

Tufts

2015–2016

The Bulletin

BULLETIN OF TUFTS UNIVERSITY

<http://uss.tufts.edu/bulletin>

Academic Year

2015–2016



**SCHOOL OF ARTS
AND SCIENCES**

College of
Liberal Arts

Graduate School
of Arts and Sciences

**SCHOOL OF
ENGINEERING**

Through this bulletin, announcement is made of the general rules, regulations, fees, and schedules in effect as of the date of publication. This bulletin is for informational purposes only and does not constitute a contract between the university and any applicant, student, or other party. The university reserves its right to make changes, without notice, in any course offerings, requirements, policies, regulations, dates, and financial or other information contained in this bulletin. Published by the Trustees of Tufts University, Medford, Massachusetts 02155. Printed in the USA.

The Bulletin

BULLETIN OF TUFTS UNIVERSITY | 2015–2016

School of Arts and Sciences

COLLEGE OF LIBERAL ARTS

GRADUATE SCHOOL OF ARTS AND SCIENCES

School of Engineering

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PRESIDENTS OF
TUFTS UNIVERSITY**Anthony P. Monaco**

President, 2011–present

Lawrence S. Bacow

President, 2001–2011

Emeritus, 2011–present

John DiBiaggio

President, 1992–2001

Emeritus, 2001–present

Jean Mayer

President, 1976–1992

Chancellor, 1992–1993

Burton Crosby Hallowell

President, 1967–1976

Leonard Chapin Mead

Acting President, 1966–1967

Nils Yngve Wessell

Acting President, 1953

President, 1953–1966

Leonard Carmichael

President, 1938–1952

George Stewart Miller

Acting President, 1937–1938

John Albert Cousens

Acting President, 1919–1920

President, 1920–1937

Hermon Carey Bumpus

President, 1914–1919

William Leslie Hooper

Acting President, 1912–1914

Reverend Frederick William Hamilton

Acting President, 1905–1906

President, 1906–1912

Reverend Elmer Hewitt Capen

President, 1875–1905

Reverend Alonzo Ames Miner

President, 1862–1875

John Potter Marshall

Acting President, 1861–1862

Reverend Hosea Ballou II

President, 1853–1861

About Tufts University

International, student-centered, Tufts University is dedicated to academic rigor and interdisciplinary research that addresses the most critical issues facing our world. Rooted in the best traditions of learning and scholarship, Tufts is committed to educating tomorrow's global leaders in all disciplines and fields through innovation in its teaching and research.

Since its founding in 1852 by members of the Universalist Church, Tufts has grown from a small liberal arts college into a nonsectarian university of approximately 10,800 students on four campuses. The trustees of Tufts College voted to make Tufts coeducational in 1892, and the first women were graduated in 1896. Although women applied to Tufts almost immediately after its founding in 1852, they were denied admission until the 1890s. With the founding of Jackson College for Women in 1910—named for Cornelia Maria Jackson, the benefactor who did the most to promote women's education at Tufts—women's education gained security at the institution.

At Tufts, creating excellence in education is forged through a philosophy that is forward-thinking, imaginative, and responsive to the fast-paced evolution of technology, politics, the sciences, our global society, and the arts.

Our Schools

The largest division of the university is the Faculty of Arts, Sciences, and Engineering. This division comprises the College of Liberal Arts, the School of Engineering, the Graduate School of Arts and Sciences, the College of Special Studies, and Summer Session. The university's graduate and professional schools are the Fletcher School of Law and Diplomacy, the School of Medicine, the School of Dental Medicine, the Cummings School of Veterinary Medicine, the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, and the Sackler School of Graduate Biomedical Sciences.

The schools are located on Tufts' campuses in Medford/Somerville, Boston, and North Grafton, Massachusetts. Students may also study at the Tufts European Center, located in an eleventh-century monastery in Talloires, France. Tufts is also

affiliated with the School of the Museum of Fine Arts and New England Conservatory of Music, providing joint graduate and undergraduate programs and flexible cross-registration.

The Undergraduate Experience

Undergraduate study is on Tufts' Medford/Somerville campus, situated on a hill about five miles northwest of Boston. It is a tranquil New England setting within easy access by subway and bus to the cultural, social, and entertainment resources of Boston and Cambridge.

Tufts is a student-centered institution, where support for students' personal and academic development is embedded into the organization and ethos of the university. The Faculty of Arts, Sciences, and Engineering is committed to scholarship of the highest order and teaching of exacting quality, while equally dedicated to providing a friendly, open, and intellectually rich and stimulating environment. This environment is one of the reasons Tufts is one of the most highly competitive universities in the country.

Tufts has programs abroad in Britain, Chile, China, France, Germany, Ghana, Hong Kong, Japan, and Spain. More than 40 percent of undergraduates choose to spend their junior year abroad to add a strong international dimension to their education. This experience adds to the international flavor of the Tufts campus when they return for their senior year.

More than 98 percent of enrolling students expect to pursue graduate or professional studies, and annually Tufts students are the recipients of such prestigious academic awards as Fulbright, Truman, Goldwater, and Beinecke scholarships and fellowships.

Changes to Academic Program in Coming Years

In April 2015, the faculty of the Schools of Arts & Sciences and Engineering voted to change the system of credit granted per course and the total number of credits required for graduation. By Fall 2018, the Schools of Arts & Sciences and Engineering will adopt the credit-hour system—used by most universities in the United States. When the new credit system is in place, most courses will be worth 3 credits, many will be worth 4 credits, and a few may be worth 5 or more credits. Current

“partial credit” courses will be worth 1 or 2 credits in the new system. Students will be required to earn a minimum of 120 credits for the baccalaureate degree (though some degree programs may require more credits) and a minimum of 30 credits for the master's degree (though some degree programs may require more credits). Students who matriculate prior to the implementation of the new credit system will see a change in the way in which course credits appear, but Tufts will make every effort to keep degree requirements consistent with information provided in the Bulletin of the student's year of matriculation. The University is actively developing a petition process for students who, upon reaching their scheduled graduation dates, believe that this change may have prevented them from meeting their degree requirements in a timely manner. Information regarding the petition process will be made available through the Registrar's Office.

The new credit-hour system will make transfer of credit easier for students and will make the Tufts transcript more self-explanatory to most graduate and professional schools. Because the credit hour generally reflects the amount of time required for the course, students may find it easier to create a balanced course-load each semester. For example, a 3 credit course generally requires 3 hours of class or instructional contact per week.

In 2011, the United States Department of Education instructed all accreditation agencies to review university credit policies and ensure that universities use a common standard for awarding credit hours. This has resulted in the need for Tufts to move to a system where credit hours and instructional contact hours are linked. The Department of Education clarified that the federal definition of the credit hour is the standard for higher education in the United States, with institutionally-determined flexibility to account for unique courses and novel instructional methods (such as online courses or “flipped” classrooms). The new credit system adopted by Schools of Arts & Sciences and Engineering adheres to the federal definition of the credit hour.

Financial Information

Expenses and Policies

All undergraduate students (with the exception of those in the R.E.A.L. program) are expected to carry a full course load (four to five courses) except in cases of serious, documented medical problems. A typical first-year student in residence at Tufts during the 2015–2016 academic year may expect the following expenses:

Tuition	\$49,520
Residence hall	\$7,134
Meal plan	\$5,960
Health service and student activity fees	\$1,084
Books, supplies, and miscellaneous expenses (estimated)	\$2,202
Total for year (estimated)	\$65,900*

Medical Insurance costs \$2,451* for the year if the student is not covered by a comparable plan of their own. International students are required to be covered by the insurance plan through Tufts.

*The charges listed above are subject to change.

Tuition

Tufts undergraduate tuition is a comprehensive fee that covers basic charges for instruction, costs of registration, most laboratory supplies, and other incidental items or services.

Campus Housing

All first-year and sophomore students are required to live in university housing or recognized fraternities or sororities, and to purchase a meal plan. Commuting students pay no residence hall fee and are not required to purchase a meal plan.

Meal Plans

Students select a meal plan or JumboCash in accordance with university requirements. JumboCash allows students to make purchases at all on-campus dining locations (Carmichael and Dewick-MacPhee Dining Centers, Hodgdon Food-on-the-Run, Hotung Café, Commons Marketplace, Brown and Brew Coffee House, Tower Café at Tisch Library, Pax et Lox Glatt Kosher Deli, Mugar Café and

The Rez), as well as the bookstore, Campus Center Info Booth, vending machines, and on-campus washers and dryers; to pay fines at the Tisch and Ginn Libraries; and to purchase parking permits or lost IDs at Public Safety Administrative Services. JumboCash can also be used to pay for printing and copying in campus libraries and computer centers. JumboCash may be used at 15 off-campus restaurants for dining in, take-out or delivery (where available), as well as at a drug store and two convenience stores (alcohol, tobacco products, lottery tickets and gift cards excluded). Dining Services is located at 89 Curtis Street, Somerville. For more information, contact 617-627-3566, e-mail: tuftsddining@tufts.edu, website: <http://dining.tufts.edu>.

Health Service

The Health Service fee is mandatory and non-waivable and covers the cost of running a comprehensive outpatient health service and counseling center. The fee covers unlimited primary care and walk-in visits to the Health Service, access to the Counseling and Mental Health Service, and an annual flu shot if available for those who desire inoculation. Laboratory tests, prescribed medications, and consultation with on-campus medical specialty consultants are not covered by the health service fee. Students who do not purchase the optional medical insurance are required to demonstrate that they have other medical insurance. Details regarding the fee and deadlines for waiving the insurance are available at <http://ase.tufts.edu/healthservice>.

Fees

All students are required to pay the student activity fee, which is proposed by the student government. Accepted students must pay an enrollment deposit, which is applied to tuition for the first year.

Housing Charges

Room assignments are made for the full academic year. The campus housing room rates set by the Board of Trustees will appear on the resident student's bill in two parts, identified as the housing commitment fee and the room charge. The housing commitment fee is nonrefundable at the time a student selects a room, has a proxy select a campus room on his or her behalf, or otherwise accepts a

room assignment from the Residential Life Office. The housing commitment fee is only refundable when:

- a) the student is placed on required leave or withdrawal by the university, or
- b) the student, subsequent to selecting a room, is admitted to a study abroad program. In such cases the student must file an electronic study abroad leave of absence form online via SIS. Students in both Tufts and non-Tufts study abroad programs must file an update form, available at the Residential Life Office in South Hall, within ten (10) days of acceptance—no later than April 27 for fall semester housing cancellation and November 13 for spring semester housing cancellation. The room charge portion of a student's bill will be equal to the room rate for the student's assignment, less the \$750 housing commitment fee.

Room selection for spring-only applicants is held during the first week of December. Once a spring-only room assignment has been selected by the student (or his or her proxy), or an assignment is offered and accepted, the student is subject to the housing commitment fee.

Questions may be directed to the Residential Life Office, Tufts University, Medford, Massachusetts 02155, 617-627-3248, fax 617-627-3929, e-mail: reslife@tufts.edu, website: <http://ase.tufts.edu/reslife>.

Payment of Bills

All currently enrolled students are billed electronically through the Tufts eBill system. Information on Tufts eBill can be found at <http://uss.tufts.edu/bursar/eBill/>. Students are required to pay tuition, fees, room, and board prior to the start of each semester. Bills for the fall semester must be paid by the first week in August; spring semester bills are due and payable in early December. The amount billed is reduced by any financial aid awarded by or sent to the university on behalf of the student for the semester. Payment in full (after deduction for financial aid) must be made before each term either by check, e-payment, wire transfer or enrolling in the monthly payment plan. Detailed information about the payment plan is sent to returning students in April and incoming students in May/June.

Fall semester charges do not include those incurred for courses an applicant must take to become fully qualified for admission. Charges will

not be reduced when courses are accepted for transfer credit.

All university charges are collected by Student Financial Services. Without waiting for receipt of a formal bill, payments for tuition, fees, room and board are to be made to Tufts on or before the due date for the semester. Checks should be made payable to the Trustees of Tufts College.

If full payment has not been received, or financial arrangements have not been agreed upon by the specified due date, a late payment fee will be assessed monthly.

The following actions will take place should a student fail to meet his or her financial obligations to the university for outstanding student loans or balances on his or her student account: the student may be denied access to university dining services; will not be allowed to access library resources; will be denied registration privileges; will not be issued an official transcript; and will be denied an on-campus room selection for an upcoming semester.

Any unpaid student account balance may be referred to our collection agency. The student will be responsible for all costs associated with collection, including collection agency fees, attorneys' fees, and court costs. The account will be reported to credit bureaus if assigned to a collection agency. Diplomas and official transcripts of records for those in arrears are regularly withheld until all payments have been made.

Administrative/Financial Withdrawal

If a student's account remains unsettled beyond the billing due date, subsequent bills will be issued reflecting monthly late payment charges. If the student's account remains unsettled after the first day of classes, the student may be subject to withdrawal from the university.

Students are strongly encouraged to communicate with Student Financial Services as soon as they encounter personal or financial difficulties so that the university may help identify possible solutions and alternatives for meeting individual needs.

Withdrawal/Leave Tuition Refund Policy

Students who elect to take a leave of absence or withdraw or who are required to withdraw will receive a tuition refund in accordance with the following schedule, based on the effective date of the leave.

Fall semester 2015

By September 7, 2015	100% of tuition charged is cancelled
September 8 to 21, 2015	90% of tuition charged is cancelled
September 22 to 28, 2015	80% of tuition charged is cancelled
September 29 to October 5, 2015	60% of tuition charged is cancelled
October 6 to 12, 2015	40% of tuition charged is cancelled
October 13 to 19, 2015	20% of tuition charged is cancelled

Spring semester 2016

By January 20, 2016	100% of tuition charged is cancelled
January 21 to February 3, 2016	90% of tuition charged is cancelled
February 4 to 10, 2016	80% of tuition charged is cancelled
February 11 to 17, 2016	60% of tuition charged is cancelled
February 18 to 24, 2016	40% of tuition charged is cancelled
February 25 to March 2, 2016	20% of tuition charged is cancelled

No tuition refunds are made after the sixth week of classes.

The student is responsible for any unpaid charges and must make arrangements to pay this balance prior to leaving Tufts. Any outstanding balance will result in a hold on the release of any transcripts until paid in full. If the student’s account is referred to a collection agency, the student will be responsible for all collection and litigation costs associated with this debt.

Campus Housing Charges

Campus housing charges will be refunded based on the above prorated tuition schedule for the semester. The date of withdrawal from housing will be based on the date that the room has been vacated and the room key returned to residential facilities. The housing commitment fee is non-refundable.

Meal Plan Charge

Students wishing to cancel their meal plan after the cutoff date, the third Friday after classes begin, will be assessed 50 percent of the prorated refund amount.

Other Charges

Other fees and charges such as the health service fee, the student activity fee, library or traffic fines, and traffic or parking citations are not refunded or prorated after the beginning of the academic year. If a student is enrolled in the optional medical insurance plan, both the charge and the plan benefits remain in place through the end of the contract period. A student enrolled for only one semester will be charged the full student activity fee and health service fee.

Financial Aid

Tufts University students are eligible for a full range of financial aid in the form of university, state, and federal grants; long-term university, state, Federal Perkins and Stafford loans; and federally subsidized campus employment. In 2014–2015, 47 percent of full-time undergraduates received over \$93 million in these forms of aid and other government and foundation grants and loans. Forty-two percent of the entering class received over \$24 million in total aid, of which over \$19 million was in the form of grants. The average grant was \$40,000; the average award (including loan and work study) was \$42,700 to entering students.

Application

Entering undergraduates, including transfers, apply for aid by submitting the Profile Form of the College Scholarship Service, the Free Application for Federal Student Aid (FAFSA), and copies of family federal tax returns before February 15. Decisions on the amounts and kinds of aid are announced in April, shortly after the letter of admission is mailed. Students requesting renewal of aid, and other undergraduates who have not received assistance previously, apply by May 1. Decisions are made in late June. Preference in awarding grants each year is given to those who received aid in the previous year.

Satisfactory progress toward a degree is required for continuance of aid.

Details concerning the Satisfactory Progress requirements can be found on the financial aid website at <http://uss.tufts.edu/finaid>.

Applications for tuition scholarships and teaching assistantships in the graduate school are an integral part of the application for admission. Decisions are announced with the letter of admission or at a later date. Complete application instructions, deadlines, and links are available at <http://uss.tufts.edu/finaid>.

Forms of Aid

University grants are by far the largest single source of funds received by Tufts undergraduates from the application procedure described above. They range from \$500 to more than full tuition each year and are combined with other scholarships, loans, and employment to meet the university's estimate of each student's need.

For graduate students, scholarships range from quarter to full tuition as decided by the department. Teaching assistants normally receive tuition scholarships plus an annual stipend for teaching. If needed, graduate students also may apply for Federal Direct Stafford and Federal GradPLUS loans.

Federal Supplemental Educational Opportunity Grants (SEOGs) are federal grants allocated to Tufts for exceptionally needy undergraduates. Awards range from \$200 to \$2,000 per year.

Federal Pell Grants are federal grants to which undergraduates from low- and moderate-income families are entitled according to their financial circumstances. Application is made by completing the FAFSA and submitting it after January 1 preceding each academic year. Only undergraduates are entitled to these grants. Awards range from \$600 to \$5730.

Carl Gilbert Matching Grants are funds awarded to Tufts and other independent institutions by the Commonwealth of Massachusetts to be given as grants to needy Massachusetts undergraduates.

Tufts National Merit Scholarships: Entering first-year students who are National Merit finalists are eligible for scholarships of \$500 to \$2,000 per year for up to four undergraduate years for any semester in which the student is charged Tufts tuition. To enter the program, students must name Tufts as first choice in the National Merit competition. Honorary awards of \$500 per year for four years may be made to successful applicants who do not demonstrate financial need. Merit awards up to \$2,000 per year may be offered to applicants with demonstrated financial need. Those who need more than the \$2,000 award will be considered for additional loan, work, and grant aid up to the total amount needed. Need must be determined annually by Tufts based on the FAFSA analysis of family ability to meet total educational costs.

Federal Perkins Loans are awarded by Tufts to students of exceptional need from funds repaid by previous Federal Perkins Loan borrowers.

Tufts loans may be offered to needy undergraduates not eligible for Federal Perkins Loans. Interest on Tufts loans is 7 percent and begins to accrue six months after the student leaves Tufts. Repayment of principal and interest begins six months after leaving Tufts and continues for five years. Tufts loans require a parental cosigner.

Federal Direct Subsidized Stafford Loans: This program offers undergraduate students loans subsidized by the federal government. Students may borrow up to \$3,500 for the first undergraduate year, \$4,500 for the second year, and \$5,500 per year for the remaining undergraduate years (maximum \$23,000). Federal Direct Loans are normally disbursed in two equal installments. The interest rate during repayment for loans made during the 2014-2015 year was 4.66%. The rate is set by the federal government each year. Repayment begins six months after the student graduates or stops attending school on at least a half-time basis.

FINANCIAL INFORMATION

Federal Direct Unsubsidized Stafford Loans are available for graduate students and for students who do not qualify for a subsidized Federal Direct Loan or who want to borrow in addition to the subsidized loan. Students are responsible for interest while in school and may make monthly interest payments or capitalize the interest. The interest rate for loans made during the 2014–2015 year was 4.66% for undergraduate students and 6.21% for graduate students. The rate is set by the federal government each year.

Dependent undergraduates may borrow up to \$2,000 above the subsidized Federal Direct Loan limits, less the amount of any subsidized loan received. Graduate students may borrow up to \$20,500 per academic year. In order to advise students of their rights and responsibilities, an on-line entrance interview is required of all first-time borrowers at Tufts prior to disbursement of the loan. Exit counseling is required of all borrowers before leaving the university.

Federal Direct PLUS Loans: Through the Federal Direct PLUS Loan program, graduate students and parents of dependent undergraduates may borrow up to the full cost of education minus any financial aid. The fixed rate during the 2014–2015 year was 7.21%. The rate is set by the federal government each year. The fee on PLUS Loans during 2014–2015 was 4.2%. A credit check is required, and payments begin 60 days after the loan is fully disbursed, but borrowers may request deferment of payments until after graduation. PLUS Loans must be used for college expenses, including room and board. PLUS Loan borrowers are required to complete a FAFSA form.

Federal Work-Study Program (FWS): FWS provides federal funds for Tufts to subsidize the hourly wages of students who need financial aid during the school year. Work-study positions are available either on campus or with off-campus, nonprofit community service programs, and typically wages range from \$8.00 to \$15.00 per hour.

Job Location and Development Program (JLD): JLD aids all Tufts students, regardless of financial need, in finding campus or off-campus employment. Students may work part time while in school or full time during vacation. Students are encouraged to visit the Tufts Student Employment website at <http://uss.tufts.edu/stuemp>, where they can register for an interactive job-search program providing access to a host of employment opportunities and services.

ROTC Programs: ROTC scholarships may be applied for before or after admission and used at Tufts. Applications may be obtained from Air Force or Navy recruiting officers, or students may join after registration and compete for two- or three-year Army scholarships. Many ROTC scholarships include full tuition, books, and fees, as well as a monthly stipend, while others offer up to \$20,000 toward tuition, plus a stipend. Tufts students participate in ROTC through units at nearby M.I.T. Most classes are held on the M.I.T. campus. After graduation, a duty commitment is required. After undergraduate college graduation, other ROTC medical college scholarships may also be available.

Contacts (at M.I.T.): Air Force: 617-253-4475; Army: 617-253-4471; Navy and Marine: 617-253-2991.

All information regarding federal student aid programs is correct as of April 2015, but is subject to change with the passage of new legislation.

For more complete information regarding financial aid policy and procedures, visit <http://uss.tufts.edu/finaid>.

School of Arts and Sciences

Mission Statement

Broadly recognized as one of the premier liberal arts colleges within a research university, the School of Arts and Sciences at Tufts University educates students for transformational leadership in communities around the world. Tufts's tradition of innovation dates to the school's founding in 1852. Today, a multidisciplinary and experiential approach defines scholarship and teaching. Faculty and students use the curricular framework of the arts and sciences to address the great intellectual and social challenges of the twenty-first century.

The school has a distinctive style. Excellence in scholarship and teaching are the school's highest priorities; translating inquiry and research into action is a defining theme. The Faculty of Arts and Sciences, the largest of Tufts's seven schools, explores collaborative research opportunities across the university's professional schools and around the world. More than 5,000 students at the undergraduate and graduate levels represent the broad range of intellectual, creative, and personal attributes. The creation of new knowledge in traditional and emerging disciplines, a dedication to globalism and active citizenship, a commitment to humanitarianism and diversity in its many forms, and a belief that intellectual discourse and discovery serve the common good are deeply held ideals.

College of Liberal Arts

Requirements for Degrees

For students entering the College of Liberal Arts, the degree of Bachelor of Arts or Bachelor of Science is awarded after four years (eight semesters) of full-time study and with successful completion of the equivalent of thirty-four credits. A cumulative average of C- (1.67) or higher is required for graduation. No more than two of the thirty-four credits may consist of fieldwork or internship placements. No more than five of the thirty-four credits may consist of Tufts online courses. Up to two semesters of full-time study after matriculation at Tufts may be spent at other approved four-year institutions or on approved foreign study programs. (See Residence

Requirement in the general information section for details.)

Three-fourths of all courses taken at Tufts with standard grading must be completed with a grade of C- or better. There is no rigid program of courses that must be taken by every student. Students are regarded as individuals, and each student is encouraged to pursue a course of study appropriate to his or her training, experience, aptitudes, and plans for the future. Within a framework designed to ensure both breadth and depth in intellectual development, there is a broad range of choice. Students work with their advisors to select those courses best suited to their particular needs and interests.

Each student selects courses to fulfill the foundation and distribution requirements. All courses used to fulfill these requirements must be taken for a letter grade, not pass-fail. A grade of D- or above is passing. Also, a grade of D- or above will fulfill foundation and distribution requirements.

Foundation Requirements

The faculty recognizes the following elements as basic to any program leading to a bachelor's degree in liberal arts, whatever a student's particular interests may be. First, an educated person in our society must be able to write coherent English and must be able to apply that writing ability to the critical analysis of information and ideas in any field. Second, the study of another language and of foreign cultures is indispensable to a liberal education; such study provides a basis for locating oneself within a larger cultural and international context. Courses in college writing, foreign language and culture, and world civilizations constitute the foundation of a liberal arts education at Tufts.

The foundation requirements should be met early in a student's college career, so that these courses may serve as a foundation for later work. In some cases, a single course may be used toward fulfillment of both a foundation and a distribution requirement.

