track. Contemporary nursing and related science knowledge is expected in order to be successful in the advanced courses within the graduate program. Required also are nursing liability insurance for every clinical course, evidence of tetanus immunization within the past ten years, one poliomyelitis booster following initial immunization, PPD test (chest x-ray required

biennially for positive reactors), rubella, rubeola, hepatitis B titers (with vaccine if titer is negative). A varicella titer and CPR certification, which must remain current, are required as well.

The Ph.D. Program. The purpose of the Ph.D. Program is to prepare nurse leaders who will advance the scientific body of knowledge that is unique to professional nursing practice. Educational experiences are offered in nursing theory development, philosophy of nursing science, qualitative and quantitative research methods, and in advanced statistics. Study in specialty areas further supports the individual's area of clinical interest.

Admission Requirements for the Ph.D. Program.

In addition to those of the Graduate School, requirements for admission are: graduation from an accredited master's program; eligibility for licensure as a registered nurse in Connecticut; a cumulative master's grade point average of 3.25 or higher; submission of Graduate Record Examination scores; completion of a graduate level inferential statistics course; three reference letters; a personal statement; a personal interview; and submission of published works or scholarly papers. Additional information may be obtained by contacting the School of Nursing Academic Advisory Center, 231 Glenbrook Road, Unit 2026, Storrs, Connecticut 06269-2026.

COURSES OF STUDY

NURS 300. Investigation of Special Topics

1-6 credits. Lecture.

NURS 311. Pharmacotherapeutics and Implications for Nursing Action

3 credits. Lecture. Prerequisite: Either NURS 322 or NURS 329.

Emphasis is placed on pharmacodynamics, on nursing measures that support desired drug responses or reduce side effects which must be tolerated, and on client teaching indicated by pharmacotherapy. Open to nondegree students.

NURS 313. Theory and Practice in Neonatal Nursing I

4 credits. Lecture/Practicum. Prerequisites or Co-requisites: NURS 322 and NURS 350, both may be taken concurrently.

Focus on the assessment of cognitive, psychomotor, psychosocial and physiological development of the neonate. Emphasis on application of theory and assessment skills in caring for high-risk maternal-fetal unit, neonates, and family-infant unit. Knowledge obtained from human fetal development is applied.

NURS 314. Theory and Practice in Neonatal Nursing II

4 credits. Lecture/Practicum. Prerequisite: NURS 313

Focuses on the acquisition and application of in-depth physiological and psychosocial knowledge to the nursing care of high risk maternal-fetal unit, neonates, and their families. Emphasis is placed on

the role of advanced practice in nursing management of high risk neonatal and perinatal populations.

NURS 315. Theory and Practice in Neonatal Nursing III

4 credits. Lecture/Practicum. Prerequisite: NURS 314.

Focuses on the components essential for preparation of the student for advanced practice in neonatal/perinatal nursing.

NURS 322. Basis of Human Reproduction

3 credits. Lecture.
Theories and concepts relevant to the human reproduction cycle which serve as a basis for nursing care of families. Human embryology and inheritance patterns of disease will be explored. Discussion of implications for nursing practice and research.

NURS 323. Advanced Physical Diagnosis

3 credits. Lecture/Laboratory. Prerequisite: NURS 384.
The diagnosis of patients with acute health problems with a focus on data collection through history, physical examination, laboratory, radiology, and electronic and hemodynamic monitoring.

NURS 329. Advanced Pathophysiology

4 credits. Lecture. Open to non-degree students with consent of instructor.

Advanced level analysis of the etiology and pathogenesis of diseases that alter the health status of adults. This analysis will be related to adults' clinical and pathophysiologic manifestations of diseases. The course is designed for nurses studying for advanced nursing practice to care for adults with chronic, acute, and life-threatening diseases.

NURS 334. Community Health Nursing Theory: Enhancing Wellness

3 credits. Lecture/Practicum. Prerequisites or Co-requisites: NURS 350 and PUBH 401, both may be taken concurrently. Offered in odd-numbered fall semesters.

Theoretical formulations from nursing, public health, and related sciences are used to enhance the levels of wellness of selected population groups in the community. A needs assessment is conducted to develop a community diagnosis as the basis for developing a plan for health promotion.

NURS 335. Community Health Nursing Theory and Practice: Risk Reduction

4 credits. Lecture/Practicum. Prerequisite: NURS 334. Prerequisite or co-requisite: NURS 370.

Analysis of risk factors for selected populations/communities through an integration of nursing and public health theories. Opportunity for development, implementation, and evaluation of risk reduction interventions is provided.

NURS 336. Community Health Nursing Theory and Practice: Health Maintenance

4 credits. Lecture/Practicum. Prerequisite: NURS 335.

Analysis of health maintenance issues and interventions for groups sharing a common health problem. Opportunity to apply integrated knowledge of nursing and public health principles in the development and evaluation of plans to maintain optimum levels of health is provided.

NURS 340. Health Care Outcome Management

2 credits. Lecture. Open to non-degree students. Offered in even-numbered fall semesters.

An examination and utilization of variance analysis and outcome measurement skills to achieve cost effective quality health care delivery through outcome management.

NURS 341. Psychopharmacology

3 credits. Lecture. Prerequisite: NURS 311, NURS 329, and NURS 384 or equivalent courses. Required preparation includes an M.S. degree in nursing including research, population assessment, policy, and science/theory courses.

The neurobiology of psychiatric disorders and the complex biochemical interactions of treatment with psychotropic medication are addressed. Specific medications, side effects, polypharmacy, and nursing management of prescriptive practices are explored.

NURS 342. Advanced Psychiatric Nursing I

3 credits. Lecture. Prerequisite: NURS 341.

The advanced practice psychiatric nurse practitioner role in multiple settings and specific psychiatric disorders from a historical and contemporary perspective will be addressed, while detailing treatment models. The required course paper will focus on a developmental stage and the associated psychiatric issues that can effect that population.

NURS 343. Advanced Psychiatric Nursing II

3 credits. Lecture. Prerequisite: NURS 342.

Specific advanced psychiatric disorders, etiology and treatment will be explored. The course project involves planning and implementing a primary mental health prevention project with a defined population.

NURS 344. Psychiatric Treatment Modalities

4 credits. Lecture.

This course addresses the treatment modalities available to advanced practice psychiatric nurses—individual, family, and group treatment. Case management is addressed. Students would focus the course paper on one treatment modality and do an in-depth analysis of the principles and practice associated with modality.

NURS 345 Advanced Psychiatric Practicum I

5 credits. Practicum.

The provision of psychiatric mental health care and consultation under the supervision of an APRN. A weekly seminar addressing the teaching and coaching

and interdisciplinary collaboration elements of role development is incorporated. Enrollees select a modality of care and the experience is arranged to maximize learning and implementing this modality.

NURS 346. Advanced Psychiatric Practicum II

5 credits. Practicum.

The provision of advanced psychiatric mental health nursing care and consultation under the supervision of an APRN utilizing a new modality of care and enhancing the application of a previous modality of care. A weekly seminar addressing the case management and leadership elements of role development is incorporated.

NURS 350. Nursing Science

3 credits. Lecture. Open to non-degree students.

Analysis of the current state of nursing science and the application of knowledge from this science and other disciplines to advanced nursing practice from historical, contemporary and futuristic perspectives.

NURS 351. Nursing Research in Advanced Practice

3 credits. Lecture. Prerequisite or Co-requisite: NURS 358.

Analysis of qualitative and quantitative methods employed to answer questions in nursing practice. Emphasis on problem identification; design principles; and accessing, analyzing, disseminating and utilizing research.

NURS 352. Policy Aspects of Advanced Nursing Practice

3 credits. Lecture.

Analysis and evaluation of legal, regulatory, policy and economic aspects of advanced nursing practice from historical, contemporary and futuristic perspective. Understand the interrelationships among change, power and politics.

NURS 354. Needs Assessment and Planning

3 credits. Lecture. Prerequisite: NURS 358.

An interdisciplinary survey course that prepares students to conduct a needs assessment on a selected population. Includes elements of epidemiology, identification of populations at risk and the development of plans to market, implement and evaluate programs to enhance the health and well-being of selected populations.

NURS 356. Nursing Theories and Patterns of Knowing

3 credits. Lecture. MBEIN students only. Instructor consent required. Offered in the spring semester.

This survey course introduces the student to the art and science of nursing practice. It explores the historical, empirical, ethical, esthetical, and personal knowing aspects of nursing praxis. The legal, educational, regulatory, and financial world of nursing is examined. The major theorists influencing the development and advancement of the profession are explored.

NURS 358. Statistical Methods in Nursing
3 credits. Lecture. Open to non-degree students.

Quantitative procedures including descriptive and inferential statistics, nonparametric approaches to data, and parametric analyses through factorial analysis of variance.

NURS 360. Advanced Practice: Acute Care Nursing I

2 credits. Lecture. Prerequisites: NURS 311, NURS 323, NURS 329, and NURS 384.

The focus of this course will be the introduction of critical thinking, analysis and application of theories and concepts to care for acutely ill clients. A strong emphasis will be placed on pathophysiology and assessment. Interpretation and management of treatment plans will be explored.

NURS 361. Advanced Practice: Acute Care Nursing II

2 credits. Lecture. Prerequisite: NURS 360.

This course continues to refine the analysis and application of theories for the nurse practitioner and clinical nurse specialist in acute care. The focus is on role development, trends, issues and research into common problems of the acutely ill client.

NURS 365. Acute Care Nurse Practitioner Practicum I

4 credits. Lecture/Practicum. Prerequisite: NURS 360 and NURS 350; NURS 350 may be taken concurrently.

The focus of this practicum will be critical thinking, assessment and diagnosis of acutely/critically ill patients. Database creation, formulating a plan of care, and evaluation of outcomes will be explored. Diagnostics and therapeutics will be emphasized.

NURS 366. Acute Care Nurse Practitioner Practicum II

4 credits. Practicum. Prerequisite: NURS 360 and NURS 350; NURS 350 may be taken concurrently.

The focus of this practicum will be the refinement of pertinent management abilities and skill for the nurse practitioner student. The student will expand their management to multiple patients. Collaboration within a multidisciplinary team, providing holistic care and evaluation of current research will be explored.

NURS 367. Acute Care Clinical Nurse Specialist Practicum I

4 credits. Practicum. Prerequisite: NURS 360 and NURS 350; NURS 350 may be taken concurrently.

The focus of this course will be on assessment and implementation of care for acutely ill clients in perioperative, medical, surgical, critical care, and emergency department settings.

NURS 368. Acute Care Clinical Nurse Specialist Practicum II

2 credits. Practicum. Prerequisite: NURS 367.

The focus of this practicum will be on decision making and advanced nursing intervention strategies within various settings. Evaluation of care will be

explored. Perioperative, medical, surgical, critical care, and emergency department clinical sites are available.

NURS 370. Health Care Financing

1-3 credits. Lecture.

An analysis of economic theory as it relates to health care. Incorporation of expert support systems in the design of nursing department and unit financial plans. Compare and contrast various budgeting systems. Open to non-degree students.

NURS 371. Nursing Administration I

1-3 credits. Lecture. Offered in odd-numbered fall semesters.

Introduction to the process of nursing administration. Emphasis is placed on theories of leadership, motivation, evaluation, organizational design and problem solving.

NURS 372. Nursing Administration II

1-4 credits. Lecture/Practicum. Prerequisite: NURS 371. Co-requisite: NURS 351. Offered in even-numbered spring semesters. Practicum applications are due October 1st for spring enrollment.

Application of management theories to nursing administration focusing on staff development, labor relations, staffing and scheduling, patient classification systems, quality management, performance and program evaluation, and human resource management.

NURS 379 Nursing Administration III

1-5 credits. Lecture. Prerequisite: NURS 350, NURS 351, and NURS 372. Offered in even-numbered fall semesters. Practicum applications are due March 1st for fall enrollment.

Synthesis of nursing and multidisciplinary theories in the system of nursing administration. Strategic planning, ethics, marketing, entre/intrapreneurship, and multisystem corporations are analyzed and the role of the administrator examined.

NURS 383. Primary Care I

3 credits. Lecture. Prerequisite: NURS 384.

Focus is on the health promotion/disease prevention and the assessment and management of selected acute and chronic health problems, including respiratory, cardiovascular, and endocrine systems. Assessment skills applied to diagnosis and treatment of human responses to acute and chronic health problems are emphasized.

NURS 384. Advanced Health Assessment

3 credits. Lecture/Laboratory/Practicum. Prerequisite: Either NURS 322 or NURS 329, which may be taken concurrently.

The clinical management of individuals experiencing common acute and chronic health problems, focusing on the cardiovascular and respiratory systems and mental health. Principles and techniques of advanced physical assessment are emphasized.

NURS 385. Primary Care II

3 credits. Lecture. Prerequisite: Grades of B or higher in NURS 383, NURS 384 and either NURS 389

or NURS 392.

Assessment and management of selected acute and chronic health problems, focusing on endocrine, gastrointestinal, integumentary and genitourinary systems, women's health and behavioral health.

NURS 386. Primary Care Practicum II

4 credits. Lecture/Practicum. Prerequisites: NURS 385, which may be taken concurrently.

Assessment and management of selected acute and chronic health problems, focusing on gastrointestinal, integumentary, genitourinary systems, women's health, and behavioral health. Includes a seminar and 12 clinical hours per week.

NURS 387. Primary Care III

3 credits. Lecture. Prerequisite: Grades of B or higher in NURS 385 and either NURS 386 or NURS 393.

Special focus will be on assessment and management of adolescents and adults with acute and chronic health problems, including musculoskeletal, neurological, immunological, sensory, and oncological problems. Violence, ethics, and genetic counseling will be addressed. A grade of B or higher is required to receive endorsement for certification examination.

NURS 388. Primary Care Practicum III

5 credits. Lecture/Practicum. Prerequisite: NURS 387, which may be taken concurrently.

Builds on all previous primary care didactic and practicum courses, focusing on clinical management of individuals experiencing acute and chronic health problems with special emphasis on musculoskeletal, neurological, immunological and sensory systems, oncology, violence, and ethics. Additional practice in an area of special interest is encouraged. Includes a seminar and 15 clinical hours per week. A grade of B or higher is required to receive endorsement for certification examination.

NURS 389. Primary Care Practicum I

4 credits. Lecture/Practicum. Prerequisites: NURS 329, NURS 350, and NURS 384. Co-requisite: NURS 383.

Focus is health promotion/disease prevention and the clinical diagnosis and management of individuals experiencing common acute and chronic health problems of respiratory, cardiovascular, and endocrine systems. The role of the nurse in primary care is examined. Includes a seminar and 12 clinical hours per week.

†NURS 396. Research Internship in Nursing

1-3 credits. Seminar.

The research internship will be completed under the mentorship of an experienced researcher. The course will meet in seminar format to provide direction and support during the internship.

NURS 397. Independent Study

1-6 credits. Independent Study.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. **Full-Time Master's Research**
3 credits.

†GRAD 397. **Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. **Special Readings (Master's)**
Non-credit.

GRAD 399. **Thesis Preparation**
Non-credit.

NURS 410. **Philosophy of Science in Nursing**
3 credits. Lecture.

A critical examination of the meanings, methods, and logical structure of science. Contemporary and historical views pertaining to the nature of truth, explanation, law, theory and methodology will be analyzed and compared. Examples drawn from nursing epistemology as well as that of other disciplines will be utilized to depict the presuppositions of modern science.

NURS 413. **Constructing Nursing Theory**
3 credits. Lecture. Prerequisite: NURS 414.

Integrates the student's experiential worldview into the construction of knowledge relevant to the evolving epistemology in nursing. Provides a forum for dialogue focused on the process of caring in the human health experience as informed by research and theoretical developments.

NURS 414. **Analysis of Contemporary Nursing Knowledge**

3 credits. Lecture. Prerequisite: NURS 410.

Methods of analysis and evaluation of the concepts and theories in nursing both grand and mid range.

NURS 430. **Qualitative Methodology in Nursing Inquiry**

3 credits. Lecture.

The study of the relationship among philosophy, theory, and qualitative methodology within the human science of nursing. Techniques related to sampling, research design, data collection, and data analysis will be explored through a combination of lecture, class discussion and course assignments.

NURS 431. **Quantitative Methodology Applied to Nursing**

3 credits. Lecture. Prerequisite: EPSY 346.

Study and application of theories of sampling and probability testing to nursing research. Different approaches to research design, variable specification, data collection and analysis are explored within quantitative methods of scientific inquiry.

NURS 432. **Instrument Development in Nursing**

3 credits. Lecture. Prerequisite: EPSY 346.

A study of the theories and methods of instrument development as applied to nursing. The basic psychometric properties to be assessed and built into a useful measure for clinical or research applications are explored.

NURS 434. **Advanced Qualitative Methods**
3 credits. Lecture. Prerequisite: NURS 430.

This seminar is designed for students in nursing and other disciplines to achieve an advanced level of expertise in selected qualitative approaches. Expected course outcome is a completed qualitative project.

NURS 435. **Grantsmanship: The Pursuit of Scholarly Support**

3 credits. Lecture. Prerequisites: NURS 430 and NURS 431.

A pragmatic exploration of the societal and professional realities of grantsmanship. Experiences are practical so as to enhance the development of skills needed to secure funding for scholarly research endeavors.

†GRAD 495. **Doctoral Dissertation Research**

1 - 9 credits.

†GRAD 496. **Full-Time Doctoral Research**
3 credits.

†GRAD 497. **Full-Time Directed Studies (Doctoral Level)**
3 credits.

GRAD 498. **Special Readings (Doctoral)**
Non-credit.

GRAD 499. **Dissertation Preparation**
Non-credit.

NUTRITIONAL SCIENCES

Department Head: Professor Sung I. Koo

Professors: Clark, Fernandez, Ferris, Freake, Greger, and Lammi-Keefe

Associate Professors: McGrane, Perez-Escamilla, and Rodriguez

Assistant Professor: Davis

The degrees of Master of Science (Plan A thesis and Plan B non-thesis options) and Doctor of Philosophy in the field of Nutritional Science are offered.

Admission to Degree Programs. In addition to the standard requirements of the Graduate School, applicants also should submit scores from the Graduate Records Examinations (GRE). Prior study in the biological sciences and nutrition is required, however, some prerequisites may be taken after matriculation in the program. More detailed information can be obtained from the department.

Program of Study. There are three major areas of expertise within the Department: molecular nutrition, nutritional biochemistry and metabolism, and community nutrition and health. Molecular nutrition is based on laboratory studies utilizing molecular biological techniques to examine mechanisms of nutrient action and metabolism in the cell, tissue, and whole animal. Nutritional biochemistry and metabolism involves human and animal studies to examine nutrient metabolism in health and disease. Community nutrition and health focuses on public health areas of nutrition including community-level nutrition assessment, education and intervention programs. These areas are interdisciplinary in approach and are supported by other departments as well as by collaborative arrangements with other institutions. Opportunities for interdisciplinary research and study exist. All programs require a thesis, dissertation, or expanded paper, in addition to the successful completion of the appropriate graduate courses and examinations.

COURSES OF STUDY

NUSC 300. **Macronutrient Metabolism**

3 credits. Lecture. Prerequisite: MCB 301.

The function and metabolic pathways of energy, carbohydrates, protein and lipids; their interrelationships and factors controlling their metabolism.

Methodologies for studying metabolism and assessing nutrient requirements in man and animals.

†NUSC 301. **Concepts of Nutrition**

2 credits. Lecture.

An introduction to the broad field of nutrition.

Intended for entering graduate students, the course provides a conceptual framework for research and study in the nutritional sciences.

NUSC 312. **Assessment of Nutritional Status**

3 credits. Lecture/Laboratory. Prerequisite: NUSC 300.

This course is designed to discuss and critique the methodologies of nutritional status assessment, namely dietary, anthropometric and biochemical.

Analysis of human blood and urine samples provides exposure to laboratory techniques and equipment used in nutritional assessment.

NUSC 313. Nutrition and Gene Expression

3 credits. Lecture. Prerequisite: MCB 301.

Regulation of eukaryotic gene expression by specific nutrients, hormones, and metabolites. Transcriptional, post-transcriptional, and translational mechanisms.

NUSC 314. Nutrition for Healthy Communities

3 credits. Lecture.

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

NUSC 315. Lipid Metabolism in Health and Disease

3 credits. Lecture.

Comprehensive study of lipid and lipoprotein metabolism. Influence of diet, drugs, exercise and obesity. Overview of relationship between genetics, lifestyle factors and chronic disease.

NUSC 317. Nutritional Epidemiology

3 credits. Lecture.

Principles and applications of nutritional epidemiology with emphasis on research design.

NUSC 332. Vitamins and Minerals

3 credits. Lecture. Prerequisite: MCB 301.

Comprehensive study of vitamins, trace elements, and selected macrominerals, including biochemical function(s), metabolic pathways, interactions, and toxicities.

NUSC 342. Special Topics in Nutrition

1-6 credits. Lecture.

Advanced study in a given area of nutritional science.

NUSC 365. Advanced Clinical Nutrition

3 credits. Lecture. Prerequisite: NUSC 300.

A study of topics of current clinical interest. Lectures, readings, reports and discussion.

NUSC 370. Field Work on Community Nutrition

1-6 credits. Practicum.

Supervised field studies of community nutrition problems and visits with community agencies and families. Readings, conferences and reports required.

NUSC 380. Independent Study in Nutritional Science

1-6 credits. Independent Study.

Research problems or critical review of literature in any area of nutrition.

NUSC 390. Seminar

1 credit. Seminar. Prerequisite: NUSC 301.

Students develop the skills required for the

analysis and presentation of current literature and research problems.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

PATHOBIOLOGY

Department Head: Professor Herbert J. Van Kruiningen

Professors: Geary and Khan

Associate Professors: Bushmich, De Guise, Frasca, French, Garmendia, and Smyth

Assistant Professor: Risatti

Adjunct Professor: Brown

Adjunct Associate Professor: Tsongalis

Adjunct Assistant Professors: Afonso, Baxt, Burrage, Golde, Grubman, Rodriguez, and Romano

Graduate instruction leading to the M.S. and Ph.D. degrees is offered by the Department of Pathobiology and Veterinary Science. All M.S. degrees are granted in Pathobiology. Ph.D. degrees are granted in Pathobiology with areas of concentration in bacteriology, pathology, and virology. Standard admission requirements are maintained for these programs. There also is a study area offered in veterinary pathology, which is open only to Ph.D. students with the D.V.M. degree. In all of these areas, the accent is on basic sciences as related to diseases of animals.

Requirements. For the M.S. degree, generally 15 credits of course work and a thesis are required. No established sequence of courses is required for the Ph.D. degree. Since students possessing the D.V.M. degree usually have four more years of advanced education than the typical Ph.D. applicant, fewer courses may be required. In addition to graduate courses offered within the Department, the candidate is expected to take graduate courses in biochemistry, cell biology, genetics, statistics, and molecular biology in appropriate departments.

Special Facilities. The Department houses the Connecticut Veterinary Medical Diagnostic Laboratory which is equipped with a fully functioning mammalian and avian necropsy laboratory, histology laboratory and diagnostic microbiology, virology and serology laboratories. State of the art molecular biology facilities are present in the Department for research on infectious, immunologic, toxic and metabolic diseases. The Department also houses the Northeastern Research Center for Wildlife Diseases. Collaborative opportunities exist with the USDA Plum Island Animal Disease Center and the School of Pharmacy Center for Biochemical Toxicology Program.

COURSES OF STUDY

PVS 300. Research and Independent Study in Animal Diseases

1-6 credits. Independent Study.

PVS 306. Vaccines: Mechanisms of Immune Protection

3 credits. Lecture.

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

the context of vaccine design. The students will gain an appreciation for the transition from basic research to practical applications. Also offered as ANSC 306.

PVS 312. Veterinary Pathology Seminar
1 credit. Seminar.

A discussion of current problems in veterinary pathology with emphasis on histopathology and the related disciplines.

PVS 335. Clinical Chemistry
3 credits. Lecture.

Study of the application of chemical, molecular, and cellular concepts and techniques to the understanding and the evaluation of health and disease.

PVS 339. Avian Pathology
2 credits. Lecture.

A comprehensive study of systemic avian pathology, stressing the correlation of pathological changes with clinical and microbiological findings.

PVS 349. Immunobiology
3 credits. Lecture.

Principles of basic and clinical immunobiology; phylogeny and ontogeny of the immune response, characteristics of the immune response, cellular and humoral immunity; central and peripheral lymphoid tissues; mechanisms of immunologic injury and immunologic diseases; comparative and veterinary immunology; transplantation and tumor immunology.

PVS 350. Diagnostic Veterinary Microbiology
3 credits. Laboratory.

Supervised instruction in the isolation and identification of pathogenic organisms from tissues and fluids of diseased animals and birds.

PVS 354. Toxicological Pathology
2 credits. Lecture.

Principles of toxicological pathology are covered, with special attention to chemical carcinogenesis and systemic toxicological pathology. For the different systems, the particularities of structure and function of the system are reviewed, along with the particular mechanisms of toxicity to that system, the specific responses of that system to injury, and the methods to test for toxicity. The discussion of related scientific journal articles supplement the textbook information reviewed in lectures.

PVS 357. Evaluation of Diagnostic Test
2 credits. Lecture.

Sampling criteria and size determination, diagnostic test selection, diagnostic strategies, test result evaluation and interpretation.

PVS 358. Analytical Toxicology
2 credits. Lecture.

Qualitative and quantitative determination of xenobiotics. Isolation techniques; principles of chromatography and spectrometry; theory, instrumentation and analysis of data.

PVS 370. Pathobiology Seminar
1 credit. Seminar.

PVS 378. Molecular Approaches to Disease Diagnosis and Prevention
2 credits. Lecture.

Molecular aspects of disease, with emphasis on methodologies and strategies for diagnosis, analysis and prophylaxis.

PVS 379. Microbiology of Atypical Bacteria
2 credits. Lecture.

An in-depth presentation of current information on medically significant atypical bacteria, with emphasis on molecular aspects of pathogenesis.

PVS 384. Viral Pathogenesis
2 credits. Lecture.

Disease processes of the virus and host at the organic and molecular levels. Various aspects of selected viral infections will be covered, including contemporary topics of interest. Active student participation through presentations and discussion of literature.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†GRAD 495. Doctoral Dissertation Research
1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research
3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)
3 credits.

GRAD 498. Special Readings (Doctoral)
Non-credit.

GRAD 499. Dissertation Preparation
Non-credit.

PHARMACEUTICAL SCIENCE

Dean: Professor Robert L. McCarthy

Course work and research programs leading to the M.S. and Ph.D. degree are offered through the Department of Pharmaceutical Sciences.

Course work and research programs leading to the M.S. degree are offered through the Department of Pharmacy Practice, however new students are not being admitted at this time.

Descriptions of the major research programs available in each of these departments as well as interdisciplinary areas and a list of faculty are shown below.

PHARMACEUTICAL SCIENCE

Department Head: Professor John B. Morris

Professors: Burgess, Langner, and Pikal

Associate Professors: Aneskievich, Bahr, Bogner, Bouvier, Gianutsos, Grant, Henkel, Hubbard, Kalonia, and Manautou

Assistant Professors: Pavlopoulos and Vinogradova

Adjunct Professors: Amacher, Cohen, Makriyannis, Matheson, Stoll, and Stuart

Adjunct Associate Professors: Blanchard, Darrington, Lechuga-Ballesteros, McNamara, Sweeney, Xie, Yang, and Zakrzewski

Adjunct Assistant Professors: Bow and Xu

Programs leading to the M.S. and Ph.D. degrees in Pharmaceutical Science are offered in these areas: (1) Medicinal Chemistry, (2) Neurosciences, (3) Pharmacaceutics, and (4) Pharmacology and Toxicology. These programs make full use of courses offered by departments in such areas as organic, analytical, and physical chemistry; biochemistry; molecular and cell biology; neurobiology; biophysics; physiology; statistics; mathematics; microbiology; pathology; and materials science. A brief description and a statement of objectives for each program area are offered below.

Medicinal Chemistry. Medicinal chemists investigate the structural features responsible for the biological activity of drug molecules. To this end they design and synthesize new potentially active drugs. They also study the molecular mechanisms of drug action using biophysical methods and focusing on the stereoelectronic features of the drug and its interactions with its site of action. As a means of exploring the mechanism of drug action, they also study the target biopolymers through which drug activity is induced. Furthermore, they are interested in modifying drug structures to assist in targeting and to facilitate transport. Although their major concern is with chemistry, medicinal chemists must be also familiar with the pharmacological and biochemical systems on which the drug molecules act.

The M.S. (Plan A) and the Ph.D. are offered in the area of medicinal chemistry. A strong background in chemistry is essential for admission. Required course work varies with the background and interests of the student. This includes advanced courses in medicinal chemistry as well as courses from the following disciplines: organic, physical, and biophysical chemistry; spectroscopy; biophysics; biochemistry;

molecular biology; pharmacology; microbiology.

Neurosciences. This is an interdisciplinary area of concentration that comprises the Neurosciences Program at Storrs. Neuroscience is concerned with the molecular, cellular, and behavioral characteristics of the nervous system and their relation to the adaptive physiology of the organism. Students in this program may approach the full range of neuroscience studies through courses and research using a variety of model systems. Particular strengths include analysis of neural development, memory encoding, neurodegenerative processes, and repair mechanisms. This area of concentration is offered in the fields of study of pharmaceutical science, physiology and neurobiology, and psychology. Application is made to the preferred field of study, but the applicant must be acceptable to the Neurosciences Committee.

Pharmaceutics. Pharmaceutics deals with those factors bearing on the design of drug delivery systems that are safe and efficacious. The necessary concern with such factors as the stability of the drug molecule in a multitude of environments, the release of the drug from various dosage forms, surface and colloid chemistry, and the subsequent absorption, metabolism, and excretion of the drug requires a diversified educational and research experience. Faculty interests and graduate plans of study may emphasize kinetics, thermodynamics, transport phenomena, biopharmaceutics, pharmacokinetics, biopharmaceutics of proteins, and biotechnology. Moreover, each of these exposures entails an emphasis on quantitative appraisals which demand grounding in advanced mathematics. While individual dissertation problems usually are sharply focused, the overall thrust of the graduate program in pharmaceutics is the education of a generalist in drug delivery systems.

The M.S. (Plan A) and the Ph.D. are offered in the concentration of pharmaceutics. In particular, course work in advanced pharmaceutics, physical chemistry, and mathematics is required.

Pharmacology and Toxicology. Scholarly laboratory research and the education of graduate students in all aspects of drug and chemical action are paramount activities of the pharmacology and toxicology faculty. Therapeutic, immunological, and toxic reactions to drugs and chemicals and their physiological and biochemical mechanisms of action are emphasized in this program. Emphasis is also placed in the areas of biochemical toxicology, inhalation toxicology, neuropharmacology, molecular toxicology, molecular pharmacology on nuclear receptors, hepatotoxicology, and immunology. The Ph.D. is offered in the concentration of pharmacology and toxicology. For admission to the graduate program, a strong background in biology as well as proficiency in chemistry, mathematics, and physics are essential. Course requirements for the Ph.D. degree are individualized, although advanced courses in pharmacology, physiology, and biochemistry are uniformly required.

Special Facilities. The Department has well-equipped laboratories in diverse research areas. Equipment available includes ultra-violet, F.T. infrared, dual wavelength, and fluorescence spectrophotometers, liquid scintillation spectrometers, analytical and preparative gas-

liquid chromatographs, high-pressure liquid chromatographs, preparative and ultra centrifuges, low and high voltage electrophoresis apparatus, differential thermal analytical and scanning calorimeter, thermal gravimetric and analytical equipment. Langmuir film balance, atomic absorptometer, gas chromatography-mass spectrometry unit, mass spectrometers and electron microscopes are available on campus. Animal quarters and cold rooms are located in or adjacent to the School of Pharmacy. The Department has a nuclear Magnetic Resonance Facility with Bruker Avance 300, 400, and 500 MHz spectrometers and a Varian Inova 600 MHz spectrometer equipped with a cryoprobe.

COURSES OF STUDY

PHAR 301. Drug Design

3 credits. Lecture.

A cooperative presentation of the fundamentals of medicinal chemistry.

†PHAR 303. Current Toxicology Literature

1 credit. Lecture.

Designed to familiarize students with current toxicology literature and to educate students in critical peer review of this toxicology literature.

PHAR 305. Advanced Organic Medicinal Chemistry I

3 credits. Lecture.

A detailed study of the structure-activity relationships of drugs, particularly those possessing central and autonomic nervous system actions.

PHAR 306. Advanced Organic Medicinal Chemistry II

3 credits. Lecture.

A detailed study of the structure-activity relationships of drugs, particularly those possessing central and autonomic nervous system actions.

PHAR 307. Research Techniques

3 credits. Lecture.

Principles and theory of methods for the extraction, separation, purification, and identification of natural and synthetic organic compounds. Applications of isotopic methods to biosynthetic and chemical problems. Enzyme methodology. Instrumental analysis.

PHAR 308. Structure and Function of Biological Membranes

3 credits. Lecture.

Overview of cell membrane structure and function based on a foundation of physical and biochemistry principles. Topics include lipid bilayers, vesicles and liposomes, cholesterol, membrane protein structure and function, transport, membrane fusion, receptors, drug/membrane interactions and membranes in cell regulation.

PHAR 311. Instrumental Analysis

1-3 credits. Lecture.

An introduction to the theory and use of selected methods of instrumental analysis.

PHAR 315. Special Problems in Medicinal Chemistry

1-4 credits. Lecture.

Individualized course for students desiring research experience in any of the areas of medicinal chemistry other than the area chosen by the student for thesis research.

PHAR 316. Dosage Forms I

3 credits. Lecture.

Introduces the student to the principles of thermodynamics, ionic equilibrium, chemical kinetics and diffusion. Application of these principles to formulation, stability and dissolution of a drug product, and release from the dosage form for optimum therapeutic outcome. Required of entering graduate students in Pharmaceutics who do not have a Pharmacy background as well as those who do not pass the qualifying examination within the first year of the program.

PHAR 317. Dosage Forms II

3 credits. Lecture.

Covers the basic principles of the surface and colloid chemistry and rheology, as these relate to the performance of dispersed system dosage forms including colloids, suspensions, emulsions, suppositories, aerosols, ointments, and transdermals. Required of entering graduate students in Pharmaceutics who do not have a Pharmacy background, and those who do not pass the qualifying examination within the first year of the program.

PHAR 318. Special Topics in Medicinal Chemistry

1-6 credits. Lecture.

Current developments in Medicinal Chemistry. A course for students needing exposure to topics not covered in other department offerings.

PHAR 319. Biopharmaceutics and Pharmacokinetics

3 credits. Lecture.

Basic principles of biopharmaceutics, bioavailability, and pharmacokinetics, including their application to the rational design of both dosage forms and maximally effective dosing regimens. Intended for graduate students who may not have sufficient previous exposure to biopharmaceutics and pharmacokinetics.

PHAR 325. Pharmaceutical Biotechnology

3 credits. Lecture.

A survey of medicinal chemistry and pharmaceutics of pharmaceutical products derived from modern methods of molecular biology. This course will consider products in use or in clinical trials to emphasize the conceptual basis, design, and synthesis of biotech products in the context of current practical applications.

PHAR 334. Advanced Biopharmaceutics

3 credits. Lecture.

Overview of physico-chemical, biopharmaceutical, and physiologic factors controlling the delivery of drug and their sites of action.

PHAR 335. Special Topics in Pharmaceutics

1-6 credits. Lecture.

Includes topics not presently covered in courses which are pertinent to current departmental research and areas of recent development in the literature.

PHAR 338. Special Problems in Pharmaceutics

1-4 credits. Independent Study.

Individualized course for students desiring research experience in any of the areas of pharmacy other than the area chosen by the student for thesis research.

†PHAR 339. Current Literature in Pharmaceutics

1 credits. Discussion.

Designed to familiarize students with current pharmaceutics literature and to educate students in critical peer review in the pharmaceutics literature.

PHAR 341. Advanced Kinetics and Mechanisms of Drug Degradation

2 credits. Lecture. Prerequisite: PHARM 388.

An advanced treatment of the physical organic chemistry critical to the characterization and understanding of stability in pharmaceutical products.

PHAR 342. Freeze Drying of Pharmaceuticals

2 credits. Lecture.

The science and technology of freeze drying, including fundamentals of heat and mass transfer gas systems, process design considerations, and formulation strategies with emphasis on stabilization of therapeutic proteins.

PHAR 344. Solid-phase Peptide Synthesis

2 credits. Lecture.

Overview of the fundamental techniques and the latest advances in the field of solid-phase peptide synthesis. Topics include solid supports, protecting groups, coupling methods and reagents, strategies for conformational constraints, combinatorial chemistry, instrumentation, analytical techniques, and solid-phase organic synthesis.

PHAR 349. Introduction to Toxicology

3 credits. Lecture.

Basic principles and concepts of toxicology. Includes toxicokinetics, toxicodynamics, metabolism of xenobiotics, toxicology of major organ systems, introductions to carcinogenesis, mutagenesis and teratogenesis and case studies in environmental and occupational toxicology. Includes seminar sessions on current topics and issues in toxicology.

PHAR 352. Toxicology of the Respiratory System

2 credits. Lecture. Prerequisite: PHAR 355.

Anatomic and functional aspects of toxic injury to

the respiratory tract with an emphasis on biochemical and physiologic mechanisms of toxic pulmonary injury. Lectures and student presentations.

PHAR 353. Genetic Toxicology

2 credits. Lecture.

An examination of chemicals which have DNA as a target for toxic interactions. Included are sections on DNA damage and its repair, mutagenesis measurement and mechanisms, indirect acting agents-promoters, comutagens, antimutagens, and interrelations among mutagenesis, cytotoxicity and carcinogenesis. Lectures and discussions of selected journal articles.

PHAR 354. Principles of Safety Evaluation

1 credit. Lecture.