1. Writing

Two semesters of college writing are normally required for graduation in liberal arts. In general, students should complete this requirement in the first year. Most students do so by taking English 1 (Expository Writing) in the first semester and, in

the second semester, English 2 (College Writing Seminar) or Philosophy 1. A Philosophy 1 class transferred from another college will not count for English 2 or 4. Students may not count Philosophy 1 as English 2 if taken before or at the same time as English 1. Students for whom English is a second language may take English 3 with consent of the instructor. *Courses taken toward fulfillment of this requirement must be taken for letter grades, except English 3, which is pass-fail.*

There are also other alternatives for satisfying the college writing requirement. In summary, the requirement may be satisfied in any of the following ways:

- Exemption from the entire requirement by attaining a score of five on the Advanced Placement Test in English Language and Composition or English Literature and Composition; an A on the British A-Level exams; or a score of seven on the Higher-Level International Baccalaureate.
- Exemption from the first half of the requirement by attaining one of the following: a score of four on the Advanced Placement Test in English Language and Composition or English Literature and Composition, 760 or above on the SAT Writing exam, six on the Higher-Level International Baccalaureate, seven at the Subsidiary Level, or a B on the British A-Level exams. Students so exempted from the first half of the requirement must complete English 2.
- Satisfactory completion of English 1 or 3 and of English 2, English 4, or Philosophy 1.
- Completion of English 1 with a grade of A or A- (resulting in exemption from the second half of the requirement). This exemption does not apply to writing courses equivalent to English 1 that were taken at another college.

2. Foreign Language/Culture Option

This foundation requirement has two parts. First, every student must satisfy a basic language requirement, demonstrating knowledge of a foreign language through the third-semester college level. The second part of the requirement may be satisfied in several different ways. Students may take advanced courses in the same foreign language or they may undertake study of a second language.

Students are offered the alternative of studying a foreign culture through courses taught in English.

Students who attended a school through grade twelve where instruction was in a language other than English may be exempted from both Parts I and II of the foreign language requirement. They should contact their academic dean in Undergraduate Education, Dowling Hall.

Students who can speak, read, and write proficiently in a language other than English that is not taught at Tufts, but who attended high school with English as the language of instruction, should take the following steps:

1. Go to <http://flats.byu.edu> and follow the instructions for language testing.
2. Arrange with the Academic Resource Center to have the exam proctored. This service is available only through the third week that classes are in session during any fall or spring semester.
3. Have the results reported to your academic dean, Dowling Hall.

No credit is awarded for this option.

PART I. BASIC LANGUAGE REQUIREMENT

Every student must demonstrate competence in a second language through the third-semester college level. Language competence may be determined on the basis of a placement examination taken at Tufts, SAT Subject Test scores, AP scores, or an approved college course. Entering students who do not demonstrate the required level of competence must take college language courses until that level is reached. American Sign Language may be used to fulfill this option.

PART II. CONTINUED LANGUAGE STUDY/ CULTURE OPTION

After the basic language requirement has been satisfied, the student has four options:

- 1) To continue study in the foreign language used to fulfill Part I until two courses have been completed at the third-year level; e.g., French 21–22 or French 31–32, German 21–22 or German 33–44. Because the fourth-semester college-level course (e.g., French 4, Spanish 4) is normally a prerequisite for courses at the advanced level, the option usually involves taking three courses beyond the basic language requirement.

2) To complete courses through the third college semester level (e.g., Spanish 1, 2, and 3) in a language different from the one used to satisfy Part I.

3) To complete three credits dealing with a single culture or designated cultural area, either the same as or different from the language used to fulfill Part I. All three courses must deal with the same culture area. For purposes of this requirement, a foreign culture is defined as having non-English speaking origins. Anglo-American, English, Anglo-Irish, and Anglo-Australian cultures do not qualify, but Aboriginal Australian, Celtic, and African-American, Latino/a, and Asian American, for example, do to the degree that they are discrete from the Anglo-American tradition.

At least one of the three culture credits must focus on the region of origin. For instance, a student choosing the East Asian and Diasporas culture area must take at least one course rooted in East Asia.

Students wishing to submit courses that are not pre-approved must petition the Academic Review Board; forms are available under Student Forms on the student services home page.

4) Foreign language courses beyond the third-semester college level may be counted as part of the culture option, e.g., Spanish 4, French 4, or courses at higher levels. For example, a student who has completed four semesters of foreign language study may choose to complete the foundation requirement by taking two culture credits in the same culture area as that of the language studied.

Travel or residence in another country, while admittedly educational, may not be applied toward fulfillment of the culture option. Courses accepted for transfer from other colleges or universities may be used upon approval.

3. World Civilizations

The world civilizations requirement focuses on an in-depth study of a non-Western civilization or civilizations, or the interaction of non-Western and Western civilizations with equal attention given to both. The definition of the non-Western world is considered to include Africa, Asia, the Caribbean, Latin America, and selected indigenous cultures of Oceania and North America.

The course taken in fulfillment of the world civilizations requirement may be used to fulfill the culture option or that distribution requirement for which the course would normally be appropriate, but not both.

For courses that are not pre-approved, a petition form is available under Student Forms at <http://uss.tufts.edu/stuServ>.

Distribution Requirements

The faculty holds that a student enrolled in any program leading to a liberal arts degree must demonstrate a reasonable acquaintance with each of the following five areas of inquiry: the humanities, the arts, the social sciences, the natural sciences, and the mathematical sciences.

- A student must take the equivalent of two course credits in each area.
- No more than two of the ten credits may be from the same department or program.
- Students may use only one approved prematriculation credit (e.g. AP or IB) toward fulfillment of each distribution area, for a total of five.
- No single course may be used in more than one distribution area. For example, a history course may be counted as either a humanities or a social science requirement, but not both.
- Courses used in the foundation requirement or as part of the concentration (major) may also be used to fulfill distribution requirements (with some exceptions noted below).

Special restrictions apply to Experimental College courses. Approval of the Academic Review Board must be obtained in all cases. Only one Experimental College credit may be used as a distribution requirement. Those courses graded pass-fail may not be used to satisfy any distribution requirement.

Summary Sheet of Requirements

A grade of D- or above will fulfill foundation and distribution requirements.

Foundation Requirements

1. WRITING

- 1) _____
- 2) _____

2. FOREIGN LANGUAGE/CULTURE OPTION

Part I: Competence equivalent to three semesters of college language courses.

- 1) _____
- 2) _____
- 3) _____

Part II: Competence equivalent to three semesters of college language courses, or culture option.

(Fulfill a, b, or c.)

- 4) _____
- 5) _____
- 6) _____

a. Continue in the first language for three more semesters

b. Three semesters in a *second* language

c. Culture option—there are two ways to fulfill the culture option:

1. Continue through the fourth or fifth semester of the language used to fulfill Part I, and take one or two credits in the same culture area as that language.

2. Take three credits related to a single culture either the same as or different from the language taken to fulfill Part I. One credit must focus on the region of origin.

3. WORLD CIVILIZATIONS

- 1) _____

This credit may also be used toward a culture OR a distribution requirement, but not both.

Distribution Requirements

1. HUMANITIES

- 1) _____
- 2) _____

2. ARTS

- 1) _____
- 2) _____

3. SOCIAL SCIENCES

- 1) _____
- 2) _____

4. NATURAL SCIENCES

- 1) _____
- 2) _____

5. MATHEMATICAL SCIENCES

- 1) _____
- 2) _____

Only students with a math SAT score below 560 or a math ACT score below 23 may use Math 4 toward the mathematical sciences distribution requirement.

Concentration (Major) Requirement

The object of the concentration (or major) requirement is to provide the student with an integrated and thorough program of study in a well-developed field of learning. Most students satisfy the concentration requirement within established academic departments and programs, selected from among those listed below. An alternative program, called the Interdisciplinary Studies major, is available to students with unique academic interests not clearly encompassed by the established fields of concentration.

All courses used toward fulfillment of the concentration requirement must be taken for letter grades.

Department or Program Major

Students are expected to choose their major and to have a faculty advisor in the major field during the second semester of the sophomore year. With the assistance of the faculty advisor, the student plans a concentration program of ten or more courses as specified by the major department. In some cases, the student must complete prerequisite courses in addition to those that constitute the concentration program.

For students with multiple concentrations, no more than half the credits used to fulfill the requirements for one concentration may be used to satisfy the requirements for a second or subsequent one. However, for courses taught in a foreign language beyond the third-year level of instruction, this overlap may be extended: up to 80 percent of the courses used to fulfill the requirements for one concentration may be used to satisfy the requirements for a second or subsequent one. Departments and programs may further restrict the amount of overlap between concentrations. Students who wish to complete two sets of concentration requirements are urged to continue to design such programs with minimal course overlap.

Interdisciplinary Studies Major

(See also Center for Interdisciplinary Studies)

The Interdisciplinary Studies major offers students the opportunity to create a self-designed, individual concentration that draws on courses from at least two of the following six areas of study: humanities, arts, social sciences, natural sciences, mathematics (quantitative), and engineering.

Students proposing an Interdisciplinary Studies major must have a high degree of initiative and self-discipline. The Interdisciplinary Studies major consists of an integrated program of at least ten credits plus a two-semester thesis or honors thesis (for eligible students) or a substantial project comparable in scope to a thesis, including a written component. A student who wishes to pursue an Interdisciplinary Studies major must submit a detailed application describing the planned program of study. The student selects an advisory committee of three faculty members who support the application, including representatives from three departments in at least two of the six areas listed above. At least two of the committee members must be full-time members of the Arts and Sciences faculty with the rank of lecturer or above; at least one of the committee members must be a tenured or tenure-track member of the Arts and Sciences faculty. In consultation with this advisory committee, the student develops a rationale for the major, selects courses, and outlines the thesis plan. The proposal is reviewed for approval by the Center for Interdisciplinary Studies (CIS) Board or its designated subcommittee.

Note: Two credits used to fulfill another major may be used toward the Interdisciplinary Studies major; students may not triple major if one major is in Interdisciplinary Studies.

For specific information and application guidelines visit the CIS website: <http://cis.tufts.edu>.

Departmental, Interdepartmental, and Program Concentrations:

Africana Studies	Architectural Studies
American Studies	Art History
Anthropology	Astrophysics
Applied Mathematics	Biochemistry
Applied Physics	Biology
Arabic	Biomedical Engineering
Archaeology	Biopsychology

Biotechnology	Interdisciplinary Studies
Chemical Physics	International Literary and Visual Studies
Chemistry	International Relations
Child Study & Human Development	Italian Studies
Chinese	Japanese
Classics	Judaic Studies
Cognitive and Brain Sciences	Latin
Community Health	Latin American Studies
Computer Science	Mathematics
Drama	Middle Eastern Studies
Economics	Music
Economics/Quantitative	Peace and Justice Studies
Engineering Psychology	Philosophy
English	Physics
Environmental Studies	Political Science
Film and Media Studies	Psychology
French	Psychology/Clinical
Geological Sciences	Religion
Geology	Russian
German Language and Literature	Russian and East European Studies
German Studies	Sociology
Greek	Spanish
Greek and Latin Studies	Women's, Gender, and Sexuality Studies (WGSS)
History	

The degree of Bachelor of Arts or Bachelor of Science is conferred on all students who complete this program. Students whose major concentration is applied mathematics, applied physics, astrophysics, biochemistry, biology, biopsychology, chemical physics, chemistry, cognitive and brain sciences, computer science, engineering psychology, environmental studies (as second major only), geological sciences, geology, mathematics, and physics are eligible to receive a Bachelor of Science or Bachelor of Arts degree. Those majoring in psychology, psychology/clinical, and quantitative economics may choose to receive the degree of Bachelor of Science or Bachelor of Arts at the time they complete their degree sheet. Students in all other majors will receive a Bachelor of Arts degree. Students whose multiple majors make them eligible for either a Bachelor of Arts degree or a Bachelor of Science degree may choose between the two when completing their degree sheet.

Pass-Fail Option

Within the limits stated below, students may elect to have their grades in certain courses recorded simply as pass or fail. The purpose of this option is to encourage students to extend their academic interests; it is not designed as a safety valve to permit students to carry unrealistic academic loads. A student will be graded as usual throughout the course, with final grades transcribed by the registrar into pass (if D- or better) or fail. A pass does not affect the grade point average; a failing grade is averaged into the grade point average. A course that has been taken using the pass/fail grading option and for which the student earned a pass may not be repeated for credit. If a class that has been taken pass/fail is later needed for a requirement that was not anticipated, the student may submit a petition request to his or her academic dean to have the originally assigned grade restored.

In a thirty-four course credit program, students are normally required to take at least twenty-six semester course credits under standard grading; the pass-fail option may be applied to any courses in excess of twenty-six, with the exceptions stated elsewhere in this section.

Transfer students and those students who transfer credit to Tufts from programs at other institutions must complete three-fourths of their work at Tufts under standard grading subject to the stated quality requirement. The pass-fail option may be applied to courses in the remaining one-fourth of the program, with the exceptions stated below.

No distinction is made between regular courses that a student elects to take under pass-fail grading and those courses that may only be taken pass/fail.

All decisions with respect to the pass-fail option must be made within the first five weeks of any term for sophomores, juniors, and seniors, and within the first ten weeks of any term for first-year students. After five weeks (ten weeks for first-year students), the student must complete a course under the grading system then in force or withdraw from the course. For liberal arts students, only electives may be taken pass-fail; courses taken to fulfill the foundation, distribution, concentration, and minor requirements may not be taken pass/fail.

Additional Graduation Requirements

Other courses to complete the thirty-four credits required for graduation may be selected without restriction. However, students should be guided in their choice by the purpose of promoting breadth as well as depth in intellectual development. In planning their programs of study, students should keep in mind that a good general education in the humanities, the arts, the sciences, mathematics, and the social sciences is a distinguishing characteristic of members of all the established professions. Faculty advisors are ready at all times to aid and counsel in making decisions.

Seniors must file a degree sheet the semester prior to their expected date of graduation. (Consult Undergraduate Education in Dowling Hall.)

Undergraduate Minor Programs

A student may have any number of majors and minors, provided there is only one disciplinary (departmental) minor. All courses used in fulfillment of a minor must be taken for a grade (not pass/fail).

Disciplinary (or Departmental) Minor

A minor is a coherent group of four to six course credits that may be a limited version of a field of concentration or a group of courses having closely related subject matter. Minors are optional and in no way replace the field of concentration. The object of a minor program is to present students with the basic concepts in a single scholarly discipline, including an introduction to appropriate methodologies and ways of thinking about the subject.

Students may have only one disciplinary (departmental) minor, regardless of the number of majors. Two course credits used toward the departmental minor may be used toward a foundation, distribution, or concentration requirement. Students may not complete both a minor and a concentration (major) in the same discipline. Not all departments have minors, so students should consult department websites for additional information.

Interdisciplinary Minor

An interdisciplinary minor involves a designated group of five credits from at least three departments or programs of the university, bringing to bear the

knowledge and perspectives of various disciplines on a single subject. In addition to the five credits, students pursuing an interdisciplinary minor are required to complete a capstone project such as a research paper, an oral presentation, or a performance, which integrates the knowledge and methodologies of the disciplines involved.

There is a wide variety of interdisciplinary minors offered within Arts and Sciences (see list below). Students should consult the individual program website and/or program director prior to declaring a minor. Students may declare a minor only after they have declared a major concentration. Students may have more than one interdisciplinary minor, regardless of the number of majors they have, and may have an interdisciplinary minor in addition to a departmental minor. Two credits used toward the interdisciplinary minor may be used toward a distribution or concentration requirement, but not toward a foundation requirement.

While each interdisciplinary minor has its own requirements and processes, in general students are responsible for selecting an advisory committee of two appropriate faculty members to support and evaluate the work on the capstone project. Capstone projects are letter graded by the faculty advisory committee and can be taken for one-half or one course credit either within the individual program or, if the individual program does not have its own capstone course number, through CIS (CIS 120: Interdisciplinary Minor Capstone). Individual interdisciplinary programs provide opportunities for students pursuing minors to share knowledge and resources in capstone courses, cohort meetings, and/or capstone presentation events.

The programs offering interdisciplinary minors approved by the Subcommittee on Academic Minors of the Committee on Curricula are listed below and should be consulted for their specific requirements and processes:

Africana Studies	Latino Studies
Asian American Studies	Leadership Studies
Colonialism Studies	Medieval Studies
Cognitive and Brain Sciences	Multimedia Arts
Film and Media Studies	Urban Studies
Judaic Studies	Women's, Gender, and
Latin American Studies	Sexuality Studies

Pre-matriculation Credits

Pre-matriculation credits are defined as credits earned from certain scores on Advanced Placement and SAT Subject examinations, scores on examinations of certain international diplomas, as well as credits earned from college courses taken prior to matriculation at Tufts or any four-year college or university. These scores and their equivalencies have been determined by the individual departments and are listed below. Pre-matriculation credits are treated as regular course credits, but are not normally applied toward the concentration. Liberal Arts students are limited to five pre-matriculation credits toward their degree. Credits earned prior to matriculation via Tufts Summer Session are not included in this limit. Only one pre-matriculation credit may be used toward each of the five distribution areas. If the student chooses to take a course that is equivalent to a pre-matriculation credit received and passes, then the pre-matriculation credit will be removed from the student's record. Students do not need to take the next level course in order to keep the pre-matriculation credit (except where stated). Students with more than five eligible Advanced Placement credits will be awarded five credits by the registrar. If they wish to make any changes, they may do so by completing the appropriate form under Student Forms at <http://uss.tufts.edu/stuServ>.

Students who took college classes while still in high school may request transfer of credit for those courses online through SIS on the Student Services web page. Credit is awarded only for courses taken at a college with regularly enrolled college students. Some colleges offer their courses at nearby secondary schools for classes composed entirely of secondary school students; credit is not awarded for these courses. Also, students requesting such credit must provide a letter from their principal or guidance counselor stating that the course was not used to complete requirements for the high school diploma.

Tufts does not grant credit for international diplomas as a whole; rather, credit is awarded for each approved subject examination passed at an appropriate level. For possible credit from international diploma examinations not listed here, students may contact a professional academic equivalency service—such as the World Educational Service—to provide an official evaluation.

**TUFTS EXAM EQUIVALENCY CHART
LIBERAL ARTS**

Key:

AP = Advanced Placement

A-Level = British Certificate of Education

FB = French Baccalaureate

IB/HL = International Baccalaureate

Higher Level

IB/SL = International Baccalaureate

Subsidiary Level

SUBJECT	EXAM	SCORE	CREDIT	EQUIVALENT	NOTES
Anthropology	A-level	A, B	1.0	ANTH 10	
	IB/HL	6, 7	1.0	ANTH 10	
Art History	AP	5	0.0	FAH 1 & 2	
Biology	AP	5	1.0	BIO 13 or 14	
	A-Level	A, B	1.0	BIO 13 or 14	
	IB/HL	6, 7	1.0	BIO 13 or 14	
Chemistry	AP	5	2.0	CHEM 1 & 2	Lose credit if CHEM 11 & 12 are taken
			1.0	CHEM 1	If CHEM 2 or 12 is taken at Tufts
	A-Level	A	1.0	CHEM 2	Exempt from CHEM 1 & 11
		B	1.0	CHEM 1	Lose credit if CHEM 11 is taken
	IB/HL	7	1.0	CHEM 2	Exempt from CHEM 1 & 11
		6	1.0	CHEM 1	Lose credit if CHEM 11 is taken
Chinese	AP	5	0.0	CHNS 4	
		4	0.0	CHNS 3	
	SAT	760–800	1.0	CHNS 22	
		710–750	0.0	CHNS 21	
		660–700	0.0	CHNS 4	
		600–650	0.0	CHNS 3	
		490–590	0.0	CHNS 2	
	410–480	0.0	CHNS 1		
Classics	A-level	A, B	1.0	CLS 310	
	IB/HL	6, 7	1.0	CLS 310	
* Computer Science	AP	4, 5	1.0	COMP 10	Either COMP A or COMP AB exam
	A-level	A, B	1.0	COMP 10	
	IB/HL	6, 7	1.0	COMP 10	
Drama/Theater	A-level	A, B	1.0	DR 310	
	IB/HL	6, 7	1.0	DR 310	
Economics	AP	5	1.0	n/a	Students should enroll in EC 5
		5/5	2.0	EC 5 & 310	If both Macro and Micro AP
	A-level	A, B	2.0	EC 5 & 310	
	IB/HL	6, 7	2.0	EC 5 & 310	
* English	AP	5	1.0	ENG 1/2	Exempt from Writing Req
		4	1.0	ENG 1	
	SAT	760 +	0.0	ENG 1	For SAT Writing
	A-level	A	1.0	ENG 1/2	Exempt from Writing Req
		B	1.0	ENG 1	
	IB/HL	7	1.0	ENG 1/2	Exempt from Writing Req
	6	1.0	ENG 1		

SUBJECT	EXAM	SCORE	CREDIT	EQUIVALENT	NOTES
* English (contd.)	IB/SL	7	1.0	ENG 1	
Environmental Science	AP	4, 5	1.0	BIO 7	
	A-level	A, B	1.0	BIO 7	
	IB/HL	6, 7	1.0	BIO 7	
French	AP	5	1.0	FR 21	
		4	0.0	FR 4	
		3	0.0	FR 3	
	SAT	770–800	1.0	FR 22	
		720–760	0.0	FR 21	
		660–710	0.0	FR 4	
		590–650	0.0	FR 3	
		500–580	0.0	FR 2	
		420–490	0.0	FR 1	
	A-level	A, B	1.0	FR 3	
	IB/HL	7	1.0	FR 21	
		6	0.0	FR 4	
		5	0.0	FR 3	
	IB/SL		0.0		Take placement exam
	FB		1.0	FR 122	
German	AP	5	1.0	GER 21	
		4	0.0	GER 4	
		3	0.0	GER 3	
	SAT	770–800	1.0	GER 22	
		720–760	0.0	GER 21	
		660–710	0.0	GER 4	
		600–650	0.0	GER 3	
		490–590	0.0	GER 2	
		410–480	0.0	GER 1	
	IB	7	1.0	GER 21	Both HL & SL
		6	0.0	GER 3	Both HL & SL
Hebrew	SAT	770–800	1.0	HEB 22	
		720–760	0.0	HEB 21	
		660–710	0.0	HEB 4	
		600–650	0.0	HEB 3	
		490–590	0.0	HEB 2	
		410–480	0.0	HEB 1	
History	AP	4, 5	1.0	HIST 310	A max of 2.0 credits are awarded
	A-level	A, B	1.0	HIST 310	
	IB/HL	6, 7	1.0	HIST 310	
Human Geography	AP	5, 4	1.0	ANTH 310	
Italian	AP	5	0.0	ITAL 4	
		4	0.0	ITAL 3	

Continued on next page

**TUFTS EXAM EQUIVALENCY CHART
LIBERAL ARTS**

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Higher Level

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Subsidiary Level

SUBJECT	EXAM	SCORE	CREDIT	EQUIVALENT	NOTES
* Italian (contd.)		3	0.0	ITAL 2	
	SAT	770–800	1.0	ITAL 22	
		720–760	0.0	ITAL 21	
		660–710	0.0	ITAL 4	
		590–650	0.0	ITAL 3	
		500–580	0.0	ITAL 2	
		420–490	0.0	ITAL 1	
	IB/HL	7	1.0	ITAL 21	
		6	0.0	ITAL 3	
	IB/SL				Take placement exam
Japanese	AP	5	0.0	JPN 4	
		4	0.0	JPN 3	
		3	0.0	JPN 2	
	SAT	760–800	1.0	JPN 22	
		710–750	0.0	JPN 21	
		660–700	0.0	JPN 4	
		600–650	0.0	JPN 3	
		490–590	0.0	JPN 2	
		410–480	0.0	JPN 1	
Latin	AP	4, 5	1.0	LAT 3	
		3	0.0	LAT 3	
	SAT	720–800	1.0	LAT 21	
		620–710	0.0	LAT 3	
		480–610	0.0	LAT 2	
	IB/HL	6, 7	1.0	LAT 3	
Mathematics AB	AP	4, 5	1.0	MATH 32	
Mathematics BC	AP	5	2.0	MATH 32, 34	
		3, 4	1.0	MATH 32	With AB subscore of 4 or 5
Mathematics	A-level	A	1.0	MATH 34	
		B	1.0	MATH 32	
	IB/HL	6, 7	1.0	MATH 32	
	IB/SL	6, 7	1.0	MATH 30	
Further Math	IB/SL	7	1.0	MATH 14	
Music	AP	5	0.0	n/a	See Department for placement
	A-level	A, B	1.0	MUS 310	See Department for placement
	IB/HL	6, 7	1.0	MUS 310	See Department for placement
Philosophy	A-level	A	1.0	PHIL 310	Knowledge and Inquiry Exam
		A, B	1.0	PHIL 1	

SUBJECT	EXAM	SCORE	CREDIT	EQUIVALENT	NOTES
Philosophy (contd.)	IB/HL	6, 7	1.0	Phil 310	
Physics 1	AP	5	1.0	PHY 1	
		4	1.0	PHY 1	With Mechanics placement exam
Physics 2	AP	5	1.0	PHY 2	
Physics C (E or M)	AP	5	1.0	PHY 11	Lose credit if PHY 1 is taken
		4	1.0	PHY 11	With Mechanics placement exam
Physics C (E & M)	AP	5	2.0	PHY 11 & 12	Lose credit if PHY 1 & 2 are taken
Physics	A-level	A	1.0	PHY 2	
		B	1.0	PHY 1	
	IB/HL	7	1.0	PHY 2	
		6	1.0	PHY 1	
*Political Science	AP	4, 5	1.0	PS 310	
	A-level	A, B	1.0	PS 310	Cannot be used toward the major
	IB/HL	6, 7	1.0	PS 310	Cannot be used toward the major
Psychology	AP	4, 5	0.0	n/a	Exempt from PSY 1
	A-level	A, B	1.0	PSY 1	
	IB/HL	6, 7	1.0	PSY 1	
Sociology	A-level	A, B	1.0	SOC 1	
	IB/HL	6, 7	1.0	SOC 1	
Spanish	AP	5	1.0	SPN 21	
		4	0.0	SPN 4	
		3	0.0	SPN 3	
	SAT	770–800	1.0	SPN 22	
		720–760	0.0	SPN 21	
		660–710	0.0	SPN 4	
		590–650	0.0	SPN 3	
		500–580	0.0	SPN 2	
		420–490	0.0	SPN 1	
	IB/HL	7	1.0	SPN 21	
		6	0.0	SPN 3	
		5	0.0	SPN 2	
	IB/SL	6, 7	0.0	SPN 2	
		5	0.0	SPN 1	
Statistics	AP	4, 5	1.0	MATH 10	
	A-level	A, B	1.0	MATH 10	
	IB/HL	6, 7	1.0	MATH 10	
Studio Art	A-level	6, 7	1.0	FAM 310	

*If both exams are taken, only one credit will be awarded. Please note, if a student elects to take the Equivalent course at Tufts, the Exam credit will be removed upon completion of the course.