Introduction to toxicologic risk assessment. Fundamentals of dose-response relationships and risk characterization, and their application in the establishment of permissible exposure limits for drugs and other chemicals in the environment or workplace.

PHAR 355. Advanced Toxicology

4 credits. Lecture.

A study of the harmful effects of toxic chemicals on biological systems. Emphasis is on mechanisms of toxicant action and on practical applications of modern techniques to assess toxicity and hazard.

PHAR 356. Special Problems in Pharmacology I

1-4 credits. Independent Study.

The course is individualized for students desiring research experience in any of the areas of pharmacology.

PHAR 357. Special Problems in Pharmacology II

1-4 credits. Independent Study.

The course is individualized for students desiring research experience in any of the areas of pharmacology.

PHAR 358. Analytical Toxicology

2 credits. Lecture.

Qualitative and quantitative determination of xenobiotics. Isolation techniques; principles of chromatography and spectrometry; theory, instrumentation and analysis of data.

PHAR 359. Immunotoxicology

2 credits. Lecture.

Demonstrates the detrimental effects on the immune system and/or inflammatory response, by a variety of physical and chemical xenobiotics. Emphasis is placed on the mechanisms of chemical and drug-induced immunosuppression, autoimmune response, and allergic response.

PHAR 365. Pharmacology of the Circulatory System

2 credits. Lecture.

A study of the cardiovascular system. Both physiological and pharmacological responses of the

cardiovascular system are reviewed. Emphasis is placed upon the biochemical and physiological changes associated with atherosclerosis.

PHAR 367. Synaptic Mechanisms in Pharmacology

2 credits. Lecture.

Regulation and function of CNS neurotransmitters and effects of drugs on synaptic mechanisms, especially drugs used in neurologic and behavioral disorders. Neurotoxicology.

PHAR 368. Electrolytic Homeostasis, Hormones, and Blood Pressure

2 credits. Lecture.

A study of the basic physiological and pharmacological mechanisms of renal function related to hormonal control of electrolyte homeostasis.

PHAR 371. Advanced Pharmacology I: Basic Principles

3 credits. Lecture.

Molecular mechanisms of drug action including occupation and rate theories. Characterization of receptors in-situ and in-vitro.

PHAR 372. Advanced Pharmacology II: Drug Disposition

2 credits. Lecture.

Drug absorption, distribution, excretion, metabolism, interaction, allergy, resistance, tolerance, idiosyncrasy and toxicity.

PHAR 373. Function and Dysfunction of Brain Synapses

2 credits. Lecture.

This course covers the functional and structural regulation events that influence synaptic activity, as well as corresponding ideas related to memory encoding. In addition, pathogenic processes are addressed which have a negative influence on brain circuits. These include age-related changes, stroke, and Alzheimer-type pathogenesis. Lastly, new and future therapeutic strategies are discussed in regard to the enhancement of memory mechanisms and repair systems. The format of the course is formal lectures and journal article discussions by students.

PHAR 375. Toxicology Scholars Colloquium

1 credit. Lecture.

Reviews, discussions and seminars focused on the research of scientists who have made significant contributions to the science of toxicology.

PHAR 376. Liver and Kidney Toxicology

2 credits. Lecture.

A study of the biochemical mechanisms responsible for chemically induced liver and kidney damage, including the uniqueness of these organs as targets of toxicant action. Emphasis is on recent mechanistic research. Includes lectures, discussions of recent literature, and student presentations and discussions.

†PHAR 377. Seminar in Medicinal Chemistry

1 credit. Seminar.
Reports and discussions.

†PHAR 378. Seminar in Immunology

1 credit. Seminar. Prerequisite: PHAR 393.
Reports and discussions.

†PHAR 379. Seminar in Pharmacology and Toxicology

1 credit. Seminar.
Reports and discussions on journal and review articles and presentation of personal research results.

†PHAR 380. Seminar in Pharmaceutics

1 credit. Seminar.
Reports and discussions.

PHAR 382. Special Topics in Pharmacology

1-6 credits. Lecture.
Includes topics not presently covered in courses, which are pertinent to current departmental research and areas of recent development in the literature.

PHAR 383. Special Topics in Toxicology

1-6 credits. Lecture.
Basic principles of toxicology as emphasized by recent developments in the biochemical toxicology literature.

PHAR 384. Special Problems in Toxicology

1-4 credits. Independent Study
Individualized course for students desiring research experience in any of the areas of toxicology.

PHAR 385. Complex Equilibria

3 credits. Lecture.
A study of the physico-chemical and mathematical treatment in pharmaceutical systems. Topics center on thermodynamics, activity coefficients, acids and bases, solubility, complexation solubilization and protein binding.

PHAR 386. Transport Processes

3 credits. Lecture.
Emphasis is on the application of the laws of diffusion to dissolution, membrane transport and release of drugs from dosage forms.

PHAR 388. Kinetics and Mechanisms of Drug Degradation and Stability

3 credits. Lecture.
A study of the kinetics and mechanisms of drug degradation in the solid and liquid states and drug stabilization.

PHAR 389. Pharmacokinetics

3 credits. Lecture.
A discussion of absorption, distribution, and clearance mechanisms, and their impact on concentration-time profiles and drug response.

PHAR 390. Colloid Chemistry and Interfacial Phenomena

3 credits. Lecture.
Interfacial phenomena, colloid chemistry.

PHAR 391. Product Development

3 credits. Lecture.
Liquid and solid dosage forms.

PHAR 392. Advanced Pharmacology III: Pharmacological Techniques

1-6 credits. Laboratory.
Exercises in laboratories of faculty members demonstrating techniques in pharmacology, physiology and toxicology.

†GRAD 395. Master's Thesis Research

1-9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1-9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

PHARMACY PRACTICE

Department Head: Clinical Professor Raafat Seifeldin

Professors: Gerald and McCarthy

Associate Professors: Chapron, Facchinetti, and Speranza

Programs leading to the M.S. degree in Pharmaceutical Science are offered with areas of concentration in (1) Pharmacy Administration, and (2) Managed Care Pharmacy. **New students are not being admitted at this time.**

The primary objective of the study area in pharmacy practice is to develop scholars competent to investigate problems of a social and economic nature as they relate to health and pharmacy care. A

secondary objective is to develop individuals who can serve as effective managers of pharmacy care systems. The scientific method serves as the common intellectual framework for all students. Pharmacy administration, health care management, statistics, and social science research methodologies provide the core knowledge base for all students, and emphasis in the administrative or behavioral sciences is offered. Since pharmacy is but one of many systems involved in the delivery of health care, interdisciplinary research and educational experiences are strongly emphasized. The place of pharmacy in the health care process, however, is the focus of the total endeavor.

COURSES OF STUDY

PHAR 327. Advanced Hospital Pharmacy Administration

3 credits. Lecture.
A study of the development, administration and operation of hospital pharmacies. Case studies are used to illustrate problem-solving techniques in hospital pharmacy practice. Current trends, procedures and policies will be presented by appropriate personnel from cooperating institutions.

PHAR 346. Introduction to Managed Care Pharmacy

3 credits. Lecture.
A study of managed care pharmacy within the United States health care system, with emphasis on managed care organization and control, pharmacy benefits design and management, outcomes measurement, pharmacoeconomics, health care provider and client education, benefits plan financing and marketing, and legal issues of managed care pharmacy.

PHAR 347. Special Topics in Pharmacy Administration

1-6 credits. Lecture.
Current developments in Pharmacy Administration. A course for students needing exposure to topics not covered in other Department of Pharmacy Practice offerings.

PHAR 348. Health Care Administration

2 credits. Lecture.
An in-depth study of the health care system in this country. Emphasis is placed on current methods, problems and trends in health care delivery. Analytical approaches necessary for assessing and improving the system are stressed through case studies.

PHAR 362. Special Problems in Pharmacy Practice

1-4 credits. Independent Study.
Individualized course for students desiring research experience in pharmacy administration or hospital pharmacy administration.

PHAR 364. Advanced Pharmacy Administration

3 credits. Lecture.

A study of modern management techniques applicable in terminal drug distribution. Special emphasis is placed upon quantitative methods and the utilization of electronic data processing.

†**PHAR 381. Seminar in Pharmacy Administration**

1 credit. Seminar.

Reports and discussions.

†**GRAD 395. Master's Thesis Research**
1-9 credits.

†**GRAD 396. Full-Time Master's Research**
3 credits.

†**GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

PHILOSOPHY

Department Head: Professor Crawford L. Elder

Professors: Anderson, Baxter, Clark, Gilbert, Kupperman, Meyers, and Wheeler

Associate Professors: Beall, Bontly, Hiskes, Lynch, and Troyer

Assistant Professors: Bloomfield and Ryder

The Department of Philosophy offers study leading to the degree of Master of Arts and Doctor of Philosophy. Courses of study typically focus on philosophy of psychology and mind or on philosophy of social phenomena and ethics, but also can be built around philosophy of language, metaphysics, or history of philosophy. The instruction is broad enough to make students versatile undergraduate instructors, and concentrated enough to enable students to do significant research.

Students are able to work closely with the faculty at every stage of progress from the initial construction of a plan of study to the completion of a dissertation. In this way, the work can be guided toward that aspect of philosophy that is of most interest to the student and also provide the student with a sound background in the field. First year students must satisfy a formal logic requirement, normally by taking Philosophy 307. First year students also should take Philosophy 301 (unless they have a strong background in contemporary analytic philosophy) and Philosophy 302 (unless they have a strong background in moral theory and meta-ethics).

Admission. After reviewing the basic requirements for admission to the Graduate School, applicants should present to the Philosophy Department their scores for the General Test of the Graduate Record Examinations, three letters of recommendation from individuals familiar with their academic work, and a philosophical writing sample.

The M.A. Program. The student's program should insure competence in the history of philosophy and in current trends in the field. The Department generally offers only Plan B (non-thesis) for the M.A.

The Ph.D. Program. The Ph.D. degree requires a minimum of eight graduate seminars beyond the M.A. level. Students who enroll in the Ph.D. program with an M.A. from another institution are reviewed after one year. A student may meet the Ph.D. language requirement by passing examinations in two foreign languages, usually French and German, or by passing an examination in one of these languages and completing either a six-credit Related Area, or, alternatively, six credits of advanced logic beyond the level of Philosophy 307.

The General Examination normally is taken within one year of the completion of course work. The General Examination is in three parts: 1) Metaphysics and Epistemology (three hours), 2) Social and Political Philosophy and Ethics (three hours), and 3) History of Philosophy (three hours).

The Department provides the student with a reading list which indicates the scope of the separate examinations.

Special Facilities. The holdings of the Homer Babbidge Library are adequate for the pursuit of

scholarly research in most fields of philosophy. The Library subscribes to all major philosophical journals and has a complete collection of past issues of most journals. The Department conducts informal weekly seminars at which members discuss current research with their colleagues. It runs a program of colloquia featuring distinguished philosophers from around the country, and presents the yearly Ruth Evelyn Parcells Lecture in ethics.

COURSES OF STUDY

PHIL 300. Independent Study for Graduate Students

1-6 credits. Independent Study. Open to graduate students in Philosophy, others with permission.

PHIL 301. Seminar in Contemporary Philosophy

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

An introduction to contemporary philosophers such as Russell, Carnap, Ayer, Quine, Putnam, and Kripke.

PHIL 305. Seminar in Aesthetics

3 credits. Lecture. Open to graduate students in Philosophy, others with permission.

A consideration of some of the basic problems in aesthetics.

PHIL 307. Logic

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 311. Properties of Formal Systems

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

The development of formal deductive systems. The completeness and consistency of logical systems adequate for the expression of parts of mathematics. A consideration of aspects of the foundations of logic and mathematics.

PHIL 312. Seminar in the Philosophy of Science

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

A discussion of selected current, methodological issues in the philosophy of science. Topics may include scientific realism versus nonrealism; theories of scientific explanation; the nature of scientific revolutions; theories of the lawfulness of nature; and feminist theories of science.

PHIL 313. Seminar in the Philosophy of Physics

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

Examination of philosophical issues associated with physical concepts of space, time, and matter. Topics may include relational versus absolute theories of space and time, and philosophical implications of quantum mechanics.

PHIL 314. Action Theory

3 credits. Seminar. Open to graduate students in Philosophy and to others with instructor consent.
Examination and analysis of the concept of "action" and related concepts such as "agent" and "intention".

PHIL 315. Seminar in Moral Philosophy

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.
A discussion and analysis of significant problems in ethical theory.

PHIL 316. Seminar in the Philosophy of Social Science

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 317. Seminar in the Philosophy of Psychology

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.
Philosophical examination of contemporary issues in the philosophy of psychology. Topics may include a philosophical analysis of the nature of behavior, consciousness, perception, cognition, and emotion; the nature of psychological explanation; comparison of the science of human psychology with ethology and other biological sciences, the physical sciences, and computer science.

PHIL 318. Seminar on Plato

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 319. Seminar on Aristotle

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 320. Seminar in the History of Philosophy

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 321. Seminar on the British Empiricists

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 326. Seminar on Rationalist Philosophers of the Seventeenth and Eighteenth Centuries

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 327. Seminar on Kant

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 329. Seminar on Existentialism and Phenomenology

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 330. Seminar on Theory of Knowledge

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.
Problems in the foundations and nature of knowledge. A critical study of recent treatments of the problem of mind. Issues such as the mind-body problem, our knowledge of the existence of other minds, the existence of private languages, will be dealt with in detail.

PHIL 331. Seminar in Philosophy of Mind

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.
A critical study of recent treatments of the problem of mind. Issues such as the mind-body problem, our knowledge of the existence of other minds, the existence of private languages, will be dealt with in detail.

PHIL 333. Seminar on Nietzsche

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 340. Seminar on Metaphysics

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 342. Seminar in Philosophy of Language

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 345. Seminar on Wittgenstein

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 350. Seminar in Recent Social and Political Philosophy

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

PHIL 352. Seminar in Feminist Theory

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.
The focus of inquiry might be the history of feminist theory, a school of contemporary feminist theory, an issue or a selection of issues in feminist theory, or feminist approaches to major texts or themes in the history of philosophy.

PHIL 360. Seminar in Recent Continental Analytic Philosophy

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.
Critical reading of selected texts of recent European philosophers such as Derrida, Irigaray, Kristeva, Heidegger, and Foucault; along with related work of analytic philosophers such as Davidson, Quine, Rorty, and Kripke.

PHIL 397. Seminar

3 credits. Seminar. Open to graduate students in Philosophy, others with permission.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

PHYSICAL THERAPY

Dean: Professor Joseph W. Smey

Department Head: Professor Scott M. Hasson

Professor: Bohannon

Associate Professors: Cosmas, Pellecchia, Tiberio, and Zito

Assistant Professor: Kinsella-Shaw

Clinical Associate Professor: Leavitt

The Department of Physical Therapy offers an Integrated Bachelor's/Master's program leading to the M.S. degree. Students are required to complete a highly structured program of study over a total of 6 semesters and 3 summer sessions which includes: basic and clinically applied sciences; clinical medicine; allied health; research; rehabilitation; and clinical practicums. Students are educated to work in and with a wide variety of patients and clinical settings. There is no emphasis on one area of physical therapy practice. Areas covered include: acute care; sub-acute; nursing home; home health care; orthopaedics; and neurological rehabilitation. The program is designed to prepare entry-level practicing physical therapists. Emphasis is placed on developing the skills and abilities necessary to function in the complex always changing health care arena. These skills and abilities include, but are not limited to: a commitment to learning; interpersonal and communication skills; time, resources and stress management; professionalism; and independent problem solving and critical analysis.

Students complete Plan B (research project-professional paper), or with the approval of the Department Head Plan A (thesis). In Plan A or in Plan B the student utilizes problem solving methodology and the scientific method of inquiry in the completion of the research endeavor. The thesis is structured in the classical manner of five chapters, while the professional paper is written in journal format.

Admission. In addition to the standard requirements of the Graduate School, applicants must have successfully completed the baccalaureate portion of the Integrated Bachelor's/Masters Program.

COURSES OF STUDY

PT 307. Integrative Seminar I

3 credits. Seminar. Prerequisite: PT 212. Open only to students in the program in Physical Therapy.

One of a series of seminars which integrate application, assessment and intervention knowledge and experience across multiple courses. Focus is on the acute, sub-acute and long-term nursing home patient population. Students develop competency in critical thinking, problem-solving, clinical decision making and best practice recommendations for the acute, sub-acute and long-term nursing home patient population groups. Students demonstrate critical reading skills of the professional literature that reflects an understanding of the problems and functional limitations of the acute, sub-acute and long-term nursing home.

PT 308. Integrative Seminar II

3 credits. Seminar. Prerequisite: PT 307. Physical Therapy majors only.

One of a series of seminars which integrate application, assessment and intervention knowledge and experience across multiple courses; and develops the research project—professional paper. Focus is on the acute, sub-acute and long-term nursing home and musculoskeletal patient population. Students identify and discuss professional issues generated by observations made in the acute, sub-acute and long-term nursing home practicum setting. Students develop competency in critical thinking, problem solving, clinical decision making and best practice recommendations for the musculoskeletal patient. Students demonstrate critical reading skills of the professional literature that reflects an understanding of the problems and functional limitations of the musculoskeletal patient population. Students submit a research project proposal that includes a comprehensive literature review, research hypotheses and methods.

PT 308W. Integrative Seminar II

3 credits. Seminar. Prerequisite: PT 307. Pre-Physical Therapy majors only.

One of a series of seminars which integrate application, assessment and intervention knowledge and experience across multiple courses; and develops the research project—professional paper. Focus is on the acute, sub-acute and long-term nursing home and musculoskeletal patient population. Students identify and discuss professional issues generated by observations made in the acute, sub-acute and long-term nursing home practicum setting. Students develop competency in critical thinking, problem solving, clinical decision making and best practice recommendations for the musculoskeletal patient. Students demonstrate critical reading skills of the professional literature that reflects an understanding of the problems and functional limitations of the musculoskeletal patient population. Students submit a research project proposal that includes a comprehensive literature review, research hypotheses and methods. Includes a writing component.

PT 309. Integrative Seminar III

3 credits. Seminar. Prerequisites: PT 308 and PT318.

One of a series of seminars which integrate application, assessment and intervention knowledge and experience across multiple courses; and develops the research project—professional paper. Focus is on the musculoskeletal and neuromuscular patient population. Students identify and discuss professional issues generated by observations made in the musculoskeletal practicum setting. Students develop competency in critical thinking, problem solving, clinical decision making and best practice recommendations for the neuromuscular patient. Students demonstrate critical skills of the professional literature that reflects an understanding of the problems and functional limitations of the neuromuscular patient population. Students collect data and prepare preliminary results of their findings.

PT 310. Integrative Seminar IV

3 credits. Seminar. Prerequisites: PT 309 and PT 320.

One of a series of seminars which integrate application, assessment and intervention knowledge and experience across multiple courses. Focus is on the neuromuscular patient population. Students identify and discuss professional issues generated by observations made in the neuromuscular practicum setting. Students meet identified standards on competency in critical thinking, problem solving, clinical decision making and best practice recommendations for all patient populations in this culminating course.

PT 311. Integrative Seminar V

3 credits. Seminar. Prerequisite: PT 309.

One of a series of seminars which develops the research project-professional paper. Focus is to complete and present the research project-professional paper in this culminating course.

PT 314. Principles of Rehabilitation

3 credits. Lecture/Laboratory/Practicum. Prerequisite: PT 212.

Explores the role of physical therapists in the rehabilitation of patients with complex problems and multi-system dysfunction. Students develop competency in assessment, treatment planning and implementation, and evaluation of treatment outcomes in the areas of functional mobility and accessibility, patient education and prevention of complications.

†PT 316. Acute Care Practicum

7 credits. Practicum. Prerequisite: PT 212.

In a supervised acute care setting, sub-acute care setting or long-term nursing home, students apply a variety of patient care procedures and techniques leading to the development of entry level competency. Clinical teaching facilities are located throughout the United States.

PT 318. Principles of Musculoskeletal Rehabilitation

6 credits. Lecture/Laboratory/Practicum. Prerequisite: PT 308.

Focus is on the physical therapy care of patients with existing or potential musculoskeletal dysfunction. The student learns to establish physical therapy diagnoses, identify realistic goals, plan and implement programs for patients with musculoskeletal problems, giving full consideration to their physical, social and psychological well being.

PT 320. Principles of Neuromuscular Rehabilitation

6 credits. Lecture/Laboratory/Practicum. Prerequisites: PT 308 and PT 318.

Through comprehensive problem solving, students analyze patient situations where neuromotor dysfunction is a complicating factor. Students develop neurophysiological sound evaluation and treatment skills integrating physical and psychological patient considerations.

†PT 322. **Musculoskeletal Practicum**
7 credits. Practicum. Prerequisites: PT 318.

In an outpatient orthopedic setting, students apply a variety of patient care activities leading to the development of entry level competency. Clinical teaching facilities are located throughout the United States.

†PT 324. **Neuromuscular Practicum**
10 credits. Practicum. Prerequisite: PT 320.

In a neuromuscular rehabilitation setting, students apply a variety of patient care procedures and techniques leading to the development of entry level competency. Clinical teaching facilities are located throughout the United States.

PT 330. **Lifespan Growth and Development**
3 credits. Lecture. Prerequisite: PT308

Provides an overview of motor development, individual development and family development from a lifespan perspective as they relate to the practice of physical therapy. The impact of disease and disability on the individual and the family is explored with a focus on recognizing dysfunction and facilitating effective coping and adaptation.

PT 343. **Physical Therapy Issues Seminar**
3 credits. Lecture. Prerequisite: PT308.

Through discussion of current issues and problems in the professional field of physical therapy, students explore the possible solutions to those problems from their own perspective as aspiring professionals, the professional organization's perspective and from the perspective of the consumer of their services.

†GRAD 395. **Master's Thesis Research**
1 - 9 credits.

†GRAD 396. **Full-Time Master's Research**
3 credits.

†GRAD 397. **Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. **Special Readings (Master's)**
Non-credit.

GRAD 399. **Thesis Preparation**
Non-credit.

PHYSICS

Department Head: Professor William C. Stwalley
Professors: Best, Dunne, Dutta, Eyler, Gai, Gibson, Gould, Hamilton, Islam, Javanainen, Kappers, Kessel, Mallett, Mannheim, Papadimitrakopoulos, Pease, Peterson, Rawitscher, Smith, and Swanson

Research Professors: Michels, Roychoudhuri, and Schweitzer

Associate Professors: Côté, Dobrynin, Edson, Fernando, Jones, Kovner, Michels, Sinkovic, Snyder, and Wells

Assistant Professors: Blum, Joo, Utz, and Yelin

The Master of Science and Doctor of Philosophy degrees are offered.

Admission. For admission to either the M.S. or Ph.D. program, completion of a bachelor's degree normally is required. It is expected that the applicant will have majored in physics or in a related subject.

The Master of Science Degree. Each student in the Master's program follows an individual plan of study arranged jointly by the student and an advisory committee, based on the student's career goals as well as prior preparation. Candidates for the Plan B Master's degree are required to complete 24 credits of courses. Under Plan A, a thesis is required, as well as completion of 9 credits of Thesis Research courses as stipulated in the Standards and Degree Requirements section of this catalog.

The Ph.D. Degree. Each doctoral student's course of study is supervised by an advisory committee, headed by the student's major advisor. The committee and the student jointly plan a curriculum that is designed to provide the general knowledge of physics appropriate for the Ph.D. and also the specialized expertise necessary to conduct dissertation research. This research is conducted under the supervision of the major advisor and culminates in an original scientific contribution.

There are numerous research projects in the Department of Physics which provide graduate students with opportunities for conducting the scientific investigations necessary for the Ph.D. degree. These include atomic, molecular and optical physics (experimental and theoretical), condensed matter physics (experimental and theoretical), nuclear physics (experimental and theoretical), particle and field theory (including relativity and cosmology) and quantum optics (experimental and theoretical). Active research groups are engaged in each of these areas. Their work is described on-line at <<http://www.phys.uconn.edu>>. A brochure that describes the Department's graduate program is on-line; copies may also be obtained by writing to the Department of Physics (by mail to Attn: Lorraine Smurra, Department of Physics, Unit 3046, 2152 Hillside Road, University of Connecticut, Storrs, Connecticut 06269-3046 or to e-mail address <gradphysics@uconnvm.uconn.edu>).

Special Requirements for the Ph.D. The requirements for the Ph.D. include all the general requirements listed in the Standards and Degree Requirements section of this catalog. In addition, satisfactory completion of Physics 321 (Electrodynamics I) and Physics 343 (Quantum Mechanics III) is required for the Ph.D. degree.

The General Examination in physics consists of written and oral sections. A set of written examinations must be completed satisfactorily to qualify for admission to the oral part of the General Examination.

COURSES OF STUDY

†PHYS 300. **Independent Study**

1-6 credits. Independent Study. This course may be taken, with change of topic, up to three times for a maximum of nine total credits.

A special reading course for graduate students.

PHYS 304. **Research in Physics**

1-6 credits. Laboratory.

Experimental and theoretical research in selected topics in physics. This course may be taken up to three times for a maximum of nine credits.

PHYS 305. **Computerized Modeling in Science**

4 credits. Lecture.

Development and computer-assisted analysis of mathematical models in chemistry, physics, and engineering. Typical topics include chemical equilibrium, reaction rates, particle scattering, vibrating systems, least square analysis and quantum chemistry.

PHYS 306. **Electrodynamics I**

3 credits. Lecture. Prerequisite: PHYS 312.

Differential formulations of electrostatics and magnetostatics, electromagnetic induction. Maxwell equations, electromagnetic waves, application to wave guides, cavities, and dispersive media. Foundations of special relativity.

†PHYS 310. **Physics Seminar**

1 credit. Seminar.

PHYS 311. **Methods of Theoretical Physics I**

3 credits. Lecture.

General orthogonal coordinate systems, special functions and differential equations of Physics, Sturm-Liouville Theory, general eigenvalue equations.

PHYS 312. **Methods of Theoretical Physics II**

3 credits. Lecture. Prerequisite: PHYS 311.

Abstract vector spaces, Hilbert space, group theory. Theory of Green's function and integral equations. Complex function theory.

PHYS 314. **Methods of Experimental Physics**

1-6 credits. Laboratory.

Experimental methods used in modern research are applied to experiments from various fields of physics, including: low temperature conductivity of metals, x-ray diffraction, acoustic attenuation, optical constants of metals, color centers in alkali halides, nuclear beta decay, Zeeman effects and others.

PHYS 315. Elementary Treatment of Recent Advances in Physics

3 credits. Lecture.

Development of concepts and theories of physics from an elementary point of view. Review of experiments leading to present views of the atomic nature of matter and energy. This course is recommended for present and prospective teachers of physics.

PHYS 316. Modern Physics for Teachers

3 credits. Lecture. Prerequisite: PHYS 317, which must be taken concurrently.

New teaching materials and techniques as developed by the Physical Science Study Committee for secondary school teachers of physics.

PHYS 317. Modern Physics Experiments for Teachers

3 credits. Laboratory. Prerequisite: PHYS 316, which must be taken concurrently.

Laboratory exercises, demonstrations, and experimental homework prepared by the Physical Science Study Committee.

PHYS 318. Theoretical Mechanics I

3 credits. Lecture.

Classical mechanics: Lagrange equations, central force motion, rigid body motions, small oscillations, Hamilton equations, canonical transformation.

PHYS 319. Theoretical Mechanics II

3 credits. Lecture. Prerequisite: PHYS 318.

Dynamics of continuous media, hydromechanics, elasticity, wave motion, wave interactions and scattering, non-linear processes.

PHYS 321. Electrodynamics II

3 credits. Lecture. Prerequisites: PHYS 306 and PHYS 318.

Maxwell's equations with time dependent sources; radiation from relativistic charged particles; dynamical laws for charged particles; diffraction of electromagnetic waves.

PHYS 322. Quantum Mechanics I

3 credits. Lecture. Prerequisites: PHYS 312 and PHYS 318.

Mathematical formulation and interpretation of quantum mechanics. Illustrative examples. Hydrogen atom. Dirac ket and bra vectors, matrix methods. Scattering theory.

PHYS 323. Quantum Mechanics II

3 credits. Lecture. Prerequisite: PHYS 322.

Symmetry and angular momentum. Approximation methods for stationary and time-dependent problems, with applications. Relativistic theory of the electron.

PHYS 324. Statistical Mechanics

3 credits. Lecture. Prerequisite: PHYS 322.

Ensembles, distribution function, partition function. Bose-Einstein and Fermi-Dirac distributions, fluctuations, applications to the properties of solids and liquids and to the kinetic theory of gases.

PHYS 325. Advanced Topics in Physics I

1-6 credits. Lecture.

Selected topics in theoretical and experimental physics.

PHYS 326. Advanced Topics in Physics II

1-3 credits. Lecture. Prerequisite: PHYS 325.

Selected topics in theoretical and experimental physics.

PHYS 327. Modern Physics

3 credits. Lecture. Prerequisite: PHYS 322.

Experimental and theoretical milestones in the development of contemporary physics. Atomic, molecular, and optical physics including quantum optics; condensed matter physics; nuclear and particle physics; and cosmology and astrophysics.

PHYS 328. Solid State Physics I

3 credits. Lecture. Prerequisite: PHYS 323.

Crystal structure; lattice vibrations; electronic band structure of solids; transport theory; basic properties of metals, semi-conductors and insulators; magnetism; super-conductivity.

PHYS 329. Solid State Physics II

3 credits. Lecture. Prerequisite: PHYS 328.

Crystal structure; lattice vibrations; electronic band structure of solids; transport theory; basic properties of metals, semi-conductors and insulators; magnetism; super-conductivity.

PHYS 331. X-Ray Physics I

3 credits. Lecture.

Symmetry of crystals. Production and properties of x-rays. Application of x-rays in the study of crystalline and amorphous solids by diffraction and spectroscopic techniques, including synchrotron radiation for studying atomic and electronic structures in materials.

PHYS 332. X-Ray Physics II

3 credits. Lecture. Prerequisite: PHYS 331.

Symmetry of crystals. Production and properties of x-rays. Application of x-rays in the study of crystalline and amorphous solids by diffraction and spectroscopic techniques, including synchrotron radiation for studying atomic and electronic structures in materials.

PHYS 335. Microwave Physics I

3 credits. Lecture. Prerequisite: PHYS 306.

The principles of microwave and radio frequency techniques applied to investigation of the properties of matter.

PHYS 336. Microwave Physics II

3 credits. Lecture. Prerequisite: PHYS 323, which may be taken concurrently, and PHYS 335.

Current investigations of the properties of matter by microwave and radio frequency methods, with special emphasis on paramagnetic defects in solids.

PHYS 337. Atomic Physics

3 credits. Lecture. Prerequisite: PHYS 323.

Coupling of angular momenta. Hartree-Fock theory of many electron atoms, fine structure and hyperfine structure. Introduction to group theory.

PHYS 338. Molecular Physics

3 credits. Lecture. Prerequisite: PHYS 337

Heitler-London and molecular orbital theories for diatomic molecules, semi-empirical methods of polyatomic molecules.

PHYS 339. Advanced Solid State Physics

3 credits. Lecture. Prerequisite: PHYS 329 or PHYS 345.

The many-body problem in solid state physics. The electron gas, normal metals, electron-phonon interactions, superconductivity, ferro- and antiferromagnetism and spin waves, polaron theory.

PHYS 340. Nuclear Physics I

3 credits. Lecture. Prerequisite: PHYS 323.

A quantum mechanical treatment of nuclear forces and nuclear structure, including the shell and collective models, and of reaction and radiation phenomena. The second semester is reserved for a discussion of selected topics on an advanced level.

PHYS 341. Nuclear Physics II

3 credits. Lecture. Prerequisite: PHYS 340.

A quantum mechanical treatment of nuclear forces and nuclear structure, including the shell and collective models, and of reaction and radiation phenomena. The second semester is reserved for a discussion of selected topics on an advanced level.

PHYS 342. Relativity

3 credits. Lecture.

Special relativity, tensor analysis, foundations of general relativity, Petrov classification of curved spacetimes, Schwarzschild and Kerr solutions, experimental tests and recent developments.

PHYS 343. Quantum Mechanics III

3 credits. Lecture. Prerequisite: PHYS 323.

Occupation number representation, electron gas, Hartree-Fock approximation, correlation energy, superconductivity, perturbation theory, Green's functions, Feynman diagrams.

PHYS 344. Quantum Theory of Fields I

3 credits. Lecture. Prerequisite: PHYS 343

Local gauge invariance, Lagrangian formulation, Noether currents, spontaneous breakdown of symmetry, Higgs mechanism and superconductivity, canonical quantization, Feynman diagrams, Green's functions.

PHYS 345. Quantum Theory of Fields II

3 credits. Lecture. Prerequisite: PHYS 344.

Topics chosen from the following: Path integral formalism, generating functionals, renormalization, abelian and non-abelian gauge theories (QED and QCD), electroweak theory, solitons, instantons.

PHYS 346. Scattering Theory I

3 credits. Lecture. Prerequisite: PHYS 323.

Symmetries and conservation theorems. Formal scattering theory. Born expansion and Fredholm theory. Two-body problems with central forces. Scattering by non-central forces. Lifetimes and decays of virtual states. Dispersion relations. Scattering by

bound particles and rearrangement collisions. Inverse problems. Applications to atomic, nuclear, and elementary particle physics. Variational bounds on scattering parameters. Multiple scattering and diffraction. Optical potential formulation of reaction theory.

PHYS 347. Scattering Theory II

3 credits. Lecture. Prerequisite: PHYS 346.

Symmetries and conservation theorems. Formal scattering theory. Born expansion and Fredholm theory. Two-body problems with central forces. Scattering by non-central forces. Lifetimes and decays of virtual states. Dispersion relations. Scattering by bound particles and rearrangement collisions. Inverse problems. Applications to atomic, nuclear, and elementary particle physics. Variational bounds on scattering parameters. Multiple scattering and diffraction. Optical potential formulation of reaction theory.

PHYS 352. Non-Equilibrium Properties of Solids

3 credits. Lecture. Prerequisite: PHYS 328.

Electrical and thermal conduction, thermoelectricity. Electrons and phonons. Perturbation techniques to estimate interaction rates; electron-phonon, phonon-phonon and imperfection scattering processes. Ultrasonic generation and attenuation, spin-lattice interactions.

PHYS 355. Nuclei and Particles

3 credits. Lecture.

Properties of nuclei and particles, conserved quantities, isospin, quark model, Fermi gas model, electroweak interaction, high energy scattering.

PHYS 357. Nuclear Magnetic Resonance I

3 credits. Lecture. Prerequisite: PHYS 322.

Basic theory and experimental methods of NMR with emphasis on resonance and relaxation in metals. Brief discussion of interpretation of NMR in non-metallic solids, liquids, and gases.

PHYS 358. Nuclear Magnetic Resonance II

3 credits. Lecture. Prerequisite: PHYS 357.

Basic theory and experimental methods of NMR with emphasis on resonance and relaxation in metals. Brief discussion of interpretation of NMR in non-metallic solids, liquids, and gases.

PHYS 361. Low Temperature Physics I

3 credits. Lecture.

Lectures and seminars on selected topics in low temperature physics; superfluidity and superconductivity, solid state, nuclear alignment and polarization, transport properties in solids.

PHYS 362. Low Temperature Physics II

3 credits. Lecture. Prerequisite: PHYS 361.

Lectures and seminars on selected topics in low temperature physics; superfluidity and superconductivity, solid state, nuclear alignment and polarization, transport properties in solids.

PHYS 363. The Electrical Properties of Polymers

3 credits. Lecture.

Experimental and theoretical aspects of electrical phenomena in polymers: DC and AC conductivity, dielectric constant, electrical breakdown, photoconductivity, etc. Extended and localized electron wavefunctions; band and hopping conduction.

PHYS 365. Quantum Optics

3 credits. Lecture. Prerequisite: PHYS 322.

Semiclassical theory of light-matter interactions. Quantum states of light. Generation, detection and interactions of nonclassical radiation.

PHYS 367. Semiconductor Physics

3 credits. Lecture. Prerequisite: PHYS 377 and PHYS 323, which may be taken concurrently.

Semiconductors and semiconductor devices. Band structure, phonon scattering, velocity-field relations, effects of doping and magnetic fields, optical and transport properties.

PHYS 368. Semiconductor Optical Devices

3 credits. Lecture. Prerequisite: PHYS 377.

Semiconductor based optical devices such as lasers, amplifiers, modulators, and photodetectors, and their application to optical fiber transmission systems.

PHYS 370. Principles of Lasers

3 credits. Lecture

The physics of lasers, including optical pumping and stimulated emission, laser rate equations, optical resonators, non-linear optics, the Kerr effect and Faraday rotation. Applications to gas, crystal, glass, liquid, dye, semiconductor, chemical and ultraviolet lasers, Q-switching, mode-locking, and parametric devices.

PHYS 371.* Physical Optics I

3 credits. Lecture. Prerequisite: PHYS 311.

Maxwell's equation, solutions of the wave equation, reflection and refraction, intensity, interference, Kirchhoff's diffraction theory.

PHYS 372.* Physical Optics II

3 credits. Lecture. Prerequisite: PHYS 371.

Fraunhofer and Fresnel diffraction, diffraction theory of aberrations. Fourier optics and coherence theory. Consent of instructor required of non-degree graduate students.

PHYS 373.* Geometrical Optics I

3 credits. Lecture.

Wave surfaces and rays, reflection and refraction, dispersion, ray tracing, paraxial optics, simple instruments.

PHYS 374.* Geometrical Optics II

3 credits. Lecture. Prerequisite: PHYS 373.

First and third order aberrations, aberration control, optical system design.

PHYS 376. Interact of Light with Matter

3 credits. Lecture.

Introduction to classical and quantum theories of the interaction of electromagnetic radiation with matter. Applications to remote sensing, photochemistry, laser fusion, solar energy conversion and photosynthesis.

PHYS 377. Fundamentals of Solid State Physics I

3 credits. Lecture.

Crystal structure, phonons, electronic band structure, metals, insulators and semiconductors.