For other types of A-level exams and Foreign Diplomas, please consult your Academic Dean.

A student will be awarded 1.0 credit for the highest level achieved in a single language, even if multiple tests were taken. This applies only to scores for which departments award credits.

However, Tufts reserves the right to determine whether or not to accept the evaluation toward the Tufts degree.

Please note: Health professions graduate programs, such as medical and dental schools, will generally expect actual college science courses with laboratory on the transcript.

Academic Standing/Satisfactory Progress Toward the Degree

Determination of a student’s academic status is made by the faculty Committee on Academic Standing. The committee reserves the right to make decisions on an individual student’s academic progress.

Academic Alert: A student will be sent an academic alert at the end of any semester in which the student earned fewer than 3.0 credits but more than 1.0, and/or had lower than a 2.0 but higher than a 1.66 GPA. Incompletes are not earned credits.

Academic Probation: A student will be considered for academic probation by the Committee on Academic Standing at the end of any semester in which the student earned 1.0 credit or fewer and/or lower than a 1.67 GPA. If put on academic probation, the student will no longer be in good academic standing, and notification of this status will be sent to the student’s advisor and parents or guardians. To be removed from academic probation, in the following semester the student must complete a minimum of 3.0 credits and earn a minimum term GPA of 2.0, with a cumulative GPA of 1.67 or higher. Incompletes are not earned credits.

Required to Withdraw: If a student’s academic performance meets the criteria for academic probation for a second semester, then the student will be subject to a required academic withdrawal for one semester.

Summary:

- Academic alert: 1.5–2.5 credits and/or term GPA 1.67–1.99. In good academic standing; no transcript notation.
- Academic probation: 0–1.0 credit and/or term GPA 0–1.66. No longer in good academic standing; transcript notation; notification sent to advisor, parents/guardian.

- Required to withdraw: Credits and GPA meet the criteria of academic probation for a second term. Student considered for withdrawal for one semester; transcript notation; notification sent to advisor, parents/guardian.

Permanent Academic Withdrawal: A student who returns from having been required to withdraw for a semester and meets the criteria for academic probation in any semester after the return will be subject to a permanent academic withdrawal, determined by the Committee on Academic Standing.

Satisfactory Progress Toward the Degree: Liberal arts undergraduates will be alerted by their academic dean if they are not earning adequate credits to make satisfactory progress toward the degree. Satisfactory progress is defined by the number of credits completed by the end of each semester, as follows:

	Credits completed	
	Fall	Spring
FIRST-YEAR	3 credits	6 credits
SOPHOMORE	10 credits	14 credits
JUNIOR	19 credits	23 credits
SENIOR	27 credits	34 credits

Dean’s List

Each semester, students who have been enrolled with a minimum of 4.0 credits, received letter grades in a minimum of three credits with no work incomplete (with the exception of Y), and earned a minimum grade point average of 3.40 in the College of Liberal Arts will be placed on the Dean’s List in recognition of their academic achievement. An indication of Dean’s List status will be placed on their permanent record. Students in the combined-degrees program with the New England Conservatory of Music whose total course load equals 4.0 credits or more will be awarded Dean’s List honors at both institutions if they meet Dean’s List GPA requirements for the course work taken at each institution. Students in the combined-degrees program with the School of the Museum of Fine Arts whose total course load equals 4.0 credits or more will be awarded Dean’s List honors if they meet Dean’s List GPA requirements at Tufts.

Degrees with Honors

Distinction (*cum laude*) is conferred at commencement on liberal arts students who achieved a record of five credits of A or A- in satisfying their concentration requirements, including related fields, and whose cumulative average for all Tufts courses is 3.50 or higher.

High distinction (*magna cum laude*) may be conferred at commencement on liberal arts students who achieved a record of six credits of A or A- in satisfying their concentration requirements, including related fields, and whose cumulative average for all Tufts courses is 3.65 or higher. Students must be recommended in writing by their departmental major.

Highest distinction (*summa cum laude*) may be conferred at commencement on liberal arts students who achieved a record of six credits of A or A- in satisfying their concentration requirements and whose cumulative average for all courses is 3.80 or better. Such candidates must also have earned at least one credit of A or A- in four of the five areas of the distribution requirement. All of these A or A- grades must be received in courses offered by a department or interdisciplinary program at Tufts or in Tufts Programs Abroad. Please note that Advanced Placement scores are not interpreted as grades.

It is important to emphasize that the numerical criteria for *magna cum laude* and *summa cum laude* determine only eligibility for consideration; actual award of these honors is contingent on departmental recommendation. A description of additional departmental criteria (such as independent research) for honors recommendations is available from each academic department or program. In addition, for students recommended for *summa cum laude*, the department must supply a letter supporting the recommendation. Finally, *summa cum laude* is awarded only by special vote of the entire faculty, recognizing extraordinary achievement in the breadth, as well as the depth, of the student's intellectual development. Students whose record includes a serious disciplinary infraction will not normally be eligible for *summa cum laude* honors. Exceptions to this policy can be made only after disclosure by the Dean of Student Affairs of the details of the infraction and subsequent vote by the faculty.

Grades in courses taken at institutions other than Tufts shall not be considered as criteria for honors. Exceptions to this rule are courses taken through cross-registration, the domestic exchange programs, the Mystic Seaport Program, or Tufts programs abroad.

See also Thesis Honors Program.

Phi Beta Kappa

Founded at the College of William and Mary in Virginia on December 5, 1776, Phi Beta Kappa is the highest national academic honor for students in the liberal arts. There are chapters of Phi Beta Kappa at 283 colleges and universities. Delta Chapter of Massachusetts at Tufts University was established on September 7, 1892, and women became eligible from the time of their acceptance at Tufts. Although second-semester juniors and all seniors will be considered without any action on their part, students can be recommended for election to Phi Beta Kappa by their major departments or programs or by individual professors. Election is determined by the student's cumulative average together with his or her program: the courses selected in the field(s) of concentration and in fulfilling the foundation and distribution requirements, the general nature and difficulty of the program, its breadth and depth, the student's progress in the program, and the use of the pass-fail option.

Thesis Honors Program

The Thesis Honors Program allows students to pursue a program of independent study usually leading to a senior honors thesis. (In some fields, the thesis may take the form of a creative project or research experience.) The principal purpose of the program is to give special impetus to the development of self-reliance, individual initiative, habits of critical analysis, and correlation of knowledge. Departments and programs are responsible for establishing specific guidelines for senior theses. Intensive specialization in a field of knowledge may be considered an appropriate corollary in some cases, depending on the student's individual approach and the particular area of investigation. Students pursuing a major in Interdisciplinary Studies or a CIS thesis are eligible for thesis honors.

Since this is an honors program, admission is normally restricted to students whose names have appeared on the Dean's List at least two times before their senior year. Students may take on an honors thesis with one semester on the Dean's List if they have transferred to Tufts or have received special permission from their major department or program. Application should be made no later than the end of the junior year. The student is responsible for finding an advisory committee. While three members are recommended, the committee may have two members, one of whom may be outside the student's major department. The advisory committee is normally chaired by a member of the student's major department or by the primary faculty advisor in the case of a major in Interdisciplinary Studies. The committee will direct the student's reading and research or other creative work and will guide the student in preparing for a qualifying examination in the area of investigation. All such programs will include a thesis course, which normally will count as two one-semester credits. Students who would like to be recommended for degrees with honors by departments or programs that require a thesis should be aware that a thesis within their own department or program is required and a CIS thesis will not usually count as a substitute.

If you plan to write a thesis, you must submit a Senior Honors Thesis Candidate form and return it to Dowling Hall by the end of September. The form is located under Student Forms on the student services home page.

The thesis may be of a creative, critical, or historical nature, or may embody critical analysis of the results of experiments carried out by the student under supervision. Its subject and scope will be agreed upon in advance by the student and sponsor and approved by the committee. The completed thesis will be presented for consideration no later than two weeks before the last day of classes of the student's final semester.

Each candidate for a degree with thesis honors is required to undergo examination on the thesis and on the principal area of investigation (or major concentration). The specific character of the examination is determined by each department or advisory committee and may be oral, written, or both.

The department or advisory committee is empowered to determine the level of thesis honors to be awarded, basing its recommendation on an evaluation of the thesis. Degrees are designated bachelor of arts or bachelor of science, with highest thesis honors, with high thesis honors, or with thesis honors. (Thesis honors will be indicated on the student's transcript, but not on the diploma.) Students who, in the judgment of the department or advisory committee, have not attained the standards required for a thesis honors designation, but whose work is worthy of a degree, are recommended for the bachelor of arts or bachelor of science degree subject to the general regulations. Students who, in the judgment of the department or advisory committee, have attained the standards required for a thesis honors designation may also receive the degree summa cum laude, magna cum laude, or cum laude, in accordance with the procedures governing degrees with distinction.

For answers to frequently asked questions and a style sheet, visit the website uss.tufts.edu/arc/writingresources/thesis.asp.

Internship Programs

Internships provide juniors, seniors, and in some cases sophomores with the opportunity to apply various types of knowledge and skills in a field-based situation. Two internship programs are available: internships for academic credit and internships that award transcript notation but no academic credit.

Internships for academic credit in a wide range of fields are offered by some departments and programs. Students granted internships for academic credit must register for a relevant course and have a faculty advisor on campus as well as professional supervision at their workplace. They also complete and submit an internship agreement at the time they register for the course. All agreements must be signed no later than the add deadline of the semester. Participants are expected to demonstrate in a written project the learning that has taken place on the job by placing the work experience in an academic context. A minimum of twelve hours of work each week or 150 hours for the semester is required, and only two one-credit internships are normally accepted toward a degree. No credit is granted retroactively for these activi-

ties, and the two internships may not be done in the same semester. Students may develop their own field placement programs. However, all new proposals must be submitted to the appropriate department for approval. *Tufts does not accept transfer credits for internships.*

Students may also participate in the All-College Internship Program, which awards transcript notation but no academic credit. A faculty advisor is not needed to participate in this program because there is no academic component, but students do receive official recognition of their work on their transcript. Students register for the internship in the Career Center by the second week of classes, spend a minimum of 100 hours over the course of the semester at the site, and complete an evaluation form at the close of the semester. Internships cannot be filed retroactively, and students may receive no more than two notations on their transcript.

Auditing

Tufts undergraduates may audit a class only with permission of the instructor. The student will not be registered for the class, no credit will be received, and there will be no record of the audit on the student's transcript. Only students currently enrolled at Tufts in the semester may audit. The student is expected to attend class regularly, but the exact character of each audit must be determined by the instructor at the beginning of the semester. However, the student may not submit papers, take exams, or participate in any form of evaluation of performance. Auditing for credit is possible through the Experimental College. (See Auditing for Breadth.)

Cross-Registration

Up to twenty undergraduate Tufts students may enroll in each of the following institutions during the fall and spring semesters: Boston College, Brandeis University, and Boston University. Qualifying students must be enrolled full time and be in good academic standing in their home institution. The course must be taken for credit and may not be taken pass-fail. There is no exchange of fees, and both course credits and grades are recorded at the home institution. Only one cross-registered course at the above institutions may be taken per

semester. Cross-registration is not allowed during Summer Session. Normally, Tufts students are limited to a total of two courses taken in departments for which there is no Tufts equivalent (e.g., business). Tufts students are subject to the requirements of the course taken at the host institution, including attendance.

Any student from the above institutions wishing to take a course at Tufts University is subject to the same rules as the resident Tufts University students. One course per fall and spring semester for up to twenty enrollments per institution may be taken at the Tufts University Medford, Boston, and Grafton campuses. This does not include classes being held at the School of the Museum of Fine Arts.

Tufts students may also cross-register for courses at certain schools within the university, with permission of the course instructor and the registrar of the relevant school.

For questions and forms, contact Student Services at 617-627-2000 or email studentservices@tufts.edu.

Domestic Exchange and Off-Campus Programs

Tufts offers one-semester student exchanges with Spelman College and Swarthmore College. Juniors in good standing may participate. For the Spelman program, participating students pay tuition, room and board (subject to availability), and special fees to Spelman. Information on the application and selection process is available from Undergraduate Education. For the Swarthmore exchange program, students pay all charges to their home institution; there is no exchange of fees. The course credits and grades earned in both exchange programs by Tufts students are recorded on the Tufts transcript.

Sophomores and juniors are also eligible to participate in a one-semester program in American Maritime Studies, accredited by Williams College and held at Mystic Seaport, Connecticut. Both credits and grades are recorded on the Tufts transcript. For more information on this program, contact Undergraduate Education.

Graduate School of Arts and Sciences

The Graduate School of Arts and Sciences is the academic unit responsible for all post-baccalaureate degree programs and certificate programs offered through the School of Arts and Sciences. The advanced degrees offered are the master of arts, master of science, master of fine arts, master of arts in teaching, master of public policy, educational specialist, doctor of occupational therapy, and doctor of philosophy. The Graduate School of Arts and Sciences also partners with other Tufts schools and several Boston area colleges and universities to offer joint and dual degrees, including juris doctorate, master of public health, and master of business administration.

Through its doctoral programs, the Graduate School of Arts and Sciences aims to advance knowledge and to develop intellectual leaders in selected areas of the natural sciences, social sciences, and humanities. In order to encourage the close association of doctoral candidates and faculty, the number of programs offered is relatively small and the number of students admitted to each is limited. Through its wide variety of master's level programs, the school provides students with a focused education and specific skills to further their professional careers.

Please refer to the individual department sections of this bulletin to obtain further details on specific programs offered at the Graduate School. The Graduate School of Arts and Sciences website, <http://gsas.tufts.edu>, and a specific departmental website will provide more information on program offerings. The Graduate Student Handbook should be referenced for information on the policies specific to graduate students.

Admission

Graduate program and application information is available online at <http://gsas.tufts.edu/admissions>. The application must be accompanied by a nonrefundable application fee. The fee is waived if the applicant is a current Tufts undergraduate, graduate, or certificate student. The admission deadlines and requirements vary by program, as do the scholarship packages.

Reserving Graduate-Level Courses While an Undergraduate

Tufts undergraduate students may reserve graduate-level courses taken prior to completion of their baccalaureate degree that are not needed for completion of those degree requirements. Through arrangement with the registrar, these courses are designated on the transcript and may be applied toward a master's degree at Tufts or elsewhere. Undergraduate students must complete the appropriate paperwork, located at http://uss.tufts.edu/registrar/SS_StudentForms.asp, in order to reserve courses for graduate education.

Combined Bachelor's/Master's Degrees Program

The Graduate School of Arts and Sciences offers a limited number of combined degrees through select departments. A combined degree program is conducted jointly by the undergraduate colleges and the graduate school. Combined-degree students must pay four years of undergraduate tuition and the entire tuition for the master's degree.

Please refer to the Graduate School of Arts and Sciences website, <http://gsas.tufts.edu>, for more information on combined degrees.

College of Special Studies

The College of Special Studies offers a variety of academic programs, including the Bachelor of Fine Arts (BFA) and Master of Fine Arts (MFA) degree programs offered in conjunction with the School of the Museum of Fine Arts. The College also offers various certificate programs in conjunction with certain non-degree-granting Tufts initiatives, such as the Certificate in Water: Systems, Science, and Society, coordinated through the Tufts Institute of the Environment.

Degrees Programs for Students enrolled in the School of the Museum of Fine Arts

In accordance with Tufts University's affiliation with the School of the Museum of Fine Arts (SMFA), a student may apply as a candidate for the Bachelor of Fine Arts degree. After acceptance into the BFA program, students take their studio art courses at the Museum School (in Boston) and their liberal arts courses either in the School of Arts

and Sciences at Tufts or at SMFA. Courses in many fields of art are available, such as printmaking, photography, painting, drawing, sculpture, ceramics, metalsmithing, video and multimedia, film, performance, sound, text and image arts, and stained glass. Requirements for the Bachelor of Fine Arts degree include 76 credits in studio art and fourteen academic courses, including five semesters of art history. More information about the BFA and MFA programs is available at www.smfa.edu.

Graduate Career Advancement Program and Graduate Certificates

The Graduate Career Advancement Program, which allows holders of baccalaureate degrees to enroll in courses at Tufts to prepare for further study or simply to expand their knowledge of particular disciplines, is offered through the College of Special Studies. A number of advanced certificate programs are also offered through the College of Special Studies. Each program consists of a coherent set of credit-bearing courses in an emerging or rapidly evolving field. The certificate can serve as a credential for professional advancement or as an intermediate step toward a master's degree. For more general information, visit <http://gradstudy.tufts.edu>. For more information about the certificate program in Water: Systems, Science, and Society, visit <http://www.tufts.edu/water/>.

School of Engineering

Mission Statement

A Unique Learning Environment

The Tufts University School of Engineering offers a rigorous engineering education in a unique environment that blends the intellectual and technological resources of a world-class research university with the strengths of a top-ranked liberal arts college. Our size and educational philosophy support a distinctive sense of community, a diversity of perspectives, and a student-centric learning environment. Engineering curricula across a wide spectrum of majors emphasize project-based learning, the nurturing of leadership skills, and cultivation of creativity through innovative design. Close partnerships with Tufts' cadre of excellent undergraduate, graduate, and professional schools, coupled with a long tradition of collaboration, provide a strong platform for interdisciplinary education and scholarship. Proximity to a thriving Boston metropolitan area facilitates close relationships with local industry and research labs, student internship and employment opportunities, and the committed engagement of seasoned practitioners in the school professoriate.

Mission

- To educate engineers committed to the innovative and ethical application of science and technology in addressing the most pressing societal needs
- To develop and nurture twenty-first-century leadership qualities, perspectives, and skills in our students, faculty, and alumni
- To develop and disseminate transformational new knowledge and technologies that further the well-being and sustainability of society
- To provide national leadership in enhancing the role and visibility of the engineering profession in the education of our youth and the development and implementation of public policy

School of Engineering Information

Undergraduate Programs

The School of Engineering offers courses leading to the bachelor of science in five departments of engineering (biomedical, chemical and biological, civil and environmental, electrical and computer, and mechanical), as well as in the computer science department. Students may also enroll in special programs in the School of Engineering in preparation for careers in architecture, medicine, dentistry, veterinary medicine, law, public health, human factors, urban planning, and biomedical engineering. The school offers twelve bachelor of science degrees: bachelor of science in biomedical engineering, chemical engineering, civil engineering, computer engineering, computer science, electrical engineering, environmental engineering, mechanical engineering, engineering science, engineering, and engineering physics, and bachelor of science (no major).

The programs of study leading to these degrees differ in structure and in the manner in which they are administered. Departments administer professional degrees in programs accredited by the Engineering Accreditation Commission (EAC) or the Computing Accreditation Commission (CAC) of ABET, Inc., for students who wish to be recognized as practicing professionals, especially those who wish to become registered professional engineers. Whereas the professional degree programs are the most structured, the bachelor of science degree program without any major is the most flexible. Through consultation with an individual faculty member in the Department of Civil and Environmental Engineering, students may pursue an individualized program of study leading to the bachelor of science degree. The bachelor of science in engineering and engineering science programs are also administered by the Department of Civil and Environmental Engineering and allow for some departure from the curriculum for the professional degree. The Department of Mechanical Engineering administers a bachelor of science degree program for students who are interested in the field of human factors and ergonomics. The Department of Electrical and Computer Engineering, in cooperation with the Department

of Physics, offers a bachelor of science in engineering physics. This program combines a mastery of the fundamental principles of physics with the professional aspects of engineering.

Professional Degree Requirements

Bachelor of Science in Biomedical Engineering

(B.S.B.M.E.)

Bachelor of Science in Chemical Engineering (B.S.CH.E.)

Bachelor of Science in Civil Engineering (B.S.C.E.)

Bachelor of Science in Computer Engineering (B.S.CPE.)

Bachelor of Science in Electrical Engineering (B.S.E.E.)

Bachelor of Science in Environmental Engineering

(B.S.EV.E.)

Bachelor of Science in Mechanical Engineering

(B.S.M.E.)

The programs leading to these degrees are accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc.

Bachelor of Science in Computer Science (B.S.C.S.)

The Department of Computer Science administers the program leading to Bachelor of Science in Computer Science (in the School of Engineering) accredited by the Computing Accreditation Commission (CAC) of ABET, Inc. This program combines mastery of computer science with the breadth and practicality of an engineering education. It is for students who desire a knowledge of computer science, computer systems, and computer applications without the hardware courses required for the computer engineering degree.

The requirements for these professional degrees in engineering are thirty-eight credits to be distributed as detailed below.

Of the thirty-eight course credits required for the professional degrees accredited by the Engineering Accreditation Commission of ABET, a minimum of 9.5 course credits must be college-level math and science appropriate to the discipline, and a minimum of 14.5 course credits must be engineering consistent with ABET general and program criteria (www.abet.org).

UNDERGRADUATE DEGREES — TUFTS UNIVERSITY SCHOOL OF ENGINEERING

DEPARTMENT	UNDERGRADUATE DEGREE	DEGREE ABBREV	FIRST MAJOR	MAJOR ABBREV	PROGRAM
BIOMEDICAL ENGINEERING	Bachelor of Science in Biomedical Engineering*	BSBME	Biomedical Engineering	BME	—
	Bachelor of Science in Chemical Engineering*	BSCHE	Chemical Engineering	CHE	—
	Bachelor of Science in Civil Engineering*	BSCE	Civil Engineering	CE	—
CIVIL & ENVIRONMENTAL ENGINEERING	Bachelor of Science in Environmental Engineering*	BSEVE	Environmental Engineering	ENVE	—
	Bachelor of Science in Engineering	BSE	Engineering	ENGR	—
	Bachelor of Science in Engineering	BSE	Engineering	ENGR	Env. Health
	Bachelor of Science in Engineering	BSE	Engineering	ENGR	Arch. Studies
	Bachelor of Science in Engineering Science	BSES	Engineering Science	ES	—
	Bachelor of Science	BS	No Major	NOMA	—
	Bachelor of Science in Computer Science*	BSCS	Computer Science	COMP	—
ELECTRICAL & COMPUTER ENGINEERING	Bachelor of Science in Electrical Engineering*	BSEE	Electrical Engineering	EE	—
	Bachelor of Science in Computer Engineering*	BSCPE	Computer Engineering	COEN	—
	Bachelor of Science in Engineering Physics	BSEP	Engineering Physics	ENPH	—
MECHANICAL ENGINEERING	Bachelor of Science in Mechanical Engineering*	BSME	Mechanical Engineering	ME	—
	Bachelor of Science (in Engineering Psychology)	BS	Engineering Psychology	EPSY	—

* ABET Accredited Program

INTRODUCTORY COURSE REQUIREMENT

The introductory courses consist of ten credits:

- a. Mathematics 32, 36, 42, 51 (or 61 for computer science majors)
- b. Physics 11
- c. Chemistry 1
- d. One-credit course in introductory engineering
- e. Intro to Computers (one credit)
- f. Physics 12 or Chemistry 2
- g. One approved natural science elective credit

Please see <http://engineering.tufts.edu/academics/undergradprograms/faq.htm> for more information.

FOUNDATION REQUIREMENT

There are eight credits required by the student's department of concentration and selected from among the following: computer science, mathematics, natural science, engineering science, engineering topics, and general education topics.

CONCENTRATION REQUIREMENT

The twelve credits that constitute the concentration requirement for a particular degree are determined by the department offering the degree.

HUMANITIES, SOCIAL SCIENCES, AND ARTS REQUIREMENT

There are six course credits required in the humanities, social sciences, and arts. English 1 or 3 is a required course. Courses selected must include a minimum of one credit each in the areas of humanities and social sciences. In addition, at least two course credits must be taken in the same department. Ex-college courses are excluded, including those approved for distribution credit by the College of Liberal Arts. See <http://engineering.tufts.edu/academics/undergradprograms/faq.htm> for more information on accepted courses in Humanities, Social Sciences, and Arts.

FREE ELECTIVE REQUIREMENT

There are two free elective credits to complete the thirty-eight credits required for these degrees. The courses selected to fulfill the two free elective credits may be chosen without any restriction.

Pre-Matriculation Credits

Pre-matriculation credits are defined as credits earned from certain scores on Advanced Placement and SAT Subject examinations, scores on examinations of certain international diplomas, and credits earned from college courses taken prior to matriculation at Tufts. These scores and their equivalencies have been determined by the individual departments. Pre-matriculation credits are treated as regular course credits and accepted toward satisfaction of the degree requirements. If the credit received is equivalent to a Tufts course, the student may not take that course for additional credit toward the degree. Students are limited to eight pre-matriculation credits toward their degree. Credits earned prior to matriculation via Tufts summer session are not included in this limit.

Secondary school students who have taken college courses should consult the appropriate departments regarding their placement and the possible award of credits. Credit is generally awarded only for courses taken at a college with regularly enrolled college students. Some colleges offer their courses in nearby secondary schools for classes composed entirely of secondary school students; credit is not awarded for these courses.

Advanced Placement Credit

Please see next page for complete listing.

TUFTS UNIVERSITY SCHOOL OF ENGINEERING—Advanced Placement Credit (2015–2016)

Subject	AP Scores	
	5	4
Biology	One credit for BIO 13 (or BIO 14)	Not accepted
Chemistry	Two credits for CHEM 1 and 2	Not accepted
Computer Science A and/or AB	One credit (Free Elective)	One credit (Free Elective)
Economics	Micro AND Macro: Two credits (Social Sciences)	Not accepted
English	Micro OR Macro: One credit (Social Sciences)	Not accepted
Environmental Science	One credit for English 1	One credit for English 1
French/Spanish	One credit (Free Elective)	One credit (Free Elective)
German	One credit (Humanities)	Not accepted
Latin	One credit (Humanities)	Not accepted
History (max 2 credits even if all three taken)	One credit (Humanities)	One credit (Humanities)
US History	One credit (Humanities or Social Sciences)	One credit (Humanities or Social Sciences)
European History	One credit (Humanities or Social Sciences)	One credit (Humanities or Social Sciences)
World History	One credit (Humanities or Social Sciences)	One credit (Humanities or Social Sciences)
Mathematics – Calculus AB	One credit for MATH 32	Not accepted
Mathematics – Calculus BC	Two credits for MATH 32 and 36	One credit for MATH 32
Physics C (Calculus Based)	Mechanics: One credit for Physics 11	Mechanics: With successful placement on the Mechanics Placement Exam (offered during orientation), one credit equivalent to Physics 11
Political Science	Electricity and Magnetism: One credit for Physics 12	Not accepted
Statistics	One credit (Social Sciences)	One credit (Social Sciences)
	One credit (Free Elective)	One credit (Free Elective)

	SAT CREDIT
Subject	One Credit, Language 21 (Humanities) for SAT Scores
Chinese	760–800
French	770–800
German	770–800
Hebrew	770–800
Italian	770–800
Japanese	760–800
Latin	720–800
Spanish	770–800

If tests are taken in both language and literature, only one credit will be awarded for each language.

International Diploma Credit

Tufts does not grant credit automatically for the diploma as a whole; rather, credit is awarded for each approved subject passed at an appropriate level.

For possible credit from all other international diplomas, students must contact a professional academic equivalency service—such as the World Educational Service (WES)—to provide an official evaluation. Tufts accepts possible credit only for certain scores on standardized examinations and reserves the right to determine equivalencies toward the Tufts degree.

BRITISH GENERAL CERTIFICATE OF EDUCATION A-Level

SUBJECT	GRADE	CREDIT
Biology	A or B	1 credit, BIO 13 and BIO 14
Computer Science	A or B	1 credit (Free Elective)
English	A or B	1 credit, English 1
Environmental Science	A or B	1 credit (Free Elective)
Foreign Languages	A or B	1 credit, Language 4 (Humanities)
Mathematics	A or B	1 credit, MATH 32
Physics	A or B	1 credit, PHY 11
All other approved subjects	A or B	Contact Student Services – Dowling Hall

INTERNATIONAL BACCALAUREATE Higher Level

SUBJECT	GRADE	CREDIT
Biology	6 or 7	1 credit, BIO 13 or BIO 14
Chemistry	6 or 7	1 credit, CHEM 1
Computer Science	6 or 7	1 credit (Free Elective)
English	6 or 7	1 credit, English 1
Environmental Science	6 or 7	1 credit (Free Elective)
Foreign Languages	6 or 7	1 credit, Language 21 (Humanities)
Mathematics	6 or 7	1 credit, MATH 32
Physics	6 or 7	1 credit, PHY 11
Psychology	6 or 7	1 credit, PSY 1 (Social Science)
All other approved subjects	6 or 7	Contact Student Services – Dowling Hall

**INTERNATIONAL BACCALAUREATE
Subsidiary Level**

SUBJECT	GRADE	CREDIT
English	7	1 credit, English 1

Engineering Double Majors

Students pursuing a major within the School of Engineering may undertake a second major with the consent of the respective department in the College of Liberal Arts or the School of Engineering. To do so, the student must notify the department of the second major at least one semester before graduation. No more than half the courses used to fulfill the requirements for one concentration may be used to satisfy the requirements for a second or subsequent one. Students may not complete the second or subsequent concentration in the same discipline.

Students following the bachelor of science in engineering and the bachelor of science in engineering science are considered to have engineering and engineering science, respectively, as majors and may participate in double-major programs.

Undergraduate Minor Programs

In addition to completing the courses for the concentration requirement, an undergraduate may elect to enroll in a minor program in the College of Liberal Arts or the School of Engineering. All courses used in fulfillment of the minor program must be taken for a grade. No more than two courses used to fulfill a foundation or concentration requirement may be counted toward fulfillment of the minor.

Minor programs offered in the School of Engineering are:

Architectural Engineering

(For liberal arts students) Department of Civil and Environmental Engineering

Biotechnology Engineering

Department of Chemical and Biological Engineering

Computer Science

Department of Computer Science

Engineering Education

Administered by the Center for Engineering Education and Outreach

Engineering Management

Administered by the Gordon Institute

Entrepreneurial Leadership

Administered by the Gordon Institute

Environmental Science and Policy

(For engineering students only) Department of Civil and Environmental Engineering

Geoengineering

(For liberal arts students) Department of Civil and Environmental Engineering

Human Factors Engineering

Department of Mechanical Engineering

Multimedia Arts

(For liberal arts and engineering students) Department of Electrical and Computer Engineering. Administered by the Film and Media Studies Program

Music Engineering

(For liberal arts and engineering students) Department of Mechanical Engineering

Musical Instrument Engineering

(For liberal arts and engineering students) Department of Mechanical Engineering

For more information, see departmental listings in this bulletin.

Dean's List

Each semester, students who have been enrolled with a minimum of 4.0 credits, received letter grades in a minimum of three credits, completed every course in which they were enrolled with no work incomplete (with the exception of Y), and earned the minimum grade point average of 3.2 will be placed on the Dean's List in recognition of their academic achievement. An indication of Dean's List status will be placed on their permanent record.

Pass-Fail Option

The spirit of the pass-fail option is to encourage academic exploration. A maximum of eight pass-fail credits may be counted toward the total credits required for graduation. No introductory, foundation, or departmental concentration course may be taken pass-fail. Normally, no more than one

course per semester may be taken pass-fail. No distinction is made between regular courses that students elect under the pass-fail grading and those courses in which grading is pass-fail. Refer to the academic calendar for deadlines. After the deadline, the only choices are to complete a course under the existing grading system or to withdraw for the remainder of the term. Forms are available at http://uss.tufts.edu/registrar/SS_StudentForms.asp

Academic Standing/Satisfactory Progress Toward the Degree

The following are guidelines for maintaining satisfactory progress toward the degree. Determination of a student’s academic status is made by the faculty Committee on Academic Standing.

Academic Alert

A student will be sent an academic alert at the end of any semester in which the student fails to make satisfactory progress and/or earns a semester GPA lower than 2.0 but not lower than 1.67. Notification of this status will be sent to the student’s advisor. Satisfactory progress is defined by the number of credits completed by the end of each semester, as follows:

	Credits completed	
	Fall	Spring
FIRST YEAR	3	7
SOPHOMORE	12	17
JUNIOR	22	27
SENIOR	32*	38*

* For BS degrees (Engineering Psychology and No Major): Senior Fall, 31; Senior Spring, 36.

Academic Probation

A student will be considered for academic probation by the Committee on Academic Standing at the end of any semester in which the student earned 1.0 credit or fewer and/or a semester GPA lower than 1.67. If put on academic probation, the student will no longer be in good academic standing, and notification of this status will be sent to the student’s advisor and parents or guardians.

Required to Withdraw for One Semester

The Committee on Academic Standing will consider requiring a student to withdraw for one semester if that student meets the criteria for

academic probation after having previously been placed on academic probation in any prior semester while at Tufts (consecutive or not).

Permanent Academic Withdrawal

A student who returns from having been required to withdraw for a semester and meets the criteria for academic probation after the semester of the return will be considered by the Committee on Academic Standing for permanent academic withdrawal.

Grade Requirements

For graduation, grades of C- or better are required in 67 percent of the courses submitted for the degree. It is expected that grades of C- or better will be earned in at least 75 percent of the courses taken in the concentration.

Degrees with Honors

Distinction (cum laude) is conferred at commencement on deserving students who earned an academic average of 3.20 or higher.

High distinction (magna cum laude) is conferred at commencement on deserving students who have an academic average of 3.50 or higher.

Highest distinction (summa cum laude) is conferred at commencement to deserving students who have a cumulative grade point average of 3.80 or higher.

These nominations are approved by a special vote of the faculty.

The above criteria may be replaced by special evaluation of the Tufts academic record if substantial transfer credit is submitted in fulfillment of the degree requirements, or if the degree program is of unusual duration. Students whose permanent record includes a serious disciplinary infraction will not normally be eligible for degrees with honors.

Tau Beta Pi

Tau Beta Pi, the national engineering honor society, founded in 1885, affords engineering students the same recognition for high scholastic achievement and exemplary character as is provided for liberal arts students in Phi Beta Kappa. The Tufts chapter is designated as Delta Chapter of Massachusetts.

Thesis Honors Program

The Thesis Honors Program allows students to pursue a program of independent study usually leading to a senior thesis and a qualifying examination. The principal purpose of the program is to give special impetus to the development of self-reliance, individual initiative, habits of critical analysis, and correlation of knowledge. Students pursuing a Center for Interdisciplinary Studies (CIS) thesis are eligible for thesis honors.

Because this is an honors program, admission is normally restricted to students whose names have appeared on the Dean's List at least two times before their senior year. Students may take on an honors thesis with one semester on the Dean's List if they have transferred to Tufts or have received special permission from their department. The application process should be completed during the junior year, including the summer of the senior year. The student is responsible for finding an advisory committee (one principal advisor who is a full-time faculty member in the School of Engineering, and at least one other full-time faculty member from the faculty of Arts, Sciences, and Engineering, or industry expert). Admission to the program requires formation of an advisory committee, consent of the student's advisor, and approval of either the student's major department or, in the case of a CIS thesis, the CIS Board. The membership of the advisory committee and the title of the thesis must be registered with the Academic Resource Center.

The advisory committee will be chaired by a full-time faculty member in the School of Engineering. Exceptions to this rule may be made at the discretion of the department chair for the student's major. The committee will direct the student's reading and research or other technical work, and will guide the student in preparing for a qualifying examination in the area of investigation. All such programs will include two one-semester course credits (with at least one credit toward the concentration elective). The thesis should be of quality comparable to a paper publishable in a peer-reviewed journal. Its subject and scope will be agreed on in advance by the student and sponsor and approved by the committee. The completed thesis will be presented for consideration no later than two weeks before the last day of classes of the student's final semester.

Each candidate for a degree with thesis honors is required to undergo examination on the thesis and on the principal area of investigation. The specific character of the examination is determined by each advisory committee and may be oral, written, or both. After the defense, a final copy of the thesis, in electronic form, should be submitted to the Tisch Library archive.

The advisory committee is empowered to determine the level of thesis honors to be awarded, basing its recommendation on an evaluation of the thesis. Degrees are designated bachelor of science with highest thesis honors, with high thesis honors, or with thesis honors. (Thesis honors will be indicated on the student's transcript, but not on the diploma.) Students who, in the judgment of the advisory committee, have not attained the standards required for a thesis honors designation, but whose work is worthy of a degree, are recommended for the bachelor of science degree subject to the general regulations. Students who, in the judgment of the advisory committee, have attained the standards required for a thesis honors designation may also receive the degree *summa cum laude*, *magna cum laude*, or *cum laude*, in accordance with the procedures governing degrees with distinction.

After the defense, a final copy of the thesis should be submitted to the Digital Collections and Archives (DCA). The DCA will accept thesis submission electronically as an alternative to submitting a bound paper copy. Please contact the DCA for more information on how to submit your thesis. For answers to frequently asked questions and a style sheet, visit the website: uss.tufts.edu/arc/writingresources/thesis.asp.

Undergraduate Internship Programs

Internships provide undergraduate students with the opportunity to apply their education and skills directly toward a field-based situation, at an off-site organization.

Most often, internships are paid positions that are performed on a full-time basis over the summer months, or for approximately ten to fifteen hours a week during the semester. These internships may be awarded transcript notations without any academic credit.

In rare instances, students may receive credit toward degree requirements for which the following conditions must be met: the internship proposal

is approved in advance by the department, a faculty mentor has supervisory and technical control of any work that receives credit, a minimum of 150 hours of work for the semester is required, and a written report is submitted that will be evaluated by the faculty mentor and the outside institution supervisor.

Undergraduate international students who wish to participate in the Curricular Practical Training (CPT) program should contact the International Center.

The Office of Engineering Internship helps qualified engineering students identify potential internship opportunities.

Combined Bachelor's/Master's Degrees Program

The School of Engineering offers exceptional engineering students the option of pursuing one of two combined degree programs: a bachelor of science and master of science degree (B.S.-M.S.) or a bachelor of science and master of engineering degree (B.S.-M.Eng.). Both bachelor's and master's degrees are awarded only on completion of the entire program; a student may not receive one degree earlier, even if the requirements for that degree have been met. Combined-degrees students must pay four years of undergraduate tuition and two semesters of graduate tuition (plus continuation fees as applicable).

Students seeking admission to the program must submit an application by November 15 of their junior year. Admission to the program requires (1) a minimum cumulative GPA (through the fall semester of the junior year) of 3.60 for the B.S.-M.S. program and 3.20 for the B.S.-M.Eng. program, and (2) acceptance by the department in which the student intends to complete the master's portion of the program. Applicants admitted to the combined-degree programs will be notified by January 15 of their junior year.

Combined-degrees students are expected to fulfill all the requirements of the bachelor's degree program (38 credits); of these, two graduate-level credits are allowed to count toward the master's degree requirements as long as they carry the designation of the department in which the master's portion of the combined degree program is to be completed.

Students admitted to the combined B.S.-M.S. program receive summer research support for the summers after junior and senior year. This summer research support provides salary at the level of research assistants set by the School of Engineering for three summer months. Students may petition to opt out of summer research provided they conduct master's thesis work approved by the student's advisor and department.

Graduate Programs

The School of Engineering is the academic unit of Tufts University responsible for postbaccalaureate degrees in engineering and computer science. The nonacademic aspects of graduate engineering programs, such as admissions, registration, special student program, transfer credit and degree certification, are administered along with the nonengineering programs by the Graduate School of Arts and Sciences. Several combined undergraduate-graduate degree programs are offered by the school, including tracks in the traditional engineering disciplines, engineering management in collaboration with the Gordon Institute, biomedical engineering/medicine in collaboration with Tufts' health science schools, and international engineering in collaboration with the Fletcher School of Law and Diplomacy.

Through its six academic departments and the Gordon Institute, the School of Engineering offers the master of science degree (a thesis is required in some programs); the master of engineering degree, which is especially well suited for part-time, practicing engineers; and the doctor of philosophy degree in selected areas of research excellence. Students may enroll full time or part time in any program subject to the residence requirements described on the Graduate School of Arts and Sciences website: <http://gsas.tufts.edu>. Departments award tuition scholarships, teaching assistantships, and research assistantships on a competitive basis to graduate admissions candidates. Prospective and current students should consult with the individual departments to obtain detailed policies regarding degree requirements and programs.

General Undergraduate Information

Undergraduate Policies

Residence Requirement

The university requires eight semesters of full-time study for the baccalaureate degree. After matriculating at Tufts, a student may spend no more than two semesters of full-time study at other approved institutions or on approved non-Tufts study abroad programs. Ordinarily, four semesters of the undergraduate's course of study must be taken at Tufts University's home campus. Up to two semesters may be spent in a Tufts-related program, either foreign or domestic. Normally, students will be in full-time residence at Tufts for the final two semesters. Transfer students must spend at least four full-time semesters at Tufts or on Tufts study abroad programs. Candidates for combined bachelor's degrees (liberal arts/engineering combined degrees, and the programs with New England Conservatory and the School of the Museum of Fine Arts) must complete their programs in no fewer than ten full-time semesters.

All students must earn a minimum number (17 for liberal arts, 19 for engineering) of their required graduation credits (34 for liberal arts, 38 for engineering) at Tufts or on Tufts study abroad programs. Pre-matriculation credits received from certain standardized examinations (such as Advanced Placement and international diplomas) are not considered Tufts credits for this purpose.

Matriculated students may transfer courses only from accredited four-year colleges and universities. No online courses will be accepted for transfer.

Enrolled students may accelerate in the following ways. Students earning a total of five credits from pre-matriculation credits and/or Tufts summer session credits (including Tufts in Talloires) may elect to use these five credits in fulfillment of one semester of residence; students earning a total of nine such credits may elect to use these nine credits in fulfillment of two semesters of residence. Pre-matriculation credits are defined as credits earned from certain scores on Advanced Placement and SAT examinations, certain international diploma examinations, as well as credits earned from approved college courses taken prior to

matriculation at Tufts or at any four-year college or university. Students may elect to use this option during their last semester of full-time study and should consult their academic dean. Courses taken during summer school at other institutions do not count toward the residence requirement.

Completion of a specified number of credits does not in itself constitute an undergraduate education. Students need time to reflect on and absorb knowledge. Four years of full-time study in an academic environment provide the opportunity to explore a varied curriculum at a reasonable pace; to interact with and learn from fellow students representing a variety of national, ethnic, religious, and racial backgrounds; to be enriched by study in a foreign country; and to survey the cultural, recreational, and educational opportunities of Boston and New England.

Exceptions to the policy are rarely granted. Petitions may be made on the basis of unanticipated personal, family, or financial emergencies.

Graduation Dates

Tufts awards undergraduate degrees three times during the year: May, August, and February. The only commencement ceremony is held in May.

Resumed Education for Adult Learners (R.E.A.L.)

The Resumed Education for Adult Learners (R.E.A.L.) program is open to students 24 years of age or older, veterans, and students who are married or are parents. This unique undergraduate program meets the need for greater academic flexibility in the education of older students. It is open to those who have some college experience, with recent coursework a requirement. The R.E.A.L. program is particularly receptive to prospective students who have assumed leadership roles in local community affairs as well as to residents of Medford and Somerville. Students in the program are enrolled in regular undergraduate courses and pursue a course of study leading to a college degree in liberal arts or engineering, for which they are expected to fulfill existing requirements. The R.E.A.L. program admits students for both the fall and spring semester of the academic year. For more information about the program, please call the Office of Undergraduate Admissions, located in Bendetson Hall, at 617-627-3170, or call the director, Jean Herbert, at 617-627-2662.

Transfer Students

Entering transfer students are considered sophomores until their transfer credits have been evaluated. Transfer students are entitled to the same advanced placement credits and exemptions from foundation requirements as students who enter Tufts as first-year students, with the same stipulation that transfers may not receive credit for a course covering essentially the same material as that for which advanced placement credit is granted.

Transfer students with eligible scores on the SAT and Advanced Placement Tests should have official records of their scores sent to Undergraduate Education before orientation. Such credits will be approved only on the basis of official test records and not a transcript from the student's previous institution.

Students transferring from other institutions must spend a minimum of four full-time semesters at Tufts or on a Tufts program abroad and must complete at least half the credits toward their degree at Tufts or on a Tufts study abroad program (17 for liberal arts, 19 for engineering). Pre-matriculation credits received from certain standardized examinations (such as Advanced Placement and international diplomas) are not considered Tufts credits for this purpose.

Transfer of Credit from Other Institutions

In order to receive transfer credit from another accredited institution, a student must have received a grade of C- or better. Transferred credits are entered in the Tufts record without the grade. Students may transfer from other institutions no more than the equivalent of seventeen Tufts course credits for the College of Liberal Arts and nineteen Tufts course credits for the School of Engineering. Tufts does not accept transfer credits for internships nor for online courses.

A matriculated student may take courses at other accredited four-year colleges and universities and receive credit for them toward a Tufts degree by obtaining approval in advance from the relevant department through SIS. Courses taken at a community college after a student has matriculated at Tufts are not accepted for transfer. Up to two semesters of full-time study after matriculation at Tufts may be spent at other approved four-year institutions or on approved foreign study programs. Students who transferred to Tufts must spend a

minimum of four full-time semesters at Tufts or on a Tufts study abroad program. Students attending summer schools (other than Tufts Summer Session) are normally allowed to transfer no more than three credits earned in one summer, nor more than a cumulative total of five credits toward a Tufts degree.

Students who plan to complete a full-time semester elsewhere must complete the equivalent of three or more Tufts credits to have it qualify as a full-time semester.

All students planning to transfer credits earned while on leave at other institutions should begin the process by first discussing their plans with their academic dean.

Applied courses in music and dance, such as performance ensembles and lessons, are not normally accepted for transfer.

Registration Information

Registration for courses is done through SIS online. Students register for courses in November for the coming spring term and in April for the next fall term. It is critical that students register for courses during this time. Failure to register or file the appropriate leave of absence could result in administrative withdrawal from the University. Students taking a leave of absence, including a leave to study abroad on a non-Tufts program, must do so through SIS under Requests.

Registration will reopen during winter and summer breaks. Students will be able to register for any open classes, drop any classes, and sign up for the waitlist during this period. Please note that the waitlist will be active throughout this time. If a student is number one on a waitlist for a course and another student drops this course, then the first waitlisted student will be rolled into the course. The ability to add courses online will remain open for the first two weeks of the term. Once the add period is over, students who wish to enroll in a course must get the instructor's signature and submit the Course Schedule Modification form to the Student Services Desk in Dowling Hall.

Sophomores, juniors, and seniors are able to drop courses online through the end of the fifth week of classes. First-year students are able to drop courses online through the end of the tenth week of classes. After these deadlines, a student may withdraw from a course until the last day classes meet (before

reading period) using the Course Schedule Modification form available online on the student services home page. The grade of W (withdrawn) will appear on the transcript, but does not affect a student's cumulative average. After the last day of classes, students must complete the course work and receive the appropriate grade.

Reduced Course Load

Permission to take a reduced program of courses may be granted to students in the Resumed Education for Adult Learners Program and those who have completed eight semesters of full-time study. Students seeking to go part time after completing the residence requirement should see their academic dean.

Reduced Course Load (Disability Related)

In very rare instances, health needs and other disabilities may also merit a reduced course load; determination for this is made by the Student Accessibility Services Office (formerly known as the Disability Services Office). Students must file a petition in advance of the semester for which it is requested and work with the director of the Student Accessibility Office and their academic dean to effect a change to their program. Please see the Student Accessibility Services website for complete details and procedures: <http://uss.tufts.edu/arc/disability>. Students are considered to be making satisfactory progress if they complete each course with a C- or better. A minimum of three credits is full time.