PHYS 378. Fundamentals of Solid State Physics II

3 credits. Lecture. Prerequisite: PHYS 377.

Optical, magnetic and transport properties. Lattice defects. Non-crystalline solids.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

* Physics 371, 372, 373, and 374 are offered only through the Physics M.S. Extension Program with an emphasis in optics, which is **not** being offered at the present time.

PHYSIOLOGY AND NEUROBIOLOGY

Department Head: Professor Angel de Blas
Professors: Armstrong, Chapple, Chen, Crivello,
Gallo, Korn, Kraemer, LoTurco, Maresh,
Moiseff, and Renfro

Associate Professors: Cantino, Nishiyama, Pescatello,
and Zinn

Assistant Professors: Conover, Rubio, and Walikonis

Physiology and Neurobiology includes the following major areas of research: (1) *Neurobiology* – cellular and comparative neurobiology with emphasis on neural integration of behavior patterns, synaptic transmission, developmental neurobiology, glial cell biology, regulation and biophysics of ion channels, neuronal mechanisms of calcium and pH regulation, molecular neurobiology and functional neuroanatomy; and (2) *Comparative Physiology* – evolution of physiological adaptations in higher organisms, comparative aspects of osmotic and ionic regulation in vertebrates, transepithelial ion and water transport, renal physiology, muscle physiology.

Interdisciplinary Study

Neurosciences. This is an interdisciplinary area of concentration. Neuroscience is concerned with the structural and functional characteristics of the nervous system and its relation to the adaptive physiology and behavior of the organism. Students in this program may approach the full range of neuroscience studies through courses and research at the cellular, systemic, and organismic levels. A particular strength of the area is the analysis of behavior, its development, and its neurological bases. This area of concentration is offered in the fields of study of biobehavioral science, pharmaceutical science, physiology and neurobiology, and psychology. Application is made to the preferred field of study, but the applicant must be acceptable to the Neuroscience Committee.

Biomedical Engineering Program. The Department of Physiology and Neurobiology participates in a joint program with the School of Engineering for graduate students interested in interdisciplinary work in which biological and engineering disciplines are interrelated. Applicants may have primary training in biology or physical sciences. For information with regard to the biological engineering program, students should write to Dr. William Chapple, Unit 4156, Storrs, Connecticut 06269-4156.

COURSES OF STUDY

PNB 301. Fundamentals of Neurobiology
3 credits. Lecture.

Major topics in neurobiology, including cellular neurophysiology, synaptic physiology, sensory and motor integration, molecular and developmental neurobiology.

PNB 302. Fundamentals of Physiology
3 credits. Lecture.

Introduction to integrative biology. Associations of molecules, cells and tissues and their integrated functions across all organizational levels. Application of language and basic concepts of physiology to the development of problem-solving skills.

PNB 314. Physiology of Excitable Cells
2 credits. Lecture.

In depth study of the molecular structure, function and regulation of ion channels and the mechanisms that control membrane potential and cell excitability. Reading and discussion focus on primary literature.

PNB 325. Biological Rhythms
3 credits. Lecture.

Neuroendocrine and environmental factors in the control of biological rhythmicity, especially circadian and annual rhythms. Emphasis on animals.

PNB 330. Hormones and Behavior
3 credits. Lecture.

Hormones and regulation of behaviors, reproductive, parental, social and aggressive behaviors, as well as migration, hibernation, and learning and memory.

†PNB 347. Electron Microscopy
1-3 credits. Lecture/Laboratory.

Lectures and laboratory exercises on the principles and practice of biological electron microscopy.

PNB 351. Projects in Electron Microscopy
1-3 credits. Independent study.

Electron microscopy as a research method in biological sciences.

PNB 390. Membrane Transport
3 credits. Lecture.

Fundamental mechanisms by which water and small molecules are transported across biological membranes. Biophysical and biochemical analysis of transport by diffusion, osmosis, channels, carriers and pumps. Physiological integration of different transport mechanisms.

PNB. 395 Independent Study
1 credit. Independent study.

A reading course for those wishing to pursue special work in biology.

PNB 396. Investigation of Special Topics
1-3 credits. Independent study.

Advanced study in a field within Physiology and Neurobiology.

PNB 397. Research
1-6 credits. Independent study.

Conferences and laboratory work covering selected fields of Physiology and Neurobiology.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

†PNB 400. Seminar in Neurobiology
1 credit. Seminar.

An in-depth study of selected topics in the molecular, cellular, and central aspects of neurobiology.

PNB 402. Seminar in Comparative Physiology
1 credit. Seminar.

†PNB 403. Seminar in Endocrinology
1 credit. Seminar.

PNB 404. Seminar in Biological Rhythms
1 credit. Seminar.

†PNB 405. Seminar in Research and Journal Presentations in Physiology and Neurobiology
1 credit. Seminar.

Provides the opportunity for graduate students to present journal articles and their laboratory research in physiology and neurobiology to the department.

PNB 407. Microcomputer Applications in Physiology
3 credits. Laboratory.

Introduction to techniques for interfacing computers to biological experiments including the acquisition and processing of biological data in real time.

PNB 417. Developmental Neurobiology
3 credits. Lecture. Prerequisite: PNB 301.

Molecular mechanisms of neurodevelopment. Neural induction, cell fate determination, neurogenesis, axon targeting, neuronal migration, synapse formation and activity-dependent synaptic remodeling.

PNB 418. Integrative Neurobiology
3 credits. Lecture. Prerequisite: PNB 301.

Physiology of the central nervous system: information processing and central mechanisms in vertebrates and invertebrates; physiological aspects of behavior.

PNB 419. Neurobiology Laboratory
3 credits. Laboratory.

Modern research techniques in cellular and CNS physiology. Includes training in the use of electronic neurophysiological instruments, and in the design and performance of experiments with several different types of neural and muscular preparations.

PNB 423. Human Reproduction

3 credits. Lecture.

The physiology of human reproduction.

PNB 424. Reproductive Neuroendocrinology

3 credits. Lecture.

Analysis of the functional interaction between the body's two regulatory systems, the nervous and endocrine systems, with respect to the regulation of female reproduction.

PNB 425. Comparative Physiology

3 credits. Lecture.

Physiological and biochemical adaptations of animals. Emphasis on the integrative responses of vertebrates.

PNB 426. Molecular and Cellular Neurobiology

3 credits. Lecture. Prerequisite: PNB 301.

The molecular basis of synaptic transmission and other signaling mechanisms of communication among nerve cells. Extracellular and intracellular molecular messengers and signal transduction mechanisms. Cellular functions involved in differentiation, proliferation and survival of nerve cells.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

PLANT SCIENCE

Department Head: Professor Mary Musgrave
Professors: Adams, Berkowitz, Brand, Civco, Guillard, McAvoy, D. Miller, Schroeder, and Singha
Associate Professors: Alexopoulos, Auer, Beck von Bodman, Clausen, Corbett, Elliott, Li, Miniutti, Morris, Schulthess, Schwab, Westa, and Yang
Assistant Professors: Gaxiola and LeGrand

The Department of Plant Science offers M.S. and Ph.D. degree programs. Research is conducted in the following major areas: *Agronomy* (including turf management); *Horticulture* (including plant biotechnology); *Soil Science*, and *Landscape Architecture* (M.S. only). Research areas are highly diverse and continuously developing. Prospective applicants should check the department website (www.canr.uconn.edu/plsci/) for current information on faculty research.

All applicants must provide results of the Graduate Record Examination general tests and three letters of recommendation with their application.

The M.S. program is available with either a thesis (Plan A) or non-thesis (Plan B) option, although most students are admitted under Plan A. Students with deficiencies in their undergraduate preparation may be expected to include preparatory coursework in their plan of study. All M.S. students must enroll in at least one semester of PLSC 397, Graduate Seminar.

Applicants for the Ph.D. program should have adequate training and experience to enable them to perform independent research. Required coursework will depend on the nature of the research project and the student's background. A minimum of two years of full-time study beyond the master's degree (or equivalent) is expected. All Ph.D. students must enroll in at least two semesters of PLSC 397, Graduate Seminar.

Special Facilities. The Department of Plant Science has research facilities in several buildings and field locations. Most laboratories are new or recently renovated and are well equipped. Several faculty laboratories are located in the college's Agricultural Biotechnology Laboratory. The Department also operates the University Plant Biotechnology Facility and the Soil Nutrient Analysis Laboratory that can be utilized for research purposes. The Plant Science Research Farm and Nursery is located within one mile of the main campus and contains 160 acres (65 hectares) and a small greenhouse range that are available for field research projects. The Floriculture greenhouse on the main campus provides about 15,000 square feet (1400 square meters) of growing area, and additional greenhouse space is associated with both the Agricultural Biotechnology Laboratory and the Plant Biotechnology Facility.

COURSES OF STUDY

PLSC 300. Advanced Grassland Management

3 credits. Lecture.

The distribution and management of forage species are discussed. Emphasis is placed on warm-season grasses. Factors affecting forage quality and the use of forages for silage, hay, and pasture are studied.

PLSC 302. Independent Study

1-6 credits. Independent Study.

PLSC 305. Topics in Plant Science

1-6 credits. Seminar.

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

PLSC 306. Advanced Plant Breeding

4 credits. Lecture.

An intensive study of those cytological and genetical phenomena having a direct bearing on plant breeding with particular reference to problems involving polyploidy and interspecific hybridization.

PLSC 307. Advanced Study of Economic Plants

3 credits. Lecture.

A study of anatomical, ecological and other relationships of economic plants.

PLSC 308. Advanced Plant Tissue Culture

3 credits. Lecture/Laboratory.

The use of aseptic techniques for another culture, embryo culture, botanical substance production, protoplast fusion, somatic embryogenesis, meristeming, somaclonal variation and other biotechnological procedures. Emphasis is placed on developmental, physiological and genetic applications.

PLSC 335. Current Topics in Plant Biology

1 credit. Lecture.

Informal discussions of current concepts, research and techniques in the areas of plant biotechnology, plant physiology and molecular biology.

PLSC 343. Plant Biotechnology

3 credits. Lecture.

Principles of recombinant DNA and plant gene transfer technologies. Applications of plant biotechnology in agriculture, horticulture, forestry, human/animal health care, and the pharmaceutical industry. Social and environmental impacts of plant biotechnology.

PLSC 346. Research Seminar in Landscape Architecture

3 credits. Seminar.

Readings of major works in the field. Students are required to prepare several papers and present several seminars.

PLSC 350. Design and Analysis of Agricultural Experiments

4 credits. Lecture/Laboratory.

The design and analysis of experiments commonly conducted in agricultural field, greenhouse, and laboratory research. Presentation of summarized data using computer generated graphics from printers, plotters, and film recorders will be covered. Emphasis is placed on use of computers (mainframe and personal) and appropriate computer programs (e.g., SAS, Sigma Plot).

PLSC 351. Crop Ecology

3 credits. Lecture.

A study of environmental factors as they affect crop growth. Consideration is also given to the interactions between plant populations, both crop plants and weeds under field conditions.

PLSC 372. Advanced Soil Genesis and Taxonomy

3 credits. Lecture.

Includes an intensive study of theories of soil genesis and the fundamental principles of soil classification. The major system of soil classification in use today is reviewed. A detailed study of the system used by the United States National Cooperative Soil Survey is included. Field trips are required.

PLSC 375. Soil Physics

3 credits. Lecture.

The physical properties of soils and their relation to texture and structure; water movement, aeration, and temperature in soils with emphasis on their influence on plant growth.

PLSC 377. Soil Analysis

3 credits. Lecture/Laboratory.

A study of the theory and practice of analytical methods used in the determination of nutrient and related elements of soil.

PLSC 378. Advanced Soil Chemistry

3 credits. Lecture. Also offered as ENVE 303.

Physical chemical characteristics of soil minerals and soil organic matter, and their reactivity with compounds present in the aqueous and vapor phase. Topics include: modern spectroscopic surface analyses, soil organic matter and its interactions with metals, redox reactions, solubility, derivation of ion-exchange equations, and kinetics of soil reactions.

PLSC 385. Plant Gene Transfer Techniques

3 credits. Laboratory.

Techniques of plant gene delivery and transgenic plant production. Verification and analysis of transgenic plants.

†PLSC 397. Seminar

1 credit. Seminar.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

POLITICAL SCIENCE

Department Head: Professor Howard Reiter*Professors:* Boyer, Clifford, Farnen, Hanson, Hiskes, Lewis, Vengroff, and Zirakzadeh*Associate Professors:* Best, Dautrich, Kelly, Kingstone, Lefebvre, Scruggs, Sterling-Folker, Waddell, and Yalof*Assistant Professors:* Bayulgen, Cole, Donahue, Dudas, Hertel, Hettinger, Ladewig, Morrell, Pressman, and Simien

The Department of Political Science offers study leading to the degrees of Master of Arts and Doctor of Philosophy. Master's degree students usually take a less specialized program, including work in several areas of political science.

Admission to the Master of Arts Degree Program. All applicants are required to take the Graduate Record Examinations. Only those applicants showing high scholastic promise are admitted. Usually, an undergraduate major in political science (or an equivalent body of course work) is required for admission. However, exceptions are made for promising candidates who have majored in related subjects. Some undergraduate work in history, economics, and sociology also is desirable. Except where the M.A. degree clearly is intended to be a terminal degree, the admissions committee is reluctant to act favorably in the case of an applicant whose record shows no successful academic exposure to one or more foreign languages.

Requirements for the Master's Degree. After fulfilling the requirements for the master's degree, a final examination is administered. The final examination for the M.A. degree is both written and oral.

Admission to the Ph.D. Degree Program. Students pursuing the M.A. in Political Science or M.P.A. degree who wish to continue for the Ph.D. degree are admitted to the doctoral program only upon recommendation of the committee administering the M.A. or M.P.A. final examination. Those who have earned the M.A. degree elsewhere are admitted to pursue doctoral work here only with very convincing professional recommendations and demonstrated evidence of scholarly ability. Such applicants also must submit the results of the Graduate Record Examinations.

Departmental Requirements for the Ph.D. Degree. The Ph.D. program involves two distinct stages. Doctoral students first prepare for a comprehensive written and oral general examination. After passing this examination, they devote themselves to research and the writing of a dissertation. All doctoral students must prepare in two of the following areas: international relations, comparative politics, American politics, public administration, public law, public policy, public opinion/survey research, and political theory. As part of the Ph.D. general examination process, the student is expected to present a dissertation proposal that is considered by the advisory committee to be ready to defend.

All doctoral students are required to take, as early in their program as possible, Political Science 393, Political Science 395, and Political Science 396.

Ph.D. students are required to have a competent reading knowledge of at least one foreign language

appropriate to the general area of study *or*, upon recommendation of the advisory committee, at least six credits of advanced work in a related area or a supporting area such as statistics. However, an advisory committee may require additional advanced work in a related or supporting area, alone or in conjunction with a foreign language.

Special Facilities. Students interested in comparative politics will find the Center for Latin American Studies and the Center for Slavic and East European Studies valuable resources. A vast archive of survey data from polls taken both in the United States and abroad is housed at the Roper Center, which is part of the Institute for Social Inquiry. Excellent computer facilities together with expert technical help from the Institute's staff provide ready access to these survey materials.

COURSES OF STUDY

POLS 300. Independent Study in Political Science

1-6 credits. Independent Study.

POLS 301. Political Theory

3 credits. Seminar.

Historical and conceptual analysis of selected political ideas such as justice, liberty, rights, political obligation, or the state; including an examination of one or more major schools or bodies of political thought from ancient to contemporary times.

POLS 304. Proseminar in Political Theory

3 credits. Seminar.

Historical survey and analysis of fundamental concepts in political theory.

POLS 307. Seminar in American Thought and Ideology

3 credits. Seminar.

POLS 311. Proseminar in International Relations

3 credits. Seminar.

Current theories of and methodological approaches to international relations.

POLS 313. Seminar in American Diplomacy

3 credits. Seminar.

Problems in American diplomacy and foreign policy.

POLS 320. Administrative Ethics

3 credits. Seminar.

Examination of models and standards of ethics in public administration, decision-making techniques and tools, and analyses of selected, contemporary dilemmas confronting public administration and public policy.

POLS 321. Foreign Policies of the Russian Federation and the Former USSR

3 credits. Seminar.

Regional and global roles of the former USSR and postCommunist Russia.

POLS 323. International Conflict and Cooperation

3 credits. Seminar.

Examination of theories and methodologies relating to the study of international conflict and cooperation. Topics include deterrence, negotiation and bargaining, theories of conflict and war, and approaches to conflict resolution.

POLS 324. International Business and World Politics

3 credits. Seminar.

Major problem areas in which politics, economics, and business intersect at the international level - trade, foreign investment, and monetary relations. The politics and mechanisms of U.S. foreign economic policy.

POLS 325. Foreign Policy Analysis

3 credits. Seminar.

Analysis of foreign policy processes from a comparative, theoretical perspective.

POLS 326. International Organization and Law

3 credits. Seminar.

International cooperation to resolve economic, social, and political transnational problems.

POLS 328. U.S. Foreign Policy in the Middle East

3 credits. Seminar.

Examination of U.S. political, economic and strategic interests and aims in the Middle East.

POLS 329. Politics and Security in the Middle East

3 credits. Seminar.

Examination of security issues in the Middle East and the responses of regional actors and external powers.

POLS 330. Seminar in Comparative East Asian Politics

3 credits. Seminar.

Processes of development, modernization, and administrative techniques of economic development in East Asia against the background of revolutionary changes in the People's Republic of China.

POLS 331. West European Politics

3 credits. Seminar.

Contending approaches to the political systems of West European nations. Comparative analysis of industrialization, institutional structure, and political economy.

POLS 332. Seminar in Latin American Politics

3 credits. Seminar.

POLS 335. Proseminar in Comparative Government

3 credits. Seminar.

Political institutions and processes compared. Derivation of generalizations.

POLS 336. Comparative Political Development

3 credits. Seminar.

Development of political systems in relation to socio-economic level and other conditioning factors. Political stability and change.

POLS 337. Politics of Russia and the Former Soviet Union

3 credits. Seminar.

Analysis of the collapse of political authority in the former Soviet Union and the process of political development in post-Communist Russia. Comparison of Soviet/Russian political attitudes and behavior with that of other industrial societies.

POLS 339. Seminar in African Politics

3 credits. Seminar.

Focus on the rise of nationalism in post-war Africa, the process of decolonization, and the problems of economic growth and national integration. Attention will also be given to the role of ideology as a determinant in the choice of development policies.

POLS 340. East European Politics

3 credits. Seminar.

Comparative analysis of the political development, economic modernization, social stratification, and indigenous ideologies of post-Communist Eastern Europe.

POLS 341. Public Opinion and American Democracy

3 credits. Seminar.

Theories of democracy and what they imply about the public's capabilities and role; empirical research on the American public and public opinion in the context of democratic theory.

POLS 342. American Political Parties

3 credits. Seminar.

The development, organization, and role of political parties in the United States, with implications for public policy.

POLS 345. Politics, Society, and Educational Policy

3 credits. Seminar.

The analysis of the interactions among educational policy, politics and other social forces. In-sights and concerns from politics and other social sciences disciplines will be applied to different levels and types of schooling.

POLS 346. Proseminar in Public Policy

3 credits. Seminar.

Major works in U.S. public policy, with comparative illustrations of general principles.

POLS 348. Connecticut State Government and Administration

3 credits. Seminar.

Structure, organization and functioning of Connecticut's state government. Management and administrative issues in the executive, legislative and judicial branches.

POLS 351. Constitutional Interpretation
3 credits. Seminar.

An exploration of the theories and process of constitutional interpretation in the United States, with an emphasis on the role the Supreme Court plays in defending and enforcing civil liberties.

POLS 352. Seminar in Public Law
3 credits. Seminar.

Selected topics in public law, the administration of justice, and jurisprudence.

POLS 353. Judicial Decision-Making
3 credits. Seminar.

The judicial decision-making process in terms of methods and models developed in the framework of the behavioral sciences.

POLS 360. Proseminar in Public Administration
3 credits. Seminar.

Theory and structure of administration and the public service.

POLS 368. Development Administration
3 credits. Seminar.

Strategies of implementing development in Latin America, Asia, and Africa; social, political, and cultural obstacles to administrative reform in developing nations; problems of technical assistance in overseas administration; theories of development administration.

POLS 373. Public Budgeting
3 credits. Seminar.

An examination of the development and structure of the public financial sectors; the principles and roles of operating and capital budgets in public organizations; and introduction to the relationships between funding mechanisms and public policy.

POLS 375. Politics of Organization and Bureaucracy
3 credits. Seminar.**POLS 381. Proseminar in American Politics**
3 credits. Seminar.

Theory and practice of American government and politics, with an emphasis on various theoretical and methodological perspectives.

POLS 384. National Decision-Making Process: Presidency and Congress
3 credits. Seminar.

The interaction of the institutionalized Presidency and the Congress in the formulation and execution of public policy. Emphasis given to current issues and problems.

POLS 386. Public Opinion and Public Policy
3 credits. Seminar.

Theoretical and empirical study of public opinion and its role in policy formation.

POLS 393. Nature of Political Inquiry
3 credits. Seminar.

The scope of political science, modes of inquiry, the role of concepts and theory. Graduate students are urged to take the course in their first semester.

POLS 395. Seminar in Quantitative Methods of Political Science
3 credits. Seminar.

Introduction to the data analysis techniques most often used by political scientists. Requires no previous background in statistics.

POLS 396. Research Design in Political Science
3 credits. Seminar.

Introduction to quantitative and non-quantitative empirical research design in political science.

POLS 397. Investigation of Special Topics in Political Science
1-3 credits. Seminar.**†GRAD 395. Master's Thesis Research**
1 - 9 credits.**†GRAD 396. Full-Time Master's Research**
3 credits.**†GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.**GRAD 398. Special Readings (Master's)**
Non-credit.**GRAD 399. Thesis Preparation**
Non-credit.**POLS 401. Research Seminar in Political Theory**
3 credits. Seminar.

Investigation of special topics in political theory, with emphasis on the preparation and completion of original research projects.

POLS 411. Research Seminar in International Relations
3 credits. Seminar.**POLS 431. Research Seminars in Comparative Politics**
3 credits. Seminar.**POLS 441. Research Seminars in American Politics**
3 credits. Seminar.**POLS 451. Research Seminar in Judicial Process**
3 credits. Seminar.**POLS 471. Research Seminar in Comparative Public Policy**
3 credits. Seminar.

Comparative analysis of particular public policies. Countries and policies considered may vary from year to year.

POLS 493. Research Seminar in Quantitative Methods

1-6 credits. Seminar. Prerequisite: POLS 395.

Research in quantitative applications to political data.

POLS 496. Special Topics in Public Policy
3 credits. Lecture.**†GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.**†GRAD 496. Full-Time Doctoral Research**
3 credits.**†GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.**GRAD 498. Special Readings (Doctoral)**
Non-credit.**GRAD 499. Dissertation Preparation**
Non-credit.

POLYMER SCIENCE

Program Director: Associate Professor Thomas Seery

Professors: Papadimitrakopoulos, Shaw, Sung, and Weiss

Research Professor: Scola

Associate Professors: Burkhard, Dobrynin, Parnas, Seery, and Sotzing

Assistant Professors: Asandei, Utz, and Zhu

Adjunct Professor: Han

Work leading to the degree of Master of Science and Doctor of Philosophy is offered in the interdisciplinary field of polymer science in the Institute of Materials Science.

Admission to Degree Programs. In addition to the basic admission requirements of the Graduate School, an applicant should submit Graduate Record Examinations (GRE) General Test scores at the time of application. A sound undergraduate major in science and/or engineering normally is required for entrance to the degree programs.

The M.S. Program. Other than the GRE General Test scores, there are no special requirements for admission to the master's program beyond those of the Graduate School. Selection of Plan A (thesis) or Plan B (non-thesis) is made after consultation with the advisory committee.

The Ph.D. Program. Admission to the doctoral program is based upon a careful assessment of the student's potential for creative research in polymer science. There are no special requirements for the doctoral program beyond those of the Graduate School, other than the GRE General Test scores.

Facilities. The Institute of Materials Science, (IMS) has well-equipped, environmentally controlled research laboratories that are continually being upgraded. These include a clean room for surface and interface research, a monochromic source, variable angle ESCA, a relaxation spectrophotometer, and a tuneable UV/visible pulsed Nd:YAG laser. The IMS Microscopy Laboratory has a new JEOL 6335F cold field emission gun SEM with an automated digital interface and a fully automated digital JEOL 2010 FaSTEM. The polymer processing area includes a Brabender Prep Center, a Brabender Plasti-Corder torque rheometer, twin screw extruder/mixer, pelletizer, and an injection molding machine. Among recently acquired instruments and facilities particularly relevant to polymer research are a Rheometrics ARES controlled strain rheometer, a PAAR Physica UDS-200 controlled stress rheometer and a Rheometric System IV, H/P 5890 and H/P 6890 Gas Chromatograph/Mass Spectrometers, and a Bruker GADDS wide-angle diffraction instrument, Bruker D5005 and D8 Advance power diffractometers, a Bruker Anton-Parr, a Renishaw Ramascope System, a Nicolet Magna 560 FT/IR, TA Instruments STA 600, T6A 500, and DSC 100. There are many other large and small instruments too numerous to list.

The Institute also operates a state-of-the-art materials simulation laboratory with a parallel cluster based on more than 24 PCs of the latest architecture. Students also have access to the main University computer system, as well as dozens of PCs, Macs, and Unix work stations.

COURSES OF STUDY

Course offerings are shown below. These are co-sponsored by departments in the sciences and engineering. Special Topics (Chemistry 394, Chemical Engineering 320) are offered each semester. The subject of these courses varies widely and depends on student and faculty interest and availability. In addition, the program sponsors weekly seminars of outstanding speakers representing various study areas in polymer science and technology. Visiting faculty frequently contribute extensively to these courses. Topics offered have included Liquid Crystals, Inorganic Polymers, and Lifetime Prediction of Materials.

Chemical Engineering

- 351. Polymer Physics
- 352. Polymer Properties
- 355. Polymer Structure and Morphology
- 356. Adhesion
- 357. Surface and Interfacial Properties of Polymers
- 358. Composite Materials
- 367. Polymer Rheology
- 368. Polymer Rheology and Processing Laboratory

Chemistry

- 380. Polymer Synthesis
- 381. Polymer Physical Chemistry
- 382. Polymer Characterization I
- 384. Polymer Characterization II
- 385. Reactions of Polymers
- 386. Microscopy and Morphology of Polymers
- 394. Investigation of Special Topics
 - Inorganic Polymers
 - Polymer Biomaterials
 - Polymer Photonics
 - Polymer Spectroscopy

Molecular and Cell Biology

- 313. Structure and Function of Biological Macromolecules
- 315. X-ray Structure Analysis

Physics

- 363. The Electrical Properties of Polymers

PROFESSIONAL STUDIES

Dean: Dr. Krista Rodin

Assistant Dean: Dr. Jeet Joshee

Program Head: Associate Professor Mark E. Sullivan

Associate Professor: Sullivan

Assistant Professor: Ndoeye

The Master of Professional Studies (M.P.S.) is a flexible, convenient on-line degree program. This unique graduate study opportunity, offered by the College of Continuing Studies, is available to students from anywhere in the world and at a time that fits into each student's schedule. All classes are asynchronous yet feature class discussions. The program is designed for your convenience, and working adults can complete all degree requirements within two years.

The M.P.S. degree is specifically designed for individuals and practitioners with established career paths who are developing marketable skills to meet evolving workforce demands, seeking professional development, seeking expanded promotional opportunities, or interested in changing careers. The M.P.S. program provides skills and knowledge for immediate application in two fields of study: Human Resource Management and Humanitarian Services Administration.

Human Resource Management (HRM).

The Human Resource Management field of study features two different tracts – *Labor Relations* and *Personnel*. The HRM program prepares graduates to manage human resources effectively in the dynamic legal, social, and economic environment currently constraining organizations. Emphasis is placed on integrating human resource management with the overall business strategy. Graduates will be qualified for professional HRM positions in industry, labor organizations and government.

Humanitarian Services Administration

(HSA). The program in Humanitarian Services Administration prepares graduates to work in field operative and administrative positions in non-governmental organizations, international non-governmental organizations, and multi-governmental organizations involved in humanitarian response and development initiatives. Graduates will be qualified to work in disaster relief and sustainability areas.

In addition to M.P.S. core and field-specific course requirements, each program also involves a Capstone Project and a Residency Requirement. Detailed information about the curriculum for each of the two fields of study is available at these Web sites:

Human Resource Management – <http://continuingstudies.uconn.edu/onlinecourses/humanresourcemanagement.html>

Humanitarian Services Administration – <http://continuingstudies.uconn.edu/onlinecourses/humanitarianservices.html>

Major advisors in Human Resource Management are Associate Professors Mark Sullivan and Assistant Professor Peter Diplock. The major advisor for Humanitarian Services

Administration are Assistant Professors Abdou Ndoeye and Rodney Allen.

COURSES OF STUDY

HUMAN RESOURCE MANAGEMENT COURSES

HRM 304. Employment Law

3 credits. Lecture.

This course addresses the applicable federal and state laws, the different forums (federal court, state courts, Equal Employment Opportunity Commission, and state Commissions on Human Rights and Opportunities), and prevention of claims through the diversity training, a system of reporting/handling disputes, and the proper employer response. This course will not address the NLRB, collective bargaining agreements, or union rights.

HRM 340. Negotiations and Administration

3 credits. Lecture.

This course provides the student with the fundamental skills needed to participate fully in any situation requiring bargaining skills.

HRM 341. Labor Relations and the Law

3 credits. Lecture.

This course will cover the basic legislation that impacts today's workplace in the public as well as the private sector. Legislation that prevents and remedies employment discrimination will be included.

HRM 342. Introduction to Alternative Dispute Resolution Process

3 credits. Lecture.

This course provides the student with the fundamental skills needed to understand and participate fully in alternative dispute resolution.

HRM 351. Human Resources and Public Policy

3 credits. Lecture.

This course examines the government's influence on the workplace and the impact of public policy on the human resource function within organizations. The course is geared towards developing a better understanding of public policy frameworks, processes, and analytical methods, and their impact on HR issues, problems, challenges, and the resulting actions required in the practice of Human Resources Management.

HUMAN SERVICES ADMINISTRATION COURSES

HSA 302. Seminar on Complex Humanitarian Emergencies

3 credits. Seminar.

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

HSA 303. Poverty and Public Health

3 credits. Lecture.

Provides students with a foundational understanding of the complex and dynamic relationships between poverty and poor health among the poor, worldwide. It examines classic and current studies on poverty and public health from an historical and interdisciplinary perspective (Public Health, Epidemiology, Social Medicine, and Social Economics), and reviews the ways in which the government and non-governmental organizations have addressed the problem. The course will prepare students to engage in thoughtful debate about needed changes in values, perspectives and interventions in order to address and ameliorate the health problems of the economically poor.

HSA 304. Nutrition during Human Emergencies

3 credits. Lecture.

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

HSA 312. Issues in Humanitarian Studies

3 credits. Seminar.

This seminar offers an opportunity for students to examine current issues of Global Human Development from the perspective of non-governmental organizations (NGOs), private voluntary organizations, international organizations (IOs), multi-governmental aid and humanitarian assistance agencies, the U.S. military and government sponsored aid organizations. Students will gain a comprehensive, multidisciplinary understanding of issues facing these organizations and stresses that are currently forcing many to reevaluate their current policies and procedures.

HSA 322. Applied Organizational Management

3 credits. Lecture. BGS students only.

This course will help students to develop management and leadership skills for working within an organization by understanding and analyzing some rational management techniques, concepts of organization and supervisory skills that are useful for effective organizations.

HSA 324. Gender and International Development

3 credits. Lecture.

This course provides the student with essential understanding of the factors that shape the social, political and economic roles of women in developing countries. The course will include considerations of specific projects aimed at integrating women into community development and the costs and benefits of

various development alternatives as perceived by outside agencies and by the women themselves.

HSA 332. International Human Rights

3 credits. Lecture.

The course will address the evolution of international human rights and of the legal instruments designed for their promotion and protection. It will study the theoretical foundations of the idea of human rights in various civilizations and cultures, evaluate its legacy within the western and non-western traditions, and examine its meaning and relevance in the contemporary world.

HSA 377. Environmental Compliance and Regulations

3 credits. Lecture.

Compliance and knowledge of a whole new generation of environmental regulations is required of all managers. This course begins with general compliance obligations, common law, trespass, nuisance and negligence. The major Federal environmental laws affecting companies and agencies are reviewed along with even more stringent State and local regulations. Also presented is a view of the severe civil and criminal penalties liabilities attached to environmental regulations, and a discussion of the sharply increasing punishments for non-compliance. The final section of the course will outline strategies for compliance with specific comments on proactive environmental management as a method for reducing legal exposure from environmental issues. It is required of managers. It empowers private citizens.

GENERAL STUDIES COURSES

GS 300. Independent Study

1-9 credits. Independent Study. With a change in content, this course may be repeated for credit. Open only with consent of instructor.

GS 323. Community Development for Local Capacity Building

3 credits. Lecture.

This course provides the student with the essentials of community development and the skills of local capacity building. Local capacity building skills are needed by Humanitarian workers in order to foster sustainable community development.

GRADUATE PROGRAM IN PROFESSIONAL STUDIES COURSES

GPPS 325. Issues in Economic Development

3 credits. Lecture.

This course concerns economic, social, and demographic change in those countries comprising the less wealthy regions of the South. It examines development from linear (neoclassical), structuralist (political economy), and other perspectives, and emphasizes relationships between "advanced" and "developing" countries within the context of the global economy. In addition to theoretical grounding, the

course provides practice in preparing development profiles of individual countries.

GPPS 347. Program Evaluation

3 credits. Lecture.

This course is intended to provide students with skills required to apply the methods of science to the assessment of social programs. Here a social program refers to organized, goal-directed activities designed to address a social problem. The goal of this course is to provide you, the student, with enough skill that you are able to design and implement evaluations of programs. The extent to which you are able to do this without assistance reflects largely your familiarity with scientific methods. Some of the more technical forms of impact studies may require additional study, or assistance from consultants.

GPPS 352. Systemic Analysis

3 credits. Lecture.

Provides students with a foundational understanding of the complex and dynamic relations between issues and the systems that cause them. Systemic analysis trains students to understand in the operational dynamics of the social and structural dimensions of a society or group.

GPPS 357. Quantitative Analysis

3 credits. Lecture.

This course is designed to help students develop skills necessary to analyze data bearing on human service questions including program evaluation, decision making and forecasting. The course will include basic univariate statistics, bivariate statistics and basic multivariate statistics including basic analysis of variance and basic multiple regression analysis, a flexible and powerful data analysis system. In addition to learning the fundamentals of these statistical procedures, students will also master the use of SPSS for Windows to perform all analysis.

GPPS 361. Strategic Staffing and Talent Management

3 credits. Lecture.

This course presents the theoretical frameworks and practical tactics for the acquisition, deployment, and retention of the talent necessary to achieve the strategic and tactical objectives of the business. Topics will include strategic staffing, human resource planning, recruitment, assessment, selection decision-making strategies, succession planning and retention strategies. The importance of linking staffing and talent management to business strategies, objectives, and competitive challenges will be emphasized.

GPPS 389. M.P.S. Internship

3 credits. Field Studies. Prerequisite: Open only to students enrolled in the Master of Professional Studies degree program.

The internship will provide professional experience in the student's field of study in a private or public organization. Students will select the organization and specific internship position with the approval of the major advisor. Students will be expected to perform professional duties for a minimum of 160 hours during the semester. Prior to

the beginning of the internship, student will develop a set of professional objectives for the internship experience. Students will maintain a log of experiences and activities during the internship. At the conclusion of the internship, students will write a paper evaluating the experience gained in light of the stated objectives.

GPPS 395. M.P.S. Residency Program

3 credits. Discussion. Corequisite: GS 397.

The residency requirement for the MPS degree will consist of two consecutive weeks of intensive study at the Storrs campus or at alternative off-site locations approved by the College Dean. Students will be expected to have completed their Capstone Project Proposals prior to the residency program. In addition, students will be assigned a series of readings on contemporary issues in the field, which must be completed prior to attending the residency. Throughout the two weeks, students will have the opportunity to participate in extensive research, discussions, case analyses, and hands-on exercises to facilitate application of concepts and skills. In addition, students will present their Capstone Project Proposal for comment and discussion with their peers, and will meet with their advisor to refine the project proposal. The final project will be submitted for approval following completion of the residency.

GPPS 397. M.P.S. Capstone Project

3-6 credits. Independent Study.

Towards the end of the M.P.S. program, students will select, with faculty approval, a topic for a major project that demonstrates the student's ability to define, analyze, synthesize, evaluate, and recommend actions or solutions to deal with a major issue, problem, or opportunity within the field of study. Capstone Projects may include job-related field projects, integrative analyses of professional literature, and comprehensive project proposals for adoption by third parties. In all cases, the Capstone Project is intended to demonstrate an extensive understanding of the topic area selected, the ability to develop and integrative and systemic analysis of a problem, and the ability to identify appropriate solutions and recommendations. A written report documenting all aspects of the project will be presented for faculty approval.

OCCUPATIONAL SAFETY AND HEALTH COURSES

OSH 321. Seminar in Occupational Safety and Health Management

3 credits. Seminar.

This course is an in-depth study of the impact of issues such as the changing demographics, and globalization of regulations, on promoting prevention of injuries and illness to workers, and protection of property and the environment in the workplace. This course is taught as a series of active seminars requiring students to research, write, and discuss papers.

OSH 322. Industrial Pollution Management

3 credits. Lecture.

This course provides students with management and applied techniques to prevent and control pollution from industrial activities. It includes legal aspects of pollution prevention and control, setting up pollution prevention programs, performing pollution prevention assessments, performing economic evaluations and management principles in controlling industrial pollution.

OSH 376. Occupational Safety and Health

3 credits. Lecture.