Grades

The standing of the student in each subject is expressed by one of the following letters:

- A** Superior work
- B** Meritorious work
- C** Satisfactory work
- D** Unsatisfactory work but allowable for credit, subject to the restrictions specified under the requirements for graduation. Some departments disallow credit toward the concentration requirement.
- P** Passing work (D- or better): for courses taken under the pass-fail option, and for selected courses offered only pass-fail by departments. Grade point average is not affected.
- F** Failure: No credit is received. A grade of F is averaged into the grade point average.

No-grade status

- I** Incomplete: An indication by the instructor that more time will be allowed to complete the requirements for the course. An incomplete may be awarded only if the student has done substantial work in the course, the instructor judges the reasons for granting incomplete status to be valid, and the instructor determines that the work can be completed in the time specified on the incomplete form. The instructor is responsible for specifying on the incomplete form the reason for the incomplete grade and the conditions that must be satisfied for the awarding of a grade. A copy of this form must be submitted to Dowling Hall at the time final grades are reported. It is the responsibility of the student to request an incomplete before the required work is due. If an incomplete is granted, all work in the course must be completed six weeks into the following semester (fall or spring only), or the date the instructor has stated on the incomplete form. The work will be evaluated without prejudice, and a grade should be submitted two weeks after the work is received by the instructor. A course not completed by the designated time will receive the default grade specified on the incomplete form. Under special circumstances, a student may request from the instructor an extension of the deadline. Any such agreement should be submitted in writing to Dowling Hall.
- W** Withdrawn: An indication that a student has been permitted to withdraw from a course after the fifth week of a semester (tenth week for first-year students), but no later than the last day of classes.
- Y** An interim symbol used to denote the absence of a grade because the work on which the final grade is to be based extends beyond the time limits of the semester.
- CR** Credit: Credit is received, but is not included in the grade point average.
- NG** No grade: The instructor has no current knowledge of the student listed on the grade sheet.
- NR** No record: There is no record of the student having attended class. The course and grade will be removed by the registrar.

In computing the average of a student's grades, each course grade of A is counted as 4.00; B, 3.00; C, 2.00; D, 1.00. Appropriate value is given to plus and minus grades and to half-credit courses. Averages are computed to three decimal places;

semester and cumulative averages are rounded to two decimal places. Since changes cannot be made after graduation, seniors are urged to have rectified any errors on their transcripts well in advance of the graduation date.

Changes in Course Grades: Statute of Limitations

Effective education requires timely and objective evaluation of students' academic work, using clear, standard, fair, and public criteria. Such standards should be listed in the course syllabus. While criteria differ across disciplines and faculty, and while the ultimate responsibility for setting standards and evaluating performance rests with departments and faculty, submitted grades are final and not subject to negotiation. Exceptions should be limited to correcting clerical and calculation errors, and correcting deviations from stated criteria. Of course, students do have the right to know the basis for a grade, and faculty should be open to that post-semester conversation. Following such a conversation, undergraduates who believe that an error or deviation remains may appeal to the department chair or program director and, if necessary, subsequently to a dean of the faculty in Ballou Hall.

Any request for a change in a course grade must be made to the course instructor no later than six weeks into the following regular semester.

Repeated Courses

Students who receive a failing grade for a course may repeat the course and receive degree credit if a passing grade is earned the second time. Both grades remain on the transcript, and both the F and the passing grade are calculated into the cumulative average. Students may choose to repeat a course after receiving a D+, D, or D-. Both the original and the repeated courses and grades will appear on the transcript. The credit value of the original course will be removed, but the full impact of the grades of both the original and repeated courses will be calculated into the cumulative grade point average. The repeated course, if passed, will receive the full credit value.

Students who earn a grade of C- or above for a course may choose to repeat the course for a variety of reasons. Degree credit and cumulative average

will reflect only the first passing grade earned in the course; record of the repeat and subsequent grade will appear on the transcript, but the grade will not be calculated into the grade point average. Some studio art classes and performance classes in dance and music may be repeated for credit. See department for details. Similarly, half-credit physical education skills courses may be repeated for credit. A total of four half credits may be earned for the physical education courses; additional such courses will appear on the transcript with no credit. Creative writing classes at the introductory level may be taken twice in each genre (fiction, poetry, journalism). Creative writing classes in fiction and poetry at the intermediate level may also be taken twice for credit. Journalism and Nonfiction Writing at the intermediate level may be taken only once each.

Extra Courses

Liberal arts students may register for a maximum of 5.5 credits each semester; engineering students may register for a maximum of 6.5 credits each semester. To add an additional credit, students must petition their academic dean for permission at the start of the semester, but not before. Such permission is rarely granted to first-year students.

Missed Classes

Students should make themselves aware of each professor's attendance policy. Students who must miss a class because of an illness should submit the online short-term illness form, available through SIS. Students are encouraged to speak with the professor directly and to consult their academic dean in Undergraduate Education in Dowling. As the academic calendar is constructed, religious holy days are not the sole factor in determining days on which classes are held or suspended. However, it is the policy of the faculty that students be encouraged to observe their appropriate religious holy days; that instructors strive to facilitate this by allowing absence from classes for such purposes and by trying to ensure that no examinations, written reports, oral reports, or other mandatory class assignments are scheduled for or due on holy days; and that instructors provide ample opportunities for such students to make up work missed on such occasions without penalty.

Study Abroad—Tufts Programs

Students are encouraged to study abroad under one of the established programs sponsored by Tufts University. (See Tufts Programs Abroad.) To apply to a Tufts Program Abroad, students must plan a program relevant to their degree program at Tufts, secure in advance the approval of their advisor, and meet the requirements of the program to which they are applying. (For further information on requirements, see <http://ase.tufts.edu/studyabroad>.) Among other requirements, students participating in Tufts Programs Abroad must be in good academic and disciplinary standing from the time of application through participation in the program.

Study Abroad—Non-Tufts Programs

To study abroad, students must plan a program relevant to their degree program at Tufts and must secure in advance the approval of their advisor and the director of Programs Abroad. Transfer credit toward the Tufts degree will be accepted only from students who are in good academic and disciplinary standing at the time of enrollment in the foreign program. A list of recommended non-Tufts programs is available online and in Dowling Hall. In order to have a semester of study away from Tufts count as one of the eight semesters of full-time study required for graduation, a student must complete the equivalent of three or more transferable Tufts credits. To meet the costs of administrative procedures connected with study at other institutions, students studying on a non-Tufts program abroad will be charged a fee.

Study Elsewhere in the United States

To study elsewhere in the United States, students must take a leave of absence from Tufts and must secure in advance the approval of their advisor and their academic dean. Approved courses will be transferred from four-year, accredited colleges or universities if the student earns grades of C- or better. Students must get courses approved for transfer from the relevant department at Tufts through SIS. Tufts does not accept online classes for transfer. In order to have a semester of study away from Tufts count as one of the eight semesters of full-time study required for graduation, a student must complete the equivalent of three or more transferable Tufts credits. To meet the costs of

administrative procedures connected with study at other institutions, students studying elsewhere will be charged a fee.

Leaves of Absence and Transfers

Students considering a leave of absence or transferring to another school must consult their academic dean and complete the online leave of absence form, available through SIS. The Residential Life Office must be notified if a housing contract has been signed. There is a penalty for failing to notify the Residential Life Office by certain deadlines (consult the Residential Life Office). Students receiving financial aid should also notify Financial Services. International students must contact the International Center for information on visa status. Students taking a personal leave of absence with a plan to return to Tufts should consult their academic dean if they intend to take classes elsewhere while on leave.

Medical Leave

Medical leave is an option available to students who, for physical or psychological reasons, are unable to continue at the university during a semester. Appropriate medical evaluation is a required part of the process. In certain cases, mental health practitioners or physicians may recommend that it is not in a student's or the community's best interests for the student to continue at the university. Decisions about return eligibility are made by the Health Accommodations and Medical Leave Committee. Students on medical leave are allowed to take courses at another four-year, accredited college while away from Tufts, but should consult their academic dean in advance.

Notification of intention to request re-entry must be submitted in writing or via email to the attention of Marisel Perez, Associate Dean of Student Affairs, in the Office of the Dean of Student Affairs (marisel.perez@tufts.edu) no later than:

- June 1 for the following Fall semester
- November 1 for the following Spring semester
- March 1 for the following Summer Sessions.

Please visit <http://uss.tufts.edu/studentAffairs/programs/medicalLeave.asp>.

Academic Ethics

A university is a community of individuals interested in the search for an understanding of knowledge. Absolute honesty on the part of every college student is and always shall be an integral part of the plan of higher education at Tufts University. Examples of academic dishonesty include plagiarism, handing in one paper for two or more courses without the knowledge and consent of the instructors involved, dishonesty on examinations, and the purchase of papers to be submitted in a course.

Certain fundamental principles for the acknowledgement of sources apply to all fields and to all levels of work. The use of source materials of any kind (including the Internet) in the preparation of essays or laboratory reports must be fully and properly acknowledged. In a paper or laboratory report, a student is expected to acknowledge any expression or idea that is not his/her own. In submitting the paper, the student is stating that the form and content of the essay or report, in whole and in part, represent his/her own work, except where clear and specific reference is made to other sources. Even where there is not conscious intention to deceive, the failure to make appropriate acknowledgement may constitute plagiarism. Any quotation—even of a phrase—must be placed in quotation marks and the precise source stated in a note or in the text; any material that is paraphrased or summarized and any ideas that are borrowed must be specifically acknowledged. A thorough rewording or rearrangement of an author's text does not release the student from these responsibilities. All sources that have been consulted in the preparation of the essay or report should be listed in the bibliography.

Allegations of student academic misconduct are reported to the Office of the Dean of Student Affairs. Students have the right to review the complaint of academic misconduct made against them and to reply in writing. Students also have the right to appeal disciplinary decisions to the Committee on Student Life (CSL) according to the policies set forth in *Tufts University Student Judicial Process*.

Consequences for academic dishonesty include disciplinary probation, suspension, or expulsion. Instructors are required to follow the grading guidelines outlined in the Academic Integrity Handbook. For more information, please refer to the Academic Integrity Handbook, available online.

Privacy

The federal Family Educational Rights and Privacy Act of 1974 (FERPA) gives each Tufts student access to his or her educational records, the right to correct inaccuracies in the records and the right to control distribution. Since September 11, 2001, the Department of Education has stated that a college must provide (absent a request) information it reasonably believes will assist law enforcement officials in investigating or preventing terrorist activities. In addition, there are exceptions in the statute, such as a subpoena, that allow Tufts to release student records even if the student objects. A description of your rights under the act, the location of records pertaining to you, and the procedures for requesting access and invoking your right to control access appears on the Student Affairs web site: <http://uss.tufts.edu/studentaffairs>.

Please note: Only directory information is made available to the public. Directory information includes whether a student is in attendance at the university and the student's local telephone number and email address. Students may request that directory information not be released to anyone by completing a privacy request form available at the Student Services Desk. Such requests are subject to the exemptions provided by certain policies, including FERPA and the Patriot Act of 2001. Students should verify implementation of their request by calling Dowling Hall. A change in phone number, along with the request not to release the information, is suggested as the best way to ensure privacy.

Nondiscrimination Policy

Tufts University is committed to the fundamental principle of equal opportunity and equal treatment for every prospective and current employee and student in their education and employment. It is the policy of the university not to discriminate on the basis of race; color; national or ethnic origin; age; religion; disability; sex; gender; sexual orientation; gender identity or expression, including a transgender identity; genetics; status as a veteran; retaliation (for filing a complaint or raising a concern about any of the above categories); and any other characteristic protected under federal or state law, including Title IX. This equal opportunity protection applies in the administration of Tufts

University's educational policies, admissions policies, employment policies, scholarship and loan programs, and athletic or other university-sponsored programs. The University expects all Tufts employees, students and community members to join with and uphold this commitment. For more information or to file a complaint of discrimination, contact the Office of Equal Opportunity and Affirmative Action at 617-627-3298 or visit <http://oeo.tufts.edu>.

Tufts Programs Abroad

Tufts University has been offering foreign study programs for more than 50 years, and at present offers undergraduate programs for juniors and seniors to study in Chile, China, Ghana, Hong Kong, Japan, London, Madrid, Oxford, Paris, and Tübingen. Non-Tufts students may be admitted provided there is space available. In all programs, students attend the designated college or university. Integration into a foreign university and the cultural and social life of the host country is the aim of Tufts Programs Abroad. Further information is available in the program office at Dowling Hall, 617-627-2000, or visit <http://uss.tufts.edu/studyabroad>.

Tufts in Chile

A program of study at the University of Chile is available for the fall semester or the full year. The University of Chile—one of Latin America's oldest and most important universities—is located in Santiago, a metropolis set in a valley 3,000 feet up in the Andes. Santiago is home to many United Nations and other international organizations for the region and is one of Latin America's leading intellectual and cultural centers. Participants, who are expected to have completed Spanish 21–22 (Composition and Conversation) or the equivalent, enroll in regular courses at the University of Chile and live with Chilean families.

A resident director provides academic advising, assists with homestays and extracurricular activities, and serves as liaison with the University of Chile. The program is of particular interest to students in Latin American studies, international relations, and environmental studies, but students from all majors are invited to apply.

Tufts in China

The Tufts-in-China program offers a fall semester at Zhejiang University in Hangzhou, China. Hangzhou is the capital city of the Zhejiang Province and is located about two hours southwest of Shanghai. Once the capital city of the Southern Song Dynasty (1127–1279), it is one of the best-known cities in China, both for its long and rich history and for its natural beauty. The region is famous for such products as silk and tea. The main campus of Zhejiang University is situated near the picturesque West Lake, whose natural beauty was celebrated by ancient poets. Zhejiang University was established in 1998 when four individual universities were brought together. It is currently the biggest university in China, both in size (39,000 students) and in range of disciplines (115 undergraduate specialties).

The Tufts-in-China program is open to students who have completed Chinese 4. Intensive instruction in Chinese language, as well as courses taught in English in such subjects as history, Chinese culture, and the Chinese legal system, are offered. Students are housed in the modern international dormitory on campus. A resident director provides academic advising and extracurricular social and cultural activities.

Tufts in Ghana

The Tufts-in-Ghana program, which takes place in the fall semester, links Tufts to the University of Ghana (Legon), located just outside the booming West African metropolis of Accra. The University of Ghana, founded in 1948, is a full-service research and teaching university offering students outstanding academic and extracurricular programs. The university's 30,000 undergraduate and graduate students are served by seven residence halls, central and branch libraries, and a university hospital.

Two or three supervised excursions per semester will take students to the Dagbe Center for Arts and Culture, which provides an experience of traditional culture and the performing arts (drumming, singing, dancing) in a picturesque seaside village set among the palms one mile from the warm Atlantic Ocean. The Tufts-in-Ghana program is designed to expand students' cultural awareness as they earn credit toward the undergraduate degree. In consultation with the resident director in Ghana, each student designs an academic program of four or five

courses from the diverse array of subjects offered by the university's many academic departments. A special course for Tufts students in Twi language is taught at the Ghana Language Center on the Legon campus. Students from all academic majors, including mathematics and the sciences, are encouraged to apply.

Tufts in Hong Kong

The Tufts-in-Hong Kong program is affiliated with the University of Hong Kong and is available for the spring semester. Hong Kong, an affluent modern city of more than six million, offers visitors a unique blend of Eastern history and Western influence. Returned to China in July 1997 after more than 150 years as a British Crown Colony, Hong Kong continues to enjoy a high degree of autonomy as a Special Administrative Region.

The University of Hong Kong, known as HKU, evolved from the former Hong Kong College of Medicine, which was instituted in 1887. Since its official opening in 1912, the university has embodied the pioneering spirit of Hong Kong. It remains at the forefront of breakthroughs in medical and scientific research. HKU has a student population of 23,000, including about 3,300 international students. Courses are taught in English and are offered across a broad curriculum. Faculties open to Tufts-in-Hong Kong students include arts, business and economics, education, engineering, science, and social studies. Students are housed in dormitories on campus.

A resident director coordinates student activities, living arrangements, and academic advising.

Tufts in Japan

The Tufts-in-Japan program offers a full academic year or the spring semester at Kanazawa University. Kanazawa, located on Japan's western coast, is an ancient castle town with a rich heritage of arts and crafts, including silk dyeing, pottery, lacquerware, Noh theatre, papermaking, and confectionery. It boasts one of the most spectacular gardens in all of Japan. Students can visit the mansions and gardens of former samurai and tour the city's two temples. Students take classes at the newly rebuilt Kanazawa University, one of the leading national universities. Courses include Japanese language at the intermediate and advanced levels, as well as subject courses taught in English. Housing is in a dormitory on the

Kanazawa University campus. Students must have completed Japanese 2 or the equivalent by the time of departure. All majors are welcome to apply.

A resident director coordinates extracurricular social and cultural activities and will serve as a contact person.

Tufts in London

The Tufts-in-London program is affiliated with University College London (UCL), the School of Oriental and African Studies (SOAS), and Royal Holloway (RHUL), all of which are constituent colleges of the University of London. Students enroll full time at one of the three colleges. Tufts in London offers a one-year program at UCL, SOAS, or RHUL; enrollment at RHUL only is available for the spring semester. UCL and SOAS are both situated in the heart of the Bloomsbury district in central London, near the cultural and social life of the capital city. RHUL is 19 miles west of central London, easily accessible by train, in a beautiful part of Surrey between the village of Englefield Green and the small town of Egham. University College London is a comprehensive university offering courses across a broad curriculum, including biology and engineering. The School of Oriental and African Studies focuses on the languages, cultures, and societies of Africa, Asia, and the Middle East. Royal Holloway is strong across the sciences, social sciences, humanities, and arts, including drama and music.

The Tufts-in-London program is under the overall supervision of a resident director who provides a full range of student services, including a program of extracurricular cultural and social activities, and coordinates all aspects of the program. Tufts-in-London students are housed in college dormitories that are located within a few minutes' walk of the campus.

Tufts in Madrid

The Tufts program in Spain is affiliated with the Autonomous University of Madrid and with the University of Alcalá. The program is primarily a one-year course of study; however, arrangements may be made to allow students to participate for the fall or spring semester. Although the program is particularly valuable for Spanish majors, students from departments and programs such as economics, history, international relations, political science,

psychology, biology, and sociology have studied in Spain as well.

Preparation equivalent to the successful completion of Spanish 21–22 (Composition and Conversation) is required. Spanish 31–32 (Main Currents of Spanish Literature) or 34–35 (Survey of Latin American Literature) are highly recommended. The Tufts director in Madrid advises students in selecting courses from the university.

The program offers an orientation session and group trips during the academic year. Monthly lectures and receptions are held at the program center, giving students contact with important figures from Spanish cultural and political life. Students are housed with Spanish families living in Madrid or Alcalá.

Tufts in Oxford

Tufts and Pembroke College of the University of Oxford maintain an agreement under which up to six qualified Tufts students are selected to spend an academic year at Pembroke College as non-degree visiting students.

Pembroke College was founded in 1624 and has a student body of 500. It is a friendly and informal college, emphasizing intellectual activity, but sports, drama, and music are also important. Oxford, with 12,000 undergraduates and 7,000 graduate students, is now over 800 years old and consists of thirty-eight independent, self-contained, self-governed colleges and numerous other institutes and organizations. Students wishing to attend Pembroke College must show college-level course work in the subject they wish to pursue at Oxford.

Each applicant is required to have a 3.7 cumulative grade-point average (on a scale of 4.0) after two semesters at Tufts. Pembroke will accept applications only from students who are prepared to study for the full year in one of the following areas exclusively: biochemistry; biological sciences; chemistry; economics; economics and management; English language and literature; English and modern languages (French, German, Italian); European and Middle Eastern languages; experimental psychology; history; history and economics; history and English; history and modern languages; history and politics; mathematics; mathematics and philosophy; modern languages and linguistics; music; philosophy; philosophy and modern languages; philosophy and theology; philosophy,

politics, and economics; physics; physics and philosophy; politics; psychology, philosophy and physiology; theology.

Tufts in Paris

The Tufts-in-Paris program offers a combination of Tufts in-house courses taught by French professors and courses in French institutions of higher education in Paris, notably the University of Paris I (Panthéon-Sorbonne) and University of Paris III (Sorbonne Nouvelle). Courses are available in French and comparative literature, political science, economics, history, cinema and theater studies, communications, art history, philosophy, religion, psychology, European studies and international relations. All courses are taught in French.

Qualified students may apply for the full-year diploma program for international students at the prestigious Institut d'Etudes Politiques (Sciences-Po). Tufts in Paris is primarily a one-year course of study; however, arrangements may be made to allow students to participate for the fall or spring semester. Although the program is particularly valuable for French majors, students from departments and programs such as economics, history, international relations, political science, psychology, and sociology have participated as well.

Preparation equivalent to the successful completion of French 21–22 (Composition and Conversation I and II) is required for the program. French 31–32 (Readings in French Literature I and II) is highly recommended. The program is under the overall supervision of a resident director, who advises students in selecting courses at the French universities in Paris. The Tufts-in-Paris program also offers its own courses in French, art history, literature and history. Full-year students are required to take either the French language course or the French literature course each semester. The program offers an orientation program and group trips during the academic year.

Tufts-in-Paris students are housed with French families.

Tufts in Tübingen

Tufts sponsors study at Eberhard-Karls Universität in Tübingen, Germany. Tübingen is located south of Stuttgart in the state of Baden-Württemberg. The university, founded in 1477, has 23,000 students.

The program is primarily one year of academic study, although arrangements may be made to allow students to participate for the spring semester only. Undergraduates who have taken at least two years of college-level German may apply to the program. The program is not, however, limited to German majors. In recent years, students have attended from departments and programs such as biology, chemistry, economics, international relations, music, political science, and psychology.

The Tufts director in Tübingen advises students in selecting a full course load at the university. All courses are taught in German. Each semester, the director organizes a five-day study trip to Thüringen (fall) or Berlin (spring).

Students in Tübingen are fully integrated into university life, living with German students in regular university dormitories. A unique opportunity to acquire the master's degree in German literature is offered by Tufts with the cooperation of the Eberhard-Karls Universität in Tübingen. See German, Russian, and Asian Languages and Literatures for a description of this program.

Tufts European Center

The Tufts University European Center is an international educational and meeting facility located in the village of Talloires, France. Considered Tufts' fourth campus, the European Center opens its doors each summer to undergraduates, selected high school students, and adult learners who are interested in a variety of exceptional programs. Set on the banks of Lake Annecy in the foothills of the French Alps, the Tufts European Center is a restored 11th-century former Benedictine Priory which was donated to Tufts in 1978 by Donald (A'16) and Charlotte MacJannet.

Tufts in Talloires

The Tufts in Talloires Program is a six-week summer semester for undergraduate students that takes place each summer at the European Center in Talloires. Students select two credit-bearing courses from an array of undergraduate offerings, all taught by Tufts' own faculty. Students live with host families in order to experience local culture firsthand. Organized hikes, trips, and program activities help Tufts in Talloires students discover this magnificent area of France.

Tufts in Annecy

The Tufts in Annecy Program is a four-week French language immersion program for university students and adults who want to concentrate on improving their French language skills. Classes are taught at a French language institute in nearby Annecy by native French speakers who are expert in developing speaking, listening, grammar, writing, and reading skills. Strong support by a Tufts faculty member as well as placement with a French host family facilitates language acquisition and enhances the exploration of French culture and customs.

Tufts Summit

The Tufts Summit Program is a highly selective, four-week summer program for rising high school juniors and seniors. The program includes a college-level course on international relations that provides students with an exploration into the complexities of world cultures and global issues. French classes make up the other part of the curriculum and are complemented by living with a French host family. Students learn about French culture and customs from their host families and through field trips to local sites of historic importance and natural beauty.

Meetings and Seminars

Because of its location near Geneva, the European Center also serves as an important meeting center. Since its founding in 1978, the Center has welcomed a great number of seminars and meetings on a wide range of topics. These events are sponsored by various faculty members and departments at Tufts as well as by other academic and professional organizations.

For more information about Tufts' programs in the French Alps or about the European Center in Talloires, please visit <http://ase.tufts.edu/europeancenter>, call 617-627-3290, or e-mail france@tufts.edu.

Tufts Summer Session

Tufts Summer Session offers more than 200 on-campus and online courses during two six-week terms and one twelve-week term each summer. A list of summer course offerings, available in November, can be helpful in planning your year-round academic program. Two-thirds of the summer students also attend Tufts during the fall and spring terms. They attend summer classes for many reasons: to take a course or courses not available other times of the academic year, catch up on a missed course, devote time to a specific course in an intense six-week session, take an additional course or courses to lighten the course load during the year, or work on an independent study or internship. Students pay a registration fee and tuition on a per-course basis. Online courses are available.

For more information on summer session programs and activities, visit <http://go.tufts.edu/summer> or email summer@tufts.edu.