This is a graduate course that provides the student with the rationale for providing an occupationally safe and healthy work environment for employees. These skills are needed to be able to work effectively in the area of human resources and employee development as well as industrial relations since workers have been provided by law with specific safety and health rights.

OSH 378. Advanced Industrial Hygiene

3 credits. Lecture.

This is a graduate-level course in the field of industrial hygiene. It is directed at protecting workers' health through the recognition, evaluation and control of hazards in the work environment.

ALL SECTIONS

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies
(Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

PSYCHOLOGY

Department Head: Professor Charles A. Lowe

Associate Department Head and Coordinator of

Graduate Studies: Professor Emeritus Amerigo Farina

Professors: Carello, Chaffin, Crawford, Dovidio, Fein, Fisher, Fowler, Green, Holzworth, Johnson, Kalichman, Katz, Kenny, Lillo-Martin, Maxson, Miller, Pratto, Rickards, Salamone, Swadlow, and Turvey

Associate Professors: Barnes-Farrell, Barton, Chrobak, Cillessen, Dixon, Fitch, Henning, Markus, Marsh, Mellor, Naigles, Park, Quinn, Rueckl, Tabor, and Williams

Assistant Professors: Agocha, Aikins, Bessenoff, Eigsti, Kay, Lukatela, Magley, Magnuson, Milan, and Treadwell

The Department of Psychology offers study leading to the degree of Doctor of Philosophy in the several areas described below. There is a pervading emphasis on the acquisition of a general background in experimental findings and theoretical interpretations. All students conduct independent experimental projects prior to research for the dissertation. Opportunities are provided for preprofessional experience in teaching, research on grant-supported projects, and with clinical agencies. The Departmental website is <http://web.uconn.edu/psychology/>.

Behavioral Neuroscience. This area of concentration offers study that focuses on the biological basis of behavior, through research participation, seminars, and formal course work. Research programs make use of a variety of approaches – of neurophysiology, neurochemistry, neuroanatomy, neuroendocrinology, genetics, ethology, and behavioral analysis – to study problems in sensation, perception, emotion, motivation, learning, motor activity, aggression, sex differences, reproductive behavior, communication, brain lateralization, and the organization of sensory cortex.

Clinical Psychology. The clinical program is designed to produce psychologists able to work on a scientific and professional level, with special competence in research, diagnosis, and therapy. At least one year of internship at an approved facility is required. The program has APA accreditation. The program emphasizes both child/family and adult interventions and also provides a neuropsychology area of emphasis.

Developmental Psychology. Training in the conduct of research and the analysis of theory in child and developmental psychology is superimposed on a broad background in general psychology. Areas given emphasis include cognitive development, computer modeling, developmental behavior genetics, intelligence, language, learning, mental retardation, and motivation.

General Experimental Psychology. Three areas of specialized study are offered: (1) the ecological approach to perception and action, (2) language and cognition, and (3) visual and auditory perception and learning. Facilities exist for research and training on many topics, including: the perceptual control of action, coordinated movement, psycholinguistics, speech perception and production,

neurobiological and psychophysical studies, and the philosophical and theoretical foundations of perception, action, and cognition. Emphasis in psycholinguistics is provided in cooperation with the Department of Linguistics.

Industrial/Organizational Psychology. This area of concentration is concerned with the development, application and extension of psychological facts, methods, and principles to the problems of business, government and industry. Students can choose to emphasize personnel psychology, organizational psychology, occupational health psychology, or human factors/ergonomics in their research and course work. All students take the same core courses in the first year of study, and all students are required to be actively engaged in research during their entire course of study. An approved one-year field research experience is required.

Neurosciences. This is an interdisciplinary area of concentration. Neuroscience is concerned with the structural and functional characteristics of the nervous system and its relation to the adaptive physiology and behavior of the organism. Students in this program may approach the full range of neuroscience studies through courses and research at the cellular, systemic, and organismic levels. A particular strength of the area is the analysis of behavior, its development, and its neurological bases. This area of concentration is offered in the fields of study of biobehavioral science, pharmaceutical science, physiology, and psychology. Application is made to the preferred field of study, but the applicant must be acceptable to the Neurosciences Committee.

Social Psychology. This division provides excellent training in both laboratory and field research methods and statistics and broad coverage of the major theoretical paradigms of social psychology. Curriculum requires exposure to three levels of analysis: the social person (including identity, social cognition, attitudes, emotions), the person and others (including groups, close relationships, and organizations), and the social context (including intergroup relations, gender, and health). Research areas include dyadic relations (e.g., close relationships, person perception, gender), social inequality (including stigma, stereotyping and discrimination, prejudice), and health psychology (including risk assessment, information, motivation skills, intervention research).

Admission Requirements. Well qualified candidates are encouraged to apply for the Ph.D. degree.

Requirements for admission include basic courses in statistics, general psychology, and experimental psychology. Applicants must present scores on the three parts of the general Graduate Record Examination.

Application forms for admission and for financial support may be obtained on-line or by writing to the Graduate Admissions Office.

The application deadline for Clinical Psychology is December 1. The application deadline for Social Psychology and Industrial/Organizational Psychology is December 15. The deadline for all other Psychology graduate programs is January 1. For questions regarding graduate programs, please call (860) 486-2057 or send an e-mail message to psychadm@uconnvm.uconn.edu.

Facilities. Research facilities include: minicomputer and microcomputer based laboratories

for industrial, neurobiological, psycholinguistic and perceptual studies; local network access to the University's mainframe; laboratories for comparative and physiological research with avian and mammalian species; laboratories in affiliated research institutions, including the Haskins Laboratories in New Haven, and the University-operated nursery school.

A variety of approved centers are available for practicum and intern training in clinical psychology, and for work experience for advanced students. These resources include a variety of Veterans' Administration, general and mental hospitals, educational and community clinics, trauma centers, and opportunities for work with developmentally disabled individuals living in the community.

COURSES OF STUDY

PSYC 300. Independent Study

1-6 credits. Independent Study.

PSYC 301. Special Topics in Psychology

1-6 credits. Seminar.

Selected topics in psychology are studied with particular attention to recent developments in the field.

PSYC 302. Practicum in Interviewing and Cognitive Assessment

3 credits. Practicum. Open to graduate students in Clinical Psychology and to others with instructor consent.

An introduction to psychological assessment with supervised practice in administering and interpreting clinical interviews and psychological tests.

PSYC 303. Adult Psychopathology

3 credits. Lecture. Open to graduate students in Clinical Psychology and to others with instructor consent.

Theoretical and descriptive overviews of mental disorder that afflict adults, emphasizing etiology, diagnosis, and conceptualization.

PSYC 304. Research in Psychology

1-6 credits. Independent Study.

PSYC 305. Research Seminar in Language and Psychology

1 credit. Seminar. Also offered as LING 305.

PSYC 306. Professional Issues in Clinical Psychology

3 credits. Lecture. Open to graduate students in Clinical Psychology and to others with instructor consent.

An examination of the relations among the law, ethical issues, and professional practices of clinical psychologists and of other providers of mental health services.

PSYC 307. Child Psychopathology

3 credits. Lecture. Open to graduate students in Clinical Psychology and to others with instructor consent.

An examination of diagnosis, etiology, and prognosis in child psychopathology.

PSYC 308. Social and Personality Development

3 credits. Seminar.

Fundamental research and theory on social behavior, social cognition, and interpersonal relations in the preschool period (2-6 years) and in middle childhood (6-12 years). Early childhood precursors and consequences in adolescence. Both normative and atypical development.

PSYC 309. Health Psychology

3 credits. Lecture.

Interaction of biological, psychological, and social factors in health. Topics include disease prevention and health promotion, psychosocial factors in treatment of illness, and stress and coping processes.

PSYC 310. Practicum in Personality Assessment

3 credits. Practicum.

Supervised practice in administration and interpretation of clinical tests and case history material, report writing and discussion of implications of diagnostic data for therapeutic procedures.

PSYC 311. Psychodynamics

3 credits. Lecture. Open to graduate students in Clinical Psychology and to others with instructor consent.

Criteria for the evaluation of personality theories. An analysis of the major methods of psychotherapy and of the personality theories on which they are based.

PSYC 312. Ecology of Language

3 credits. Lecture.

The scope and content of an ecological theory of language are outlined. Conventional theories of language, ecological theories of perceiving and acting and relevant portions of social psychological, anthropological, and linguistic theory are explored.

PSYC 313. Memory

3 credits. Lecture.

Contrasts associationist, cognitive, connectionist, and cognitive neuroscience approaches to issues involving short-term memory, long-term memory, and the representation of knowledge.

PSYC 314. The Mental Lexicon

3 credits. Lecture.

The role of the mental lexicon in the perception and production of words, including the representation and use of knowledge about phonology, morphology, orthography, and semantics.

PSYC 315. Connectionist Models

3 credits. Lecture.

Connectionist models in psychology and computational neuroscience. Topics include learning, memory, and language processes in both intact and damaged networks.

PSYC 316. Empirically Validated Methods of Psychotherapy

3 credits. Lecture. Prerequisite: PSYC 323. Open to graduate students in Clinical Psychology and to others with instructor consent.

Instruction and supervised practice of empirically validated, psychotherapeutic techniques and treatments.

PSYC 317. Integrative Treatment with Special Populations

3 credits. Lecture. Prerequisite: PSYC 323.

Psychotherapeutic interventions with alcohol and drug abusers, abused children and their parents, people with HIV/AIDS, and with paraphilias and sexual dysfunctions.

PSYC 318. Didactics of Supervision and Consultation

3 credits. Lecture. Open to students in Clinical Psychology. Prerequisites: PSYC 302, PSYC 310, PSYC 330, and PSYC 331.

Exposure to theories, models, and empirical data pertinent to providing quality supervision of the psychodiagnostic and psychotherapeutic activities of mental health professionals.

PSYC 319. Practicum in Clinical Supervision

3 credits. Practicum. Open to students in Clinical Psychology. Prerequisites: PSYC 302, PSYC 310, PSYC 330, and PSYC 331.

Supervised training in supervising psychodiagnostic and psychotherapeutic activities of less advanced clinical psychology students.

PSYC 320. Seminar in Clinical and Abnormal Psychology

3 credits. Seminar. Open to graduate students in Clinical Psychology and to others with instructor consent.

PSYC 321. Research Design and Test Construction

3 credits. Lecture. Open to graduate students in Clinical Psychology and to others with instructor consent.

Theoretical issues and practical problems in developing valid measures of personality variables and in designing experimental and quasi experimental research.

PSYC 322. Psychology of Personality

3 credits. Lecture.

An evaluation of current problems, theories, and research in personality. Emphasis is on normal rather than pathological implications of various theoretical approaches.

PSYC 323. Foundational Methods of Psychotherapy

3 credits. Lecture. Prerequisite: PSYC 311.

Application of foundational methods of psychotherapeutic interventions from humanistic-experiential and interpersonal-systems theories.

PSYC 324. Group Psychotherapy

3 credits. Lecture.

Theories and methods of group psychotherapy.

PSYC 325. Foundations in Neuropsychology

3 credits. Lecture.

An introduction to neuropsychology, including functional neuroanatomy, neurochemistry, neuropharmacology and cognitive/emotional function and dysfunction.

PSYC 326. Neuropsychological Assessment

3 credits. Lecture. Prerequisite: PSYC 325.

An introduction to clinical neuropsychological assessment, including review of neuroanatomy and neuropsychological functions, common syndromes of neuropsychological dysfunction, specific tests to measure neuropsychological functions and professional issues for the neuropsychologist.

PSYC 327. Practicum in Neuropsychological Assessment

3 credits. Practicum. Prerequisites: PSYC 302, PSYC 325, and PSYC 326.

Field placements in clinical neuropsychology. Students will be placed in area hospitals, rehabilitation centers, or on campus, where they will perform neuropsychological evaluations under supervision and attend clinical rounds and team meetings.

PSYC 328. Neuropsychopharmacology

2 credits. Lecture.

This course will review the anatomy and physiology of the CNS and then discuss the effects of pharmacological agents on it. Topics include general anaesthetics, hypnotics and sedatives, anticonvulsants, alcohol, muscle relaxants, tranquilizers, hallucinogens, and narcotics. Student presentations will treat topics relating the CNS and behavioral pharmacology.

†PSYC 329. Clerkship in Clinical Methodology

1-6 credits. Practicum.

Supervised clinical training in a community facility.

†PSYC 330. Practicum in Adult Psychotherapy

1-3 credits. Practicum. Open to students in Clinical Psychology.

Supervised psychotherapy training with adults including diagnostic procedures.

†PSYC 331. Practicum in Child Psychotherapy

1-3 credits. Practicum. Open to students in Clinical Psychology.

Supervised psychotherapy training with children and parents including diagnostic procedures.

PSYC 332. Developmental Ethology

3 credits. Lecture.

Introduction to conceptual, theoretical, and empirical issues based upon an ethological and

biopsychological approach to development across species. Topics include nature-nurture, behavioral embryology, early experience, continuity-discontinuity, and performanceism versus epigenesis.

PSYC 333. Cognitive Development

3 credits. Lecture.

Current theory and research on children's conceptual development.

PSYC 334. Proseminar in Industrial/Organizational Psychology I

3 credits. Seminar. Open to doctoral students in Industrial/Organizational psychology, others with permission.

Introduction to research and practice in the field of I/O psychology; personnel psychology, organizational psychology, human factors/ergonomics, and judgment and decision making.

PSYC 335. Special Topics in Developmental Psychology

3 credits. Seminar.

Selected topics in developmental psychology are studied with particular attention to current research and theoretical trends.

PSYC 336. Advanced Child Psychology

3 credits. Lecture.

This course undertakes, at an advanced level, a developmental treatment of child behavior on the basis of experimental findings and psychological theory.

PSYC 337. Advanced Social Psychology

3 credits. Lecture. Open to Social Psychology graduate students, others with permission.

An overview of the field of social psychology organized around the major underlying theoretical orientations. Several positions are critically examined along with representative empirical work.

PSYC 338. Development of Language

3 credits. Lecture. Open to Psychology graduate students, others with permission.

Experimental and descriptive study of the child's language processes, with emphasis on acquisition, structure, meaning, thought, and the influence of verbal processes on nonverbal behavior.

PSYC 339. Infancy and the Effects of Early Experience

3 credits. Lecture.

Data and theory concerning the effects of early experience in infancy on behavioral and physiological development. Cross-species comparisons are emphasized.

PSYC 340. Motivation

3 credits. Lecture. Also offered as COMM 340.

Theories of motivation considered in relation to their supporting data.

PSYC 341. Reading Acquisition and Reading Disorders

3 credits. Lecture.

Examination of theories and research: Aspects of literacy and stages of acquisition; cognitive prerequisites for reading and writing; individual differences in learning and the problem of dyslexia.

PSYC 342. Experimental Social Psychology

3 credits. Seminar.

A critical overview of the various laboratory methods and techniques in social psychology.

PSYC 343. Intergroup Relations

3 credits. Lecture.

Marxism, social identity theory, realistic group conflict theory, elite theory, equity theory, relative deprivation, authoritarian personality, social dominance theory and evolutionary theory as it pertains to intergroup and gender relations.

PSYC 344. Psychology of Women and Gender

3 credits. Lecture.

A survey of research and theory on the interpretation of sex differences; gender, status, and power, and women's life span development.

PSYC 345. Applied Social Psychology

3 credits. Lecture.

Different areas of applied social psychology will be examined in different semesters. Possible foci include Psychosocial Aspects of the AIDS Epidemic, and Organizational Change.

PSYC 346. Current Topics in Social Psychology

3 credits. Seminar.

Topics vary by semester. Recent topics have included Social Cognition, Small Groups, Health Psychology, Emotion, Problems in Personality, and Ecological Social Psychology.

PSYC 347. Proseminar in Industrial/Organizational Psychology II

3 credits. Seminar. Open to doctoral students in Industrial/Organizational psychology, others with permission.

Introduction to research and practice in the field of I/O psychology; personnel psychology, organizational psychology, human factors/ergonomics, and judgment and decision making.

PSYC 348. Field Research Methods

3 credits. Seminar. Prerequisite: PSYC 342.

An examination of various methods of field research, focusing on design, analysis, theory, and practical issues.

PSYC 349. Causal Modeling in Social Psychology

3 credits. Lecture. Prerequisite: STAT 379.

The analysis of data to test causal theories, the use of factor analysis to test models of measurement, and the comparison of alternative models is discussed.

PSYC 350. Cerebral Mechanisms in Perception

3 credits. Lecture.

Knowledge and principles of neural organization related to attention, sensory processing, perception and cognition.

PSYC 351. Neural Foundations of Learning and Memory

3 credits. Lecture.

Examination of the processes involved in habituation, conditioning, learning, and memory through a study of the neural elements and systems involved in their production and maintenance.

PSYC 352. Biopsychology of Motivation and Emotion

3 credits. Lecture.

Neural basis of motivated and emotional behavior with special emphasis on the limbic system.

PSYC 353. Introduction to Nonlinear Dynamics

3 credits. Lecture.

Basic concepts and methods of nonlinear dynamics systems theory applied to behavioral time-series data.

PSYC 354. Seminar in Animal Behavior

1-6 credits. Seminar.

PSYC 355. Physiological Psychology

3 credits. Lecture.

A survey of research findings on the physiological and anatomical process underlying sensory and motor functions, emotion and motivation, learning and thinking.

PSYC 356. Behavioral Neuroscience Research Seminar

2 credits. Seminar.

Seminar on current research, with intra- and extra-mural colloquium speakers.

PSYC 357 Physiological Psychology Laboratory

3 credits. Laboratory.

Techniques used in the study of physiological psychology, including ablation, electrical and chemical stimulation, and electrophysiological recording of the nervous system.

PSYC 358. Selected Topics in Physiological Psychology

1-6 credits. Lecture.

Special problems or areas of research are studied with particular attention to recent developments in the field.

PSYC 359. The Neuropsychology of Language

3 credits. Lecture.

An examination of language and speech in relation to the biological systems that serve communicative processes in man.

PSYC 360. Advanced Nonlinear Dynamics for the Behavioral Sciences

3 credits. Lecture. Prerequisite: PSYC 353.

Advanced concepts and methods of nonlinear dynamics systems theory applied to behavioral time-series data.

PSYC 361. Animal Behavior

3 credits. Lecture.

A survey of the scientific study of animal behavior, with an emphasis on evolutionary and developmental mechanisms underlying non-human behavior patterns.

PSYC 362. Laboratory in Animal Behavior

3 credits. Laboratory.

PSYC 363. Learning and Related Behavior Processes

3 credits. Lecture.

Analysis of learning theories and the data of classical and instrumental conditioning.

PSYC 364. Dynamics of Language

3 credits. Lecture.

Application of dynamical systems theory to language modeling.

PSYC 365. Perceptual Information Processing

3 credits. Lecture.

Perceptual behavior interpreted as the processing of sensory information.

PSYC 366. Psychological Theory and Measurement

3 credits. Lecture.

An examination of the nature of psychological concepts and theory. What is measured and what does it mean.

PSYC 367. Cognition

3 credits. Lecture.

An introduction to theories of human cognition.

PSYC 368. Psychology of Language

3 credits. Seminar.

Psychological aspects of linguistic structure, with particular attention to phonology.

PSYC 369. Sensation and Perception I

3 credits. Lecture.

Relations among physical, physiological, and psychological variables in selected sensory and perceptual processes. Attention is given to problems of measurement, empirical findings, and theoretical interpretations.

PSYC 370. Sensation and Perception II

3 credits. Lecture. Prerequisite: PSYC 369.

A continuation of Psychology 369.

PSYC 371. Interpersonal Relations

3 credits. Lecture. Prerequisite: PSYC 342.

The study of affect, cognition, and behavior in two-person relationships.

PSYC 372. Attitude Organization and Change

3 credits. Lecture. Open to Psychology graduate students, others with permission.

An overview of the field of attitude theory and research focusing on problems of attitude formation, attitude organization, and attitude change.

PSYC 373. Selected Topics in Visual Perception

3 credits. Lecture.

The data and theories in pattern perception, motion perception, color vision, electrophysiology, and the effects of early visual experience.

PSYC 374. Control and Coordination of Action

3 credits. Lecture.

Covers the ecological approach; movement as the product of a representational/computational system; intentionality; physical principles of self-organization and cooperativity; task dynamics. Problems in the physiology of activity, prosthetics and robotics are addressed.

PSYC 375. Introduction to Cognitive Systems

3 credits. Lecture.

Survey of the fundamental concepts of machine theory, cybernetics, structural stability theory, and natural systems theory with respect to their role in modeling cognitive systems.

PSYC 376. Special Topics in Cognitive Systems Theory

3 credits. Lecture.

Special topics in cognitive systems theory are reviewed with particular emphasis on techniques for the intrinsic measurement of systems behavior including information processing capacities and goal achievements. Students are required to apply the techniques discussed to an ongoing research topic of their own choosing.

PSYC 377. Current Topics in Industrial/Organizational Psychology

3 credits. Seminar.

Selected topics in industrial/organizational psychology are studied with particular attention to current research and theoretical trends. Topics vary by semester.

PSYC 378. Work Motivation

3 credits. Seminar. Prerequisite: PSYC 382.

Major theoretical approaches to work motivation, and their implications for the design of work settings and the treatment of workers.

PSYC 379. Leadership in the Workplace

3 credits. Seminar. Prerequisite: PSYC 382.

Theoretical and research issues associated with leadership in the workplace. Classical and current theories of leadership, research in leadership development, and evaluation of various leadership models.

PSYC 380. Person Perception

3 credits. Seminar.

An examination of the social psychological literature dealing with person perception and cognition, organized around the historical development and current status of attribution theory and research.

PSYC 381. Consumer Psychology

3 credits. Lecture. Prerequisite: PSYC 337 or PSYC 382

Recent developments in consumer psychology including research on segmentation, positioning, packaging and advertising, with an emphasis on qualitative research methods and techniques.

PSYC 382. Organizational Psychology

3 credits. Seminar. Open to doctoral students in Industrial/Organizational Psychology, others with permission.

Major research lines in organizational behavior (work motivation, leadership, work attitudes, job design, turnover, absenteeism), with attention to emerging areas (e.g., women in management). Emphasis on research methods and analytic strategies.

PSYC 383. Sentence and Discourse Processing

3 credits. Lecture.

How psychological theories of perception and learning provide insight into language processing at the level of sentence structure and discourse structure.

PSYC 384. Human Behavior Genetics

3 credits. Lecture.

Concepts and methods in human behavioral genetic analyses with emphasis on normal variations, psychopathologies, and ethical issues.

PSYC 385. Neurobiology of Aging: Changes in Cognitive Processes

3 credits. Lecture.

Neural basis of age-related changes in learning and memory. Both the normal aging process and age-related pathologies examined. Encompasses both animal models and human data.

PSYC 386. Social Cognition

3 credits. Lecture.

Study of causal attribution, stereotyping, evaluating, judgment and decision-making, persuasion, expectancies, memory, attention as they pertain to social life.

PSYC 387. Personnel Psychology

3 credits. Lecture. Open to doctoral students in Industrial/Organizational Psychology, others with permission.

Techniques of personnel psychology: recruitment, selection, placement, evaluation, training, development, and related areas.

PSYC 388. Human Factors

3 credits. Seminar. Open to doctoral students in Industrial/Organizational Psychology, others with permission.

Theories of design and analysis of man-machine systems in an industrial/organizational context. Special emphasis on the human as an information-processing sub-system operating with other people and machines in complex systems. Application of psychological principles to design of industrial workplaces, military systems, and consumer products; and to the design of simulation systems for training.

PSYC 389. Social Organizational Psychology

3 credits. Lecture.

Organizational consulting using social psychological theories which employ the individual, group, and organization as units of analysis in organizational change.

PSYC 390. Human Judgment and Decision Process

3 credits. Lecture. Open to doctoral students in Industrial/Organizational Psychology, others with permission.

Examination of social judgment methodology, judgmental heuristics and biases, process tracing, bootstrapping, behavioral decision theory, and multi-attribute utility measurement.

PSYC 391. History of Psychology

3 credits. Lecture. Open to Psychology graduate students, others with permission.

Intellectual antecedents to contemporary clinical, developmental, experimental, and social psychology.

PSYC 392. Measurement and Scaling

3 credits. Lecture. Prerequisite: STAT 379.

History and theories of psychological measurement and scaling. Application of unidimensional scaling models (e.g., Thurstone, Guttman, and Likert scaling, hierarchical cluster analysis, multidimensional scaling, and factor analysis) to psychological research problems.

PSYC 393. Occupational Health and Safety

3 credits. Lecture. Prerequisite: PSYC 388.

Research methods, theories and findings related to the impact of work duties and environmental conditions on occupational safety and health.

PSYC 394. Selection and Placement

3 credits. Seminar. Prerequisite: PSYC 387.

Theory and research on employee selection and placement. Selection models, employee testing, statistical methods in selection and placement, equal opportunity and EEOC guidelines and related ethical issues.

PSYC 395. Performance Appraisal

3 credits. Seminar. Prerequisite: PSYC 387.

Methods and issues in performance rating in organizations. Classic studies and current models of performance evaluation are used to explore factors which enhance or hinder the accurate gathering, evaluation, and communication of employee performance information.

PSYC 396. Design and Analysis of Human-Machine Systems

3 credits. Seminar. Prerequisite: PSYC 388

The basis, in theories of perception and learning, for design of complex human-machine systems.

PSYC 397. Simulation and Training

3 credits. Seminar. Prerequisite: PSYC 388.

The theoretical basis for techniques of effective training of human operators in complex human-machine systems.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

PSYC 400. Work Systems and Performance

3 credits. Seminar. Prerequisite: PSYC 388.

Research methods, theories and findings related to the impact of work duties, schedules, psycho-social variables and circadian psychophysiology on human performance.

PSYC 401. Occupational Health Psychology

3 credits. Seminar. Prerequisite: STAT 379 or NURS 358 or PUBH 434.

Introduction to research in occupational health and the field of occupational health psychology. Topics include work stress, worker participation in hazard management, epidemiology of occupational exposures, workplace incivility, and design of safe work environments.

PSYC 402. Clinical Health Psychology

3 credits. Seminar.

Examines the interaction of biological, psychological, and social factors in health and the application of psychological interventions for physical illness, psychological problems secondary to physical illness, and health promotion.

PSYC 403. Health Psychology Research Methods

3 credits. Lecture. Prerequisites: STAT 242 and STAT 379, or equivalent statistics course preparation as determined by the instructor.

Research designs, methods, and data analysis strategies used in health promotion and disease prevention research (e.g., case control studies, randomized clinical trials).

PSYC 405. Teaching Experimental Psychology

3 credits. Practicum.

The lecture method applied to teaching undergraduate courses in experimental psychology (introductory, cognition, learning and memory, sensation and perception) and giving conference presentations. Attention is given to presentation style and content.

PSYC 495. Internship in Clinical Psychology

0 credits. Practicum.

Students assume professional psychological assessment, psychotherapeutic, and consultation responsibilities under the direct supervision of licensed clinical psychologists. *consent required.*

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

PUBLIC HEALTH

Field of Study Director: Associate Professor David Gregorio

Professors: Affleck, Babor, Bruder, Ferris, Handwerker, Leiws, Reisine, Santerre, and Tennen

Associate Professors: Aseltine, Beazoglou, Blechner, Cherniak, Dicks, Erickson, Fifield, Fortinsky, Gregorio, Lazzarini, Morse, Pendrys, Perez-Escamilla, Petry, Schensul, Stevens, Storey, and Walsh

Assistant Professors: Burleson, Eberle, Guha, Huntington, Kerins, Kramer, Leger, Meyer, Segal, Thibodeau, Trapé-Cardoso, Ungemack, Vernon, Warren, Wetstone, and Whitbread

The Public Health program, based in the Department of Community Medicine and Health Care, leads to the Master of Public Health degree. The program faculty represents the population-based health sciences. The core curriculum consists of the basic public health disciplines: social and behavioral sciences, epidemiology, biostatistics, health administration, environmental health and health law. Public health research methods and the Practicum, a service learning activity, are also required of all students. Advanced course offerings permit students to concentrate their study in health administration, law and policy, epidemiology, occupational and environmental health, and applied public health practice. The program is tailored to the needs of working professionals who wish to pursue part-time evening studies. Students must earn a minimum of 48 credits, both under Plan A (thesis project) and Plan B (master's essay). Advanced standing based on the student's academic background and approved transfer credit may be applicable. The program is accredited by the National Council on Education for Public Health.

Dual Degree Programs. The Graduate Program in Public Health sponsors dual degree programs with the Schools of Medicine (M.P.H./M.D.), Dental Medicine (M.P.H./D.M.D.), Social Work (M.P.H./M.S.W.), Nursing (M.P.H./M.S.), Law (M.P.H./J.D.). Information is available from: David Gregorio, Ph.D., M.S., University of Connecticut Health Center, Farmington, Connecticut 06030-6325, <mph@nso.uchc.edu>.

COURSES OF STUDY

PUBH 400. Introduction to Public Health
3 credits. Lecture.

Provides an introduction to the discipline, its scientific foundations, and its relationship to other fields including clinical medicine. The basic concepts and skills necessary for a practitioner of public health are explained. Students gain a better appreciation of epidemiology to guide public health interventions and the development of public health policy.

PUBH 401. Principles of Epidemiology
3 credits. Lecture.

Introduction to epidemiological concepts and methods as applied to public health research, community diagnosis, prevention, health planning and

evaluation studies. Intensive use of exercises in descriptive and analytic epidemiology based on current investigations.

PUBH 402. Introduction to Biostatistics
3 credits. Lecture.

An introductory presentation of the fundamentals of biostatistical theory and application, aimed at developing competence in the use of statistics, probability distributions, hypothesis testing, inference and estimation as applied to the most commonly used techniques in parametric and nonparametric statistical methods. Critical appraisal of research reported in journal articles serves as an application of learned techniques.

PUBH 403. Health Administration
3 credits. Lecture.

Examination of past, present, and proposed approaches to the organization and management of health care services. Emphasis is on the role and functioning of the manager and the evolution of health care policy and trends as they affect managerial roles.

PUBH 404. Environmental Health
3 credits. Lecture.

Explores the policy, political and public health implications of such issues as air pollution, drinking water, exposure to hazardous chemicals, indoor air pollution, food protection, lead poisoning, housing, international issues, etc. Provides the student with some basic technical information and familiarity with terms for a better understanding of policy and political decisions and health effects of environmental exposures.

PUBH 405. Social and Behavioral Foundations of Public Health
3 credits. Lecture.

An introductory survey emphasizing basic social science concepts in the analysis of public health including orientations toward health, disease and health care, the origins and distribution of health care resources, and the role of social movements and research in improving public health.

PUBH 406. Law and Public Health
3 credits. Lecture.

An introduction to the American legal system as it relates to health care and public health. Sessions present important applications of law to health including the powers of state governments, public health at the federal level, hospital, physician and HMO liability, emergency care and medical research, mental health law, reproductive health and the right to privacy, the right to refuse treatment and end of life issues, privacy and confidentiality in health care, infectious disease law and disability discrimination, and public health policy and advocacy.

†PUBH 407. Practicum in Public Health
1-3 credits. Practicum.

Under faculty guidance, students undertake an organized set of activities that responds to an identified need of a public health agency or health-related organization. The activities may involve the

policy development, planning, implementation, administration or evaluation of public health services, or a combination of such activities. Students should be appropriately advanced before initiating the practicum.

PUBH 408. Introduction to Epidemiology & Biostatistics I

3 credits. Lecture. Open to students admitted to MPH program, others with consent of instructor.

This is the first of a two-course sequence introducing students to concepts and methods of epidemiology, biostatistics and public health research. Topics include nature of variability, common probability distributions, causal reasoning, control of bias and confounding, descriptive and analytic design of observational and experimental studies, principles of disease screening and clinical efficacy.

PUBH 409. Introduction to Epidemiology & Biostatistics II

3 credits. Lecture. Open to students admitted to MPH program, others with consent of instructor. Completion of PUBH 408 required.

This continuation of a two-course sequence on basic epidemiology, biostatistics and public health research addresses hypothesis generation, data collection methods, point and confidence interval estimation, inference testing, correlation/regression analysis, multivariable interaction, effect modification, power and meta-analysis. Evaluation of study designs, research methods and statistical procedures in clinical and public health literature will be stressed.

PUBH 410. Fundamentals of Strategic Planning

3 credits. Lecture.

Fundamentals of strategic planning for public and non-profit organizations emphasizing the development of mission and vision statements, stakeholder analysis, scanning of internal and external environments; formulation and implementation of goals and objectives, definition of strategic issues, program planning, and evaluation. Introduction to related concepts in long range planning and group decision making. A group strategic planning project caps the course.

PUBH 412. Health Regulation

3 credits. Lecture.

Focus is on the relationship between law and health care. Regulation of practice, practitioners and facilities. Legal aspects of alternative delivery systems including managed care. Legal and ethical dimensions of the health care provider-client relationship also are addressed.

PUBH 414. Health Economics

3 credits. Lecture.

An introduction to economic theory and various applications of economics in the analysis of the U.S. health care system.

PUBH 415. Accounting and Financial Analysis for Health Care Managers

3 credits. Lecture.

Course introduces the basic accounting and financial analysis methods necessary for the effective analysis, interpretation, and application of administrative information in health care institutions.

PUBH 416. Principles of Quality Improvement

3 credits. Lecture.

An introduction to the concepts, methods and uses of quality assurance in health care. Specific emphasis on quality assurance as it applies to continuous improvement, managed care, practice guidelines, preventive health, outcome studies and ethical issues.

PUBH 417. Health Care Management Information Systems

3 credits. Lecture.

Overview of theoretical foundation, structure and operation of MIS in health services. MIS based indicators such as DRG's, severity of illness measures, relative value scales and workload measures. Uses of MIS data including utilization review, quality assurance and health services research.

PUBH 419. Public Health Agencies

3 credits. Lecture.

Takes organization and management theory into practice. The focus is on governmental and non-profit agency management and administration. Emphasis is on developing and defending budgets, personnel management, working within the political context, with the community and with multiple agencies.

PUBH 430. Public Health Informatics

3 credits. Lecture.

An overview of the basic information skills required to clarify a health-related information need and identify and use appropriate information resources to select materials that answer that need. The course will include discussions of health-related networks and information resources, demonstrations of their appropriate use, class exercises and a semester project. Enrollment limited to 12.

PUBH 431. Public Health Research Methods

3 credits. Lecture.

Introduction to conceptualization, methods, and analysis in public health research including: formulation of research questions and hypotheses, development of research and analytic models, use of qualitative (interviewing and observation) and quantitative (secondary and survey data) data collection methods, and qualitative and quantitative data analysis leading to the formulation of research projects.

PUBH 432. Health Services Research

3 credits. Lecture.

An advanced seminar designed to give students an opportunity to present and discuss their work in this area. Students need to have a completed, or nearly completed, research project before the start of the class in early July. Students interested in the seminar

should discuss their proposed project with the instructor as early as possible [Hal Mark, (860) 679-3276].

PUBH 433. Health Program Evaluation

3 credits. Lecture.

Methods of evaluating the implementation and impact of health programs. Topics include: specification of program objectives and components, experimental and quasi-experimental evaluation designs, collection and analysis of program data, and the dissemination and application of evaluation results.

PUBH 434. Topics in Intermediate Biostatistics

3 credits. Lecture.

An introduction to the interplay of experimental design and data analysis. Begins with a review of statistical estimation and testing. Topics include analysis of variance, linear regression, and power analysis. Applications are emphasized through the demonstration and use of statistical software.

PUBH 435. Statistical Methods in Epidemiology

3 credits. Lecture.

An introduction to the statistical methods most commonly used in analyzing data from epidemiological studies. The course begins with a review of basic epidemiology and statistics. Subsequently, the focus is on contingency table methods and logistic regression with emphasis on dose-response relationships, interaction and confounding. Computer software for data analysis is demonstrated.

PUBH 437. Epidemiological Research Appraisal

3 credits. Lecture.

A research seminar on uses, strengths and limitations of epidemiological methodology. Major studies in infectious disease, chronic disease and health care epidemiology are critically analyzed. The goal is to promote sound judgment of the scientific validity of epidemiological evidence.

PUBH 438. Investigation of Disease Outbreaks

3 credits. Lecture.

Provides students with the basic skills and perspectives necessary to investigate acute disease outbreaks. The emphasis is on the use of epidemiology to investigate outbreaks of infectious diseases, guide public health interventions, and develop public health policy. Students will participate in an outbreak investigation conducted by the state health department.

PUBH 450. Public Health Practice

3 credits. Lecture.

Discussion of initiatives to define the practice of public health, including the Institute of Medicine (IOM) Report on the Future of Public Health and the Public Health Service's "essential functions" of public health. Includes review of expenditures studies and

estimates of actual public health infrastructure resource needs, as well as discussion of appropriate future roles for public health.

PUBH 451. Maternal and Child Health Services

3 credits. Lecture.

Maternal and child health services are examined, highlighting the past successes and future challenges to the health care delivery system. Current topics which include nutritional influences, reproductive technology, injury control, domestic violence, child abuse/neglect, emerging infections, perinatal risk behaviors and mental health provide case studies for evaluation of maternal and child health policy development.

PUBH 452. Injury and Violence Prevention

3 credits. Lecture.

Injury and violence are major preventable public health problems with predictable patterns. The purpose of this course is to familiarize the student with the epidemiological literature of intentional and unintentional injuries. The course is designed to focus on the knowledge and skills required to design, implement, and evaluate scientifically sound community injury prevention and control programs.

PUBH 453. Chronic Disease Control

3 credits. Lecture.

Chronic diseases are examined from clinical, epidemiological and program planning perspectives. Diseases examined include: selected neoplastic diseases, cardiovascular diseases, chronic obstructive pulmonary diseases, cerebrovascular disease and diabetes. The role of public health agencies, for profit and non-profit entities in research, education, and risk reduction activities also are covered.

PUBH 454. Infectious Disease Control

3 credits. Lecture.

Overview of microbiology. Agent-host environment relationship in causation and control of infectious diseases. Epidemiological patterns of major infectious diseases, with emphasis on sexually transmitted diseases, respiratory conditions and nosocomial infections.

PUBH 455. Health Education

3 credits. Lecture.

Methods for planning, presenting, and evaluating health education programs in communities, schools and worksites. Includes use of the Precede Model, setting of goals and objectives, behavior modification theory, group processes, teaching techniques and activities for developing and presenting workshops or courses.

PUBH 460. History of Public Health

3 credits. Lecture.

Development and fundamental historical themes of public health, from ancient civilizations to the present, with emphasis on public health history of

the United States and its relevance to current public health issues. The development of local, state and national public health agencies in the U.S. is highlighted. The history of specific disease entities (e.g., TB) are discussed to illustrate major themes.

PUBH 461. Healthcare Law and Ethics
3 credits. Lecture.

An analysis and evaluation of the legal rights of patients and providers in the health care process. Specific topics may include: nature of rights, consent to treatment, contraception, abortion, sterilization, involuntary commitment, and allocation of limited medical resources.

PUBH 462. International Health
3 credits. Lecture.

Examines primary health care as a model suited to the health needs of developing nations. Provides a broader understanding of the genesis of illness in developing countries and analyzes the kind of care required to have an impact on these illnesses.

PUBH 463. Comparative Health Systems
3 credits. Lecture.

An analysis of national health systems in relation to their socio-economic, political, cultural, and epidemiologic contexts. The examination of alternative approaches to organizing scarce health care resources serves as an integrating theme.

PUBH 465. Occupational Health
3 credits. Lecture.

Recognition and prevention of occupational disease and injuries, including social and political aspects and policy issues such as OSHA and Workers' Compensation laws. Overview of some of the major occupational disease issues. Approaches of industrial hygiene, ergonomics, and occupational epidemiology to understanding and preventing occupational health hazards.

PUBH 466. Industrial Hygiene
3 credits. Lecture.

The skills required to recognize, evaluate and control occupational hazards. Review of hazards associated with a variety of work processes and jobs. Students learn how to take an occupational history, to research the hazards associated with an industry, and to conduct a plant walk-through. Control methods, such as ventilation and personal protective equipment, are evaluated.

PUBH 467. Occupational and Environmental Disease
3 credits. Lecture.

Clinical introduction to occupational disease, including diagnostic strategies and patient management techniques. Review of the diseases of primary target organs, including the range of syndromes from that organ, appropriate diagnostic techniques, and treatment options.

PUBH 468. Occupational and Environmental Epidemiology
3 credits. Lecture.

Topics include the history of occupational epidemiology, causal models, occupational exposure classification systems, environmental epidemiology, cohort mortality studies, cross-sectional surveys, case-control studies, ecologic studies, and statistical and methodological issues in research design and their solutions.

PUBH 471. AIDS Seminar
3 credits. Lecture.

Examines the worldwide epidemic of HIV disease. Includes sections on epidemiology, natural history of HIV disease, retrovirus biology, comparisons with other epidemics past and present, treatment and testing, legal and public policy issues, education, behavior modification and other control efforts, and the public health response to the epidemic.

PUBH 472. Disability and Public Health
3 credits. Lecture.

Examines both developmental and acquired disabilities from a public health perspective. Public health issues of cognitive and physical disability, including: prevention, diagnostic and definitional considerations, epidemiological and statistical controversies, legal and ethical aspects, treatment considerations and research concerns.

PUBH 473. Women, Public Health and Reproduction
3 credits. Lecture.

The history of reproduction and public health issues in the U.S.; underlying ethical issues in modern reproductive health care and key components of opposing views; major financial, social and emotional considerations in policy making and the increasing role that reproductive health plays in public health as a whole.

PUBH 474. Urban Health
3 credits. Lecture.

Comprehensive overview of historical forces and social factors related to the health status of African-Americans, Hispanics, and other minority groups in American society. Although much of the course content examines current minority health issues, the use of theory and research to identify underlying causes and to suggest practical strategies/interventions for addressing these problems is a major focus.

PUBH 475. Gerontological Health
3 credits. Lecture.

Biological and social aspects of aging as they relate to the physical and mental health of older populations; the organization of geriatric health services; and the legal, ethical, and public policy issues posed by increases in life expectancy.

PUBH 476. Community Mental Health
3 credits. Lecture.

Overview of mental illness, substance abuse and related conditions, including epidemiological patterns and interventions. Chronic mental patients, the

homeless mentally ill and other special groups. The community mental health movement and role of government. Regulations and mental health law.

PUBH 495. Independent Study in Public Health

1-9 credits. Independent Study.

An individual course for those wishing to pursue special topics in the public health sciences under faculty supervision.

PUBH 497. Graduate Seminar in Public Health

1-6 credits. Seminar.

†GRAD 395. Master's Thesis Research
1 - 9 credits.

†GRAD 396. Full-Time Master's Research
3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)
3 credits.

GRAD 398. Special Readings (Master's)
Non-credit.

GRAD 399. Thesis Preparation
Non-credit.

PUBLIC POLICY

Department Head: Associate Professor Kenneth Dautrich

The Department of Public Policy offers two master's degree programs: Master of Public Administration and Master of Arts in the field of Survey Research.

Master of Public Administration

Program Director: Professor William Simonsen

Professor: Lewis

Associate Professor: Robbins

Assistant Professors: Bifulco, Donahue, and Hettinger

The Master of Public Administration (M.P.A.) program provides students with a dynamic and integrated approach to the study of public policy and management. The M.P.A. Program is committed to preparing students for leadership positions in public policy and management through a personalized education that is both theoretically rich and skills-based. The M.P.A. program is accredited by the National Association of Schools of Public Administration and Public Affairs (NASPAA). The M.P.A. website can be accessed at this address: <<http://www.mpa.uconn.edu>>.

Admission. Admission to the M.P.A. program is selective. Considerations for admission include: A bachelor's degree from an accredited college or University, a strong academic record as indicated by grade point average, acceptable verbal, quantitative and analytical scores from the Graduate Record Examinations (GRE). Acceptable TOEFL exam scores for international students are required. A personal letter, current resume and three letters of recommendations are also required.

The Admissions Committee begins the review of applications on **February 15th** for Fall admission and on **November 15th** for Spring admission.

All admissions materials can be found at this website: <http://www.mpa.uconn.edu>.

Plan of Study. The student's plan of study is individually developed in consultation with a major advisor to meet his or her goals and interests.

A focused approach is the program's framework for teaching public management, analytical techniques, and public policy. The curriculum is organized into a set of core courses, a field internship, and area of concentration, and a capstone project.

Problem-oriented courses prepare students for decision-making in public management. The program develops the skills managers need to diagnose problems, collect and analyze information, plan, choose among policy alternatives, communicate findings, implement programs, and manage change.



Master of Arts in Survey Research

Program Director: Associate Professor Kenneth Dautrich

Associate Professor: Best

Assistant Professor: McDermott

The Master of Survey Research (MSR) Program at the University of Connecticut offers a Master of Arts (MA) degree in the field of study in survey research. The program provides students with a dynamic and

integrated approach to the field of survey methodology. The quality of our academic program is the product of an outstanding faculty and the resources of a research university. The use of practical experiences as a learning tool, combined with theory, analysis, and case studies in the classroom, make our program job-relevant and intellectually challenging.

The program is designed to serve students with a diverse range of interests and backgrounds that places them in a wide variety of occupations. Our graduates work in the market research, public policy, political and social science areas. Our program views survey research as a tool that can be utilized in multiple fields.

A plan of study consists of 24 graduate credits that is designed to be completed in one year of study. The program has an interdisciplinary focus and encourages inclusion of relevant university courses in such disciplines as public administration, political science, business administration, marketing, sociology and psychology.

COURSES OF STUDY

Public Policy (PP)

PP 300. Independent Study

1-6 credits. Independent Study.

†PP 301. Special Readings in Public Policy

1-6 credits. Special Readings.

PP 315. Capstone in Public Administration I

1 credit. Seminar.

Development of the research question, bibliography, and methodology for the capstone project.

PP 316. Capstone in Public Administration II

3 credits. Seminar.

Research and writing of the capstone project.

PP 317. Capital Financing and Budgeting

3 credits. Seminar.

Examination of the municipal bond market, capital budgeting techniques, and related public policy issues.

PP 318. Financial Management for Public and Nonprofit Organizations

3 credits. Seminar.

Management of financial resources in public service organizations. Topics include variance analysis, public sector and nonprofit accounting, financial statement analysis, and forecasting.

PP 319. Program Development and Evaluation

3 credits. Seminar.

Techniques for evaluating and improving organizational performance and the ability to deal with the challenges posed by changing environments. Topics include strategic planning, program development, program implementation, evaluating effectiveness, and performance measurement and improvement.

PP 320. Ethics in Policy and Management

3 credits. Seminar.

Ethics in public policy and management, including contemporary ethical dilemmas and decision-making tools and techniques.

PP 321. State and Local Fiscal Problems

3 credits. Seminar.

Analytical tools and concepts to evaluate policies related to government revenues, the delivery of public services, and intergovernmental relations.

PP 322. Evaluating Public Programs

3 credits. Seminar.

The tools and concepts important to evaluation research.

PP 323. Leadership and Management of Nonprofit Organizations

3 credits. Seminar.

The theory and practice of effective leadership and management of nonprofit organizations.

PP 324. Resource Development for Nonprofit Organizations

3 credits. Seminar.

Important concepts in the fundraising process unique to local, national and international nonprofit organizations.

PP 325. Labor Relations and Public Financial Management

3 credits. Seminar.

Overview of the interrelation of two key fields of public administration: finance and labor relations.

PP 341. Public Opinion and Democratic Process

3 credits. Seminar.

American public opinion in the context of democratic theory.

PP 358. Administrative Law

3 credits. Seminar.

The basis legal framework of administrative organization and the rules governing administrative powers and their exercise; also the legal procedures for the enforcement of bureaucratic responsibility in the democratic state.

PP 361. Theory of Public Organization

3 credits. Seminar.

An examination of organization theory and research findings; their relation to public organizations.

PP 362. Organizations and Management

3 credits. Seminar.

The application of organization theory and research findings; their relation to public organizations.

PP 363. Administrative Functions of Local Government

3 credits. Seminar.

An examination of the characteristic managerial problems of the several functions of local government such as police, fire, traffic, public works, parks, health, recreation. The course is designed for individuals planning to work with citizen agencies, in agencies for governmental management, or in journalism.

PP 364. Governmental Financial Administration

3 credits. Seminar.

Techniques, practice, and organization of the financial functions in governmental administration, including revenues administration, fund operation, debt operations, records administration, purchasing, audits, and financial reports.

PP 365. Human Resource Management

3 credits. Seminar.

The structures, processes, and principles of human resource management and labor-management relations in the public service, and examination of contemporary human resource policies and challenges.

PP 367. Problems in Intergovernmental Administration

3 credits. Seminar.

Examination of intergovernmental relations as an administrative system, with emphasis on current problems.

†PP 369. Supervised Internship

3-9 credits. Practicum. Open only to students in the Master of Public Administration program.

Experience in a public organization under competent supervision.

PP 370. Applied Methods I

3 credits. Seminar.

Research design for organizational management and policy analysis and evaluation. How to communicate, execute and evaluate research. Skills in selecting appropriate analytic procedures and properly interpreting and reporting results.

†PP 372. Introduction to Public Administration Skills

1 credit. Seminar.

Provides basic skills and competencies important to completing the MPA program and for future professionals in the public service.

PP 373. Budgeting in Public Service Organizations

3 credits. Seminar.

Processes and techniques of public budgeting; the principles and roles of budgets in public service organizations; analytic tools, concepts, and principles of budget analysis and decision making.

PP 375. Analytic Tools for Public Problems

3 credits. Seminar.

The analytic tools necessary to evaluate the activities of government.

PP 376. Applied Research Methods II

3 credits. Seminar. Open only to students in the Master of Public Administration program.

Statistical reasoning, tools, and techniques for effective public management.

PP 379. Principles and Methods of Survey Research

3 credits. Seminar.

Exploration of the theory and practice of survey research, including sampling, questionnaire design, analysis and reporting results.

PP 380. The Practice of Survey Research

6 credits. Seminar.

The practice and use of survey research in the United States and throughout the world. The structure, culture and professional norms of the survey community. The role of public opinion polling in government and public policy-making.

PP 381. Quantitative Methods for Survey Research

3 credits. Seminar.

Introduction to statistics for survey research analysis.

PP 382. Advanced Quantitative Methods for Survey Research

3 credits. Seminar.

Advanced statistics for survey research analysis.

PP 383. Principles and Methods of Survey Research II

3 credits. Seminar.

Advanced theory and statistics for survey research.

PP 384. Focus Groups

3 credits. Seminar.

Introduction to focus group research.

PP 391. Policy Analysis

3 credits. Seminar.

Approaches and techniques used to evaluate public programs and public policy.

PP 394. Social Policy

3 credits. Seminar.

Examination of the concepts and principles of public policy analysis, with applications to important social issues.

PP 397. Special Topics in Public Policy

1-6 credits. Lecture.

†GRAD 395. Master's Thesis Research

1-9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

SOCIAL WORK

Dean: Professor Kay W. Davidson

Associate Dean for Academic Affairs: Assistant Professor Catherine M. Havens

Associate Dean for Administration: Associate Professor David Cournoyer

Professors: Bloom, Davidson, Fisher, Gitterman, Healy, Hesselbrock, Humphreys, Johnson, Klein, and Pine

Associate Professors: Comer, Cournoyer, Dicks, Drachman, Heller, Kurz, Negroni-Rodriguez, Parks, Simmons, and Wayne

Assistant Professors: Bullock, Cordero, Dean, Harding, Havens, Letendre, Malcolm, Spath, Thomas, and Werkmeister-Rozas

The University of Connecticut School of Social Work promotes social and economic justice by providing high quality graduate education in social work. The School shares with other units of the University the pursuit of excellence in teaching, research and scholarship, the vision of an expanded international role, and a commitment to public service that bring the knowledge of the University to the people of the State. The School of Social Work offers courses of study leading to the degrees of Master of Social Work and Doctor of Philosophy.

The M.S.W. Program. The primary goal of the M.S.W. program is to prepare competent professional practitioners to help people to enrich their lives, improve their communities, and contribute to social justice. To prepare MSW graduates for advanced practice in a variety of settings, the curriculum emphasizes knowledge and method skills for social work in micro-level practice (i.e. helping individuals, families, and groups to mobilize their personal and environmental resources to reach their goals) and macro-level practice (i.e. administration, policy formulations, organizational and environmental changes through group and community advocacy and social actions).

The course of study requires that each student earn 18 of the program's 60 credits in field education through supervised placements in agencies where they learn to integrate theory and practice. All students are required to complete courses in Human Oppression (BASC 300), Research I (BASC 330), Research Methods in Social Work Practice (RSCH 332), Analysis of Social Welfare Policy (BASC 350), Human Behavior in the Social Environment: Macro Theories (BASC 360), Human Behavior in the Social Environment: Micro Theories (BASC 361), Macro Foundation Practice (BASC 390) and Micro Foundation Practice (BASC 391). In addition to the required foundation courses and advanced research course, students specialize in one of the following advanced major concentrations: casework, group work community organization, administration or policy practice. Electives and independent study enable students to meet their interests in focused areas of the profession. B.S.W.s from a social work program accredited by the Council on Social Work Education may be eligible for course exemptions or for the Advanced

Standing Option. The School does not grant social work course credit for life experience or previous work experience. The M.S.W. Program at the School of Social Work is accredited by the Council on Social Work Education.

The M.S.W. Admission Procedure. Applications for admission to the M.S.W. program should be sent directly to the School of Social Work. A more detailed description of the M.S.W. program, admission procedures, and financial aid information are available at the School of Social Work website <<http://www.ssw.uconn.edu>> and in the current view book of the School of Social Work which can be obtained from the Admissions Office, University of Connecticut School of Social Work, 1798 Asylum Avenue, West Hartford, Connecticut 06117. Phone: (860) 570-9118.

Dual Degree Programs. Reflecting the School's commitment to interdisciplinary teaching and practice, dual degree programs are offered with the University of Connecticut Schools of Law (J.D.), Business (M.B.A.) and Medicine (M.P.H.). A joint degree program is also offered with the Yale Divinity School. There are separate admission applications for these programs.

The STEP Program. The School of Social Work also has a non-degree program, STEP (Staff Training and Education for the Profession), that is available to students who hold a bachelor's degree. Students are encouraged to test their interest in the social work degree by taking courses in STEP. Students who then matriculate may be able to apply up to 14 credits earned through STEP toward the M.S.W. degree. Non-credit courses also are held on a variety of specialized social work topics.

The Ph.D. Program. The goal of the doctoral program in Social Work is to equip future social work leaders with the expert scholarly and research skills needed to provide intellectual leadership and direction to the profession. The program provides a rigorous curriculum designed to prepare social workers for careers as faculty in colleges and universities and as researchers, policy analysts and planners, and high level administrators in public and private social service organizations. The curriculum reflects the particular attention given to the unique role of research in the traditions of professional social work in relation to applied practice and to knowledge building.

The course of study consists of 54 graduate credits. Nine core courses (27 credits) provide the students with competency in advanced research methods and statistics, social science theories and practice theories, while the balance consists of three elective courses (9 credits) in related disciplines, dissertation preparation seminar (3 credits) and dissertation research (15 credits). It is expected that program completion will require three to five years for full-time students.

The Ph.D. Admission Procedure. In addition to the admission standards of the University of Connecticut Graduate School, applicants to the Ph.D. Program in Social Work must have an MSW degree and a minimum of two years post-MSW experience in social work. Completed applications, processing fee, residence affidavit, three letters of recommendation, a

personal statement, financial aid form and curriculum vita, and official transcripts from all colleges/universities attended must be sent directly to the University of Connecticut Graduate School, Unit 1006, Storrs, Connecticut 06269-1006. All Ph.D. Program applicants are advised to visit the UConn School of Social Work website <<http://www.ssw.uconn.edu>> for more detailed information about the Ph.D. Program.

COURSES OF STUDY

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Master of Social Work Courses

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Social Work Foundation Courses

BASC 300. Human Oppression: The African-American and Puerto Rican Perspective

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for students in the M.S.W. program. Must be taken prior to or concurrent with first year of field education.

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

BASC 301. Special Populations

1 credit. Lecture. Open to students in the M.S.W. Advanced Standing Option. Co-requisite: CSWK 340 or GRWK 340 or POPR 340 and CSWK 301 or GRWK 301 or POPR 310. This course is required of all students in the Advanced Standing Option and is to be taken in the summer prior to the beginning of full time study for the M.S.W. degree.

The goal of the course is to provide an opportunity for students to understand and to critically analyze human oppression and issues that are relevant to social work practice methods. The course will examine demographic, economic, political, social and cultural forces operating at national and local levels highlighting the African-American and Puerto Rican experiences and perspectives. The focus of the class is the application of the knowledge of special populations to the social work practice methods. The course will combine lectures by the instructor and

invited speakers, and class discussions. At times, small groups will be used to encourage students to examine their personal and professional interactions with oppression, and to discuss their implications for social work practice.

BASC 330. Research I

2 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Must be taken prior to or concurrent with first year of field education. Meets one of the pre-requisites for RSCH 332.

Prepares M.S.W. students to understand research methodology including basic statistics and computer application; critically review research studies; learn how to utilize research to solve social problems and enhance social work practice, and to understand the role of the practitioner/researcher in social work.

BASC 350. Analysis of Social Welfare Policy and Social Service Delivery Systems

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for students in the M.S.W. program. Must be taken prior to or concurrent with first year of field education. Policy Practice students must take this course prior to or concurrent with POPR 301: Policy Practice: Process, Use of Data and Information Technology.

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

BASC 360. Human Behavior in the Social Environment: Macro Theories

2 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. This course is one of two required courses for students in the M.S.W. program on human behavior in the social environment. Both courses must be taken prior to or concurrent with the first semester of the first year of field placement.

The required courses in human behavior in the social environment emphasize social work's "person-and-environment" frame of reference. Although the focus of analysis differs, this course emphasizes the social and physical environment. Major themes stressed throughout the course include theories and research about the interdependence of persons and their environments (physical and social), political,

economic, and cultural contexts, including values and ethical issues, in which our social welfare institutions function. Cultural and ethnic diversity, institutional prejudice, especially racism and sexism, issues of social, economic, and political justice and the process of social change will be stressed. Values and ethical issues relevant to macro social work will also be considered.

BASC 361. Human Behavior in the Social Environment: Micro Theories

2 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. This course is one of two required courses for students in the M.S.W. program on human behavior in the social environment. Both courses must be taken prior to or concurrent with the first semester of the first year of field placement.

Focuses on the individual and the family in transaction with social, economic, political, and cultural contexts and forces. Content areas emphasize current theories, empirical evidence to support these theories, ethical implications, and critical analysis. The course is organized around a systems perspective through a biopsychosocial lens. Variations arising from culture, ethnicity, social class, gender, sexual orientation are considered in this course.

BASC 390. Macro Foundation Practice

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisites: BASC 360 and BASC 361 or must be taken as co-requisites. Co-requisites: BASC 391, FED 351, and FED 301. Required course for students in the M.S.W. program.

The focus of this course is on macro practice foundation knowledge and skills associated with generalist practice in administration, community organizing and policy practice. It explores the history and place of macro methods in the evolution of the social work profession. Students are introduced to the unique language and perspective of macro practice as a capacity building and strength based intervention. The course includes definitions of and ways to analyze communities, organizations and policies. Emphasis is given to strategies and tactics for achieving change in communities, organizations and policies, to improving services for populations at risk, and promoting diversity and distributive justice, including an international context. Particular ethical and value mandates and dilemmas associated with macro practice are identified throughout the course.

BASC 391. Micro Foundation Practice

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisites: BASC 360 and BASC 361 or must be taken as co-requisites. Co-requisites: BASC 390, FED 351, and FED 301. This course is one of the two foundation practice courses taken with the first semester of the first year of field placement. Required course for students in the M.S.W. program.

This course is designed to provide a history of and a foundation for micro social work theory and practice emphasizing ecological, strengths and capacity building perspectives. It provides knowledge, values and skills associated with generalist practice with individuals, families and groups within the context of

organizations and communities. The course examines the mission of the social work profession and its value and ethical base, including its commitment to diversity, populations-at-risk and social and economic justice. Strategies for helping client-systems will include: preparing for practice; developing mutual working agreements; engaging, assessing and formulating goals; implementing interventions; monitoring and evaluating progress; and terminating services. The course emphasizes integration of course content with field experience.

FOUNDATION FIELD

FED 301. Field Education Seminar I

0 credits. Seminar. Open to students in the M.S.W. program. Co-requisite: FED 351. Required course for students in the M.S.W. program.

This seminar helps students prepare for and make optimum use of their field education experience. Topics include the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar is used to identify issues that arise in the field and ways to deal with them.

†FED 302. Field Seminar II

1 credit. Seminar. Open to students in the M.S.W. program. Prerequisites: FED 351 and FED 301. Co-requisites: FED 352 and ADMN 301 or CSWK 301 or GRWK 301 or CORG 301 or POPR 301. Required course for students in the MSW program.

This seminar helps students prepare for and make optimum use of their field education experience. Areas of seminar content include such topics as the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar identifies issues that arise in the field and ways to deal with them.

†FED 351. Field Education Foundation I

4 credits. Practicum. Open to students in the M.S.W. program. Co-requisites: BASC 390, BASC 391, and FED 301.

Teaches students basic skills in social work practice with systems of all sizes including individuals, groups, organizations, and communities. This field experience course provides the foundation for the development of advanced skills in specific social work methods in advanced field experiences.

†FED 352. Field Education Foundation II

4 credits. Practicum. Open to students in the M.S.W. program. Prerequisites: FED 351 and FED 301. Co-requisites: ADMN 301 or CSWK 301 or GRWK 301 or CORG 301 or POPR 301 and FED 302.

Continues to develop basic skills in social work practice with systems of all sizes, while adding increased emphasis on the students' development of skills in the students' major method.



Social Work Advanced Concentration Courses**ADVANCED RESEARCH COURSE****RSCH 332. Research Methods in Social Work Practice**

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. The prerequisites for this course may be met in one of the following ways: 1) successful completion of (minimum grade of B) a basic undergraduate or graduate research course during the previous six years; 2) successful completion (C or better) of BASC 330/RSCH 330 - Research I; or 3) successful completion (achieving a score of 70% or better) on a standard competency examination prepared and administered by the research curriculum committee of the School. Required course for students in the M.S.W. program. Policy Practice students must take this course prior to or concurrent with POPR 301: Policy Practice: Process, Use of Data and Information Technology.

This course builds on students' prior research knowledge acquired through undergraduate training, previous elective graduate coursework or self study. This course will provide students with: 1) an understanding of various "families" of research methods to equip them to evaluate social work practice with systems of all sizes and to be able to understand and interpret basic published social work research; 2) the knowledge to identify data collection methods that are appropriate to the research design being employed; and 3) an understanding of true experimental designs as a means for addressing strong causal inference with oppressed groups.

ADVANCED FIELD SEMINARS**FED 310. Field Education Seminar III**

0 credits. Seminar. Open to students in the M.S.W. program. Prerequisites: FED 352 and FED 302. Co-requisite: CSWK 353 or GRWK 353 or ADMN 353 or CORG 353 or POPR 353. Required course for students in the M.S.W. program.

This seminar helps students prepare for and make optimum use of their field education experience. Topics include the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar is used to identify issues that arise in the field and ways to deal with them.

†FED 311. Field Education Seminar IV

1 credit. Seminar. Open to students in the M.S.W. program. Prerequisite: CSWK 353 or GRWK 353 or ADMN 353 or CORG 353 or POPR 353 and FED 310. Co-requisite: CSWK 354 or GRWK 354 or CORG 354 or ADMN 354 or POPR 354. Required course for students in the M.S.W. program.

This seminar helps students prepare for and make optimum use of their field education experience. Areas of seminar content include such topics as the roles and responsibilities of the student, field instructor and faculty advisor, exploration and development of the

learning contract, and the educational assessment of self as a learner in the profession.

†FED 350. **Field Education Seminar V**
1 credit. Seminar. Open to students in the M.S.W. program. Prerequisites: FED 352 and FED 302. Co-requisite: CSWK 355 or GRWK 355 or ADMN 355 or CORG 355 or POPR 355.

This seminar helps students prepare for and make optimum use of their field education experience. Topics include the roles and responsibilities of the student within the agency setting, exploration and development of learning contracts, and the educational assessment of self as a learner in the profession. The seminar is used to identify issues that arise in the field and ways to deal with them. Required course for students in the M.S.W. program completing a Block Field Placement.

ADVANCED CONCENTRATION COURSES**Administration****ADMN 301. Managing People: Communication Skills in Supervision, Personnel Management and Leadership**

3 credits. Lecture. Open to M.S.W. students in the Administration concentration. Prerequisites: BASC 390, BASC 391, FED 351, and FED 301. Co-requisite: FED 352 and FED 302. Required course for students in the Administration concentration.

This course covers leadership theory and analysis, supervision, personnel/human resource management, with emphasis on interactional skills. The course prepares students to function effectively in supervisory and administrative roles and to use themselves in creative professional ways in exercising leadership in human service settings.

ADMN 302. Managing Money: Financial Management Strategies and Fiscal Responsibilities for Social Administrators

3 credits. Lecture. Open to M.S.W. students in the Administration concentration. Prerequisites: ADMN 301, FED 352, and FED 302. Co-requisite: ADMN 353 and FED 310. Required course for students in the Administration concentration.

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

ADMN 303. Creating and Managing Opportunities in the Organization's Internal and External Environment

3 credits. Lecture. Open to M.S.W. students in the Administration concentration. Prerequisites: ADMN 302, ADMN 353, and FED 310. Co-requisite: ADMN

354 and FED 311. Required course for students in the Administration concentration.

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

ADMN 316. Women in Social Welfare Administration

2 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Emphasizes issues for women in social welfare administration. Covers barriers faced by women in seeking administrative positions and promotions; advancement opportunities for women; research findings on gender and management; career planning; and development of practice strategies for solving administrative dilemmas. Addresses concerns of special groups of women, including issues of race, age, and sexual orientation.

ADMN 317 Social Work Administration Overview

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Not to be taken for credit by students in the Administration concentration.

Introduction to social work administration; role of administrators and other staff in agency organization and operation; interaction of agency, community, constituency, staff and board of service provision; processes or organization, planning, coordination, decision-making and policy determination; basic principles of administration.

ADMN 319. Computer Applications in Human Service Agencies

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Emphasizes concepts and techniques of computer use, application areas of the electronic technologies for the full range of social work agency needs, principles of computer system design and development, and in particular, methods of managing the computer process. All students enrolling in this course are expected to have basic computing skills such as operating a computer and word processing. For those who do not have these requisite skills, help is available at the computer center located in the School of Social Work.

ADMN 327. Current Topics in Administrative Skills

1-3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Intensive skill-oriented workshop on various topics in administration. Varied topics each semester include budgeting, marketing, staff development, conflict management, working with boards, and grant writing.

ADMN 335. Staff Development and Training

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Offered in a workshop format, focuses on skill building in planning, developing, and implementing training in human service organizations. In addition, examines selected organizational and management issues related to staff development. Facilitates learning through discussion, small group exercise, and a training project to be carried out in the student's agency (either field placement or place of employment).

†ADMN 353. Field Education in Administration III

4 credits. Practicum. Open to M.S.W. students in the Administration concentration. Prerequisites: FED 352 and FED 302. Corequisites: ADMN 302 or POPR 310 and FED 311. Required course for students in the Administration concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Administration concentration and must be taken concurrently with advanced Administration method courses.

†ADMN 354. Field Education in Administration IV

4 credits. Practicum. Open to M.S.W. students in the Administration concentration. Prerequisites: ADMN 353 and FED 310. Corequisites: ADMN 303 and FED 311. Required course for students in the Administration concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Administration concentration and must be taken concurrently with advanced Administration method courses.

†ADMN 355. Block Placement in Administration

8 credits. Practicum. Open to M.S.W. students in the Administration concentration. Prerequisites: FED 352 and FED 302. Co-requisites: POPR 310 and FED 350.

Field Education in Administration for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course.

Casework**CSWK 301. Casework Helping Process: The Work and Ending Phases**

3 credits. Lecture. Open to M.S.W. students in the Casework concentration. Prerequisites: BASC 390, BASC 391, FED 351, and FED 301. Co-requisite: FED 352 and FED 302.

Builds upon foundation theory of ecological strengths and capacity building perspectives and the method base of social work practice. Course content focuses on the interventive facet and transactional nature of

the casework process in helping people with a wide range of life transition stressors and environmental obstacles. Substantial attention is paid to working with people of special populations. Students focus upon the development of critical thinking and decision-making skills and the ability to be self-observant.

CSWK 302. Casework Practice Approaches: Differential Applications

3 credits. Lecture. Open to M.S.W. students in the Casework concentration. Prerequisites: CSWK 301, FED 352, and FED 302. Co-requisite: CSWK 353 and FED 310. Required course for students in the Casework concentration.

This course builds upon knowledge, skills, and values developed previously and deepens the understanding of theoretical, method, and empirical bases of casework practice, while maintaining simultaneous concern for people and environments. The course examines the ways that assessment and interventive strategies are informed by different theoretical orientations and research findings. Students continue to develop skills related to work with special populations and to develop professional self awareness.

CSWK 303. Casework with Vulnerable and Resilient Populations

3 credits. Lecture. Open to M.S.W. students in the Casework concentration. Prerequisites: CSWK 302, CSWK 353, and FED 310. Co-requisite: CSWK 354 and FED 311. Required course for students in the Casework concentration.

This course consolidates casework theory and methods established in the prior casework courses. The unifying concept in this course is the application of differential casework interventions with vulnerable and resilient populations over the life course. The course will also focus on contemporary issues and ethical dilemmas affecting professional function, roles and identity. Students are challenged to locate and critically examine empirical and practice theory literature necessary for working with different populations.

CSWK 322. Family Practice Methods in Casework

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisite: CSWK 301.

Examines casework with people experiencing significant problems in family living. Gives attention to problems at several stages and of various types: parent-child problems in the early school years and adolescence; problems of single parenthood; diverse family structures and arrangements; implications of separation and abuse; problems involving mental and physical illness in the family; alcoholism and drug dependency; the aging person in the family. Specific focus will be determined by student interest and current field practice.

CSWK 338. Comparative Theories in Casework Practice

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisite: CSWK 302

This advanced practice course builds upon knowledge of informed practice developed in CSWK 302. This course includes a range of theories which are applicable to social work practice with multiple populations and in multiple contexts. These include evidence based theories as well as those derived from practice. Emerging theories such as feminist, constructivist, psychodynamic, and new cognitive and behavioral applications of theory are examined, critiqued and considered in light of their potential application to student cases. Students must have ongoing cases and case material available for examination.

CSWK 340. Skills Laboratory in Casework Practice

1 credit. Lecture. Open to M.S.W. students in the Advanced Standing option in the Casework concentration. Co-requisites: CSWK 301 and BASC 301. Required course for students in the Advanced Standing Option in the Casework Concentration and must be taken in the summer prior to the beginning of full-time study for the M.S.W. degree.

Students will have the opportunity to identify, practice, and critique a range of assessment, intervention skills. Students will use materials and cases from the concurrent CSWK 301 course to further develop their casework skills.

CSWK 345. Clinical Conditions with Children and Adolescents

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisites: BASC 390, BASC 391, FED 351, and FED 301. Students in the Casework concentration are required to take this course or CSWK 346. Casework majors may take both courses using one of them toward elective credit. Students from other concentrations who meet the prerequisites may take this course as an elective. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

Addresses values, knowledge, and skills required for social work practice with children and adolescents who experience varied biopsychosocial problems related to mental disorders, as well as practice with their families. It helps students to think about practice situations in a spirit of inquiry, maintaining awareness of the complexity of psychiatric conditions and the limitations of our knowledge about them. Students become familiar with current psychiatric classification systems and learn a range of assessment and intervention skills. Students demonstrate the ability to access the most recent empirical and practice knowledge, and to develop skills related to work in a variety of social work practice settings where mental challenges are encountered. Mental disorders are addressed in the context of larger biopsychosocial systems. Attention is paid to differences arising from such variables as age, gender, ethnicity, race, religion, sexual orientation, and physical ability.

CSWK 346. Clinical Conditions with Adults and Older Adults

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisites: BASC 390, BASC 391, FED

351, and FED 301. Students in the Casework concentration are required to take this course or CSWK 345. Casework majors may take both courses using one of them toward elective credit. Students from other concentrations who meet the prerequisites may take this course as an elective. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

This is a practice course which pays equal attention to the values, skills, and knowledge required for social work practice with adults and older adults who have a range of bio psychosocial problems related to mental disorders. Students will learn a range of assessment and intervention skills and become familiarized with current psychiatric classification systems. Students will demonstrate the ability to access the most recent empirical and practice knowledge and to develop skills related to work in a variety of mental health settings. Mental disorders will be learned within the context of the larger bio psychosocial system and attention is paid to differences based upon such variables as age, gender, ethnicity, religion, sexual orientation, and physical ability.

†CSWK 353. **Field Education in Social Casework III**

4 credits. Practicum. Open to M.S.W. students in the Casework concentration. Prerequisites: FED 352 and FED 302. Corequisites: CSWK 302 and FED 310. Required course for M.S.W. students in the Casework concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice. Required course for students in the Casework concentration and must be taken concurrently with advanced Casework method courses.

†CSWK 354. **Field Education in Social Casework IV**

4 credits. Practicum. Open to M.S.W. students in the Casework concentration. Prerequisites: CSWK 353 and FED 310. Corequisites: CSWK 303 and FED 311. Required course for M.S.W. students in the Casework concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice

†CSWK 355. **Block Placement in Casework**

8 credits. Practicum. Open to M.S.W. students in the Casework concentration. Prerequisites: FED 352 and FED 302. Corequisites: CSWK 302, CSWK 303, and FED 350.

Field Education in Casework for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course.

CSWK 365. **Family Therapy: Theory and Practice**

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Provides a knowledge of significant theories, theorists, practice skills and techniques for family

therapy, as well as the growing professional self-awareness of the therapist. Provides: a) opportunities for study of the use of family therapy with particular problem situations; b) critical study of changes in current theories, emerging theories and integration of theories; c) analysis of research in family therapy; d) an ongoing seminar for discussion of cases.

Community Organization

CORG 301. **Essential Theory and Intervention Practice in Community Organization**

3 credits. Lecture. Open to M.S.W. students in the Community Organization concentration. Prerequisites: BASC 390, BASC 391, FED 351, and FED 301. Co-requisites: FED 352 and FED 302. Required course for students in the Community Organization concentration.

This course builds on content covered in micro and macro foundations of social work practice and reviews in greater depth community organization history, values and assumptions, Rothman models of organizing, roles of the community social worker, and strategies used by community organizers to bring about change. The course promotes in-depth understanding of the various types of communities and enhances skills for community analysis. Essential information for grassroots organizing and community and coalition building is covered. It incorporates content on providing community based services to oppressed population groups, including leadership development and advocacy. Furthermore, it highlights the importance of power theory and dynamics in selecting models and strategies for intervention. The importance of relationship building and attention to process tasks and goal achievement are covered.

CORG 302. **Theory and Practice of Social Movements For Community Organizers**

3 credits. Lecture. Open to M.S.W. students in the Community Organization concentration. Prerequisites: POPR 310, CORG 353, and FED 310. Co-requisite: CORG 354 and FED 311. Required course for students in the Community Organization concentration.

This course will integrate Community Organization foundation and advanced method practice knowledge, values and skills. Students will be asked to select an agency-based Community Organization assignment that they have been working on during the academic year as the basis for a capstone assignment. An outline for this assignment will be distributed and discussed in class. Appropriate literature that will help students in conceptualizing and writing their capstone assignments will also be distributed and discussed. The course will concentrate on addressing social movement theory and implications for social change and community social work. A minimum of two social movements will be analyzed and one or more social movement related projects will be selected as an in-class project(s).