Combined-Degrees Programs

Combined Five-Year Liberal Arts/ Engineering Program

For most students entering college, the choice between liberal arts and engineering is a clear-cut matter. For some students, however, the choice is quite difficult. For the latter, both the professional flavor and occupational orientation of the engineering programs, on the one hand, and the variety of course selection in the liberal arts curriculum, on the other, have strong appeal. At Tufts, it is possible for students to secure the advantages of both types of education under the combined five-year program.

With a normal course load in each of 10 semesters, students may complete the degree requirements in both engineering and liberal arts. The five-year program includes two fields of major concentration, one in liberal arts and one in engineering. The plan has particular appeal for engineering students who wish to secure a more liberal arts education than is possible in a four-year engineering curriculum and for liberal arts students who desire a strong technological background. Two degrees are awarded on completion of the program. Both degrees are awarded only on completion of

the entire program; a student may not receive one degree earlier, even if the requirements for that degree have been met. Students who start a five-year program, but decide within two years not to continue, may complete the degree requirements for either engineering or liberal arts in the usual period of four years.

Students may apply for and be admitted to the combined five-year program only after entrance to Tufts. Because the program requires careful planning, students are encouraged to apply as early as possible. Five-year students are required to confer with their faculty advisors at the beginning of each semester to make certain that the courses that have been selected constitute a proper program. Five-year students must complete a minimum of forty-six courses and fulfill the foundation, distribution, and concentration requirements of both engineering and liberal arts. Within the School of Engineering, the B.S. degree may not be used as part of this program, except for the engineering psychology (human factors) program.

Combined-Degrees Program with New England Conservatory of Music

Tufts University and New England Conservatory of Music have by agreement instituted a full five-year program leading to a bachelor of arts or bachelor of science degree from Tufts and a bachelor of music degree from the conservatory. It is designed for students who wish to pursue studies in a musical instrument, voice, composition, music history, and theory without giving up the academic disciplines of a liberal arts degree. Admission to this combined-degrees program is generally gained by simultaneous application to both institutions. Students in the program will complete a minimum of 24 Tufts credits; will be in full-time residence for ten semesters; and will meet the foundation, distribution, and concentration requirements stipulated by the College of Liberal Arts. Prospective students are requested to address their concerns to the Dean of Enrollment Services, Office of Admission, New England Conservatory of Music, 290 Huntington Avenue, Boston, Massachusetts 02115, or Undergraduate Education at Tufts University.

Combined-Degrees Program with the School of the Museum of Fine Arts

Tufts University and the School of the Museum of Fine Arts, Boston, have by agreement instituted a five-year program leading to a bachelor of fine arts degree and a bachelor of arts or science degree. Admission to this combined-degrees program is by simultaneous application to both institutions, or for students enrolled at Tufts by application to the Museum School, usually in the first or second year. Students in the program will complete a minimum of twenty-four Tufts credits; will be in full-time residence for 10 semesters; and will meet the foundation, distribution, and concentration requirements stipulated by the College of Liberal Arts. Requirements for the degree in art (B.F.A.) include many of the same academic requirements plus five semester courses in art history and 76 credits in studio art. Normally, the majority of the academic work is taken on the Tufts Medford/Somerville campus, and at least 70 credits of studio art are commonly taken at the Museum School. The entire five-year program consists of a minimum 24 academic courses and 76 credits of studio art. Information regarding the combined-degrees program may be obtained from the Museum School Admissions Office at admissions@smfa.edu, 617-369-3626, or 800-643-6078, or from Academic Affairs at 617-369-3833.

Combined Bachelor's/Master's Degrees Program with the School of Engineering

(SEE SCHOOL OF ENGINEERING FOR DESCRIPTION.)

Combined Bachelor's/Master's Degrees Program with the College of Liberal Arts

Combined bachelor's/master's degrees programs are offered by the College of Liberal Arts and the Graduate School of Arts and Sciences. Exceptional students may combine undergraduate and graduate courses and are simultaneously enrolled in bachelor's and master's degree programs. Both degrees are awarded only on completion of the entire program; a student may not receive one degree earlier, even if the requirements for that degree have been met. Combined-degrees students must pay four years of undergraduate tuition and the entire tuition for the master's degree.

The combined-degrees program is one way of recognizing the fact that an increasing number of undergraduates are entering college with exceptional preparation in certain areas and that many are capable of doing graduate work in their junior and senior years.

Students seeking admission to the program should consult their undergraduate major advisors and their prospective graduate advisors before applying to the graduate school. Combined-degrees students are expected to fulfill all the requirements of the undergraduate and graduate programs. No courses offered in fulfillment of one set of requirements may be used for the other.

Admission to the program is normally during the junior year. Only in exceptional cases will an application be accepted after the junior year. Therefore, students interested in the program should contact their advisors early in their academic career to facilitate program planning. A student may elect to withdraw from the program at any time by filing the appropriate petition.

Combined Bachelor's/Master's in Public Health (M.P.H.) Degrees Program

(SEE HEALTH PROFESSIONS PROGRAMS FOR DESCRIPTION.)

Combined-Degrees Program with The Fletcher School of Law and Diplomacy

The combined-degrees program is conducted jointly by the undergraduate college and the Fletcher School of Law and Diplomacy. It offers an opportunity for a limited number of highly qualified Tufts undergraduates in Arts and Sciences to earn both the bachelor's degree in their selected major and the Master of Arts in Law and Diplomacy (M.A.L.D.) degree on completion of a total of five to six years of study. Students may apply for the program once they have completed and received grades in at least twenty undergraduate credits.

A total of sixteen Fletcher course credits are required for the M.A.L.D. degree. As many as four of these courses may be used to fulfill requirements for the bachelor's degree. Fletcher courses will be taken over a period of two and a half to three years, during which time the student will complete his or her academic work for the bachelor's degree. No more than a combined total of five undergraduate and Fletcher courses may be taken during any one

semester, no more than four of which may be Fletcher courses. The student's program must be coordinated to satisfy both the Fletcher requirements and those of the undergraduate department. Credit toward the M.A.L.D. degree will not be allowed for Fletcher courses taken through cross-registration or Fletcher Summer School before beginning the combined-degrees program. Cross-registration for courses at Harvard or other institutions will not be approved until the student has completed at least eight Fletcher courses. Upon admission to this combined-degrees program, the student must work with his or her major advisor, the respective academic dean, and the Fletcher registrar to ensure that he/she is meeting all requirements for both the bachelor's and M.A.L.D. degrees. These meetings must take place before beginning coursework toward the M.A.L.D. degree.

The normal length of this program is six years. Students who are completing this combined-degrees program in a total of six years will be required to satisfy the residency requirement of eight semesters toward the bachelor's degree and four semesters toward the M.A.L.D. degree. Tuition will be assessed so that during semesters 1–8, they will pay Arts and Sciences tuition and then during semesters 9–12, they will pay tuition at the Fletcher School.

Some students opt for an accelerated program where they complete the combined-degrees program in a total of five years. In this scenario, students would satisfy the residence requirement of the bachelor's degree upon completion of seven semesters, after which they would begin paying tuition to Fletcher for three semesters.

Those wishing to apply for the program should do so during the semester following the one in which they complete twenty undergraduate credits. If admitted to the program, they will begin taking Fletcher courses at the start of the following semester, whether it begins in January or September. The application deadlines are October 15 for January admission and January 15 for September admission.

Eligibility for financial aid will be based upon where the student is charged tuition for a particular semester. When students are charged and pay tuition to Arts and Sciences, they would be eligible to apply for undergraduate financial aid, and when they are charged and pay tuition to the Fletcher

School, they would be eligible to apply for financial aid from the Fletcher School. Students should be aware that financial aid eligibility may vary significantly between the undergraduate program and the Fletcher School program.

The application fee is not required for combined-degree program applicants. Application forms, requests for interviews, and information on the Fletcher School may be obtained from the Fletcher School Admissions Office (Goddard 213) or by calling 617-627-3040.

Combined Liberal Arts/Dental Seven-Year Program

(SEE HEALTH PROFESSIONS PROGRAMS FOR DESCRIPTION.)

Teacher Licensure Programs

Tufts Graduate School of Arts and Sciences offers several programs for master's-level students who are interested in obtaining Massachusetts Initial Teacher Licensure.

Programs preparing early childhood, elementary, middle and high school teachers, as well as visual art teachers at all levels, are approved by the Massachusetts Department of Elementary and Secondary Education (DESE). Graduate students seeking licensure as teachers complete at least one semester of full-time student teaching in a school which partners with Tufts teacher preparation programs. Licensure candidates must also pass the required Massachusetts Tests for Educator Licensure (MTEL), administered through the Massachusetts Department of Elementary and Secondary Education, if they wish to be licensed to teach in Massachusetts public schools. More information about the state licensure process and MTEL can be found on the Tufts Department of Education webpage at <http://ase.tufts.edu/education/student/licensure.asp>.

Members of the Tufts faculty carefully advise licensure candidates through the entire professional preparation process. They advise candidates on how to fulfill all the academic requirements of the masters level degree and Subject Matter Knowledge requirements for Initial Teacher Licensure in Massachusetts. Academic requirements may be fulfilled by taking Tufts courses that are numbered above 100; students must receive grades of B- or

higher in these courses. At the SMFA, Art Education students may enroll in studio art course numbers at all levels with the approval of the academic advisor and director of the art education program. Faculty in all programs also guide candidates on how to begin the teacher licensure process and prepare for MTEL exams.

Department of Education

The 12-month Master of Arts in Teaching (M.A.T.) programs lead to Massachusetts Initial Teacher Licensure at the elementary, middle and high school levels. The Elementary M.A.T. program focuses on the STEM disciplines and how these essential disciplines can be effectively taught within the elementary school curriculum, grades 1–6. The middle and high school licensure programs accept students who have earned an undergraduate degree in the academic subject area that they plan to teach. These M.A.T. programs include 10–12 graduate credits: 8 credits of professional preparation, including supervised student teaching, and 2–4 credits in the subject area selected. The Visual Arts Program prepares teachers to teach in grades Pre–K–8 or grades 5–12. M.A.T. programs in Modern Languages and Latin and classics prepare teachers to teach in grades Pre–K–6 or grades 5–12. Other M.A.T. programs prepare teachers to teach in grades 5–8 or 8–12. Students are assigned two program advisors—one in the Department of Education and one from the Arts and Sciences department representing the subject area that the student wishes to teach. The advisors assist students in planning a program of study that meets the requirements for state licensure as well as the M.A.T. academic degree.

In addition, the department offers graduate programs leading to licensure as school psychologists for all grade levels.

To launch the Slate online application process, or for additional information, students may contact the Department of Education in Paige Hall at 617-627-3244.

Eliot-Pearson Department of Child Study and Human Development

The program of teacher preparation and licensure in early childhood education requires that students complete a departmental major in child development and additional course work in professional

preparation, including supervised teaching practica. Students who successfully complete the department's program of professional courses and state testing requirements are eligible for licensure as teachers of young children in Pre–K to grade 2. For additional information, students may contact the Department of Child Study and Human Development at 617-627-3355.

TuftsPlus: A Privileged Application Process for Tufts Undergraduate Students

Tufts undergraduate students, including B.F.A. students at the School of the Museum of Fine Arts, Boston, are encouraged to apply for the M.A.T. in Art Education after their junior year with the application privileges of the TuftsPlus process. The TuftsPlus process streamlines the graduate admissions procedures, offers some tuition scholarships, and gives students the opportunity to complete their undergraduate degree and then matriculate directly into the M.A.T., which is a 12-month graduate program. For more information, contact the Tufts Office of Graduate Admissions at gradadmissions@tufts.edu or 617-627-3395.

Health Professions Programs

The health professions advisors work with students exploring various health careers; advise them regarding curriculum, internships, and the application process; and offer a variety of programs and workshops each year. Students are encouraged to meet with an advisor at any point in their college career. Students interested in attending health professions schools are urged to visit the health professions advising website at <http://uss.tufts.edu/hpa> to learn about various professions and preparation for them. Information about how to schedule meetings with the health professions advisors is also on the website, and it is suggested that students seek advice from the health professions advisors as a complement to their academic advisor.

The director of health professions advising also sits on the Policy Board of the Community Health Program, a multidisciplinary major for students interested in health care issues, policy and community, and population health care. Many prehealth students choose to pursue this as second major along with a disciplinary major such as biology, or Spanish or psychology, and starting in September

of 2015 will have the option of selecting it as a stand-alone major. For more information, visit <http://ase.tufts.edu/commhealth>.

Predental, Premedical, Preveterinary and Other Prehealth Programs

There are no formal predental, premedical, or preveterinary majors at Tufts. All health professions schools, including physician assistant, occupational therapy, advanced nurse practitioner, optometry and more, admit students from every major. Many preprofessional students major in biology, but a significant number choose an area of interest ranging from art history to child development to engineering. The major is not an important consideration for admission to health professions school, as long as the science and non-science academic record is sound.

Dental, medical, and veterinary schools vary in their minimum requirements for admission, and these requirements are currently being discussed and reevaluated. Visit <http://uss.tufts.edu/hpa> and choose “Academic Preparation” for up-to-date information. However it is likely that the following courses will remain as requirements:

1. Biology: two courses with laboratory, preferably in areas of cellular and molecular biology, genetics, and physiology. At Tufts, these are Biology 13 and 14.
2. Chemistry: two courses of general chemistry with laboratory (typically Chemistry 1 and 2); one course in organic with laboratory (Chemistry 51/53) and one course in biochemistry (either Chem 171 or Bio 152). Some dental and veterinary schools still require the second semester of organic chemistry as well (Chemistry 52/54).
3. Physics: two introductory-level courses with laboratory (typically Physics 1 and 2).
4. Mathematics: The emphasis is increasingly on statistics and not on calculus. Most prehealth students come to Tufts with credit in calculus. More calculus is not required by health professions schools but may be required by the major that the student chooses to pursue. A semester of statistics is highly recommended, and the subject is offered within various majors, including biology, economics and psychology to name three, as well as Math 10 in the math department.

5. Biochemistry: Although this is not yet a universal requirement, it is increasingly the case, so all prehealth students should take one semester. Students may take biochemistry within the biology or chemistry department as listed above.

6. General requirements: U.S. schools desire evidence that students can read and write English well. Most schools require one year of college-level English. Biomedical professional schools prefer students with broad general knowledge, including understanding of behavioral sciences and of different cultures and languages. Some course work in anthropology, community health, psychology or sociology is strongly recommended

Some schools have other requirements, and it is recommended that students acquaint themselves with the special requirements for admission to schools in which they are especially interested. Also, most schools will not accept advanced placement credit or shortened courses for satisfying their science or non-science requirements and will want candidates to take additional science courses. Premedical students should consult *Medical School Admission Requirements for U.S. and Canadian Medical Schools* (www.aamc.org) and the Osteopathic Medical College Information Book (www.aacom.org), and predental students, *ADEA Official Guide to Dental Schools* (www.adea.org). These are published annually. Veterinary schools have more variability in their requirements than medical and dental schools. Students should consult *Veterinary Medical Schools Admission Requirements* (www.aavmc.org).

Physician assistant, advanced practice nursing and a number of other health professions graduate programs require anatomy and physiology. These are taught at Tufts within the graduate program in occupational therapy and cross-listed as Bio 4 and Bio 9.

Predental, premedical, and preveterinary students may apply in the summers following junior year or senior year or as alumni for any application year. The Tufts advising staff work with and support all students and alumni, no matter what year they choose to apply. Science requirements should be completed by the spring semester prior to the summer of application. Usually, students take the medical and dental aptitude tests at this time.

Applicants to physician assistant or nurse practitioner programs may apply in summer or early fall of the year prior to desired matriculation. The GRE should be taken during that summer.

Letters of recommendation written by faculty members who know the candidate well are very important. It is strongly recommended that students become well acquainted with individual faculty. Participation in small seminar classes and joining in undergraduate research programs are two ways of getting to know individual faculty members. Students are also urged to learn as much as possible about health care through undergraduate research, volunteer work at health-care facilities, and/or summer internships or employment. Students interested in veterinary school should have experience in the care of animals, have assisted a practicing veterinarian, and, if possible, should have participated in biomedical research or environmental projects. Applicants should aim to include a letter of recommendation from a professional in their field of choice with whom they have worked or volunteered.

Finally, there are more qualified applicants than spaces in these professional schools. As a consequence, some qualified students will not be admitted. High grades, strong letters of recommendation, and high aptitude scores are essential for—but do not guarantee—admission.

The Health Professions Recommendation Committee coordinates the preparation of composite letters of recommendation to medical, dental, optometry and other schools that request a committee letter. All students who apply should register with the committee the year they will apply. The deadline for registering with the committee is April 1 of the application year. It is increasingly important to begin the application process at an early date (e.g., in May of the application year.) For students wishing to attend professional school immediately after graduation, that requires completion of all courses and the standardized test by the end of junior year. However, many applicants take a year or two after graduation to work or do a service program before applying and thereby strengthen their application. The majority of Tufts applicants to health professions graduate programs do so.

Tufts University School of Medicine— Early Assurance

For a very select group of sophomores, the School of Medicine offers an opportunity for early acceptance into the medical school. To be eligible, students must complete two semesters of general chemistry, two of introductory biology, and one of organic chemistry by the summer following sophomore year. Qualified applicants need to perform extremely well in all their academic work, and should demonstrate a mature, informed motivation for a medical career. If accepted, a student will still complete the remaining two undergraduate years before beginning the four-year medical school curriculum. However, with an assurance of admission, the student may be more likely to explore the curriculum more fully by studying abroad, writing a thesis in a non-science discipline, or pursuing another significant academic interest. At the end of the junior year, those students who were accepted the previous year make their final commitment to attend Tufts University School of Medicine. The medical school, in turn, expects accepted students to maintain the same level of performance in their course work during their junior and senior years, but the MCAT is not required.

For more information, visit <http://uss.tufts.edu/hpa/AcademicPrep>.

Cummings School of Veterinary Medicine— Early Assurance

For a very select group of sophomores with commitment to veterinary medicine and experience working with animals, the School of Veterinary Medicine provides an opportunity for early acceptance into the veterinary school. To be eligible, students must complete two semesters of general chemistry and two of introductory biology by the end of sophomore year. If accepted, a student will still complete the remaining two undergraduate years before beginning the four-year veterinary school curriculum. The veterinary school expects accepted students to maintain the same level of performance in their course work during their junior and senior years, but the GRE test is not required for matriculation.

For more information, visit <http://uss.tufts.edu/hpa/AcademicPrep>.

Tufts University School of Dental Medicine— Early Assurance

For a very select group of sophomores with a commitment to dental medicine, an opportunity for an early acceptance to the School of Dental Medicine is offered. To be eligible, students must complete two semesters of general chemistry and two semesters of introductory biology by the end of sophomore year. Qualified applicants need to perform well in all their academic work. If accepted, students will complete the remaining two undergraduate years before beginning the four-year dental school curriculum. They will also complete two semesters of physics, one of organic chemistry, one of biochemistry, and an additional upper-level biology course. At the end of the junior year, those students who were accepted the previous year make their final commitment to attend Tufts University Dental School. The dental school, in turn, expects accepted students to maintain the same level of performance in their course work during the senior year. It is also expected that the candidates will receive at least an 18 academic average score, an 18 total science score, and an 18 perceptual ability score on the administration of the Dental Aptitude Test.

For more information, visit <http://uss.tufts.edu/hpa/AcademicPrep>.

Combined-Degree Bachelor's/Master's in Public Health (M.P.H.) Program

A combined Bachelor's/M.P.H. program is offered in conjunction with the Public Health and Professional Degree Programs at Tufts School of Medicine. This program allows students who are planning to pursue a career in public health the opportunity to complete four credits of course work toward their required courses while undergraduates, leaving them with only nine more credits of course work to complete after they have received their undergraduate degree and matriculated into the M.P.H. program. Interested students may apply at the end of their sophomore year or the beginning of their junior year. This program is available to students in all majors, and no specific courses are required before application.

More information is available at <http://uss.tufts.edu/hpa/AcademicPrep>.

Combined Degree Bachelor's/Masters of Science in Health Communication Program

A combined Bachelor's/M.S. in Health Communication program is offered in conjunction with the Public Health and Professional Degree Programs at Tufts School of Medicine. This program allows students who are planning to pursue a career in health communication the opportunity to complete two and one-half credits of course work toward their required graduate courses while undergraduates, leaving them with only eight more credits of course work to complete after they have received their undergraduate degree and matriculated into the M.S. Health Communication program. Interested students may apply at the end of their sophomore year or the beginning of their junior year. This program is available to students in all majors; please note that there are specific courses offered through the Community Health Program that are required before application.

More information is available at <http://uss.tufts.edu/hpa/AcademicPrep>.

Postbaccalaureate Premedical Program

Tufts provides the opportunity for college graduates who did not study the sciences to prepare for entrance into a health profession of their choice. The Postbac Program is a small, selective one located on the Medford campus. Students who have completed their prehealth science requirements but need to do more coursework to enhance their application should consider the Boston campus Master's in Biomedical Sciences program. (More information is available at <http://publichealth.tufts.edu/academics/MBS-Microsite>.)

The Postbac Program offers a concentrated program of study, supplemented by a network of personalized advising and support, and gives Tufts Postbac Program graduates the needed advantage when applying to competitive medical schools and related graduate programs. The program is flexible and allows students to develop an individualized program of study, chosen from a wide range of course offerings. This flexibility allows students to pursue careers in medicine, dentistry, veterinary medicine, physical therapy, occupational therapy, optometry, or podiatry, or as a physician assistant or nurse practitioner.

Tufts provides a variety of workshops and guest speakers specifically for students in the program. Students may also attend any program or event on the Medford campus, as well as participate in student clubs and activities, or may become involved in research. To be eligible, students should have a bachelor's degree and a minimum of a 3.3 undergraduate grade point average. The typical student excelled in an undergraduate field other than science, but has recently made a commitment to pursuing a career in the health-care profession. The program is not remedial.

For more information and an application, visit <http://uss.tufts.edu/undergradEducation/academics/postbac>.

Pre-Law and Pre-Business

Pre-Law

There is no specific Pre-Law major at Tufts, as students should choose to major in what they find the most enjoyable. Students considering law school are encouraged to take a variety of courses in which they may develop their writing abilities, critical thinking, oral communication, analytic problem-solving approaches and research skills. Each of these skills offers valuable preparation for law school. Advising for pre-law is organized by the Associate Director of Pre-Professional Advising. Students thinking about attending law school are urged to visit the Pre-Law website at <http://uss.tufts.edu/pre-law> and register for the Pre-Law Newsletter through SIS.

Pre-Business

At Tufts, students do not pursue a specific Pre-Business track, however, Tufts provides a host of opportunities for students to learn about and apply their interest in business careers (e.g. finance, startups, consulting, or business/rotational development programs) after graduation. Corporations that recruit at Tufts typically invite students from a variety of majors across Liberal Arts and Engineering to interview. Employers look for a student's interest in their business or industry, as evidenced by internships, extracurricular activities, and academic courses. Students interested in business careers or grad school may choose to complete an interdisciplinary minor in Finance or Entrepre-

neurial Leadership Studies. In addition to course work, students may participate in the many business related student groups on campus (e.g., Tufts Financial Group, Tufts Entrepreneurs Society, 180 Degrees Consulting, and Tufts Consulting Collective). Students are also strongly encouraged to attend industry-specific events such as the Finance Career Forum, Consulting Networking Night, Tufts Entrepreneurs' Symposium, and seminars in financial modeling and presentation skills. When there is interest in an M.B.A., Tufts students are well positioned with a liberal arts degree, because most M.B.A. programs welcome candidates from diverse backgrounds with the critical thinking skills gained in a liberal arts education. Most importantly, students are encouraged to experience the workplace via internships prior to starting a career in business and in full-time jobs prior to attending business school. These work experiences allow students to better understand their interests, to discover new areas for exploration, and ultimately to make wise decisions about jobs and graduate programs. To learn more about internships, recruiting, graduate school admissions, or to schedule an appointment with the business advisor, students are welcome to visit the Tufts Career Center (<http://careers.tufts.edu/students>, 617-627-3299), with offices located in Dowling 740.

Experimental College

The Experimental College celebrated its 50th anniversary in April 2014. This makes the Experimental College one of the nation's oldest and most successful centers for educational innovation within the setting of a traditional liberal arts university. Throughout its history, the Experimental College has embodied the commitment of Tufts University to the vitality of the undergraduate experience. To this end, the college has become a place where faculty, administrators, and students work together to offer a carefully selected range of courses—letter-graded, credit-bearing electives—intended to broaden and enrich the traditional curriculum. Experimental College courses are open to all Tufts students.

Governed by a board consisting of faculty, staff, and students, the goals of the Experimental College are to introduce new, typically unavailable topics and approaches to students at a formative time in

their academic careers. Experimental College courses fill gaps in the conventional curriculum; contemporize education by teaching timely, situational topics in a small class setting; and engage students in shaping their own education.