CORG 312. **Political Advocacy**

3 credits. Lecture. Open to M.S.W. students in Community Organization and Policy Practice

concentrations. Pre- or co-requisites: FED 352 and FED 302. The requisites for this course differ for each of these concentrations. This is a required course for students in the Community Organization and Policy Practice concentrations.

This course builds on the concepts and interventions introduced in the Macro Foundation Practice course. The content covers political decision-making groups, including executive, legislative, judicial and private agency decision-making. The ways macro practitioners use power and political analysis is discussed. Emphasis is on the design, implementation and evaluation of a political advocacy strategy to improve the life situations of populations at risk, such as lobbying, preparing and delivering testimony to a public policy making group and forming and maintaining coalitions. Ethical requirements and dilemmas in doing political advocacy are integrated throughout the course.

†CORG 353. **Field Education in Community Organization III**

4 credits. Practicum. Open to M.S.W. students in the Community Organization concentration. Prerequisites: FED 352 and FED 302. Co-requisites: POPR 310 and FED 310. Required course for M.S.W. students in the Community Organization concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice.

†CORG 354. **Field Education in Community Organization IV**

4 credits. Practicum. Open to M.S.W. students in the Community Organization concentration. Prerequisites: CORG 353 and FED 310. Co-requisites: CORG 302 and FED 311. Required course for M.S.W. students in the Community Organization concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice.

†CORG 355. **Block Placement in Community Organization**

8 credits. Practicum. Open to M.S.W. students in the Community Organization concentration. Prerequisites: FED 352 and FED 302. Co-requisites: POPR 310 and FED 350.

Field Education in Community Organization for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course.

CORG 370. **Grassroots Neighborhood Organizing**

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Provides intensive instruction for students who wish to become practitioners or trainers in grassroots neighborhood model of organizing. Examines Alinsky's model of organizing and the refinement of that model.

Group Work

GRWK 301. Essentials of Social Group Work Practice

3 credits. Lecture. Open to M.S.W. students in the Group Work concentration. Prerequisites: BASC 390, BASC 391, FED 351, and FED 301. Co-requisite: FED 352 and FED 302. Required course for students in the Group Work concentration.

Provides knowledge, theories, and practice principles common to social group work. Focuses on knowledge and practice methods that are used to identify and understand procedures and processes essential to planning, developing and working with small groups in various agency-based settings, dealing with a range of issues and diverse peoples. Social and behavioral sciences and group work literature, empirical data and practice wisdom serve as the foundation for organizing course content and activities.

GRWK 302. Differential Group Work: Populations and Settings

3 credits. Lecture. Open to M.S.W. students in the Group Work concentration. Prerequisites: GRWK 301, FED 352, and FED 302. Co-requisite: GRWK 353 and FED 310. Required course for students in the Group Work concentration.

Designed to increase the depth of understanding of the content of GRWK 301: Essentials of Social Group Work Practice. This course focuses on the application of group work processes, properties and group work skills to group work practice with groups that are established for different purposes and with populations that differ according to age, culture and need for group work services. This course will also examine the impact of different settings as the context for group work practice.

GRWK 303. Advanced Group Work Practice Methods and Techniques

3 credits. Lecture. Open to M.S.W. students in the Group Work concentration. Prerequisites: GRWK 302, GRWK 353, and FED 310. Co-requisite: GRWK 354 and FED 311. Required course for students in the Group Work concentration.

The overall emphasis of this course will be on a critical analysis and sound examination of the social group work method B – its underlying theories, knowledge, research supported practices, ideological commitments, and basic tenets and principles. The primary focus is on the development of advanced practice methods and techniques.

GRWK 311. Group Processes

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for students in the Group Work concentration.

The purpose of this course is to help students develop a conceptual frame of reference for understanding small group processes. The focus of study is mainly on establishing a theoretical and conceptual appreciation of how small groups function. Students will develop an increasingly wide range of conceptual tools to identify and assess group processes. Students will gain a better understanding of small group interaction as it impacts individuals,

interpersonal relationships and interactions with others beyond the group. Experiential as well as didactic study methods will be used.

GRWK 340. Skills Laboratory in Social Group Work Practice

1 credit. Lecture. Open to M.S.W. students in the Advanced Standing option in the Group Work concentration. Co-requisites: GRWK 301 and BASC 301. Required of students in the Advanced Standing Option with Group Work Method Concentration and must be taken in the summer prior to the beginning of full-time study for the M.S. W. degree.

Its primary focus is to offer students an opportunity to demonstrate how to apply (i.e., simulate practice experiences) some of the knowledge and theory presented in GRWK 301 - Essentials of Social Group Work Practice in practice situations. Students will participate in exercises and use procedures to enhance and assess current practice skill levels. Exercises and other instructional aids will center on particular elements pertinent to basic competencies in social group work practice including group formation, entering an established group, work within the group's process and achieving group goals. As well, attention is focused on group work within the context of the agency setting and its philosophical stance toward this method of practice.

GRWK 341. Group Work with Substance Abusing Women

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

Provides 1) a basic orientation to current knowledge on problems of women substance abusers, and 2) opportunities for students to develop clinical group work skills in working with the population. Provides specific kinds of group experiences which deal with restoration and improvement of self-image, interpersonal competence and coping skills of substance abusing women through experiencing the use of an array of practical techniques in class.

GRWK 342. Group Work Practice in Therapeutic Settings

3 credits. Lecture. Open to students in the M.S.W. program. Prerequisite: GRWK 301.

Seminar on use of groups for therapeutic purposes in settings such as mental health clinics, residential treatment centers, counseling services, etc. Students share responsibility for the examination of material from their own clinical practice with groups.

GRWK 348. Understanding and Working with Violent Youth

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Researches knowledge and practical experiences of the forces that unattach and disconnect at-risk violent youth from their families and society. Shows effective intervention and prevention methods and programs from a multi-disciplinary approach. Incorporates and integrates into practice the

knowledge and skills necessary to more effectively provide group work services to at-risk youth.

†GRWK 353. Field Education in Group Work III

4 credits. Practicum. Open to M.S.W. students in the Group Work concentration. Prerequisites: FED 352 and FED 302. Co-requisites: GRWK 302 and FED 310. Required course for students in the Group Work concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice.

†GRWK 354. Field Education in Group Work IV

4 credits. Practicum. Open to M.S.W. students in the Group Work concentration. Prerequisites: GRWK 353 and FED 310. Co-requisites: GRWK 303 and FED 311. Required course for students in the Group Work concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice.

†GRWK 355. Block Placement in Group Work

8 credits. Practicum. Open to M.S.W. students in the Group Work concentration. Prerequisites: FED 352 and FED 302. Corequisites: GRWK 302, GRWK 303, and FED 350.

Field Education in Group Work for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course.

Policy Practice

POPR 301. Policy Practice: Process, Use of Data and Information Technology

3 credits. Lecture. Open to M.S.W. students in the Policy Practice concentration. Prerequisites: BASC 390, BASC 391, FED 351, and FED 301. Co-requisite: FED 352 and FED 302. Required course for students in the Policy Practice concentration.

Course content includes the definition of policy practice, the phases of policy practice and the skills needed for policy practice especially advanced analytical and interactional skills, including the conscious use of self in practice, as well as persistence, creativity, and pragmatism and taking appropriate risks in the pursuit of policy practice goals. Other content includes the use of large data sets, data management systems, quantitative analysis, qualitative methods, especially focus groups. Emphasis is given to the use of policy practice to achieve distributive justice and implement and evaluate effective social service policies for populations at risk. Ethical requirements and dilemmas in policy practice are integrated throughout the course.

POPR 302. Policy Practice: Careers, Contexts, Innovations and Financing

3 credits. Lecture. Open to MSW students in the Policy Practice concentration. Prerequisites: POPR

301, POPR 353, and POPR 310. Co-requisite: POPR 354 and FED 311. Required course for students in the Policy Practice concentration.

The course will begin with content on career planning. Students will be helped to understand the complexity of social service funding, including the sources of funds and the mechanisms for transferring funds to social service programs, including federal and state tax policies and implication for social service programs. Critical current issues such as the growth of faith-based and profit-making social service strategies will be debated. Other topics will include the use of the media and public relations expertise, cutting edge social theories, micro and macro economic theories, and global economic policies and how they impact social service policies. Students will be expected to demonstrate an ability to integrate and critically evaluate their practice skills as they prepare to leave the program. Emphasis will be given to the use of policy practice intervention strategies to achieve distributive justice and effective service policies for populations at risk. Ethical requirements and dilemmas in policy practice will be integrated throughout the course.

POPR 310. Program Planning, Development, and Evaluation

3 credits. Lecture. Open to M.S.W. students in the Policy Practice, Administration, and Community Organization concentrations. Pre- and co-requisites differ for each of these major concentrations. Refer to the Social Work Student Handbook for details. Required course for students in the ADMN, CORG and POPR concentrations.

This course covers a broad range of knowledge and skills needed to develop sound program proposals and to plan, manage, and evaluate social programs. These include assessing social and community needs; setting goals within the context of strategic plans; writing measurable objectives; designing program implementation and evaluation strategies, developing a program budget, and identifying funding sources. The course will address value and ethical issues in program development, as well as constraints and opportunities that support or constrain program planning.

POPR 340. Program Planning, Development and Evaluation Skills Laboratory

1 credit. Lecture. Open to students in the M.S.W. Advanced Standing Option in the Administration, Community Organization, and Policy Practice concentrations. Co-requisites: POPR 310 and BASC 301. Required of Advanced Standing Option students with ADMN, POPR, and CORG concentrations and must be in the summer prior to the beginning of full-time study for the M.S.W. degree.

Focuses on gaining knowledge and skills in the elements of program planning and proposal writing, and includes application of these through development of a program proposal for funding. The skills laboratory will provide an additional opportunity for students to apply knowledge and skills through a proposal review and evaluation exercise. The exercise will be conducted on the last day of the course after the students' final projects have been

submitted. The instructor will choose one final project for the purposes of the review exercise with the student's name removed. (Note: more than one proposal can be selected offering an opportunity for ranking them in the exercise.)

†POPR 353. Field Education in Policy Practice III

4 credits. Practicum. Open to M.S.W. students in the Policy Practice concentration. Prerequisites: FED 352 and FED 302. Co-requisites: POPR 310 or CORG 312 and FED 310. Required course for students in the Policy Practice concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice.

†POPR 354. Field Education in Policy Practice IV

4 credits. Practicum. Open to M.S.W. students in the Policy Practice concentration. Prerequisites: POPR 353 and FED 310. Co-requisites: POPR 302 and FED 311. Required course for students in the Policy Practice concentration.

Focuses primarily on the student's major method, emphasizing preparation for competent, advanced specialized practice.

†POPR 355. Block Placement in Policy Practice

8 credits. Practicum. Open to M.S.W. students in the Policy Practice concentration. Prerequisites: FED 352 and FED 302. Co-requisites: POPR 310 and FED 350.

Field Education in Policy Practice for well-prepared students who have completed all course requirements except the second year of field education and the appropriate method course.



Social Work Elective Courses

Direct Service

DSEL 320. Direct Practice in School for Children with Educational Disabilities and Their Families

3 credits. Lecture. Open to students enrolled in the M.S.W. program and MSW graduates. HBEL 348, Emotional and Behavioral Disorders of Childhood and Adolescence is strongly recommended as a foundation, or to be taken concurrently.

Meets state requirements for school work certification, approved by the Bureau of Certification and Professional Development. The practice of social work in schools requires that the social worker possess knowledge and skills to provide social work services for students with educational impairments and their families. To provide such service, the social worker must be able to engage in effective partnerships with parents and other multi-disciplinary team members and possess a repertoire of interventions appropriate for this population. Presents and discusses controversies and issues relative to labeling

and testing procedures, such as the impact of racial and ethnic differences. Covers six areas of impairment as designated by law (Emotionally Impaired, Mentally Impaired, Learning Disabled, Autistic Impaired, Physically and Otherwise Health Impaired, and Speech and Language Impaired). Stimulates further study in impairment areas and lays a basic knowledge and skill foundation of social work services appropriate for these populations.

DSEL 325. Direct Practice in Health

3 credits. Lecture. Open to students in the M.S.W. Program. Co- or Prerequisite: CSWK 301.

Examines practice concepts and principles in working with patients, families, and patient and caretaker's groups, in a variety of health care settings: acute care, chronic care, inpatient and ambulatory care, nursing homes, hospice, and community-based services. Studies issues and trends in practice including prevention (AIDS as a prime example); team work and other forms of interdisciplinary collaboration; organizational innovation; new practice roles; new ethical and moral dilemmas in health care practice. Views content from an ecological perspective on practice.

DSEL 328. Social Work Practice with Children

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

This course is designed to help students develop knowledge and skills in preventive work as well as clinical work with children. It briefly examines major theoretical orientations and research findings in working with children. Aspects of ecological theory, psychosocial theory, cognitive-behavioral theory as well as theories of group development are presented. Key issues of child development are summarized. Major social work settings that provide services to school age children are described and their impact on services addressed. The major emphasis of this course is on: 1) students' understanding of the importance of program media either as tools or as an end in themselves (program media include, but are not limited to drawing, simple arts and crafts, cooking, drama, games, music, nature walks, puppet-shows, role plays, sand trays, doll houses, story-telling and writing, sports etc.); 2) students' development of skills in selecting these program media to achieve certain practice goals, and 3) students' development of ease and leadership skills in utilizing a variety of program media in working with children.

Human Behavior

HBEL 300. Substance Abuse I: Introduction to Alcohol and Other Drugs

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

Examines the special issues and problems in dealing with alcohol and drug abuse. Focuses on: developing a conceptual framework of drug abuse and addiction; major classifications of drugs; examining high risk populations with an emphasis on their unique problems and needs; integrating knowledge with practice by giving careful consideration to treatment issues such as identification, assessment, referral, therapeutic strategies, treatment modalities and settings; providing information on the role of federal, state, and voluntary organizations which impact on prevention, education and treatment programs.

HBEL 301. Substance Abuse II: Prevention and Treatment of Alcohol and Other Drug Abuse

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Prerequisite: HBEL 300. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

Builds upon HBEL 300, an overview of the various classes of drugs and the acute and chronic effects of drugs on human behavior and the body. Focuses on traditional and new intervention techniques that could be applied to social work practice. Provides knowledge of clinical applications and the empirical validation of effectiveness of major intervention strategies used in treatment of addictions.

HBEL 325. Social Work Perspectives on the Status of Women in Society

3 units. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Examines cultural assumptions about women; the theories which support these assumptions and the socializing agents that maintain them; new ways of thinking about woman's role, about alternative social arrangements, and about implications for social work intervention.

HBEL 327. Ethnic Minorities and the Social Work Profession: Black Experience

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for Substantive Area: Focused Area of Study on Black Studies for Social Work Practice. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Considers the Black Experience from historical, social, political, and economic perspectives. Addresses the evolution of male/female roles and relationships, the genesis of Black family patterns, and the consequences for social work practice. Examines the impact of poverty and discrimination in a context of international and national cultural factors.

HBEL 328. Ethnic Minorities and the Social Work Profession: The Puerto Rican/Latino/a Experience

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for Substantive Area: Focused Area of Study on

Puerto Rican/Latino/a Studies Social Work. Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Considers the Puerto Rican experience in the United States from the historical, social, political, economic, and cultural perspectives. Examines the impact of poverty, migration, and discrimination on individuals, families and communities.

HBEL 344. Aging and Mental Health

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

Uses ecological theory as a framework for understanding the psychological processes of adaptation and the mental health needs of the elderly. Analyzes various service arrangements in terms of their usefulness in rehabilitation and prevention.

HBEL 347. Black Family Life

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Black Studies for Social Work Practice. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Examines the Black family from an historical and current perspective, focusing on the individual and collective social, cultural, and psychological contents within which behavior is expressed and by which it is significantly influenced; the adaptive, resilient behavior utilized by Black family units for survival and success; the Black family as a varied and complex system interacting with other systems within the wider society; myths related to the behavior and functioning of Black families.

HBEL 352. Death and Dying

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice. Elective course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

Focuses on dying as experienced by persons of all ages (not only the elderly) and on its psychological concomitants, such as rage and grief, bereavement and mourning; suicide and suicide prevention; dying as a career with identifiable states, as well as the concept of death as a social phenomenon.

HBEL 357. Social Gerontology

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for Substantive Area: Focused Area of Study on Social Work Practice with Older Adults.

Considers the societal aspects of aging, including the social psychological concomitants of adjustments, changing roles, and systems of social relationships. Includes an overview of the economic aspects of aging and the service delivery system.

HBEL 362. Social Work Practice with Women

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Examines the special issues involved in direct practice with women clients. Focuses on actual practice using student presentations and addressing the personal social problems that arise out of the significant role definitions and behavioral expectations for women. Reviews and analyzes theoretical perspectives that inform practice with special emphasis on implications for effective development and design.

HBEL 365. Forensic Social Work: Introduction to Law and Social Work

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Focuses on the interrelatedness of legal and social problems. Examines selected federal and state statutes, judicial decisions, and administrative relations which impact the daily lives of individuals and groups. Explores legal principles and authorization which underlie and provide parameters for social work practice. Reviews social work theories, skills and contributions which have influenced the general welfare of individuals, families and communities. Focuses on the development of more comprehensive social work intervention and advocacy. Examines the adjudication process and its increasing influence on social policy making. Analyzes professional legal issues in social work practice.

HBEL 370. New Perspectives on Lesbians and Gay Men

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Examines the problems of America's homosexual minority. Presents homophobia (fear of homosexuals or homosexuality) as a prejudice held by all people, gay and straight, in a society which holds that heterosexuality is the "normal" and "acceptable" behavior and attitude. Intended to expand the students' awareness of how homophobic attitudes affect them and their relationships with other people in both professional and non-professional settings.

HBEL 373. Violence Against Women: A Cultural Heritage

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Examines the connections between violence against women and the power distributions within society. Special focus on sexual assault, battering, sexual harassment, prostitution and pornography. Analysis considers social, political, and economic dynamics that affect the individual. Discusses the connection between violence and other social problems: sexism, racism, and classism.

HBEL 376. Puerto Rican and Latina Women and Their Reality

3 credits. Lecture. Open to students in both the

M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Puerto Rican/Latino/a Studies Social Work. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Emphasizes the double oppression that the Puerto Rican woman faces. Analyzes the double burden that she confronts when seeking to maintain her identity as a Puerto Rican and as a woman in a society which discriminates against both groups. Equal emphasis is placed on issues of racism, classism, and heterosexuality since these issues create an even stronger burden on Puerto Rican women. Special consideration is given to Puerto Rican cultural aspects of the socialization process of males and females with a focus on rigid adherence to sex roles (e.g., machismo - marianismo).

HBEL 380. Current Topics in Family and Children's Services

1-3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Examines selected issues and topics in family and children's services. Each course offering provides an in-depth examination of policy and/or practice in one specialized area such as sexual abuse, parent education, school social workers, family preservation programs, and other timely topics.

HBEL 381. Child Maltreatment: History, Theory, Prevention and Intervention

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Primarily for students with some practice experience in family and children's services, examines the phenomena of child abuse and neglect and societal and professional responses aimed at their prevention and treatment. As with other courses in the Substantive Area in Family and Children's Services, it is presented in the context of ecologically-oriented, family-centered child welfare policy and practice.

HBEL 386. Studies in the Holocaust: Implications for Social Work

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Focuses on the Holocaust and its many implications for social work students. The course traces the rise of the Nazi totalitarian state resulting from defeat after World War I, the world wide depression of the 1930's and Hitler's targeting of Jews in Germany and eventually Europe-wide. The lessons for social workers will be drawn from these experiences. The integration of this material by students into other courses is encouraged.

HBEL 388. Mentoring as Social Work Practice

1-3 credits. Lecture. This is a two-semester course; must be taken Fall and Spring semesters (1 credit Fall semester; 2 credits Spring semester). Elective course for Substantive Area: Focused Area of Study on Puerto

Rican/Latino/a Studies Social Work. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

The mentoring process offers opportunities to enhance the utilization of community-based services, promote positive self-image, and encourage educational and career exploration. Increasingly social service agencies are recognizing mentoring as effective in prevention and intervention work. This year-long seminar will match social work students (mentors) and out-of-home adolescents in the Department of Children and Families (DCF) system (mentees). Students and adolescents will meet as a class, every other week. They will explore mentoring related literature and address issues that are important to both mentors and mentees. On alternative weeks, mentors and mentees will meet for activities that enhance the mentoring process and reinforce class-related content.

HBEL 391. Parenting and Parent Education

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Explores the methods that parents use to impart cultural values, control behavior, and assure healthy development of children. Students review findings of basic research about parenting and participate in a parent education workshop.

HBEL 393. Emerging Issues in Mental Health and Substance Abuse

3 credits. Lecture. Required course for Substantive Area: Focused Area of Study on Mental Health and Substance Abuse in Social Work Practice.

This course is designed to introduce students to current issues confronting providers of mental health and addiction services and consumers of these services as we enter the 21st Century. Philosophies about people with mental health, addiction and co-occurring disorders are changing in response to the developing knowledge base and the rise of consumer movements. Specific emphasis on the growing need for broad based multi cultural service systems for consumers will be fostered. Issues of poverty and the "severely and predominantly mentally ill" will be discussed.

HBEL 395. Scientific Foundations of Child/Adolescent Development, Mental Disorders, and Substance Abuse

3 credits. Lecture. Open to students in the M.S.W. program and STEP program. Prerequisite or co-requisite: BASC 361 in the past two years or permission of the instructor.

A Web-based course on knowledge for practice in children's services, mental health (all ages), and addictions. It can be used to meet an elective requirement in some substantive areas, by permission of the area chair. No class attendance required, one optional session. Students become familiar with current and emerging knowledge in these areas. They become proficient at accessing cutting-edge practice-relevant information to address issues and challenges that arise day-to-day. Class members discuss issues and questions with each other and the instructor via

the World-Wide Web. Class members can collaborate with each other on assignments if they wish. An optional class session at the beginning of the semester is offered to help students become comfortable with Web technology, and to get to know each other and the instructor in person.

Independent Study

IS 394. Independent Study

1 – 9 credits. Independent Study. Open only to students enrolled in the M.S.W. program.

Special social work topics not included in the curriculum may be the subject of an Independent Study. A proposal to do an independent study must be presented no later than the second session of the semester in which the course is to be completed and be approved by the Director of Student Services. A maximum of three independent study courses or nine credits may be applied toward degree requirements.

Research

RSCH 323. Research in Black Studies

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Black Studies for Social Work Practice.

In this graduate seminar, students will design and implement a research project that has the potential to improve the quality of Black Family Life. The focus will be on the current multi-disciplinary theoretical and research literature on Black families, individuals, and communities. Students will hone skills in conducting, interpreting, and writing-up empirical research. Elective course for Substantive Area: Focused Area of Study on Black Studies for Social Work Practice.

RSCH 326. Special Topics in Research

3 credits. Lecture. Open to students in the M.S.W. Program. Prerequisite: RSCH 332.

Introduces new and innovative material on a variety of special topics in research. These topics will rotate content to include survey methods, ethnography, single system design or focus on a specific problem or population.

RSCH 370. Ethnographic Research

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Prerequisite: RSCH 332.

Presents research methods typically applied on the inductive side of the cycle of science, particularly those intended to discover the meaning of systems that people use to structure experience. Provides instruction and supervised experience in exploratory research methods and analysis of non-numerical data.

RSCH 378. Research in Puerto Rican/Latino(a) Studies

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Prerequisite: BASC 300 or HBEL 328. Required course for Substantive Area: Focused Area of Study on Puerto Rican/Latino/a Studies Social Work.

Examines existing research on Puerto Ricans. Analyzes past research efforts on Puerto Ricans, reviews various approaches to research methodology and techniques and their application to practical problems and concerns in social work practice. Understanding of all factors involved in the research process are part of the competency requirements for completion of the Puerto Rican Studies Substantive Area. Students apply research knowledge to implement a research study in a selected practice area or problems affecting Puerto Rican client systems.

RSCH 390. The Survey Method in Social Work Practice

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Prerequisite: RSCH 332.

Detailed methodological study of the sample survey as a tool for collecting and analyzing data which can lead to community action and subsequent change. Emphasizes instrumentation, multi-staged sampling, and data processing.

RSCH 391. Program Evaluation

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Prerequisite: RSCH 332.

Provides skills required to apply the methods of science to the assessment of social programs. After completion of the course, students will be able to conduct needs assessments, monitor program implementation, and assess impact of programs. Topics include qualitative and quantitative methods, utilization focused evaluations, evaluation of training, and cost benefit analysis.

RSCH 397. Quantitative Analysis

3 units. Lecture. Open to students in both the M.S.W. program and the STEP program. Prerequisite: RSCH 332.

Beginning level course in multiple regression analysis. Students learn to apply simple and multiple regression analysis to social work practice problems, including basic personality research, program evaluation, decision making, and forecasting. Students use up-to-date computer and statistical technology, analyze real data pertinent to social work questions.

Social Welfare

SWEL 306. Supervision and Consultation in Social Work

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Concepts, principles, methods of supervision in social work; study of worker-supervisor relationship; individual and group aspects of teaching and learning. Concepts, principles, and methods of supervision and consultation.

SWEL 310. Services to Immigrants and Refugees and Cross-Culture Helping

3 credits. Lecture. Open to students in both the

M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work.

Examines and connects concepts from migration studies with social work practice knowledge. Highlights the influence of immigration policy and procedures on the lives of immigrants and on service delivery and social work practice. Examines the interrelationship between sending and receiving countries and examines the experiences of individuals in the home country with their experiences in the new country. Emphasizes cultural and cross-cultural issues in each of the migration stages. Highlights different cultural views on health, mental health, help-seeking behavior, family and child-rearing practices and gender role behavior.

SWEL 317. Women, Children, and Families: Social Policies and Programs

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Focuses on the policies and programs that affect women and children, in particular income supports, maternal and child health, housing, domestic violence, foster care and adoption, and parenting and child maltreatment. Special attention will be paid to the legal rights of women and children, especially those who are immigrants, have disabilities, or are members of minority groups. Required course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

SWEL 321. Social Work Perspectives on Adoption

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Focuses on new developments in adoption and the knowledge, values and skills needed by social workers to effectively plan and deliver adoption services to a diverse group of children and families.

SWEL 333. Travel Study for Social Work

1-3 credits. Field Studies/Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work. Elective course for Substantive Area: Focused Area of Study on Puerto Rican/Latino/a Studies Social Work.

Combines academic study with travel to examine social work and social welfare in other systems. Addresses the impact of social, economic and political systems on social welfare and social work; a cross-national examination of the profession; and cross-cultural understanding.

SWEL 340. Social and Ethical Issues

2 credits. Lecture. Open to students in the M.S.W. program and the STEP program.

Focuses on how the profession of social work has developed in relation to social issues. Includes a review of its mission, values, and sanctions as well as

the role of professional organizations. Followed by a focus on social work's response to social issues and on its boundaries, ethics, and practice dilemma.

SWEL 348. International Social Work Global Issues

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for Substantive Area: Focused Area of Study on International Issues in Social Work. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Cross-national, comparative approach to selected topics in international social problems and social welfare. Consideration of the problem of developing nations and modernization and urbanization as worldwide processes; the role of international organizations; the role of social work in international issues; and the implications of cross-national study for practice.

SWEL 351. Policy Issues in Aging

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work Practice. with Older Adults.

History, development, and ramifications of social, economic and political policy issues relevant to the elderly; the elderly as voters and political actors. Major attention to framework for policy analysis.

SWEL 353. Policy Issues in Health Care

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Policy analysis of major health issues, including national health insurance and increasing health costs; health systems and institutional administration; the functions and performance of multi-disciplinary teams; utilization and supervision of paraprofessionals. In-depth program evaluation in the health field using case materials.

SWEL 359. Seminar on Long-Term Care for the Elderly

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Examines nursing homes and other long-term care facilities. Explores services offered by these institutions and the role of social work. Special attention given to the politics and government regulations of long-term care.

SWEL 360. Labor and Social Work

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

Examines theoretical and practical linkages between the labor movement and social work practice; the historical development of this relationship with special attention to the theoretical roots of community organization theory within the labor movement. Analyzes social service support systems for labor activities and contemporary unionization of social service workers.

SWEL 370. Social Work in Health Care: Introduction to Knowledge, Policy and Practice

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Bio-psycho-social-cultural aspects of health, illness, and disability in the context of individual, family, and community life. Attention is given to health care systems, social work roles and tasks in health care, the impact of health policy, and the concerns of planning, administration, supervision, and consultation in health care and in social work services in health care.

SWEL 371. Permanent Families for Children

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Focuses on permanency planning as a framework for social work practice in child welfare. Examines the philosophy, theory, and methodology of permanency planning for children and youth placed, or at risk of placement, out of their homes. Emphasizes programs, skills, and strategies for preventing placement, reuniting placed children with their biological families, or developing other permanent families, particularly through adoption.

SWEL 374. Social Work and Children's Rights

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Elective course for Substantive Area: Focused Area of Study on Social Work with Women and Children in Families.

Reviews the historical development of the children's rights movement and its relationship to current services. Examines and evaluates legal decisions affecting due process, equal protection, right to permanency, etc. Also examines legal problems as they affect foster care, adoption, child custody, and child support.

SWEL 377. Urban Policy Issues

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program. Required course for Substantive Area: Focused Area of Study on Urban Issues in Social Work. Elective course for Substantive Area: Focused Area of Study on International Issues in Social Work.

Focuses on urban problems and policy issues as well as social work practice issues in urban settings. Connecticut cities are used to explore the effectiveness of current policies and consider the need for policy change. Current social and economic needs of urban populations and the political environment are also considered.

SWEL 378. AIDS and Social Work

3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Addresses common grounds and concerns as related to most people with HIV/AIDS regardless of gender or modes of transmission. Examples are:

enhancing quality of life for people living with AIDS; initiating support groups; and caring for the care givers. HIV/AIDS has affected some groups of people more than others. For this reason, differences related to HIV/AIDS prevention, education, human services, and social work practice among women, children, drug users, gay men and lesbians, and people of color will also be explored.

SWEL 380. Political Social Work

3 credits. Lecture. Elective course for Substantive Area: Focused Area of Study on Urban Issues in Social Work.

This course will offer students an opportunity to explore the world of elected politics as a legitimate field of social work practice. Social workers are currently playing many roles in this area including, serving as volunteer and paid staff in political campaigns at the local, state and federal level; as paid staff of elected politicians; in politically appointed positions; and as elected politicians. Course content will focus attention on practical realities of each of these positions. As part of this course, students will be required to attend the annual Campaign School sponsored by the Institute for the Advancement of Political Social Work Practice.

Special Topics**SPTP 318. Special Topics**

1 - 3 credits. Lecture. Open to students in both the M.S.W. program and the STEP program.

Introduces new and innovative material into the curriculum on an experimental basis. Any special topics course may be offered only twice and may not duplicate content already available in the regular curriculum. Any instructor offering a special topics course must submit the title and a brief statement of focus of the course to the Registrar for inclusion in the course registration schedule. A student may apply up to 8 credits of Independent Study and Special Topics in Social Work (combined) toward the M.S.W. degree. This course is open to all matriculated students.

**All Sections**

†GRAD 395. **Master's Thesis Research**
1 - 9 credits.

†GRAD 396. **Full-Time Master's Research**
3 credits.

†GRAD 397. **Full-Time Directed Studies (Master's Level)**
3 credits.

GRAD 398. **Special Readings (Master's)**
Non-credit.

GRAD 399. **Thesis Preparation**
Non-credit.

**Doctor of Philosophy Courses****SSW 410. Research Design and Knowledge Generation**

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course focuses on logic methods and methods of scientific inquiry in the social sciences. Students explore the logic of knowledge building with reference to rational, empirical and cultural processes. Rational processes examined include logic, model building, hypothesis testing, induction, and deduction, and appraisal of knowledge claims. Empirical processes examined include observation, symbolic representation of data, and data structures. Cultural processes examined include the effect of culture on conceptualization, priorities, ethical considerations and resource distribution. Students are expected to develop methodological rigor as well as critical assessment of contemporary research issues that affect social work practice.

SSW 411. Research II: Social Work Practice Evaluation

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

Provides social work students with skills required to apply the methods of science to the assessment of social work practice with individuals and groups, social programs, and social policy. The course combines traditional social work research methods with epidemiological methods to examine four interrelated topics: (1) evaluation as a component of planning and development of social policies, social service programs, and social work interventions, (2) conducting needs assessments and diagnostic assessments, (3) monitoring social work intervention program implementation and operation, and (4) conducting impact studies. Integrating diversity and cultural competencies with the evaluation process is also covered

SSW 412. Research III: Multivariate Statistics I

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course builds on an introductory level of statistical knowledge and assumes that students have completed an introductory statistics course, including experiences with data analyses that involve computer-based interactions (SPSS, SAS, etc.). This course develops an understanding of the general linear model (GLM). Once students gain a solid understanding of GLM, they can extend their knowledge to a variety of more complex statistical tests. The course focuses on the selection and application of appropriate statistical procedures to answer research questions or test hypotheses in social work research and involves the extensive use of available statistical packages. While the course emphasizes understanding of statistical testing, interpretation, and written presentation of statistical results, knowledge of the mathematical formulae and assumptions underlying each statistical procedure will be required and discussed.

SSW 413. Research IV: Multivariate Statistics II

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course builds upon SSW 412 and also focuses on the selection and application of appropriate statistical procedures to answer research questions or test hypotheses in social work research. It focuses on data reduction methods and analyses of discrete or categorical data and makes extensive use of commercial statistical packages. While the course emphasizes understanding of statistical testing, interpretation, and written presentation of statistical results, knowledge of the mathematical formulae and assumptions underlying each statistical procedure is required and discussed.

SSW 420. Critical Analysis of Historical and Philosophical Themes of the Profession

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course helps students to develop critical and historical understanding of social work knowledge, values and interventions. It reviews the social, economic, political and intellectual forces that influence the development of social welfare and professional social work. It examines the role that conflicting ideologies and commitments play in alleviating stress and suffering. The course focuses on knowledge of the development and history of social work in the context of changing social, economic, political and intellectual environments.

SSW 431. Social and Behavioral Science: Smaller Target Systems

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course helps students to understand the theoretical and empirical frameworks on which contemporary best practices are built. The theories and frameworks examined include cognitive, behavioral/social learning, psychodynamic, family systems, and other related concepts. Other theories may be added that have been demonstrated to be valid underpinnings of effective or promising social work practice.

SSW 432. Social and Behavioral Science: Knowledge Base for Practice with Large Target Systems

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course conveys substantive knowledge from social science disciplines that inform macro practice with large systems (community organization, administration, and policy practice). Relevant disciplines include economics, political science, sociology (including organizational theory), anthropology, and epidemiology. Students use fundamental knowledge in each of these social sciences to demonstrate competence in the application of major social science theoretical models relevant to macro practice and the empirical evidence that supports these theories. Connections between macro and micro practice (social work with small systems)

is covered. Ethical implications of knowledge developed by disciplines with different value bases when applied to social work is also covered.

SSW 440. Comparative Social Work Practice Models (Micro Practice)

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course explores the major social casework and group practice models from historical, theoretical, and empirical perspectives. Current practice approaches and models from related fields empirically shown to be most effective or promising are examined. Selected social work models are examined within the social, political, and ideological contexts of their times, as well as with respect to their contributions to the profession's knowledge base. Each model's contribution to the knowledge base and to direct practice methods are investigated and related to the student's conceptual and practice experiences.

SSW 441. Comparative Social Work Practice Models (Macro Practice)

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course explores the evolution and current development of macro practice methods, including community organization, administration, and policy practice in social work. After a brief review of the conceptual history of macro practice social work, the course examines the unique roles of macro practice methods in carrying out the mission of the profession. Value issues and ethical dilemmas associated with social advocacy and policy change are examined throughout.

SSW 451. Dissertation Preparation Seminar

3 credits. Lecture. Open to doctoral students in Social Work, others with permission.

This course is designed to assist students in identifying suitable dissertation topics and developing appropriate methodological approaches. It provides opportunities to assist students in building a firm foundation, upon which to engage in independent research and scholarship and to advance existing knowledge. Students prepare papers related to their dissertation topics for presentation and discussion with the group and for external conferences, in the process strengthening their scientific communication skills

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

SOCIOLOGY

Department Head: Associate Professor John Manning

Professors: Abrahamson, Broadhead, Dashefsky, Glasberg, Goodstein, Naples, Rockwell, Sanders, Taylor, Tuchman, Villemez, Wallace, and Weakliem

Associate Professors: Aseltine, Bernstein, Cazenave, McNeal, Purkayastha, and Wright

Assistant Professors: Brakefield-Younts, Cheng, Fischer, Mulcahy, Price, and Ratcliff

The Department of Sociology offers study leading to the M.A. and Ph.D. degrees in Sociology. Available areas of study include political sociology and social movements, gender and sexualities, racism and ethnic group relations, stratification and inequality, deviance, social structure and personality, and theory. Members of the Department also are associated with Women's Studies, Judaic Studies, African Studies, African-American Studies, Asian American Studies, and Human Rights programs.

The Department regards a basic understanding of research methods and statistics to be an essential part of graduate training in sociology. Accordingly, students are required to pass a basic statistics course as a prerequisite to the quantitative methods course.

Requirements for the M.A. The purpose of all courses, residence, exams, and dissertation requirements is training and education for scholarly work and research in either an academic or applied setting.

Students should complete the M.A. degree in two years or less. Students may (1) write a Master's thesis (required for admission to the Ph.D. program) or (2) submit a portfolio of their scholarly work in four areas: social structure and personality, social theory, social organization, and methods (for a terminal M.A. degree). Portfolios may be submitted at any time.

The Master's degree in Sociology requires a minimum of 37 credits, including Sociology 301 (Proseminar, 1 credit), Sociology 308 (Core Theorists, 3 credits), Sociology 321 (The Logic of Social Research, 3 credits), Sociology 326 (Quantitative Research I, 3 credits), and Sociology 324 (Qualitative Research I, 3 credits).

Students with Master's Degrees in fields other than Sociology. Students with Master's degrees in fields other than sociology may be admitted into the regular Master's program even if their goal is the Ph.D. Applicants will remain in the Master's program until they have satisfied the equivalency requirements as determined by the advisory committee and the graduate admissions committee.

Requirements for the Ph.D. The Ph.D. in Sociology requires a minimum 30 credits beyond the Master's degree, including Sociology 309 (Contemporary Social Theory, 3 credits), Sociology 327 (Quantitative Research II, 3 credits), and Sociology 325 (Qualitative Research II, 3 credits).

Candidates for the Ph.D. are required to have a Master's degree in Sociology or its equivalent as determined by the admissions committee.

Students who have been admitted to the Ph.D. Program by the departmental admissions committee are eligible to take the General Examination for the Ph.D. degree after fulfilling residence and course requirements, including the foreign language requirement (or six to nine credits in a related area).

The General Examination consists of two area examinations in areas chosen by the student with the advice and consent of the advisory committee. Each area examination assesses substantive and theoretical knowledge of the area, critical thinking and assessment skills, an understanding of the implications of this knowledge for general sociology, and methodological skills appropriate to the area.

COURSES OF STUDY

SOCI 300. Independent Study for Graduate Students

1-6 credits. Independent Study.

Special topic readings or investigations.

†SOCI 301. Proseminar

1 credit. Lecture.

Required of all M.A. candidates in the first year of study. Covers issues of successful graduate education and professionalization, including transitioning from the role of student to scholar; mentoring; networking; choosing thesis topics; presenting papers at conferences; getting papers published; getting grants; and developing vitae.

SOCI 302. Topics in Sociological Theory.

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory. Topics will vary by semester.

SOCI 303. Teaching Sociology

1-3 credits. Seminar. Open only to graduate students in Sociology.

A survey and discussion of the content, viewpoints and methods that can be employed in teaching sociology. Emphasis is on course preparation for new teachers.

SOCI 304. Topics in Racism and Ethnic Group Relations

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological analyses of racism and ethnic group relations. Topics will vary by semester.

SOCI 305. Investigation of Special Topics

1-3 credits. Seminar.

A seminar course. Topics vary by semester.

SOCI 307. History of Sociological Theory

3 credits. Lecture.

A historical analysis of the development of sociological theory. This course focuses upon the enduring questions that sociological theory has addressed, and the relations of sociological theory to

prevailing social and intellectual conditions. An emphasis is placed upon 19th and early 20th century theorists, such as: Comte, Spencer, Sumner, Pareto, Simmel and others.

SOCI 308. Core Theorists

3 credits. Seminar.

An examination of the original writings of the major figures in sociological theory: Durkheim, Marx, Weber, and Simmel. The course focuses upon the theories of these major figures, their relations with contemporaries, their interconnections, and their influence upon subsequent theory and theory groupings.

SOCI 309. Current Theory and Research

3 credits. Seminar. Prerequisite: SOCI 308.

An examination of current theories. Topics include: consideration of their continuities with classical theories, conceptual and measurement problems in testing and constructing current theories, and the interplay between theory and research.

SOCI 310. Topics in Individuals and Society

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory and research concerning the relationship between individuals and society. Topics will vary by semester.

SOCI 311 Topics in Culture

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory and research in culture. Topics will vary by semester.

SOCI 312. Feminist Theory and Social Science

3 credits. Seminar.

Examines intellectual background and contemporary context for feminist theoretical debates in the social sciences. Explores these debates with reference to feminist perspectives on political theory, science, economics, postmodernism, postcolonialism, globalization, socialization, and sexuality.

SOCI 314. Human Ecology

3 credits. Lecture.

A review of ecological theories and their application to the study of the human community.

SOCI 315. The Community

3 credits. Lecture.

A critical analysis of current theories of the nature of the community, its types, functions, processes, agencies, and values. Emphasis is given to community surveys and community organization.

SOCI 320. Seminar in Quantitative Methods in Sociology

3 credits. Seminar.

Introduction to quantitative techniques in sociology and computer data analysis. A prior undergraduate course in social statistics is recommended.

SOCI 321. The Logic of Social Research

3 credits. Seminar

Required of all M.A. candidates in the first year of study. Covers the logic of how to frame and design social research. Topics include the link between theory and method, selection of a research topic, inductive versus deductive reasoning, causality (including research designs for identifying causal relations) and causal errors, conceptualization, operationalization, levels of analysis, measurement, reliability and validity, sampling, using mixed methods, research ethics, and the politics of social research.

SOCI 323. Applied Survey Design and Analysis

3 credits. Lecture. Prerequisite: SOCI 322.

The design, administration, and analysis of sample surveys.

SOCI 324. Qualitative Research I

3 credits. Seminar. Open to master's and doctoral students in Sociology, others with permission.

Introduction to qualitative methods of social research. Topics include epistemologies of qualitative methodologies; ethical issues in qualitative research; the Chicago School; symbolic interactionism and grounded theory; introduction to fieldwork; basic fieldwork techniques; interviewing; narrative analysis; textual analysis; data analysis; content analysis using computers; and writing analyses of data.

SOCI 325 Qualitative Research II

3 credits. Seminar.

Advanced topics in qualitative methods of social research. Topics include contemporary debates in qualitative methodology; critical perspectives on qualitative methodology; feminist research; institutional ethnography; the case method; extended case method; Third World and postcolonial approaches to social research; analyzing and reanalyzing field data; applied and evaluation research; participatory and activist research.

SOCI 326. Quantitative Research I

3 credits. Seminar. Prerequisites: SOCI 320 or its equivalent and SOCI 321.

Required of all M.A. candidates in the first year of study. Introduction to quantitative methods of social research. Topics include linear regression, including ANOVA and ANCOVA; hypothesis testing and model selection; regression diagnostics; non-linearity and functional form; path analysis; and factor analysis.

SOCI 327. Quantitative Research II

3 credits. Seminar

Advanced quantitative methods of social research. Topics include generalized linear models, including binary logit and probit, multinomial logit, ordered logit and probit, and count data; censoring, truncation, and sample selection; panel data; and correlated errors

SOCI 328. Topics in Qualitative Methods

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in qualitative methods in sociological research. Topics will vary by semester.

SOCI 329. Topics in Quantitative Methods
3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in quantitative methods in sociological research. Topics will vary by semester.

SOCI 334. Racism
3 credits. Seminar.

Variable topics in the study of racism, such as racism and U.S. social policy, white racism, and the social construction of whiteness. Topic may vary by semester.

SOCI 337. Seminar on Society and the Individual
3 credits. Seminar.

A comparative analysis of the major theoretical approaches to individual-society relations, with an emphasis upon interdisciplinary contributions and trends of development. Contemporary issues and the prospects for theoretical integration are examined in the perspective of the long-term development of the field.

SOCI 340. Seminar on Crime and Justice
3 credits. Seminar.

Broad survey of topics and issues relating to crime and the criminal justice system in the United States. Emphasis on policy issues.

SOCI 341. Topics in Deviance and Crime
3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory and research in deviance and crime. Topics will vary by semester.

SOCI 342. Majority-Minority Group Relations
3 credits. Lecture.

Current theories of majority-minority group relations with special reference to prejudice; methodological issues, case studies and surveys.

SOCI 343. Seminar on American Jewry
3 credits. Seminar.

Applications of sociological theory and methods to the analysis of American Jewry.

SOCI 344. Sociology of Mental Illness
3 credits. Lecture.

Socio-cultural processes in relation to mental illness. Critique of sociological thinking regarding etiology, forms and treatment of mental illness.

SOCI 345. Deviant Behavior
3 credits. Lecture.

Review of theory and research, with emphasis on their implications for a general theory of deviant behavior.

SOCI 347. Social Gerontology
3 credits. Lecture.

A basic consideration of the societal aspects of aging including the social psychological concomitants of adjustments, changing roles, and systems of social relationships.

SOCI 349. Medical Sociology
3 credits. Lecture.

An examination of the institutional pattern of health care, including the social aspects of health and sickness, types of practitioners, and the social organization of therapeutic settings.

SOCI 351. Demography
3 credits. Seminar.

Survey and analysis of theories and present problem areas in demography. This includes such topics as: population growth and distribution, population composition, mortality, fertility, migration, and population policy.

SOCI 353. Methods of Population Analysis
3 credits. Seminar.

The sources and characteristics of demographic data and vital statistics and the methods and problems of population data analysis.

SOCI 354. Seminar in the Family
3 credits. Seminar.

An analytical study of the family as a social group in terms of structure, member roles, and function with an examination of ethnic, religious, and class differences. The interrelationship between the family and its cultural context is analyzed with particular reference to the impact of modern culture.

SOCI 356. Gender and Society
3 credits. Seminar.

Critical appraisal of social scientific perspectives on women and men. Feminist theory and current social science research on gender. Emphasis on interdisciplinary approaches.

SOCI 357. Seminar in Human Fertility, Mortality, and Migration
3 credits. Seminar.

A review and critique of the literature on fertility, mortality and migration, and the dynamic interaction of these variables in population change.

SOCI 358. Topics in Gender and Sexualities
3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory and research in gender and sexualities. Topics will vary by semester.

SOCI 359. Energy, Environment, and Society
3 credits. Seminar.

Sociological perspectives on energy production, distribution and consumption; environmental impacts and constraints; alternative energy and environment futures; and cross-national studies of policy formation and implementation.

SOCI 360. Analysis of Social Organization
3 credits. Seminar.

An examination of patterns of social organization found in bureaucracies and voluntary associations.

SOCI 361. Topics in Political Sociology
3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory and research in political sociology. Topics will vary by semester.

SOCI 362. Gender, Politics and the State
3 credits. Seminar.

Explores gendered construction of state and politics with attention to changes over time, across cultures and political institutions. Examines key debates within feminist political and legal theories and third world feminist and post colonialist theories of the state. Discusses links between local resistance, immigration, cultural citizenship, international politics, neoliberal discourse, and global economic restructuring.

SOCI 363. Seminar in Social Control of Deviant Behavior
3 credits. Seminar.

SOCI 364. Political Sociology
3 credits. Seminar.

Sociological aspects of political institutions and behavior; social and economic bases of political power, ideology, and mobilization of support; community and national power systems, political parties, and elites.

SOCI 365. Social Change
3 credits. Lecture.

A study of the forces prompting and impeding societal change with particular attention to those operative in contemporary society. Major theories of social change are examined.

SOCI 366. Seminar in Social Stratification
3 credits. Seminar.

Social class theories, and problems of distribution of power and privileges. Some attention will be given to a comparative analysis of class systems.

SOCI 367. Seminar in Theories of the State
3 credits. Lecture.

A sociological examination of theoretical analysis of the role of the state in modern society, and the relationship between the state and the applications of these theories to empirical analyses of specific research questions.

SOCI 368. The Metropolitan Community
3 credits. Lecture.

Topics in urban sociology.

SOCI 369. Seminar in Comparative Urbanization
3 credits. Seminar.

Urbanization as a factor in social and cultural change, particularly in developed areas: Asia, Africa and Latin America.

SOCI 370. Inequality and the Welfare State

3 credits. Seminar.

Analysis of the relationship between systems of racial, class, and gender inequality, and the formation and implementation of social policy by the contemporary U.S. welfare state.

SOCI 371. Topics in Stratification and Inequality

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Special topics in sociological theory and research in social stratification and inequality. Topics will vary by semester.

SOCI 372. Law and Society

3 credits. Lecture.

An overview of theoretical perspectives in the sociology of law, with emphasis on classical social theory.

SOCI 374. Comparative Analysis of Power Structures

3 credits. Lecture.

Analysis of power structures, with special references to the ways in which they are transformed.

SOCI 375. Sociology of Work

3 credits. Seminar.

Analysis of work behavior with particular attention to formal and informal organization of labor, white collar, executive and professional roles.

SOCI 380. Sociological Perspectives on Socio-Economic Development

3 credits. Seminar.

A critical review of differing analyses of developing countries as they concern social structure, processes of change, and blockages in development.

SOCI 382. Health Organizations and Their Environments

3 credits. Lecture.

An in-depth analysis of the interaction between organizations and their sociological environments. An emphasis is placed on health service organizational obstacles to health planning.

SOCI 383. Cross-National Study of Health Systems

3 credits. Lecture.

An analysis of national health systems in relation to their socio-economic, political, cultural, and epidemiologic contexts. The examination of alternative approaches to organizing scarce health care resources serves as an integrating theme for the course.

SOCI 390. Social Movements

3 credits. Seminar.

Analysis of the conditions and processes underlying movement formation and participation and influencing their careers and outcomes.

†GRAD 395. Master's Thesis Research

1 - 9 credits.

†GRAD 396. Full-Time Master's Research

3 credits.

†GRAD 397. Full-Time Directed Studies (Master's Level)

3 credits.

GRAD 398. Special Readings (Master's)

Non-credit.

GRAD 399. Thesis Preparation

Non-credit.

SOCI 401. Advanced Topics in Sociological Theory

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory. Topics will vary by semester.

SOCI 402. Advanced Topics in Quantitative Methods

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in quantitative methods in sociological research. Topics will vary by semester.

SOCI 403. Advanced Topics in Qualitative Methods

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in qualitative methods in sociological research. Topics will vary by semester.

SOCI 404. Advanced Topics in Racism and Ethnic Group Relations

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in racism and ethnic group relations. Topics will vary by semester.

SOCI 405. Advanced Topics in Sociology

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological analysis. Topics will vary by semester.

SOCI 406. Advanced Topics in Deviance and Crime

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in deviance and crime. Topics will vary by semester.

SOCI 407. Advanced Topics in Gender and Sexualities

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in gender and sexualities. Topics will vary by semester.

SOCI 408. Advanced Topics in Political Sociology

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in political sociology. Topics will vary by semester.

SOCI 409. Advanced Topics in Stratification and Inequality

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in social stratification and inequality. Topics will vary by semester.

SOCI 410. Advanced Topics in Individuals and Society

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in the relationship between individuals and society. Topics will vary by semester.

SOCI 411. Advanced Topics in Culture

3 credits. Seminar. With a change in content, this course may be repeated to a maximum of 9 credits.

Advanced topics in sociological theory and research in culture. Topics will vary by semester.

†GRAD 495. Doctoral Dissertation Research

1 - 9 credits.

†GRAD 496. Full-Time Doctoral Research

3 credits.

†GRAD 497. Full-Time Directed Studies (Doctoral Level)

3 credits.

GRAD 498. Special Readings (Doctoral)

Non-credit.

GRAD 499. Dissertation Preparation

Non-credit.

STATISTICS

Department Head: Professor Dipak Dey

Professors: Chen, Glaz, Kuo, Mukhopadhyay,

Ravishanker, Vitale, and Wang

Assistant Professors: Alvarez, M'lan, and Pozdnyakov

Adjunct Associate Professors: Cappelleri, Ray, and Ting

The Department of Statistics offers work leading to the M.S. and Ph.D. degrees, as well as courses in applied statistics in support of graduate programs in other fields. The M.S. program combines training in both statistical application and theory. To broaden their view of the use of statistics, candidates for the master's degree are required to enroll in at least one course involving the application of statistics offered by any other department on campus except Computer Science and Mathematics. In addition, students are encouraged to become involved in the statistical consultation work done by members of the Department. The doctoral program also provides a balance between statistical methods and theory. It emphasizes the development of the ability to create new results in statistical methods, statistical theory, or probability. After completing the necessary course work and a sequence of comprehensive written and oral examinations, the Ph.D. student must write a dissertation representing an original contribution to the field of statistics or probability. It is possible for the dissertation to be predominantly a development of statistical methodology in new areas of application. Both the M.S. and Ph.D. programs allow students sufficient flexibility to pursue their interests and to provide the time to take courses offered by other departments.

There are no official course requirements for admission to graduate study in the Department, but a degree of mathematical facility is necessary for acceptable progress through the program.

The Department of Statistics is housed in the College of Liberal Arts and Sciences Building. Extensive computational facilities are available through three operating systems: Linux, Unix, and PC-Based NT. The Homer Babbidge Library provides excellent coverage of current and past issues of statistics journals as well as books in this field. There is also a separate departmental library.

COURSES OF STUDY

STAT 300. Investigation of Special Topics
1-6 credits. Independent Study.

STAT 301. Introduction to Applied Statistics

3 credits. Lecture. Not open to students who have passed STAT 201 or STAT 201Q.

One-, two- and k-sample problems, regression, elementary factorial and repeated measures designs, covariance. Use of computer packages, e.g., SAS and MINITAB.

STAT 310. Distribution Theory for Statistics

3 credits. Letcure. Open to graduate students in Statistics, others with permission.

STAT 311. Supervised Research in Statistics

1-6 credits. Practicum.

STAT 314. Advanced Statistical Methods
3 credits. Lecture.

Discrete and continuous random variables, exponential family, joint and conditional distributions, order statistics, statistical inference: point estimation, confidence interval estimation, and hypothesis testing.

STAT 315. Mathematical Statistics I
3 credits. Lecture.

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

STAT 316. Mathematical Statistics II
3 credits. Lecture. Prerequisite: STAT 315.

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

STAT 320. Applied Statistics I
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

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

STAT 321. Applied Statistics II
3 credits. Lecture. Prerequisite: STAT 320.

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

STAT 330. Statistical Inference I
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

Exponential families, sufficient statistics, loss function, decision rules, convexity, prior information, unbiasedness, Bayesian analysis, minimaxity, admissibility, simultaneous and shrinkage estimation, invariance, equivariant estimation.

STAT 331. Statistical Inference II
3 credits. Lecture. Open to graduate students in Statistics, others with permission. Prerequisite: STAT 330.

Statistics and subfields, conditional expectations and probability distributions, uniformly most powerful tests, uniformly most powerful unbiased tests, confidence sets, conditional inference, robustness, change point problems, order restricted inference, asymptotics of likelihood ratio tests.

STAT 332. Linear Statistical Models
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

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

STAT 333. Advanced Probability
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

Fundamentals of measure and integration theory: fields, o-fields, and measures; extension of measures; Lebesgue-Stieltjes measures and distribution functions; measurable functions and integration theorems; the Radon-Nikodym Theorem, product measures, and Fubini's Theorem. Introduction to measure-theoretic probability: probability spaces and random variables; expectation and moments; independence, conditioning, the Borel-Cantelli Lemmas, and other topics as time allows.

STAT 342. Analysis of Experiments
3 credits. Lecture. Prerequisite: STAT 301. Not open to students who have passed STAT 242 or STAT 242Q.

Straight-line regression, multiple regression, regression diagnostics, transformations, dummy variables, one-way and two-way analysis of variance, analysis of covariance, stepwise regression.

STAT 343. Design of Experiments
3 credits. Lecture. Prerequisite: STAT 301. Not open to students who have passed STAT 243 or STAT 243Q.

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

STAT 352. Sampling Theory
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

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

STAT 356. Introduction to Operations Research

3 credits. Lecture. Open to graduate students in Statistics, others with permission.

STAT 361. Statistical Computing

3 credits. Lecture. Open to graduate students in Statistics, others with permission.

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

STAT 372. Introduction to Biostatistics
3 credits. Lecture.

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

STAT 373. Clinical Trials
3 credits. Lecture.

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

STAT 374. Concepts and Analysis of Survival Data
3 credits. Lecture.

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

STAT 379. Quantitative Methods in the Behavioral Sciences
3 credits. Lecture.

A course designed to acquaint the student with the application of statistical methods in the behavioral sciences. Correlational methods include multiple regression and related multivariate techniques.

STAT 380. Applied Time Series
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

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

STAT 382. Applied Multivariate Analysis
3 credits. Lecture. Open to graduate students in Statistics, others with permission.

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

†GRAD 395. Master's Thesis Research
1 - 9 credits.**†GRAD 396. Full-Time Master's Research**
3 credits.**†GRAD 397. Full-Time Directed Studies (Master's Level)**
3 credits.**GRAD 398. Special Readings (Master's)**
Non-credit.**GRAD 399. Thesis Preparation**
Non-credit.**STAT 410. Seminar in Applied Statistics**
1-6 credits. Seminar. Open to graduate students in Statistics, others with permission.**STAT 420. Seminar in Nonparametric Statistics**
1-6 credits. Lecture. Open to graduate students in Statistics, others with permission.**STAT 430. Seminar in Multivariate Statistics**
1-6 credits. Lecture. Open to graduate students in Statistics, others with permission.**STAT 440. Seminar in the Theory of Statistical Inference**
1-6 credits. Lecture. Open to graduate students in Statistics, others with permission.**STAT 450. Seminar in the Theory of Probability and Stochastic Processes**
1-6 credits. Lecture. Open to graduate students in Statistics, others with permission.**STAT 460. Sem in Biostatistics**
1-6 credits. Lecture. Open to graduate students in Statistics, others with permission.**STAT 470. Seminar in Applied Probability**
1-6 credits. Lecture. Open to graduate students in Statistics, others with permission.**†GRAD 495. Doctoral Dissertation Research**
1 - 9 credits.**†GRAD 496. Full-Time Doctoral Research**
3 credits.**†GRAD 497. Full-Time Directed Studies (Doctoral Level)**
3 credits.**GRAD 498. Special Readings (Doctoral)**
Non-credit.**GRAD 499. Dissertation Preparation**
Non-credit.

WOMEN'S STUDIES

Program Director: Dr. Marita McComiskey
Core Faculty: S.P. Benson, M. Breen, M. Crawford, A. D'Alleva, F. Dussart, V. Makowsky, D. Meyers, and N. Naples

In virtually every field of university study, scholarship on women and gender has become increasingly influential because of its path-breaking theoretical perspectives and its empirical findings. The programs of virtually every professional association testify to the vitality and presence of feminist research.

The Women's Studies Graduate Certificate at the University of Connecticut can be earned by students enrolled in a graduate degree program, or as a stand-alone certificate for those who have completed their undergraduate degree.

Although feminist scholarship may be available in other disciplines, Women's Studies offers a concentrated perspective and in-depth analysis. The graduate certificate enables students to pursue interdisciplinary study in this flourishing field while enhancing their educational background by encouraging the integration of personal, academic and political experiences and ideals.

Because the program is interdisciplinary and students will approach the certificate from a range of home fields and with widely varying preparation, all certificate plans of study will be individualized. Each certificate candidate combines the study of Women's Studies theory and methodology, either through current study or prior preparation. The core faculty of the Women's Studies Program will act as advisors to certificate students; careful advising will ensure that each student's program has the appropriate interdisciplinary breadth and fits appropriately with her/his other course work and professional needs.

All Women's Studies certificate plans of study must include work in more than one department and must be approved by the Program Director or her designee, who will coordinate the certificate program.

The requirements for the Graduate Certificate in Women's Studies follow:

1. For non-degree students:

Open to students with a bachelor's degree upon approval of the Women's Studies Graduate Study Committee.

Requires 12 hours of course work, of which at least nine hours must be at the 300 level or above, including:

Philosophy 352 – Feminist Theory
Women's Studies 365 – Women's Studies Research Methodology

Not more than one Women's Studies 390 may be applied to the certificate.

2. For students enrolled in existing graduate programs:

Open to students enrolled in any UConn graduate program.

Requires 12 hours of course work, of which at least nine hours must be at the 300 level or above.

Not more than one Women's Studies 390 may be applied to the certificate.

Application forms for both options may be obtained from the Women's Studies Program office.

Courses applicable to the Graduate Certificate in Women's Studies include many advanced 200-level Women's Studies courses and the following graduate-level Women's Studies courses as well as a variety of courses in Anthropology, English, French, History, Human Development and Family Studies, Philosophy, Political Science, Psychology, and Sociology. Each semester the Women's Studies Program publishes a list of the applicable courses to be offered in the following semester.

COURSES OF STUDY

WS 301. Women and American Education

3 credits. Seminar.

An interdisciplinary analysis of gender and the issue of sex equity in American educational institutions from the Colonial to the contemporary period.

WS 315. Gender and Culture

3 credits. Lecture.

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

WS 333. Topics in the History of American Women

3 credits. Lecture.

WS 341. Analysis of Rituals

3 credits. Lecture. Prerequisite: Anthropology 311.

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

WS 344. Psychology of Women and Gender

3 credits. Lecture.

A survey of research and theory on the interpretation of sex differences; gender, status, and power, and women's life span development.

WS 365. Women's Studies Research Methodology for Graduate Students

3 credits. Lecture.

Discussion of feminist and gender-oriented research methods and their relation to traditional disciplines. Analysis of gender bias in research design and practice. Major independent research project required.

WS 371. Genders, Sexualities, and Theories

3 credits. Lecture.

Genders and sexualities with special attention given to lesbian, gay, bisexual, and transgender issues.

WS 390. Independent Study

1-6 credits. Independent Study.

WS 395. Special Topics Seminar in Women's Studies

3 credits. Seminar.

Topics of current interest from a feminist perspective.

GRADUATE FACULTY

The Graduate Faculty includes only those individuals appointed by the dean of the Graduate School by authorization of the President. Members of the University Faculties who hold the rank of assistant professor or above at the University of Connecticut may become members of the Graduate Faculty upon recommendation of the department head (or dean of a school or college which is not departmentalized) and approval by the dean of the Graduate School if the professor's department, alone or in conjunction with another department, offers a program leading to a degree awarded through The Graduate School. A professor whose department does not offer a graduate degree program may be appointed to the Graduate Faculty by the dean of the Graduate School on the recommendation of the head of a department, (or dean of a school or college which is not departmentalized) whose graduate degree program(s) the professor would serve.

The following list is current as of June 2005.

Jorgelina Abbate, *Assistant Professor of Education*, Ph.D., Boston College
 Nelly M. Abboud, *Associate Professor of Civil Engineering*, Ph.D., University of Delaware
 Kinetsu Abe, *Professor of Mathematics*, Ph.D., Brown University, D.Sc., Tohoku University, Japan
 William Abikoff, *Professor of Mathematics*, Ph.D., Polytechnic Institute of Brooklyn
 Mark Abrahamson, *Professor of Sociology*, Ph.D., Washington University
 Michael L. Accorsi, *Professor of Civil Engineering*, Ph.D., Northwestern University
 Luke E. K. Achenie, *Professor of Chemical Engineering*, Ph.D., Carnegie-Mellon University
 K. James Ackley, *Assistant Professor of Music*, M.M., Cleveland Institute of Music
 Douglas J. Adams, *Assistant Professor of Orthopaedic Surgery*, Ph.D., University of Iowa
 Eldridge S. Adams, *Associate Professor of Ecology and Evolutionary Biology*, Ph.D., University of California, Berkeley
 Roger G. Adams, *Professor of Plant Science in Residence*, Ph.D., University of Massachusetts
 Adam J. Adler, *Assistant Professor of Medicine*, Ph.D., Columbia University
 Glenn G. Affleck, *Professor of Community Medicine and Health Care*, Ph.D., University of Connecticut
 John R. Agar, *Associate Professor of Prosthodontics*, D.D.S., Medical College of Virginia; M.A., George Washington University
 V. Bede Agocha, *Assistant Professor of Psychology*, Ph.D., University of Missouri
 H. Leonardo Aguila, *Assistant Professor of Medicine*, Ph.D., Albert Einstein College of Medicine
 Francis W. Ahking, *Associate Professor of Economics*, Ph.D., Virginia Polytechnic Institute and State University
 Julie W. Aikins, *Assistant Professor of Psychology*, Ph.D., Pennsylvania State University

Mark Aindow, *Associate Professor of Metallurgy and Materials Engineering*, Ph.D., University of Liverpool, England
 Arlene D. Albert, *Professor of Molecular and Cell Biology*, Ph.D., University of Virginia
 Andrei T. Alexandrescu, *Assistant Professor of Molecular and Cell Biology*, Ph.D., University of Wisconsin
 John Alexopoulos, *Associate Professor of Plant Science*, M.L.A., University of Massachusetts
 Michael P. Alfano, *Associate Professor of Education in Residence*, Ph.D., University of Connecticut
 Lynn M. Allchin, *Assistant Professor of Nursing*, Ph.D., Loyola University
 Rodney G. Allen, *Assistant Extension Professor*, Ph.D., Southern Illinois University
 Pamir Alpay, *Assistant Professor of Metallurgy and Materials Engineering*, Ph.D., University of Maryland
 William T. Alpert, *Associate Professor of Economics*, Ph.D., Columbia University
 Marilyn A. Altobello, *Associate Professor of Agricultural and Resource Economics*, Ph.D., University of Massachusetts
 Enrique E. Alvarez, *Assistant Professor of Statistics*, Ph.D., University of Michigan
 Reda A. Ammar, *Professor of Computer Science and Engineering*, Ph.D., University of Connecticut
 Emmanouil N. Anagnostou, *Associate Professor of Civil Engineering*, Ph.D., University of Iowa
 Elizabeth H. Anderson, *Associate Professor of Nursing*, Ph.D., University of Rochester
 Gregory J. Anderson, *Professor of Ecology and Evolutionary Biology*, Ph.D., Indiana University
 Stephen A. Anderson, *Professor of Family Studies*, Ph.D., Kansas State University
 Susan Anderson, *Professor of Philosophy*, Ph.D., University of California, Los Angeles
 Thomas Frank Anderson, *Associate Professor of Chemical Engineering*, Ph.D., University of California, Berkeley
 Sheila M. Andrew, *Associate Professor of Animal Science*, Ph.D., University of Maryland
 Robert F. Andrie, *Associate Professor of Geography*, Ph.D., State University of New York, Buffalo
 Brian J. Aneskievich, *Associate Professor of Pharmacology*, Ph.D., State University of New York, Stony Brook
 Raymond Albin Anselment, *Professor of English*, Ph.D., University of Rochester
 Srdjan D. Antic, *Assistant Professor of Neuroscience*, M.D., M.S., Belgrade University, Yugoslavia
 A. F. Mehdi Anwar, *Professor of Electrical Engineering*, Ph.D., Clarkson University
 Theodore E. Arm, *Professor of Music*, D.M.A., Juilliard School of Music
 Frank P. Armstrong, *Assistant Professor of Art*, M.F.A., Yale University
 Lawrence E. Armstrong, *Professor of Education*, Ph.D., Ball State University
 Andrew Arnold, *Professor of Medicine*, M.D., Harvard University
 Vicky Arnold, *Associate Professor of Accounting*, Ph.D., University of Arkansas
 Alexandru D. Asandei, *Assistant Professor of Materials Science*, Ph.D., Case Western Reserve University
 Nehama Aschkenasy, *Professor of Judaic and Middle Eastern Studies in Residence*, Ph.D., New York University

Robert H. Aseltine, *Associate Professor of Behavioral Sciences and Community Health*, Ph.D., University of Michigan
 Marysol W. Asencio, *Associate Professor of Family Studies*, Dr.P.H., Columbia University
 Carol A. Auer, *Associate Professor of Plant Science*, Ph.D., University of Maryland
 Lisa M. Aultman-Hall, *Associate Professor of Civil and Environmental Engineering*, Ph.D., McMaster University, Canada
 Peter J. Auster, *Assistant Professor of Marine Sciences in Residence*, Ph.D., National University of Ireland
 John E. Ayers, *Associate Professor of Electrical Engineering*, Ph.D., Rensselaer Polytechnic Institute
 Fakhreddin Azimi, *Associate Professor of History*, Ph.D., Oxford University, England
 Sulim Ba, *Associate Professor of Operations and Information Management*, Ph.D., University of Texas
 Thomas F. Babor, *Professor of Community Medicine and Health Care*, Ph.D., University of Arizona
 Amvrosios C. Bagtzoglou, *Associate Professor of Civil and Environmental Engineering*, Ph.D., University of California, Irvine
 Ben A. Bahr, *Associate Professor of Pharmacology*, Ph.D., University of California, Santa Barbara
 William F. Bailey, *Professor of Chemistry*, Ph.D., University of Notre Dame
 Edward Baker, *Assistant Professor of Management*, Ph.D., University of North Carolina
 Peter C. Baldwin, *Associate Professor of History*, Ph.D., Brown University
 Rajeev Bansal, *Professor of Electrical Engineering*, Ph.D., Harvard University
 Rashmi Bansal, *Assistant Professor of Neuroscience*, Ph.D., Central Drug Research Institute (India)
 Ravi Bapna, *Associate Professor of Operations and Information Management*, Ph.D., University of Connecticut
 Elisa M. B. Barbarese, *Professor of Neuroscience*, Ph.D., McGill University, Canada
 Thomas J. Barber, *Professor of Mechanical Engineering in Residence*, Ph.D., New York University
 John S. Barclay, *Associate Professor of Natural Resources Management and Engineering*, Ph.D., Ohio State University
 Keith Barker, *Professor of Computer Science and Engineering*, Ph.D., Sheffield University, England
 Janet Barnes-Farrell, *Associate Professor of Psychology*, Ph.D., Pennsylvania State University
 Regina Barreca, *Professor of English*, Ph.D., City University of New York
 Yaakov Bar-Shalom, *Professor of Electrical Engineering*, Ph.D., Princeton University
 Marianne L. Barton, *Associate Clinical Professor of Psychology*, Ph.D., University of Connecticut
 Richard F. Bass, *Professor of Mathematics*, Ph.D., University of California, Berkeley
 Richard W. Bass, Jr., *Professor of Music*, Ph.D., University of Texas
 Sherry Bassi, *Assistant Professor of Nursing*, Ed.D., University of Sarasota
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- Suman Singha, *Professor of Horticulture*, Ph.D., Cornell University
- Boris Sinkovic, *Associate Professor of Physics*, Ph.D., University of Hawaii
- C. F. Sirmans, *Professor of Finance*, Ph.D., University of Georgia
- Annelie C. Skoog, *Associate Professor of Marine Sciences*, Ph.D., University of Göteborg, Sweden
- Laurie E. Sloan, *Associate Professor of Art*, M.F.A., Temple University
- Joseph W. Smey, *Professor of Allied Health*, Ed.D., Clark University
- Henry M. Smilowitz, *Professor of Pharmacology*, Ph.D., Massachusetts Institute of Technology
- Erling Smith, *Professor of Civil Engineering*, Ph.D., University of Durham, England
- Katharine C. Smith, *Assistant Professor of English*, Ph.D., University of Connecticut
- Michael Smith, *Professor of Chemistry*, Ph.D., Purdue University
- Winthrop Ware Smith, *Professor of Physics*, Ph.D., Massachusetts Institute of Technology
- Leslie B. Snyder, *Professor of Communication Sciences*, Ph.D., Stanford University
- William B. Snyder, *Associate Professor of Linguistics*, Ph.D., Massachusetts Institute of Technology
- David R. Solomon, *Assistant Professor of Mathematics*, Ph.D., Cornell University
- David Arthur Sonstroem, *Professor of English*, Ph.D., Harvard University
- Richard H. Sosis, *Associate Professor of Anthropology*, Ph.D., University of New Mexico
- Gregory A. Sotzing, *Associate Professor of Materials Science*, Ph.D., University of Florida
- Larz S.W. Spangberg, *Professor of Endodontics*, Doct. Odont., University of Umea, Sweden
- Karen Spalding, *Professor of History*, Ph.D., University of California, Berkeley
- Robin Spath, *Assistant Professor of Social Work*, Ph.D., Brandeis University
- Cheryl Spaulding, *Associate Professor of Education*, Ph.D., Stanford University
- Kenneth Angelo Speranza, *Associate Professor of Pharmacy Administration*, Ph.D., Purdue University
- Eugene Spiegel, *Professor of Mathematics*, Ph.D., Massachusetts Institute of Technology
- Susan Spiggle, *Associate Professor of Marketing*, Ph.D., University of Connecticut
- Nikolaus A. Spoerel, *Assistant Professor of Biochemistry*, Ph.D., Free University, West Germany
- Ronald Squibbs, *Assistant Professor of Music*, Ph.D., Yale University
- Mytheli Sreenivas, *Assistant Professor of History*, Ph.D., University of Pennsylvania
- Narasimhan Srinivasan, *Associate Professor of Marketing*, Ph.D., State University of New York, Buffalo
- Pramod K. Srivastava, *Professor of Medicine*, Ph.D., Osmania University, India
- Ranjana Srivastava, *Assistant Professor of Chemical Engineering*, Ph.D., University of Maryland
- Jan Stallaert, *Associate Professor of Operations and Information Management*, Ph.D., University of California, Los Angeles
- Glenn Stanley, *Professor of Music*, Ph.D., Columbia University
- Robert W. Stephens, *Professor of Music*, Ph.D., Indiana University
- Jennifer Sterling-Folker, *Associate Professor of Political Science*, Ph.D., University of Chicago
- David A. Stern, *Professor of Dramatic Arts*, Ph.D., Temple University
- Richard G. Stevens, *Associate Professor of Community Medicine and Health Care*, Ph.D., University of Washington
- Eileen Storey, *Associate Professor of Medicine*, M.D., M.P.H., Harvard University
- Gary P. Storhoff, *Associate Professor of English*, Ph.D., University of Connecticut
- Linda D. Strausbaugh, *Professor of Molecular and Cell Biology*, Ph.D., Wesleyan University
- Philip A. Streifer, *Associate Professor of Education*, Ph.D., University of Connecticut
- Zoe L. Strickler, *Assistant Professor of Art*, M.Des., University of Alberta, Canada
- Leslie D. Strong, *Assistant Professor of Family Studies in Residence*, Ph.D., Florida State University
- William C. Stwalley, *Professor of Physics*, Ph.D., Harvard University
- Steven Suib, *Professor of Chemistry*, Ph.D., University of Illinois
- Mark E. Sullivan, *Associate Extension Professor*, Ph.D., University of Connecticut
- Chong Sook Paik Sung, *Professor of Chemistry*, Ph.D., Polytechnic Institute of New York
- Charles M. Super, *Professor of Family Studies*, Ph.D., Harvard University
- Steven G. Sutton, *Professor of Accounting*, Ph.D., University of Missouri
- Harvey Alan Swallow, *Professor of Psychology*, Ph.D., University of Miami
- Hariharan Swaminathan, *Professor of Education*, Ph.D., University of Toronto, Canada
- Mark S. Swanson, *Professor of Physics*, Ph.D., University of Missouri
- Whitney Tabor, *Associate Professor of Psychology*, Ph.D., Stanford University
- Theodore L. Taigen, *Associate Professor of Ecology and Evolutionary Biology*, Ph.D., Cornell University
- Jiong Tang, *Assistant Professor of Mechanical Engineering*, Ph.D., Pennsylvania State University
- Bette Talvacchia, *Professor of Art*, Ph.D., Stanford University
- John Tanaka, *Professor of Chemistry*, Ph.D., Iowa State University
- Jason M. Tanzer, *Professor of Oral Diagnosis*, D.M.D., Tufts University; Ph.D., Georgetown University
- Geoffrey W. Taylor, *Professor of Electrical Engineering*, Ph.D., University of Toronto, Canada
- Ronald L. Taylor, *Professor of Sociology*, Ph.D., Boston University
- Thomas D. Taylor, *Professor of Prosthodontics*, D.D.S., University of Iowa; M.S.D., University of Minnesota
- Howard Tennen, *Professor of Community Medicine and Health Care*, Ph.D., University of Massachusetts
- Alexander Teplayev, *Assistant Professor of Mathematics*, Ph.D., Cornell University
- Mark Terasaki, *Associate Professor of Physiology*, Ph.D., University of California, Berkeley
- Erin Terwilleger, *Assistant Professor of Mathematics*, Ph.D., University of Missouri
- Carolyn M. Teschke, *Associate Professor of Molecular and Cell Biology*, Ph.D., Washington State University
- Lakshman S. Thakur, *Associate Professor of Information Management*, Eng.Sc.D., Columbia University