In addition to our elective courses, the Experimental College also administers two peer-taught first-year programs called Explorations and Perspectives. Both of them combine advising and academics with peer-group support and close contact among entering students, upper-level undergraduates, and concerned faculty.

Please note: The Experimental College does not offer any academic concentrations of its own. However, certain courses will sometimes be cross-registered with a specific department or program, while others may be approved in advance for distribution credit or after the fact, on an individual basis, by petition.

The Experimental College also provides forums for inquiry, such as noncredit colloquia, conferences, and workshops, that meet the expressed needs of the university community as a whole. Finally, it houses such interdisciplinary programs as Film and Media Studies and TuftsFilmWorks.

More information regarding the programs and activities of the Experimental College is available from the office at 95 Talbot Avenue, at www.excollege.tufts.edu, or by calling 617-627-3384.

Experimental College Courses

Designed primarily for undergraduates, Experimental College courses are open to all members of the university. They are credit-bearing electives taught in accordance with university standards. Students should refer to the Ex College website for specific information, detailed course descriptions, and daily updates.

Instructors in the Experimental College are, in large measure, professionals from the greater Boston community, across a wide variety of fields, who have some special expertise to share. A few, select upper-level undergraduates are also given the opportunity to teach courses of their own design. However, unlike our adjunct-taught courses, peer-taught courses are graded on a pass-fail basis.

On average, the Experimental College offers close to eighty courses each year. A selected list of some recent offerings follows.

Making Movies

"Obamacare" and Everyday America

American Wilderness

Experimenting with Philanthropy

The Business of Sports: A Study of the NBA

Neuroscience and Criminal Justice

Human Development in the Digital Age

Microfinance

The Right to Privacy in Modern America

Medical Spanish

Katrina/New Orleans

The Theory and Practice of Nonviolent Resistance

Demystifying the Hipster

Explorations

Explorations are intended to both establish a sense of community and promote critical thinking. Each Exploration group consists of twelve to fourteen entering students who meet weekly in academic seminars designed and team-taught by two upper-level students. A faculty member or professional staff person serves as academic advisor to the first-year students. Thus, incoming students receive both immediate and sustained support.

Perspectives

Like Explorations, the Perspectives program uses upper-level students as peer teachers and advisors, but rather than each team of student leaders choosing their own subject area, all the groups attempt to answer questions about the world of media. The work done by each Perspectives group will be grounded in study of how media works, impacts our lives, and drives our current technological revolution.

Auditing for Breadth

Auditing for Breadth allows students to broaden their education by attending courses in which they might not otherwise enroll. A student may elect to audit any three undergraduate courses during their tenure at Tufts. Faithful attendance is the major requirement for each audit. Students select their own courses to audit but must have the approval of the course instructor. One course credit is awarded on completion of the three audits and a short paper. More information is available at the Experimental College office.

Quidnuncs

The Latin term *quidnunc* translates into English as “what next?” This program is designed in that spirit, allowing students to study as part of a peer group that will collectively investigate an interdisciplinary topic of the group’s own choosing. Previous groups have studied international health care, electronic journalism, creating a sex education curriculum, sustainable development in Nicaragua, conflict resolution and cooperative games, and most recently, an exploration of the MOOC phenomenon.

TuftsFilmWorks

TuftsFilmWorks (TFW) is the university’s center for film and multimedia production. Relying on new digital video technologies, TFW is the umbrella structure under which the Experimental College nurtures student filmmakers. Among the many projects completed over the years are two full-length features (a World War II epic and a Hollywood-style romantic comedy), a documentary about Mongolia (filming for which was all done on location), a dystopian black comedy about job interviews, and a film noir about the dangers of picking up a stranger at a bar. Currently, our advanced students are working collaboratively with outside professionals on a short, festival-worthy film about the excesses and damage done as the 1960s slid into the 1970s. All TFW students are trained to understand and appreciate the craft of filmmaking while learning to use cutting edge digital production and editing equipment. At the same time, they are engaged in ongoing studies of film history and style.

TUTV

The Experimental College is the administrative home of TUTV, the on-campus access channel and production studio. Faculty-sponsored and student-run, TUTV has taken its television roots to the internet, where it streams a wide range of programming. TUTV continues to attract more and more students who develop, along with location and studio production skills, the ability to manage an organization; make critical and ethical decisions; and interact in a positive manner with students, faculty, and administrators. In short, the students who run TUTV learn to become leaders.

Special Events

The Experimental College regularly sponsors campus-wide programs designed to bring together faculty and students. Among the most notable recent events was a talk by Rick Hauck, a Tufts Alum and retired NASA astronaut. Mr. Hauck’s talk inaugurated the Janover Family Lecture Series, an annual showcase for people whose careers have been marked by innovation. In addition, a second program, “A Taste of Tufts,” has become a regular feature of campus life. On a number of Fridays during the year, a faculty member leads a discussion on his or her research, what drives him or her, and how he or she came to a chosen field. Among the presenters have been Daniel Dennett, a renowned philosopher; Ayanna Thomas, from the Psychology Department; and Anthony Monaco, President of Tufts. Other programs range from films and lectures to dinners/roundtable discussions to an “Election Night Extravaganza” every four years. In 2008 and then again in 2012, we filled the Mayer Campus Center with over 1,500 participants, as the Tufts community came together—via TV, the Web, Facebook, Twitter, and person-to-person—to share in the excitement and history of a presidential election.

Jonathan M. Tisch College of Citizenship and Public Service

Alan D. Solomont, *Dean*

Miriam E. Nelson, *Associate Dean*

Peter Levine, *Associate Dean of Research*

Kei Kawashima-Ginsberg, *Director of CIRCLE*

Shirley Mark, *Director, Community Partnerships*

Nancy Thomas, *Director, National Study of Learning, Voting, and Engagement*

Mindy Nierenberg, *Senior Director, Tisch College Programs; Director of Leadership Studies Minor*

Sarah Shugars, *Communications Manager*

Bettina Stevens, *Administrative Director*

TISCH COLLEGE FACULTY

FACULTY EXECUTIVE COMMITTEE

Barbara Grossman, *Professor, Drama and Dance, School of Arts and Sciences*

David Gute, *Associate Professor, Civil & Environmental Engineering, School of Engineering*

Jonathan Kenny, *Professor, Chemistry, School of Arts and Sciences*

Wanda Wright, *Assistant Professor, Public Health and Community Service, School of Dental Medicine*

SCHOOL OF ARTS AND SCIENCES

Linda Beardsley, *Lecturer, Education*

Jeffrey Berry, *Professor, Political Science*

Marina Bers, *Associate Professor, Eliot-Pearson Department of Child Development*

Dale Bryan, *Assistant Director, Peace and Justice Studies*

Kathleen Camara, *Associate Professor, Eliot-Pearson Department of Child Development*

Steve Cohen, *Senior Lecturer, Education*

Heather Curtis, *Associate Professor, Religion*

Hugh Gallagher, *Associate Professor, Physics and Astronomy*

Kelly Greenhill, *Associate Professor, Political Science*

Lorlene Hoyt, *Research Associate Professor, Urban and Environmental Policy and Planning*

Charles Inouye, *Professor, Japanese, German, Russian, and Asian Languages and Literatures*

Penn Loh, *Lecturer, Urban and Environmental Policy and Planning*

John McDonald, *Professor and Chair, Music*

Christine McWayne, *Associate Professor, Eliot-Pearson Department of Child Development*

Gilbert Metcalf, *Professor, Economics*

Colin Orians, *Professor, Biology*

Deb Pacini, *Professor, Anthropology*

Peter Probst, *Professor and Chair of Art History, Adjunct Professor of Anthropology, Art and Art History*

Jeffrey Summit, *Rabbi and Research Professor, German, Russian and Asian Languages and Literatures*

Arthur Utz, *Associate Professor, Chemistry*

Sabina Vaught, *Associate Professor, Education*

David Walt, *University Professor and Robinson Professor of Chemistry, Chemistry*

Maryanne Wolfe, *Professor, Child Development*

SCHOOL OF ENGINEERING

John Durant, *Associate Professor, Civil and Environmental Engineering*

Doug Matson, *Associate Professor, Mechanical Engineering*

Chris Rogers, *Professor, Mechanical Engineering*

Chris Swan, *Associate Professor, Civil and Environmental Engineering*

CUMMINGS SCHOOL OF VETERINARY MEDICINE

Lisa Freeman, *Professor, Clinical Sciences*

Joann Lindenmayer, *Associate Professor, Environmental & Population Health*

Deborah Linder, *Research Assistant Professor, Clinical Sciences*

Emily McCobb, *Director, Shelter Medicine Program; Assistant Director, Center for Animals and Public Policy, Clinical Science*

Megan Mueller, *Research Assistant Professor, Clinical Sciences*

FRIEDMAN SCHOOL OF NUTRITION SCIENCE AND POLICY

Christina Economos, *Associate Director, John Hancock Research Center on Physical Activity, Nutrition, and Obesity Prevention*

Jennifer Sacheck, *Assistant Professor, John Hancock Center on Physical Activity, Nutrition and Obesity Prevention*

THE FLETCHER SCHOOL OF LAW AND DIPLOMACY

Michael Klein, *William L. Clayton Professor of International Economic Affairs*

SCHOOL OF DENTAL MEDICINE

Kathryn Dolan, *Assistant Professor, Public Health and Community Service*

John Morgan, *Associate Professor, Public Health and Community Service*

SCHOOL OF MEDICINE

Doug Brugge, *Professor, Public Health and Community Medicine*

Scott Gilbert, *Associate Professor, Medicine*

Aviva Must, *Professor, Public Health and Community Medicine*

Anthony Schlaff, *Professor, Public Health and Community Medicine*

The Jonathan M. Tisch College of Citizenship and Public Service is a national leader in civic education, whose model and research are setting the standard for higher education's role in civic renewal. Serving every student at Tufts University, Tisch College prepares young people for a lifetime of civic engagement and creates an enduring culture of active citizenship.

The following Tisch College programs enhance the civic education, research and practice of students, faculty, alumni, and community partners.

EDUCATION

Tisch Scholars for Citizenship and Public Service

Tisch Scholars is an innovative leadership program that develops core civic skills over several years. Tisch Scholars are leaders for civic engagement and catalysts for change. Students start by taking a course that helps them understand community assets, identify root causes of issues, enter communities as outsiders, and manage projects. In collaboration with local organizations, Tisch Scholars annually work on projects designed to create positive change, engage University resources and build capacity in Tufts' host communities. The developmental program consciously builds new levels of knowledge, skills and behaviors year by year and brings together a mentoring community of peers. With approximately 60 students participating, Tisch Scholars interact across their years, helping each other connect their community experiences back to their academic work and ultimately to a deeper understanding of the issues.

Tufts 1+4 Bridge-Year Service Learning Program

Tisch College's innovative bridge-year program provides accepted students the opportunity to learn from a transformational year of full-time service, domestically or abroad, before beginning their academic studies at Tufts. Tisch College is working with experienced domestic and international service organizations to support a year of meaningful community service.

Tisch Distinguished Speaker Series

Throughout the academic year, the Tisch College Distinguished Speaker Series brings leaders from a range of fields and perspectives to campus to discuss pressing public issues. During their visits, these distinguished guests will connect with students and faculty for educational and informative discussions.

Tisch Summer Fellows

Tisch Summer Fellows spend their summer receiving hands-on training and support in a real-world environment. Working locally, nationally, or internationally, these Tisch Fellows gain skills and experience that guide and shape their development as active citizens. Recently, students collaborated with community organizations to support economic recovery in Somerville, worked in Pentagon positions designed exclusively for Tufts students, got to know the ins and outs of dynamic New York non-profits, and traveled to Guatemala to build critical infrastructure for local coffee farmers.

Active Citizenship in the Curriculum

Find Tufts' most engaging, applicable and interesting courses through Tisch College's Course Guide! Including classes from nearly every department of the School of Arts and Sciences and the School of Engineering, these courses will help students develop the knowledge and practical skills needed to make a positive impact in the world. Whether you've declared your major or are looking for something new, this expanding course guide can help you find what you're looking for.

Leadership Studies Minor

Leadership studies is an interdisciplinary minor is led by Tisch College. The program offers students the opportunity to study leadership theory from a multi-disciplinary perspective. Scholarship in leadership studies analyses the influence of historical, political, economic, psychological, and technological forces on effective leadership and leadership models. Leadership studies at Tufts places particular emphasis on leadership that bridges cultural divides. Details about requirements are included in the list of Departments, Programs and Research Centers in this Bulletin.

Senior Fellows

Tisch College hosts leading academics and practitioners as Senior Fellows who organize courses, seminars, or workshops to engage students around their area of interest. Currently, Tisch College supports a Senior Fellow for the Humanities, a Senior Fellow at the veterinary school, and Senior Fellows who teach classes such as community organizing and entrepreneurship.

Common Reading Book

Tisch College begins working with incoming students before they even step on campus, annually selecting a common reading book with a civic engagement focus. Common Reading Programs are active with the School of Arts and Sciences, School of Engineering, School of Medicine, and School of Dental Medicine, giving students at those schools a shared experience as they explore the book's themes through lectures and discussions. Past books have included *The Other Wes Moore* by Wes Moore; *The Spirit Catches You and You Fall Down* by Anne Fadiman; and *The Upstream Doctors: Medical Innovators Track Sickness to Its Source* by Rishi Manchanda, A97, M03.

Community Service Learning (CSL) Partnerships

As one way to infuse active citizenship across all Tufts schools, Tisch College supports Community Service Learning (CSL) programs in Tufts schools. Through the Tisch College and School of Medicine Community Service Learning Program, medical students complete 50 CSL hours prior to graduating. Additionally, students from the School of Dental Medicine participate in a five-week “externship” at one of 25 facilities across the country, and students at the Cummings School of Veterinary Medicine actively serve through numerous community programs, including a low-cost pet clinic at Worcester Technical High School.

Civic Honors Society

Active citizenship does not end with graduation. Tisch College's *Honos Civicus* Society is a growing network of Tufts alumni who excelled in active citizenship courses and co-curricular activities during their undergraduate years at Tufts. Over 600 students have been inducted into the *Honos Civicus*

Society since its creation. The program is active at the School of Arts and Sciences, School of Engineering, School of Medicine, School of Dental Medicine, Friedman School of Nutrition and Science Policy, and Cummings School of Veterinary Medicine.

Presidential Awards for Citizenship and Public Service

The Presidential Awards are presented every spring to exceptional undergraduates and graduate students. The awards recognize outstanding student accomplishment and celebrate the diverse meanings of citizenship and public service that Tufts seeks to support. Past recipients have been recognized for initiating programs that trained their peers in Spanish to reach new populations of community residents, developing and testing a technology to rapidly and accurately assess childhood developmental delays, courageously leading policy change on campus, launching a rabies clinic in Worcester public housing, volunteering “over the top” numbers of hours in service to children in our host community, and more.

RESEARCH

The Center for Information and Research on Civic Learning and Engagement (CIRCLE)

CIRCLE at Tisch College is the leading source of authoritative research on civic and political engagement of Americans between the ages of 15 and 25. CIRCLE's research has begun to change public discourse and press coverage about young people as citizens, and has changed political campaigns in America by helping to show that it is cost-effective to mobilize young voters. Additionally, CIRCLE regularly provides training and technical assistance to at least 300 organizations around the country, mostly direct providers of services to youth. Recent research has included leadership of women and girls, civic engagement of the many young people who don't attend college, and how social networking can strengthen civic discourse and opportunities.

The National Study of Learning, Voting, and Engagement (NSLVE)

Tisch College's National Study of Learning, Voting, and Engagement offers colleges and universities an opportunity to learn their student registration and voting rates and, for interested campuses, a closer examination of their campus climate for political learning and engagement and correlations between specific student learning experiences and voting. Critical to our broader mission of strengthening college student learning for democracy, NSLVE's goals are to provide a service to colleges and universities interested in learning about their students' voting habits and build a national database for research on college student political learning and engagement in democracy.

Tisch Community Research Center (TCRC)

The Tisch Community Research Center involves Tufts faculty and students from across all schools of the university in research done in collaboration with community partners. Run by a Steering Committee of community members and Tufts Faculty, TCRC provides seed funding to faculty-community research partnerships and provides networking opportunities for faculty and community members interested in community-based research.

Faculty Fellows

This program builds the capacity of Tufts faculty to integrate active citizenship into their research and teaching. Supporting faculty leadership in building active citizenship as a defining strength across the University, Faculty Fellows participate in unique interdisciplinary conversations that enhance their work. Each year, a dozen faculty from across the university are selected to participate.

PRACTICE

Tisch Fund for Civic Engagement

Tisch College supports individuals and student groups to implement events and programs with a clear connection to active citizenship and social justice. Open to students at all Tufts schools, the Tisch Fund supports events, projects, and programs with a clear connection to active citizenship. Priority is given to projects in local communities which engage the Tufts community in their work.

CASE Network (Connecting Alumni and Student Experiences)

A signature program in Washington, DC, the CASE Network gives Tufts students working or interning over the summer the opportunity to connect with a community of Tufts alumni mentors. These mentors help support students' summer learning experience and share valuable insights about life after college.

CIVIC

Founded and managed by Tufts undergraduates, CIVIC (Cooperation and InnoVation In Citizenship) is a space for civil political debate at Tufts University. The organization seeks to educate the community on relevant political issues, provide a forum for the discussion of issues of concern, and encourage and support free political speech on campus.

Jumpstart

Jumpstart is a national early education organization that inspires children to learn, adults to teach, families to get involved, and communities to progress together with the goal of enabling every child in America to enter school prepared to succeed. Tisch College hosts Jumpstart at Tufts. Over 60 Tufts undergraduates participate as Jumpstart leaders each year.

Leonard Carmichael Society (LCS)

Housed by Tisch College, LCS supports active citizenship and community services through programs ranging from after-school assistance to annual fund-raisers for community organizations. LCS facilitates a wide variety of volunteer opportunities in and around the Tufts community, including hospital work, blood drives, tutoring opportunities, and work with the elderly, the homeless, the disadvantaged, and the blind. LCS also facilitates public dialogue on issues related to volunteerism. With a volunteer corps of over 1,000 and a student staff of 85, LCS is the largest student group on campus.

Generation Citizen

Generation Citizen is a national non-profit that partners college students with public school classrooms to teach an innovative action-based civics curriculum two days a week for a semester. At Tufts, Generation Citizen is supported by Tisch College and partners with several area schools. Participating Jumbos teach students how to identify a community issue that matters to them, create a strategic action plan, and then take real-world action on it.

Stem Ambassadors

Supported by Tisch College, STEM Ambassadors is a professional development program with an outreach mission for student representatives from Tufts University's School of Arts and Sciences and School of Engineering. The program engages Tufts students in sharing their passion and excitement for the sciences and engineering with local middle and high school students, prospective students of Tufts University, and the greater Tufts community including Medford, Somerville, and Boston.

Careers in Social Impact

Tisch College partners with the Tufts Social Impact Alumni Network and Career Services to help current students discover what they can bring to the social impact field. An annual networking event, Careers in Social Impact is an evening of conversations with an inspiring group of professionals pursuing social impact-driven careers.

Clinton Global Initiative University (CGI U)

The Clinton Global Initiative University (CGI U) engages the next generation of leaders on college campuses around the world. Each year, CGI U hosts a meeting where students, university representatives, topic experts, and celebrities come together to discuss and develop innovative solutions to pressing global challenges. Tisch College supports Tufts students selected for CGI U through mentoring and financial support.

Community Partnerships

Tisch College actively builds the capacity of students, faculty and community organizations to effectively partner in education and research to address community-identified needs in Tufts host communities of Medford, Somerville, Boston's

Chinatown and Grafton. A resource for both Tufts and its host communities, Tisch College hosts regular skill-building and networking workshops.

Institute of Nonprofit Management & Leadership

The Institute for Nonprofit Management and Leadership's (INML) transforms communities by equipping the most promising nonprofit leaders with the skills, confidence and resources they need to make their organizations effective, innovative and sustainable. To date, INML has trained more than 600 leaders affiliated with over 270 nonprofits. Beginning in 2015, the program will grant certificates in partnership with Tisch College.

Tufts Social Impact Network

The Tufts Social Impact Network engages Tufts alumni interested in social impact and entrepreneurship. Supported by Tisch College, the Social Impact Network creates opportunities for networking, collaboration, and skill-building.

Active Citizens of Tufts (ACT) Boston

The Active Citizens of Tufts—Boston (ACT) unites alumni of Tufts University's undergraduate, graduate and professional schools through public service opportunities and educational forums for the purpose of building a stronger, healthier and safer Greater Boston community. The group works closely with Tisch College.

Jumbo Alumni Service Month

Jumbo Alumni Service Month (JASM) celebrates active citizenship at Tufts University by providing alumni, students, and friends with opportunities to volunteer their time and talents locally with a group of their peers. During JASM, regional alumni chapters and shared interest groups sponsor local community service initiatives for Tufts alumni and students throughout the world. These events encourage, recognize and celebrate the tradition of active citizenship at Tufts and beyond. JASM is a collaborative initiative spearheaded by Tisch College, the Tufts University Alumni Association, and the Active Citizens of Tufts alumni chapter.

Tisch College is located in Lincoln Filene Hall on the Medford campus. For more information, call 617-627-3453 or visit <http://activecitizen.tufts.edu>.

Institute for Global Leadership

Tufts' Institute for Global Leadership (IGL) is an incubator of innovative ways to educate learners at all levels in understanding difficult and compelling global issues. Our goal is to develop new generations of critical thinkers for effective and ethical leadership, who are able to comprehend and deal with complexity, to bridge cultural and political differences and to engage as responsible global citizens in anticipating and confronting the world's most pressing problems.

To meet these challenges, the Institute emphasizes rigorous academic preparation and experiential learning. Students learn through intensive engagement in classes, global research, internships, workshops, simulations, and international symposia—all involving national and international students and leaders from the public and private sectors. These activities stress critical and normative thinking, written and oral communication skills, problem solving, and an interdisciplinary approach to learning. Students produce tangible outcomes to their studies through their research projects, the international forums, and other significant initiatives. The experience helps stimulate intellectual curiosity and build individual self-confidence and independence, while at the same time developing analytical and practical leadership and decision-making skills.

The IGL is located at 96 Packard Avenue. For more information, call 617-627-3314 or visit www.tuftsgloballeadership.org.

IGL Programs

COURSES

Education for Public Inquiry and International Citizenship (EPIIC) (1985–)

The cornerstone of the institute, EPIIC is a rigorous, carefully integrated multidisciplinary program on a global theme that is open to students of all majors and years. Since its inception at Tufts in 1985, EPIIC has been challenging students, as well as policymakers and the public at large, to think critically about questions of pivotal importance to the world. Its main components are a yearlong colloquium, research projects, an international symposium, professional workshops, and public service initiatives. Past topics have included International Terrorism (1986); The West Bank and Gaza Strip (1987); Transformations in the

Global Economy (1993); Ethnicity, Religion and Nationalism (1994); The Future of Democracy (1997); Global Inequities (2002); The Role of the U.S. in the World (2004); Oil and Water (2005); and The Politics of Fear (2006). The 2012–2013 topic was Global Health and Security, and the 2013–2014 topic was The Future of the Middle East and North Africa. The theme for 2014–2015 was Russia in the 21st Century and the theme for 2015–16 is The Future of Europe.

Inquiry (1992–)

Working with public and private schools in six states, Inquiry is one of the University's largest and most diverse public service initiatives. It provides a unique opportunity for high school students to participate in an intellectual and challenging yearlong program, culminating in a role-playing simulation on an international issue. Tufts students act as mentors for the high school students. In 23 years, more than 5,300 high school students and 900 Tufts students have participated. Each year the simulation derives from the annual EPIIC theme.

Program for Narrative and Documentary Practice (2011–)

The Program for Narrative and Documentary Practice—directed and founded by renowned award-winning photojournalist Gary Knight, the cofounder of Photo VII, and award-winning photographer Samuel James—gives students the skills to explain the world around them to a much broader audience. The program teaches students to shape global issues into multi-media stories that are narrative and compelling. The program does not train journalism students. Rather, it takes students interested in politics, history, economics, international relations, conflict resolution, technology and engineering—students who wish to engage in the world—and teaches them storytelling and journalism. It involves immersion in a subject and produces work that draws on video, photography and writing. The program annually offers an introductory course in the fall, a seminar in the spring, and an opportunity to participate in an on-site summer workshop, along with organizing public lectures for the campus throughout the year. Its workshops have taken place in Arizona, documenting the U.S./Mexico border and immigration dilemmas; in Myanmar/Burma, documenting the country's re-emergence; in Dhaka,

Bangladesh, documenting the mega-city; in Saint Petersburg, Russia, documenting Russia today; and in Rio de Janeiro, Brazil, exploring the impact of access to medication for hepatitis C.