- Edward A. Thibodeau, *Assistant Professor of Behavioral Sciences and Community Health*, D.M.D., Tufts University; Ph.D., University of Rochester
- Rebecca L. Thomas, *Assistant Professor of Social Work*, Ph.D., Temple University
- Robert Mark Thorson, *Professor of Geology and Geophysics*, Ph.D., University of Washington
- Roger S. Thrall, *Professor of Medicine*, Ph.D., Marquette University
- X. Cindy Tian, *Assistant Professor of Animal Science*, Ph.D., Cornell University
- David Tiberio, *Associate Professor of Allied Health*, Ph.D., University of Connecticut
- Robert S. Tilton, *Associate Professor of English*, Ph.D., Stanford University
- Jennifer S. Tirnauer, *Assistant Professor of Molecular Medicine*, M.D., University of Maryland
- Jeffrey Lynn Tollefson, *Professor of Mathematics*, Ph.D., Michigan State University
- Hung Ton-That, *Assistant Professor of Molecular, Microbial, and Structural Biology*, Ph.D., University of California, Los Angeles
- Lang Tong, *Associate Professor of Electrical Engineering*, Ph.D., University of Notre Dame
- Thomas Torgersen, *Professor of Geology and Geophysics*, Ph.D., Columbia University
- Jeffrey P. Townsend, *Assistant Professor of Molecular and Cell Biology*, Ph.D., Harvard University
- Constantine Trahiotis, *Professor of Neuroscience*, Ph.D., Wayne State University
- Marcia C. Trapé-Cardoso, *Associate Professor of Clinical Medicine in Residence*, M.D., University of São Paulo, Brazil
- Roger M. Travis, Jr., *Associate Professor of Classics*, Ph.D., University of California, Berkeley
- Kimberli R. H. Treadwell, *Assistant Professor of Psychology*, Ph.D., Temple University
- Gautam Tripathi, *Associate Professor of Economics*, Ph.D., Northwestern University
- John Gordon Troyer, *Associate Professor of Philosophy*, Ph.D., Harvard University
- Stephen L. Trumbo, *Associate Professor of Ecology and Evolutionary Biology*, Ph.D., University of North Carolina
- Clarence L. Trummel, *Professor of Periodontics*, D.D.S., University of Missouri; Ph.D., University of Rochester
- Eileen Trzcinski, *Assistant Professor of Economics*, Ph.D., University of Michigan
- Pei-Tsan Tsai, *Assistant Professor of Physiology and Neurobiology*, Ph.D., University of California, Berkeley
- Petros Tspouras, *Professor of Pediatrics*, M.D., National University of Athens, Greece
- Gaye Tuchman, *Professor of Sociology*, Ph.D., Brandeis University
- Celal S. Tufekci, *Assistant Professor of Mechanical Engineering in Residence*, Ph.D., Rensselaer Polytechnic Institute
- Jennifer Tufts, *Assistant Professor of Communication Sciences*, Ph.D., Pennsylvania State University
- Y. Alex Tung, *Associate Professor of Operations and Information Management*, Ph.D., University of Kentucky
- Peter Turchin, *Professor of Ecology and Evolutionary Biology*, Ph.D., Duke University
- Hans Turley, *Associate Professor of English*, Ph.D., University of Washington
- Michael Thomas Turvey, *Professor of Psychology*, Ph.D., Ohio State University
- Jane A. Ungemack, *Assistant Professor of Community Medicine and Health Care*, Dr.P.H., Columbia University
- William B. Upholt, *Professor of BioStructure and Function*, Ph.D., California Institute of Technology
- Flavio A. Uribe, *Assistant Professor of Orthodontics*, D.D.S., Institut de Ciencias de la Salud, Colombia
- Eduardo Urios-Aparisi, *Assistant Professor of Spanish*, Ph.D., University of Glasgow, United Kingdom; Ph.D., University of Illinois
- Kelly H. Uscategui, *Assistant Professor of Marketing*, Ph.D., University of South Carolina
- Marcel Utz, *Assistant Professor of Materials Science*, D.T.S., ETH Zürich, Switzerland
- Harry van der Hulst, *Professor of Linguistics*, Ph.D., Leiden University, The Netherlands
- Jaci L. VanHeest, *Assistant Professor of Education in Residence*, Ph.D., Michigan State University
- Herbert J. Van Kruiningen, *Professor of Pathobiology*, D.V.M., Ph.D., Cornell University; M.D., Brown University
- C. Arthur Van Lear, *Associate Professor of Communication Sciences*, Ph.D., University of Utah
- John F. Veiga, *Professor of Management and Organization*, D.B.A., Kent State University
- Anthony T. Vella, *Assistant Professor of Medicine*, Ph.D., Cornell University
- Sandra G. Velleman, *Assistant Professor of Animal Science in Residence*, Ph.D., University of Connecticut
- Richard Vengroff, *Professor of Political Science*, Ph.D., Syracuse University
- Kumar S. Venkitanarayanan, *Associate Professor of Animal Science*, Ph.D., University of Connecticut
- John A. Vernon, *Assistant Professor of Finance*, Ph.D., City University, England; Ph.D., University of Pennsylvania
- Roelf J. Versteeg, *Assistant Professor of Geology and Geophysics*, Ph.D., University of Paris, France
- Alexander C. Vias, *Associate Professor of Geography*, Ph.D., University of Arizona
- Wayne J. Villemez, *Professor of Sociology*, Ph.D., University of Texas
- Olga Vinogradova, *Assistant Professor of Pharmaceutical Science*, Ph.D., Case Western Reserve University
- Robert T. Vinopal, *Associate Professor of Molecular and Cell Biology*, Ph.D., University of California, Davis
- Charles I. Vinsonhaler, *Professor of Mathematics*, Ph.D., University of Washington
- Pieter Visscher, *Professor of Marine Sciences*, Ph.D., University of Groningen, The Netherlands
- Richard A. Vitale, *Professor of Statistics*, Ph.D., Brown University
- Epapante (Penny) Vlahos, *Assistant Research Professor of Marine Sciences*, Ph.D., University of Massachusetts
- Jeff S. Volek, *Assistant Professor of Education*, Ph.D., Pennsylvania State University
- Susanne Beck von Bodman, *Associate Professor of Plant Science*, Ph.D., University of Illinois
- Katarina von Hammerstein, *Associate Professor of German*, Ph.D., University of California, Los Angeles
- Jason C. Vokoun, *Assistant Professor of Natural Resources Management and Engineering*, Ph.D., University of Missouri
- Brian E. Waddell, *Associate Professor of Political Science*, Ph.D., City University of New York
- David L. Wagner, *Associate Professor of Ecology and Evolutionary Biology*, Ph.D., University of California, Berkeley
- Manuela M. Wagner, *Assistant Professor of German*, Ph.D., Graz University, Austria
- David M. Waitzman, *Assistant Professor of Neurology*, M.D., Ph.D., City University of New York
- Randall S. Walikonis, *Assistant Professor of Physiology and Neurobiology*, Ph.D., Mayo Graduate School of the Mayo Clinic
- Michael Wallace, *Professor of Sociology*, Ph.D., Indiana University
- Altina L. Waller, *Professor of History*, Ph.D., University of Massachusetts
- Stephen Walsh, *Assistant Professor of Community Medicine and Health Care*, Sc.D., Harvard University
- Bing C. Wang, *Assistant Professor of Electrical and Computer Engineering*, Ph.D., Princeton University
- Guanhua Wang, *Associate Professor of History*, Ph.D., Michigan State University
- Guiling Wang, *Assistant Professor of Civil and Environmental Engineering*, Ph.D., Massachusetts Institute of Technology
- Lei Wang, *Assistant Professor of Electrical and Computer Engineering*, Ph.D., University of Illinois
- Tixiang Wang, *Associate Professor of Mathematics*, Ph.D., University of Connecticut
- Yazhen Wang, *Professor of Statistics*, University of California, Berkeley
- Zhao-Wen Wang, *Assistant Professor of Neuroscience*, Ph.D., Michigan State University
- J. Evan Ward, *Associate Professor of Marine Sciences*, Ph.D., University of Delaware
- Glenn S. Warner, *Associate Professor of Natural Resources Management and Engineering*, Ph.D., University of Minnesota
- Nicholas Warren, *Assistant Professor of Medicine*, Sc.D., University of Massachusetts, Lowell
- Dudley T. Watkins, *Professor of Physiology*, M.D., Ph.D., Western Reserve University
- James Watras, *Associate Professor of Physiology*, Ph.D., Washington State University
- Janet S. K. Watson, *Associate Professor of History*, Ph.D., Stanford University
- Julianne Wayne, *Associate Professor of Social Work*, Ed.D., Clark University
- David Weakliem, *Professor of Sociology*, Ph.D., University of Wisconsin
- Shannon E. Weaver, *Assistant Professor of Family Studies*, Ph.D., University of Maryland
- Mei Wei, *Assistant Professor of Metallurgy and Materials Engineering*, Ph.D., University of New South Wales, Australia
- Friedmann J. Weidauer, *Associate Professor of Modern and Classical Languages*, Ph.D., University of Wisconsin
- Mary G. Weinland, *Assistant Professor of Education in Residence*, Ph.D., University of Connecticut
- Robert A. Weiss, *Professor of Chemical Engineering*, Ph.D., University of Massachusetts
- Sandra Weller, *Professor of Microbiology*, Ph.D., University of Wisconsin
- Barrett O. Wells, *Associate Professor of Physics*, Ph.D., Stanford University
- Kentwood D. Wells, *Professor of Ecology and Evolutionary Biology*, Ph.D., Cornell University

Raymond William Wengel, *Professor of Plant Science*, Ph.D., University of Wisconsin

Mark E. Westa, *Associate Professor of Plant Science*, M.L.A., Harvard University

Scott L. Wetstone, *Assistant Professor of Community Medicine and Health Care*, M.D., University of Connecticut

Samuel Crane Wheeler, *Professor of Philosophy*, Ph.D., Princeton University

Kathleen M. Whitbread, *Assistant Professor of Community Medicine and Healthcare*, Ph.D., Union Institute and University

Bruce A. White, *Professor of Physiology*, Ph.D., University of California, Berkeley

Robert Bruce Whitlatch, *Professor of Marine Sciences*, Ph.D., University of Chicago

Michael M. Whitney, *Assistant Professor of Marine Sciences*, Ph.D., University of Delaware

Stephen K. Wikel, *Professor of Physiology*, Ph.D., University of Saskatchewan, Canada

Roger B. Wilkenfeld, *Professor of English*, Ph.D., University of Rochester

Michael Willenborg, *Associate Professor of Accounting*, Ph.D., Pennsylvania State University

Peter K. Willett, *Professor of Electrical Engineering*, Ph.D., Princeton University

Michelle Williams, *Associate Professor of Psychology*, Ph.D., University of Georgia

Glen Y. Wilson, *Assistant Professor of Education*, Ph.D., Arizona State University

Richard A. Wilson, *Professor of Anthropology*, Ph.D., London School of Economics and Political Science (United Kingdom)

Andrew Winokur, *Professor of Psychiatry*, M.D., Tufts University; Ph.D., University of Pennsylvania

Sarah E. Winter, *Associate Professor of English*, Ph.D., Yale University

Steven K. Wisensale, *Professor of Family Studies*, Ph.D., Brandeis University

Leslie Wolfson, *Professor of Neurology*, M.D., Albert Einstein College of Medicine

Charles W. Wolgemuth, *Assistant Professor of Physiology*, Ph.D., University of Arizona

Thomas K. Wood, *Professor of Chemical Engineering*, Ph.D., North Carolina State University

Walter W. Woodward, *Assistant Professor of History*, Ph.D., University of Connecticut

Bradley Wright, *Associate Professor of Sociology*, Ph.D., University of Wisconsin

Carol A. Wu, *Assistant Professor of Medicine*, Ph.D., Vanderbilt University

Catherine H. Wu, *Professor of Medicine*, Ph.D., City University of New York

Dianqing Wu, *Associate Professor of Genetics and Developmental Biology*, Ph.D., Clarkson University

George Y. Wu, *Professor of Medicine*, M.D., Ph.D., Albert Einstein College of Medicine

Yu Xu, *Associate Professor of Nursing*, Ph.D., State University of New York, Buffalo

David A. Yalof, *Associate Professor of Management*, Ph.D., Johns Hopkins University

Xiangzhong Yang, *Professor of Animal Science*, Ph.D., Cornell University

Xiusheng Yang, *Professor of Natural Resource Management and Engineering*, Ph.D., Ohio State University

Xudong Yao, *Assistant Professor of Chemistry*, Ph.D., University of Maryland

Charles Yarish, *Professor of Ecology and Evolutionary Biology*, Ph.D., Rutgers University

Philip L. Yeagle, *Professor of Molecular and Cell Biology*, Ph.D., Duke University

Edvin Yegir, *Associate Professor of Art*, M.F.A., Yale University

Susanne F. Yelin, *Assistant Professor of Physics*, Ph.D., Ludwig-Maximilians Universität, Germany

Andrew Yiannakis, *Professor of Education*, Ph.D., University of New Mexico

Fang Yin, *Assistant Professor of Operations and Information Management*, Ph.D., University of Texas

Mark A. Youndt, *Assistant Professor of Management*, Ph.D., Pennsylvania State University

Michael Young, *Associate Professor of Education*, Ph.D., Vanderbilt University

Lixia Yue, *Assistant Professor of Physiology*, Ph.D., McGill University, Canada

Richard A. Zeff, *Associate Professor of Pathology*, Ph.D., Rush University

Bi Zhang, *Professor of Mechanical Engineering*, Ph.D., Tokyo Institute, Japan

Peng Zhang, *Assistant Professor of Mechanical Engineering*, Ph.D., University of Illinois

Ping Zhang, *Associate Professor of Molecular and Cell Biology*, Ph.D., Albert Einstein College of Medicine

Shengli Zhou, *Assistant Professor of Electrical and Computer Engineering*, Ph.D., University of Minnesota

Lei Zhu, *Assistant Professor of Chemical Engineering*, Ph.D., University of Akron

Qiang Zhu, *Assistant Professor of Endodontology*, Ph.D., University of Connecticut

Qing Zhu, *Associate Professor of Electrical and Systems Engineering*, Ph.D., University of Pennsylvania

Christian M. Zimmermann, *Associate Professor of Economics*, Ph.D., Carnegie Mellon University

Steven A. Zinn, *Professor of Animal Science*, Ph.D., Michigan State University

Cyrus Zirakzadeh, *Professor of Political Science*, Ph.D., University of California, Berkeley

Michael A. Zito, *Associate Professor of Allied Health*, M.S., Ohio State University

Mark G. Zurolo, *Assistant Professor of Art*, M.F.A., Yale University

RESEARCH PROFESSORS AND RESEARCH SCIENTISTS

Research professors and research scientists are affiliated with the University's many supported research programs. While some are not members of the Graduate Faculty, they contribute significantly to ongoing research in many graduate Fields of Study.

This list is current as of May 2005.

Diane Biegel, *Assistant Research Professor*, Ph.D., New York University

Steven A. Boggs, *Research Professor*, Ph.D., University of Toronto, Canada

Patricia A. Bresnahan, *Assistant Research Professor*, Ph.D., University of Connecticut

Roslyn H. Fitch, *Associate Research Professor of Psychology*, Ph.D., University of Connecticut

Linda K. Frisman, *Research Professor*, Ph.D., Brandeis University

Claire F. Michaels, *Research Professor*, Ph.D., University of Connecticut

Chandra S. Roychoudhuri, *Research Professor*, Ph.D., University of Rochester

Daniel R. Schwartz, *Research Scientist*, D.V.M., Tufts University

Danielle F. Wozniak, *Research Scientist*, Ph.D., University of Connecticut

ADJUNCT FACULTY IN THE GRADUATE SCHOOL

An appointment to adjunct faculty status in The Graduate School is honorary and recognizes an individual, who is not otherwise eligible for membership on the Graduate Faculty, possessing experience in a scholarly, scientific, or clinical field of research or practice. The following individuals have been appointed to such status by the dean of the Graduate School. Adjunct faculty members in The Graduate School may serve as Associate Advisors on graduate students' advisory committees. The Field of Study with which the individual is associated is indicated. An appointment ends on August 31 of the year noted. The list is current as of May 2005.

- Claudio L. Afonso, *Adjunct Assistant Professor of in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., University of Nebraska (2007)
- David E. Amacher, *Adjunct Professor in the Graduate School* (Pharmaceutical Science), Ph.D., Kent State University (2006)
- Todd Arnold, *Adjunct Assistant Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., University of Georgia (2006)
- Barry Baxt, *Adjunct Assistant Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., State University of New York Downstate Medical Center (2005)
- Kerry T. Blanchard, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Connecticut (2006)
- Laurine M. Bow, *Adjunct Assistant Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Connecticut (2007)
- Fred Brown, *Adjunct Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., Manchester University (2006)
- James D. Bryers, *Adjunct Associate Professor in the Graduate School* (Chemical Engineering), Ph.D., Rice University (2007)
- Thomas G. Burrage, *Adjunct Assistant Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., Clark University (2007)
- Joseph C. Cappelleri, *Adjunct Associate Professor in the Graduate School* (Statistics), Ph.D., Cornell University (2005)
- Steven D. Cohen, *Adjunct Professor in the Graduate School* (Pharmaceutical Science), D.Sc., Harvard University (2006)

- Sydney P. Craig III, *Adjunct Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., California Institute of Technology (2006)
- Michael D. Curtis, *Adjunct Associate Professor in the Graduate School* (Civil and Environmental Engineering), Ph.D., University of Connecticut (2007)
- Richard T. Darrington, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Utah (2005)
- Frederick D. Day-Lewis, *Adjunct Assistant Professor in the Graduate School* (Geological Sciences), Ph.D., Stanford University (2006)
- Jonathan Elukin, *Adjunct Associate Professor in the Graduate School* (Judaic Studies), Ph.D., Princeton University (2006)
- Jon R. Geiger, *Adjunct Assistant Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., University of Connecticut (2006)
- William T. Golde, *Adjunct Assistant Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., University of Colorado (2005)
- Domenico Grasso, *Adjunct Professor in the Graduate School* (Civil and Environmental Engineering), Ph.D., University of Michigan (2005)
- Marvin J. Grubman, *Adjunct Assistant Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., University of Pittsburgh (2005)
- Herbert E. Klei, *Adjunct Associate Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., University of Connecticut (2006)
- Masatoshi Kondo, *Adjunct Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., University of Illinois, D.Sc., University of Antwerp, Belgium (2006)
- Carl Ladd, *Adjunct Assistant Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., University of Connecticut (2006)
- Thomas M. Laue, *Adjunct Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., University of Connecticut (2005)
- David Lechuga-Ballesteros, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Michigan (2006)
- Alexandros Makriyannis, *Adjunct Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Kansas (2007)
- Dale Matheson, *Adjunct Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Pennsylvania (2007)
- Daniel P. McNamara, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Michigan (2007)
- Peter J. Oates, *Adjunct Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., Vanderbilt University (2007)
- George A. Perdizet, *Adjunct Associate Professor in the Graduate School* (Molecular and Cell Biology), M.D., University of Connecticut; Ph.D., University of Chicago (2006)
- John S. Philo, *Adjunct Associate Professor in the Graduate School* (Molecular and Cell Biology), Ph.D., Stanford University (2006)
- Bonnie K. Ray, *Adjunct Associate Professor in the Graduate School* (Statistics), Ph.D., Columbia University (2006)
- Luis L. Rodriguez, *Adjunct Assistant Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., University of Wisconsin (2005)
- Tracy Romano, *Adjunct Assistant Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., University of Rochester (2007)
- Barth F. Smets, *Adjunct Associate Professor in the Graduate School* (Civil and Environmental Engineering), Ph.D., University of Illinois (2007)
- Raymond E. Stoll, *Adjunct Professor in the Graduate School* (Pharmaceutical Science), Ph.D., Purdue University (2006)
- Bruce O. Stuart, *Adjunct Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Rochester (2007)
- Kevin R. Sweeney, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Connecticut (2006)
- Naittee Ting, *Adjunct Associate Professor in the Graduate School* (Statistics), Ph.D., Colorado State University (2006)
- Gregory J. Tsongalis, *Adjunct Associate Professor in the Graduate School* (Pathobiology and Veterinary Science), Ph.D., University of Medicine and Dentistry of New Jersey (2005)
- Jason C. White, *Adjunct Associate Professor in the Graduate School* (Environmental Engineering), Ph.D., Cornell University (2006)
- Xiang-Qun (Sean) Xie, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Connecticut (2006)
- Cen Xu, *Adjunct Assistant Professor in the Graduate School* (Pharmaceutical Science), Ph.D., Illinois State University (2006)
- De-Ping Yang, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., University of Connecticut (2005)
- Marek Zakrzewski, *Adjunct Associate Professor in the Graduate School* (Pharmaceutical Science), Ph.D., Dalhousie University, Canada (2005)

EMERITUS FACULTY AND STAFF

List from the Department of Human Resources,
University of Connecticut, March 2005

John L. Abbott, *Professor, English*
Arthur S. Abramson, *Professor, Linguistics*
Harold J. Abramson, *Professor, Sociology*
Cynthia H. Adams, *Associate Vice President,
Multicultural Affairs*
Walter C. Adelsperger, *Professor, Dramatic Arts*
Evelyn S. Ahlberg, *Assistant Professor,
Mathematics*
William A. Aho, *Professor, Poultry Science*
Janet M. Aitken, *Professor, Geology and
Geography*
Robert A. Aldrich, *Professor, Natural Resources
Management and Engineering*
Albert Alissi, *Professor, Social Work*
George J. Allen, *Professor, Psychology*
Max M. Allen, *Associate Professor, Psychology*
Polly R. Allen, *Professor, Economics*
Derek W. Allinson, *Professor, Plant Science*
Carol P. Anderson, *Associate Professor*
Robert L. Anderson, *Extension Agent,
Cooperative Extension Service*
Francis X. Archambault, *Professor, Educational
Psychology*
Ronald F. Aronson, *Professor,
Cooperative Extension Service*
Robert Asher, *Professor, History*
Richard A. Ashley, *Professor, Plant Science*
Isabelle K. Atwood, *Assistant Vice President
for Business Services*
Gerhard Austin, *Associate Professor,
Modern and Classical Languages*
Alphonse Avitabile, *Director, Waterbury Campus*
Leonid V. Azaroff, *Professor, Materials Science*
Belvy E. Bagley, *Professor, Music*
Leon E. Bailey, *Associate Vice President, Academic
Affairs*
James L. Baird, Jr., *Director, Avery Point Campus*
Alexinia Y. Baldwin, *Professor, Curriculum and
Instruction*
Robert C. Baldwin, *Interim Dean, Extended and
Continuing Education*
Frank W. Ballard, *Professor, Dramatic Arts*
William G. Barber, Jr., *Extension Agent,
Cooperative Extension Services*
Gene J. Barberet, *Professor,
Modern and Classical Languages*
Robert L. Bard, *Professor, Law*
Reuben M. Baron, *Professor, Psychology*
Peter S. Barth, *Professor, Economics*
Edward L. Bartholomew, *Professor, Metallurgy*
John Bartok, *Extension Professor*
Ralph H. Bartram, *Professor, Physics*
Floyd L. Bass, *Professor, Educational Leadership*
James M. Bauer, *Professor, Physical Therapy*
Curt F. Beck, *Professor, Political Science*
David R. Bedding, *Associate Professor*
Robert L. Bee, *Professor, Anthropology*
James P. Bell, *Professor, Chemical Engineering*
Bruce A. Bellingham, *Professor, Music*
Robert B. Bendel, *Professor, Animal Science*

Carroll O. Bennett, *Professor, Chemical
Engineering*
Harold Berger, *Associate Professor, English*
Riva Berleant, *Professor, Anthropology*
Henrietta Bernal, *Professor, Nursing*
Bernard. Bible, *Professor, Plant Science*
Borys Bilokur, *Associate Professor, Modern and
Classical Languages*
Virginia O. Birdsall, *Professor, English*
Alvaro Bizzicari, *Professor, Modern and Classical
Languages*
Rufus A. Blanshard, *Associate Professor, English*
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APPENDIX

ACADEMIC INTEGRITY IN GRADUATE EDUCATION AND RESEARCH

The assurance of integrity in graduate education and research is of paramount concern. Academic and scholarly activity at the graduate level takes many forms at the University of Connecticut, including, but not limited to, classroom activity, laboratory or field experience, and artistic expression. The Graduate School of the University of Connecticut upholds the highest ethical standards in its teaching, research, and service missions.

The Code of Conduct and the statement of Hearing and Appeal Procedures that follow pertain to matters involving graduate academic and scholarly misconduct. Responsibility for such misconduct requires intent but is not excused by ignorance. Thus, it is important for students to be conversant with the tenets of this Code. Matters of a disciplinary nature in which graduate students may become involved are to be addressed by Section III of the University's "Student Conduct Code," enforcement of which is within the purview of the Dean of Students.

The Dean of the Graduate School is charged with responsibility for coordinating the process by which an allegation of academic misconduct on the part of a graduate student is reported, investigated, and adjudicated. The Graduate Faculty Council, in accordance with the provisions of its By-Laws, is responsible for the formulation of policies and procedures pertaining to any and all matters of academic integrity in graduate education and research and to proper handling of allegations of violations. Members of the Graduate Faculty have primary responsibility to promote and to sustain throughout the University an environment in which the highest ethical standards of teaching, scholarship, research, and publication prevail. All members of the University community have a responsibility to uphold the highest standards of teaching, scholarship, research, and publication and to report any violation of academic integrity of which they have knowledge.

A. FORMS OF ACADEMIC AND SCHOLARLY MISCONDUCT

There are many forms of academic and scholarly misconduct. Categories of academic and scholarly misconduct are identified below, and where appropriate, illustrations are given. These categories and illustrations are not intended to be exhaustive.

CHEATING could occur during a course (e.g., on a final examination), on an examination required for a particular degree (e.g., the doctoral General Examination, the Final Examination for the master's or the doctoral degree, or a foreign language translation

test), or at other times during graduate study.

PLAGIARISM involves taking the thoughts, words, or ideas of others and passing them off as one's own.

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

UNAUTHORIZED POSSESSION, USE, OR DESTRUCTION OF ACADEMIC OR RESEARCH MATERIALS, which include, for example, examinations, library materials, laboratory or research supplies or equipment, research data, notebooks, or computer files.

COMPUTER VIOLATIONS include but may not be limited to unauthorized use, tampering, sabotage, or piracy of computer files or data and the like.

FABRICATION OR FALSIFICATION IN RESEARCH could involve, for example, deliberate falsification of experimental results or tampering in any way with actual experimental results or research data.

RESEARCH VIOLATIONS involving, for example, human subject violations (including ethical and social violations), animal care violations, inappropriate breaches of confidentiality, deliberate obstruction of the research progress of another individual, or deliberate disregard for applicable University, local, State, or federal regulations.

CONFLICTS OF INTEREST such as, for example, unauthorized use of University or faculty academic or research facilities, materials, or resources for unapproved purposes; or allowing or attempting to use personal relationships (academic or otherwise) between a graduate student and any member of the University community to influence improperly academic judgments, scholarly evaluations, or decision making.

TAMPERING with any document or computer file pertaining to academics or research, including, for example, student academic records, official transcripts, laboratory journals, examination papers, and the like.

ANY ATTEMPT TO INFLUENCE IMPROPERLY, for example, by means of bribery or threat, any member of the faculty, the staff, or the administration of the University in any matter pertaining to academics or research.

AIDING OR ABETTING another individual in the planning or the commission of any act of academic misconduct.

ANY IMPROPRIETY OR ACT OF MISCONDUCT COMMITTED BY A GRADUATE STUDENT IN A TEACHING ROLE in the University, such as requesting or accepting a favor in exchange for a grade or engaging in any form of sexual harassment.

DELIBERATE OBSTRUCTION of an investigation of any act of academic or research misconduct.

B. ACADEMIC MISCONDUCT WITHIN A PARTICULAR COURSE

When an instructor believes there is sufficient evidence to demonstrate a clear case of academic misconduct within a particular course taught by that instructor, the instructor shall notify the student in writing, and also orally if possible, that unless the student requests a hearing to contest the instructor's belief, the instructor shall impose the appropriate academic consequences warranted by the circumstances. This should occur within 30 days of discovery of the alleged academic misconduct. The appropriate academic consequence for serious offenses is generally considered to be failure in the course. For less serious offenses regarding small portions of the course work, failure for that portion is suggested, with the requirement that the student repeat the work satisfactorily for no credit.

The faculty member is responsible for saving the evidence of academic misconduct in its original form and need not return any of the papers or other materials to the student. Copies of the student's work and information about other evidence will be provided to the student upon request.

The student is given seven days from this first written notice to respond. If the student confesses or does not respond to the written notice of the instructor's belief of academic misconduct and appropriate consequences within the course, the academic consequences shall be imposed and a report submitted to the Dean of the instructor's school or college and to the Dean of the Graduate School.

If a student chooses to contest the instructor's belief of academic misconduct, the student must make a written request to the Office of the Dean of the Graduate School for a hearing to determine the facts of the alleged misconduct.

C. ALLEGATIONS OF ACADEMIC MISCONDUCT

The following procedures apply in most instances

where academic misconduct is alleged. In some cases, misconduct may be alleged for students who are supported through a federally funded fellowship or training grant program or through other federal grants (e.g., as a Research Assistant). In such instances, the procedures stipulated by agreements between the University and the federal government will prevail, including use of the University's policy and procedures for review of alleged unethical research practices. The procedures described in this document will apply to those allegations not subsumed by such agreements. In addition, standards governing the professional conduct of students in particular fields may be relevant in certain settings (e.g., clinical, counseling, therapeutic, etc.). Allegations of professional misconduct based on such standards may be brought forward under this code.

Whenever an alleged violation of this code has been filed with the Office of the Dean of the Graduate School, the accused is to be notified in writing within ten working days. The written statement filed with the Office of the Dean should describe fully the alleged misconduct and the circumstances involved (i.e., the name of the individual alleged to be responsible for the misconduct; date, time, place of the alleged misconduct; name(s) of person(s) who might have been involved in or have knowledge of the alleged misconduct; and any other pertinent information). The statement must bear the signature(s) of the individual(s) submitting it, and it must be dated. A copy of the statement will be sent to the accused within ten working days of its filing. The Dean of the Graduate School will discuss the allegation of academic misconduct with the dean of the relevant school or college. The Dean of the Graduate School will then make a determination regarding whether the alleged violation should be resolved at the Graduate School level in accordance with the hearing and appeal procedures contained herein or whether the alleged violation should be referred to the field of study, academic department, school or college in which the infraction is thought to have occurred. (Such a determination will also be made when an accused student, pursuant to section B, requests a hearing.)

If the alleged violation is referred to the field of study, academic department, school or college, then it will be addressed and resolved in accordance with the applicable hearing and appeal procedures followed by that particular unit. The Office of the Dean of the Graduate School will notify the accused in writing of this determination. In the event that the alleged violation is referred to the field of study, academic department, school or college, the Office of the Dean of the Graduate School should be notified of any outcome of the case. In either event, the Dean of the school or college in which the alleged misconduct occurred is notified that a report of alleged misconduct has been received.

If the alleged violation is to be resolved at the Graduate School level, the report of alleged misconduct is referred to the Office of the Dean of the Graduate School, which confirms the allegation(s) and the existence of supporting

evidence. The Office reviews the allegation(s) and the evidence to determine specifically which provision(s) of this Code is/are alleged to have been violated. If the allegation(s) cannot be supported, or if there is insufficient evidence to proceed with an inquiry, the matter is dropped. If the allegation(s) can be supported, and if sufficient evidence exists to warrant an inquiry, the Office of the Dean of the Graduate School notifies the appropriate Associate Dean (either the Associate Dean of the Graduate School at Storrs or the Associate Dean of the Graduate School at the Health Center). The Office also notifies the accused by Certified Mail of the charge(s). A copy of this Code is sent with the letter of notification to inform the accused of his or her rights and of the hearing and appeals procedures to be followed. The Office also notifies the Dean of the school or college in which the alleged misconduct occurred of the charges.

D. GRADUATE HEARING COMMITTEE

The Graduate Hearing Committee is composed of three voting members (two members of the graduate faculty and one graduate student). The Executive Committee of the Graduate Faculty Council selects them with advice from appropriate Deans. The appropriate Associate Dean of the Graduate School (Storrs or Health Center) conducts the hearing as a non-voting member. A member of the Hearing Committee cannot have a direct involvement in the case under consideration. The accused will be notified in writing of the composition of the hearing committee and will have the right to object to the appointment of any committee member on the grounds that the member's participation would jeopardize the party's right to a fair hearing. The Associate Dean conducting the hearing will determine whether any objections have merit and will judge whether a panel member will be seated.

The proceeding, although formal, is not a court proceeding and the Hearing Committee will not be bound by the procedures and rules of evidence of a court of law. The Committee's decision is to be made by majority vote and is to be based on clear and convincing evidence submitted at the hearing, including evidence regarding intent.

The Associate Dean will conduct the hearing, ordinarily in private unless the accused student and accuser agree to an open hearing, using the following steps:

1. Identification of the accused student, the person bringing the allegation, any representative of the accused, and the hearing panel.
2. The accused student may make an opening statement.
3. The presentation of evidence by the person alleging the misconduct. Evidence includes written statements, testimony of the person alleging the misconduct, oral testimony of wit-

nesses, physical exhibits, and evidence of intent.

4. Questioning of witnesses and accuser, and rebuttal of evidence.
5. Presentation of evidence by the accused student. Evidence includes written statements, testimony of the accused student, oral testimony of witnesses, physical exhibits, and evidence of intent.
6. Questioning of the accused student and witnesses, and rebuttal of evidence.
7. Recall of any hearing participants.
8. Summation statements by the person alleging the misconduct and by the accused student.

During the hearing the accused student:

1. May decline to make statements. Refusal to answer questions shall not be interpreted as evidence of guilt.
2. May decline to appear at the hearing. Refusal to appear shall not be interpreted as evidence of guilt. The hearing panel will consider the evidence in the absence of the accused student.
3. May be advised for consultation purposes during the hearing. The student's consultant may not address the hearing panel or others at the hearing unless permitted by the Associate Dean conducting the hearing.

The hearing panel's decision is to be forwarded to the student, the person alleging the misconduct, the Dean of the school or college in which the alleged misconduct occurred, and to the Dean of the Graduate School within two weeks from the date of the hearing.

If the student is found not to be responsible for graduate academic misconduct, then no academic consequence may be imposed and the case is considered officially closed, and all records associated with the hearing are removed from the student's permanent academic file.

In the event that the student is found responsible for graduate academic misconduct, the panel may recommend to the Dean of the Graduate School academic and/or university sanctions. The Dean will examine the record of the hearing and will weigh the severity of the recommended sanction(s) against the seriousness of the student's misconduct. The Dean then will meet with the student before making a final judgment about sanctions. The Dean may impose any academic sanctions and may recommend to the Dean of Students any university sanctions to be imposed.

Decisions of the Dean of the Graduate School can be appealed to the Provost for University Affairs by the student. An appeal is not a new hearing. It is a review of the record of the original hearing. The accused student and a consultant of his or her choice have the right to review the accused student's file and other records of the hearing. An appeal may be sought on two grounds:

1. On a claim of error in the hearing procedure. Appeals on such grounds must be presented, specifically described, in writing within five days (excluding weekends and holidays) of the announcement of the decision.
2. On a claim of new evidence or information material to the case that was not available at the time of the hearing. Appeals on such grounds must be presented, specifically described, in writing within five days (excluding weekends and holidays) of the new evidence having been discovered.

The Provost for University Affairs shall have the authority to dismiss an appeal not sought on proper grounds.

If an appeal is upheld, the Dean of the Graduate School shall refer the case with procedural specifications back to the hearing panel.



NOTE: A graduate student is defined as any individual who holds admission to the Graduate School to pursue either a graduate certificate or a graduate degree, as well as any other individual enrolled in a graduate-level course who is not strictly an undergraduate degree or an undergraduate certificate student.

Approved by the Board of Trustees
on November 10, 1998.

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