EXPERIENTIAL EDUCATION AND RESEARCH

Global Research, Projects, and Internships (1986–)

Students are encouraged to conduct original, policy-oriented research and projects that allow them to test their theories and assumptions on the ground. Since 1986, more than 1,400 students have conducted research or participated in an international internship in more than 90 countries, most recently in Colombia, Kosovo, Rwanda, and Turkey. These projects often develop into significant projects and senior honors theses. One project culminated in the creation of an NGO in northern Uganda, Collaborative Transitions Africa; another, which looked at the local outreach process from the International Criminal Tribunal for the former Yugoslavia, became the model for the Sierra Leone truth commission's outreach.

New Initiative for Middle East Peace (NIMEP) (2003–)

NIMEP is a non-polemical student research think-tank and outreach initiative aimed at comprehending the conflicts of the Middle East and North Africa, and at seeking progressive solutions to the conflicts in the Middle East. In 2005, NIMEP published the first edition of its journal, *NIMEP Insights*. The journal featured student research papers from NIMEP trips to Israel and the West Bank and to Egypt, as well as the IGL's 2004 trip to Iran. NIMEP's trips have taken student delegations to Jordan, Tunisia, Kurdistan, the Gulf, Israel/Palestine, Turkey, Lebanon, and Syria. NIMEP's most recent fact-finding trip is to Morocco. NIMEP holds weekly student-led seminars on diverse issues, and holds dialogue sessions on contentious issues. Its non-partisan approach has allowed it to play a bridging role on campus between often polarized groups. NIMEP also initiated the Web-based Soliya course, which has been offered as an academic credit course through the Political Science Department, in which small groups of university students from the US and predominantly Muslim countries in the Middle East engage in intensive dialogue about the relationship between the US and the Arab and Muslim world.

Iran Dialogue Initiative (IDI) (2004–)

IDI's mission was to facilitate educational dialogue and exchange between Tufts University students and students at the School for International Relations (SIR) in Tehran. A non-polemical and non-political initiative, in 2004, IDI organized the first official U.S. university visit to Iran since the 1979 revolution, where ten Tufts Fletcher and A&S/E undergraduate students spent two weeks traveling through Iran and meeting with their peers at SIR as well as at Mofid, a religious university in Qom. Given the ongoing political tensions of recent years, this program is on hold as a visitation program, but educational research has continued.

Tufts Energy Conference (TEC; formerly the Energy Security Initiative) (2005–)

This initiative was developed by undergraduate students who participated in the 2005 EPIIC Oil and Water colloquium. It is an effort to educate the campus about global energy supply and demand, alternative energy sources, and the geopolitical consequences of the world's quest for energy sources. Research trips have been conducted in Belgium, California, Colorado, Denmark, Germany, India, South Africa, and the United Arab Emirates. The Tufts Energy Conference hosts an annual symposium on the campus, partnering with a broad range of organizations. ESI also helped establish a sister program at Peking University, the Peking University International Student Energy Initiative. With its growth, TEC now operates as a collaboration between graduate and undergraduate students and as its own entity, with occasional support from the IGL.

Alliance Linking Leaders in Education and the Services (ALLIES) (2006–)

ALLIES began as a special project of the EPIIC symposium on The Politics of Fear. Its initial objective was to consider the political, socio-economic, and cultural nature of the civil-military relationship, and too often the civil-military divide, within the United States. Special relationships were forged between the Institute for Global Leadership and the U.S. military's prestigious educational leadership institutions, with ALLIES chapters now at the United States Air Force Academy, the United States Military Academy, and the United States Naval Academy. ALLIES holds academic confer-

ences, simulations, and roundtables that rotate among its member schools. It also fosters dialogue, encourages joint summer research opportunities, creates activities such as FieldEx simulations that bring together students at private liberal universities and future military officers, and educates about the role of the U.S. military at home and abroad. Students have conducted joint research trips to Chile, Jordan, Poland, Rwanda, Turkey, Uganda, and Ukraine. The IGL's National Security and Civil Liberties Program (2006–) is an affiliate of ALLIES and is an opportunity for students to experience and understand the fundamental relationship between civil rights and national security concerns. It brings together students from the Tufts campus and from the U.S. military academies to address controversial issues such as Guantanamo, warrantless wiretaps, WikiLeaks, and the extent of executive privilege. This program has collaborated with the Law Library of the Library of Congress and the Washington Law School of American University.

Synaptic Scholars (2006–)

The Synaptic Scholars program is designed to encourage and enable students interested in creative intellectual exploration to realize their potential in intensive, interdisciplinary settings. The program creates a framework in which intellectual juxtapositions, critical thinking and self-directed explorations are fully realized. Synaptic Scholars is a leadership program, meant to provide a forum for students to take risks, pursue passions, and challenge assumptions in an intimate, supportive and collaborative environment. It is designed to cultivate a strong sense of accountability and responsibility, while encouraging scholars to enrich the University's intellectual life and programming. It is now a self-sustaining intellectual community of diverse academic interests which selects its members after interviews and submission of project concepts. Selected in the last stage of their first year, "Syns" are active for three years. There is usually a range of 24–36 scholars on campus at a time. Scholars have created fireside chats with faculty and the annual Tufts Idea Exchange (TEX), modeled in part on the TED talks.

Poverty and Power Research Initiative (PPRI) (2007–)

This program is an effort to study the relationship between extreme poverty and the nature of the national decision-making process in the countries of the developing world. PPRI grew out of activities initiated during the 2007–2008 EPIIC colloquium, Global Poverty and Inequality, under the guidance of IGL INSPIRE Scholar-Practitioner Jose Maria Argueta, former national security adviser in Guatemala. Students have conducted on-site research in Guatemala, Jordan, the Philippines, and Turkey as well as in the U.S. Themes have ranged from systemic corruption to the role of the media in development and democratic state building in Turkey.

Pugwash International Student Chapter (2011–)

In 2011, emerging out of the EPIIC topic "Our Nuclear Age," the IGL began a student chapter of Pugwash International. The program is a forum for students and faculty to discuss and debate the ethical and normative dimensions of science, technology and public policy. It has held workshops on technology and conflict; on ethical issues regarding autonomous lethal robots, "cyberwar," neuroscience and national security; and on the ethics of whole genome sequencing.

Leaders in China-U.S. Relations (LCUR) (2012–)

The purpose of the LCUR organization is to advance relations between the U.S. and China while taking advantage of the diversity of experiences, backgrounds and interests within the Tufts community by organizing events and providing a forum to discuss current political events related to China. LCUR grew out of ALLIES and hosts the annual China-U.S. Symposium. With its growth, LCUR, now renamed SURGE, operates as a collaboration between graduate and undergraduate students and as its own entity, with occasional support from the IGL.

Innocence International (2014–)

The IGL is in the process of establishing a research and internship program with Innocence International on behalf of prisoners on death row believed to be wrongly incarcerated. Innocence International was founded by the famed boxer Rubin "Hurricane" Carter and his co-defendant John Artis, who were

released from prison in 1985 after having been held for 18 years for a wrongful murder conviction. The initiative will focus on the American and international criminal justice system, asking students to think critically about the intersection of race, class, and imprisonment. The Africana Center and the new Center for Race and Democracy at Tufts University are collaborating on this project.

SOCIAL ENTREPRENEURSHIP

Building Understanding through International Learning and Development (BUILD) (2002–)

For its first six years, BUILD participants spent a semester learning about international development, cross-cultural exchange, the history and politics of Nicaragua and the needs of the rural community of Siuna, Nicaragua, before spending their winter break working in the community. In 2008, BUILD moved its work in Nicaragua to Guatemala, where the student group worked with the cooperative Santa Anita La Union. BUILD has also run a spring semester, student-taught course on sustainable development. This was initially a project in collaboration with the Tisch College for Citizenship and Public Service. In 2009, BUILD was chosen as the Tufts recipient of the Davis Foundation 100 Projects for Peace. In 2010, BUILD expanded its program to India, and BUILD India was chosen as the 2011 Tufts recipient of the Davis Foundation 100 Projects for Peace. IGL student initiatives have won the first prize of \$10,000 for the last seven years, every year it has been offered. BUILD is now expanding into Nicaragua.

Engineers Without Borders (EWB) (2005–)

A collaboration with the School of Engineering, the mission of the Tufts Chapter of Engineers Without Borders is to design sustainable development projects for communities around the world and to engage students, faculty and the campus in the process. Unique to the Tufts chapter is its emphasis on collaboration between engineering and arts and sciences students, and its leaders have often been majors in the social sciences. Members have worked on projects in Tibet, Ecuador, El Salvador, Haiti, Palestine, and Uganda.

Empower (2007–)

A Clinton Global Initiative commitment of the IGL, the Empower Program for Social Entrepreneurship educates, mentors, and motivates aspiring social entrepreneurs at Tufts. Empower is a program for undergraduate and graduate students to engage in practical experiential learning in social entrepreneurship. The Empower Fellowship provides the opportunity for students to launch social enterprises, participate in internships and conduct applied research related to social entrepreneurship in international or local community development. The fellowship offers either a grant or a stipend for students to pursue these opportunities during the summer and allows students to join the Social Entrepreneurship Network at Tufts, which encourages collaboration, mentorship, and the promotion of social entrepreneurship on campus.

This IGL initiative focuses on social entrepreneurship and poverty alleviation. Bringing together a global network of non-governmental organizations, such as ACCION, Kiva and the Schwab Foundation for Social Entrepreneurship, Empower offers students opportunities for research and internships across the world. A multidisciplinary initiative, topics include innovations in micro-finance, education, water sanitation, and support for indigenous artisans and musicians. Its recipients have won prestigious prizes from MIT and USAID, and at World Bank competitions. The World Bank competition Innovation: Moving Beyond Conflict attracted two thousand submissions from 40 countries. Of the 30 winners, three came from Empower-supported IGL students. Empower continues to support ongoing Institute group projects such as GroupShot, one of the three selected by the World Bank; BUILD; RESPE (Research and Engagement Supporting Poverty Elimination) Haiti; and BrandHaiti.

INTERNATIONAL LEADERSHIP AND EXCHANGE

Tufts Initiative for Leadership and International Perspective (TILIP) (1997–)

In 1997, Tufts University, in cooperation with Peking University (Beijing), the Chinese University of Hong Kong, and the University of Hong Kong, began this leadership program. Originally a residence and internship program in China and Hong Kong, it evolved into a more academic program culminating with the international students

attending the EPIIC symposium. The residence/internship component was discontinued, and in 2008 TILIP was re-conceptualized to expand its global reach. Closely continuing its work with Peking University in Beijing, TILIP emerged as one of that university's most prestigious and competitive programs. Brazil, Canada, Guatemala, Haiti, India, Iraq, Israel, Mexico, Palestine, Russia, Rwanda, Seeds of Peace Israel/Palestine and South Asia, Singapore, South Africa, South Korea, and Ukraine have all sent student delegations to the IGL as part of the IGL's commitment to the Clinton Global Initiative to globalize its EPIIC program.

Robert and JoAnn Bendetson Public Diplomacy Initiative (2006–)

The Bendetson Public Diplomacy Initiative is an effort to bring key global policymakers and officials to Tufts to share their experiences and perspectives with students, and to create conducive environments in the search for common ground. It brings policymakers and officials together to discuss their shared experiences, such as in its program on “Iraq: Moving Forward” in 2007, which explored next steps in Iraq with high-level participants from Iraq, South Africa, Northern Ireland, and Guatemala. Then working with the political and military leaders of the ANC and former high-level Apartheid government figures, and with leaders of the IRA and Provo military and political groups, this project convened meetings over several years with all sectors of the Iraqi political spectrum, excluding al-Qaeda. It worked for three years discretely to create and encourage the Helsinki Principles, which formed the foundation for non-sectarian elections in Iraq. The meetings were hosted by the Conflict Management Initiative, the NGO founded by Nobel Laureate and Mayer Award recipient the Hon. Martti Ahtisaari, the former President of Finland. Its concluding gathering, where the principles were announced, was held in Baghdad. There are ongoing deliberations regarding economic and educational initiatives.

EXPERT MENTORING

Dr. Jean Mayer Global Citizenship Lecture Series (1993–)

This lecture series, and its accompanying award, honors the legacy of former Tufts University President and Chancellor Jean Mayer by bringing distinguished individuals to campus who combine scholarship and public service and who are dedicated to helping students solve some of the world's pressing challenges. There is a reciprocal understanding that whenever possible the recipient engages Tufts students in their activities. Recipients include the Hon. Martti Ahtisaari, Admiral Ami Ayalon, the Hon. Anson Chan, Bill Drayton, Gen. Romeo Dallaire, Sylvia Earle, Shirin Ebadi, Murray Gell-Mann, the Hon. Jose Ramos Horta, General Dirk Jameson, Sunita Narain, Sen. Sam Nunn, Conor Cruise O'Brien, Luis Moreno Ocampo, Steven Pinker, Gwyn Prins, Mary Robinson, Amartya Sen, Zainab Salbi, Wole Soyinka, Ronald Takaki, Archbishop Desmond Tutu, Abiodun Williams, and Muhammad Yunus.

Institute Scholars and Practitioners in Residence (INSPIRE) (1999–)

This program originally brought exceptional scholars and practitioners to Tufts for public lectures, classroom lectures and research and career advising. Participants have included Jack Blum, senior counsel for special projects for Finance Sector Compliance Advisors Limited and an expert on controlling government corruption, international financial crime, money laundering, international tax havens and drug trafficking; Peter Droege, the Asia-Pacific chair of the World Council for Renewable Energy and director of Solar City for the International Energy Agency; and Sanjoy Hazarika, former New York Times Delhi bureau chief and a member of India's National Security Advisory Board. Now the program has been reconfigured to emphasize liaison with specific IGL programs to provide oversight and guidance. INSPIRE Fellows are often linked to ongoing projects now: for example, Action against Hunger's Pakistan former director Daniel Holmberg, Harvard Belfer Center for Science and International Affairs Fellow Lucas Kello, and RAND Professor Lowell Schwartz were linked to Empower, EPIIC, and ALLIES; led research projects and workshops; and provided research guidance. This past year, the Carnegie Corporation supported three INSPIRE

Fellows from the Middle East: Carnegie Endowment Senior Associate on Nuclear Policy Ariel Levite, leading Palestinian intellectual and analyst Mouin Rabbani, and former Iraq national security adviser Mowaffak al-Rubaie.

Voices from the Field (2001–)

The IGL brings back to campus mid-career alumni (the Voices) who are presently working in the fields of nation building, complex humanitarian emergencies, human rights, U.N. peacekeeping, refugee assistance, preventative diplomacy, conflict resolution, global health reconstruction, and development assistance. They engage in several days of intense round-table conversation and undergraduate advising. They are also integrated into the EPIIC symposium. Participants have included alumni such as 30-year humanitarian relief worker Daniel Holmberg, Fletcher School Security Studies Fellow Col. William Ostlund (US Army), Commander of the CDC Dr. Ezra Barzilay, and senior United Nations peacekeeping official Nick Birnback.

ACCESS (2009–)

ACCESS is a joint mentorship program between the IGL at Tufts University and Beyond Conflict (formerly the Project on Justice in Times of Transition, or PJTT) that combines the two organizations' respective resources to mentor and foster a new generation of leaders in international diplomacy. It has conducted academic credit seminars, held lectures and provided unique access to public diplomacy efforts and internships in such places as Colombia, England, Nicaragua, and Spain. Among its INSPIRE Fellows have been Tim Philips, the cofounder of the Project on Justice in Times of Transition, and Ambassador William Luers. Most recently, students have been engaged in an annual workshops on neuroscience and conflict resolution at MIT and have been researchers and interns on their ongoing projects.

The Oslo Scholars Program (2010–)

The Oslo Scholars Program, an initiative of the Oslo Freedom Forum and the IGL, offers undergraduate students who have a demonstrated interest in human rights and international political issues an opportunity to attend the annual Oslo Freedom Forum in Norway, and the opportunity to work with its honorees. Its honorees are some of the

world's leading human rights defenders and activists, such as Justine Hardy of Heal Kashmir and Dr. Izzeldin Abuelaish, the Gazan doctor who founded the Daughters for Life Foundation. The forum, now in its fifth year, provides students with invaluable learning opportunities and internships.

AWARDS

The Boryana Damyanova Program for Corporate Social Responsibility (2008–)

This program is focused on introducing and providing research skills for students interested in learning more about the complex issues of capitalism, integrity, and corporate citizenship and accountability. The Damyanova Program also presents an annual award to an individual who best represents these issues. Recipients have included author and activist Robert K. Massie, corporate accountability consultant Maria Figueroa Kupcu (A'93), and human rights lawyer Michael Posner. In 2012, the Tufts student ACER (Advisory Committee for Endowment Responsibility) group joined this program. This program was begun to honor the memory of EPIIC and IGL student Boryana Damyanova (A'06), who was killed in a traffic accident in her senior year.

The Alexandra Boulat Award for Photojournalism (2010–)

This award has been established by the IGL and its Exposure program to promote the creation of documentary work with a social purpose. Named in honor of Alexandra Boulat (1962–2007), a cofounder of VII Photo Agency, it has been created to acknowledge the inspiration and mentorship she provided to Exposure and its students. Boulat was an award-winning French photographer, known for her compelling images of people affected and displaced by war. The juried award is given to a current Tufts student or alumni to fund a documentary project. The first recipient was Samuel James (A'10), who is an alumna of several IGL programs and is now the program coordinator for the IGL's Program for Narrative and Documentary Practice (PNDP). He used the award to continue his work looking at the ongoing struggle for power, land and oil in Nigeria. The second recipient was Nichole Sobocki, a 2009 Tufts graduate and now a freelance photojournalist and videographer based in eastern Kenya and primarily working with Agence France-Presse.

The Gerald R. Gill Oral History Prize (2011–)

The prize honors the legacy and memory of Gerald R. Gill, a longtime friend of the Institute, an associate professor of American history at Tufts University, and one of the University’s most honored and distinguished teachers. It is a competitive prize open to graduate or undergraduate students who plan to incorporate an oral history component into their research projects. Gill was a founding and core faculty member in American Studies and Peace and Justice Studies, and he taught courses in African-American history, the Civil Rights Movement, and sports in American history. The first recipient was Michael Kremer (A’11), who used the support to add an oral history component to his senior thesis on “The Diversity Visa Lottery: A Study Linking Immigration Politics to Immigrant Characteristics and Experiences.”

The Tim Hetherington Award (2012–)

The Program for Narrative and Documentary Practice (PNDP) began a Tim Hetherington Award to honor his life and work. Tim Hetherington (1970–2011) photographed the experience of war from the perspective of the individual, mostly in West Africa and the Middle East. Through his photographs, writing and films, Hetherington offered new ways to look at and think about human suffering. Hetherington published *Liberia Bit by Bit: Long Story Retold*, documenting the civil war in Liberia, and *Infidel*, a book of his photographs from *Restrepo*, the film he co-directed with Sebastian Junger about a platoon of soldiers in Afghanistan. *Restrepo* was awarded the Grand Jury Prize at the 2010 Sundance Film Festival and was nominated for an Academy Award in 2011 for Best Documentary Feature. Hetherington was a member of PNDP’s Advisory Board. He was killed covering the war in Misrata, Libya. The juried award is offered to current students or alumni of Tufts University to support a non-fiction storytelling project that seeks to illuminate a humanitarian story that is under-reported. The first recipient was Elizabeth Herman (A’10), an alumna of the EPIIC and Exposure programs, to continue her work on “A Woman’s War” in Bosnia-Herzegovina.

PUBLICATIONS

NIMEP Insights (2005–)

NIMEP Insights is the journal of the IGL’s New Initiative for Middle East Peace. Since 2005, the student group has been publishing the journal, usually a mix of Tufts student community articles on the Middle East and articles by the group members from their fact-finding missions in the Middle East.

Discourse: The Tufts Interdisciplinary Journal Dedicated to the Power of Reason and the Exchange of Ideas (2007–)

Discourse began as a Synaptic Scholars project. It provides an inclusive campus-wide platform for reasoned discussion and prescriptive analysis of issues of both international and domestic concern, while also including poetry, fiction, art and photography to illuminate the human condition. Its emphasis is on exploring a diversity of thought and perspectives from students, scholars and practitioners. The purpose of *Discourse* is to provide an open forum for discussion of contemporary dilemmas, not a vehicle with any specific political or intellectual agenda.

Academic and Support Services

Library Resources at Tufts

The Tufts University libraries support the educational and research programs of the university by serving students, faculty, and staff. On the Medford/Somerville campus are the Tisch Library serving the schools of Arts and Sciences and Engineering; the Edwin Ginn Library of the Fletcher School of Law and Diplomacy; and the Department of Digital Collections and Archives, which manages the university's growing digital collections and houses the university's archives. The Hirsh Health Sciences Library serves the Tufts health sciences schools on the Boston campus. The Webster Family Veterinary Library serves the Grafton campus.

The Tufts libraries share one Integrated Library System (ILS). The online catalog provides access to resources physically and virtually available within the Tufts libraries and beyond. The resources of these libraries include over three million bibliographic items: electronic and print books and journals, videos, music CDs, microforms, slides, pamphlets, and government publications. Along with the catalog of the libraries' rapidly expanding collections, each library's website hosts a state-of-the-art array of electronic databases, links to other websites, systems and services including a body of research tools accessible from each library's home page using any Web browser. Web resources are selected by the libraries for their value to Tufts faculty and students and include a substantial number of electronic resources: over 70,000 electronic journals, which contain full-text articles, in over 400 electronic databases and indexes, and over 500,000 electronic books.

Students and faculty can also gain access through the university libraries to the resources of the eighteen academic and research libraries belonging to the Boston Library Consortium and, through interlibrary loan, to library collections throughout the country and abroad.

The Tisch Library

The Tisch Library provides support for the instructional and research needs of the faculty, students, and staff in the Schools of Arts and Sciences and Engineering. The physical facilities of the Tisch Library consist of the Tisch and Lilly Music libraries.

Renovated, expanded and renamed in 1996, the Tisch Library provides a user-friendly learning environment that combines printed library materials with state-of-the-art electronic resources. The library provides seating for up to a quarter of the student body, print and electronic collections, a Media Center with five electronic classrooms, a Digital Design Studio for digital media production, a computer-equipped classroom to teach library research skills, a university-wide Geographic Information Systems (GIS) Center, and a café with a student art gallery and faculty publications display.

The library is a depository for federal government publications, including maps. Special collections include the personal library of Hosea Ballou II, the Ritter Collection of Musicology, and the Bolles Collection of English history and other rare books and manuscripts. The library has begun to digitize its special collections and integrate them into classroom projects. The library is also digitizing materials from its stack collections and making them available through the Internet Archive and the Hathi Trust.

The library has an active laptop lending program, and it also lends digital production equipment such as recorders and cameras. Free scanning centers are available throughout the library. The Digital Design Studio offers large poster printing. The Media Center provides streaming access to its reserved collection through Video Furnace.

Tisch Library has an extensive library instruction program that is integrated into the curriculum. Principles of information literacy are incorporated in learning objectives designed by departments and programs specific to those areas of study. Learning objectives increase in sophistication for undergraduates and graduate students as they work towards completion of their degrees. Instruction is provided in classrooms within and outside of the library and also virtually.

Individualized research assistance is provided through a variety of formats including one-on-one consultation, reference desk, e-mail, instant messaging, and text messaging. Tisch Library provides online research guides in all major subject areas and in over 240 specific courses. The library also offers a credit-bearing senior capstone research skills course every semester.

Lilly Music Library

The Lilly Music Library, located in the Granoff Music Center, houses musical scores, literature, and sound recordings (including a very popular CD collection of over 20,000) on a wide range of music subjects. Course reserves and reference for music are offered there, while electronic resources for music study, including streaming audio databases, are available to the Tufts community on and off campus.

For more information on Tisch library services and collections, visit <http://tischlibrary.tufts.edu>.

Edwin Ginn Library, The Fletcher School

The Edwin Ginn Library of the Fletcher School is one of the largest specialized libraries in the field of international affairs. The collection is especially strong in the fields of international law and organizations, human rights, economic and political development, international energy resources and environmental matters, international security and peacekeeping, conflict negotiation, and international business and finance.

The Ginn Library holds documents from the League of Nations, the United Nations, and numerous international organizations as well as a large collection of international treaty documents. The papers of Edward R. Murrow and of Ambassadors John Moors Cabot and Philip Kingsland Crowe have been deposited in the Ginn Library; they are now housed in Digital Collections and Archives and are available for research there. Ginn Library also houses two Bloomberg Terminals and provides access to Westlaw.

Fletcher's information technology environment falls under the Ginn Library. In addition to the library computers, printers and scanners, staff also oversee the technology in the Mugar Lab and Fletcher classrooms. Ginn's circulation desk loans out laptops, projectors, cameras, chargers and other IT resources.

Ginn staff coordinate workshops for Fletcher students, faculty and staff on the following topics: Stata, RefWorks, Zotero, WordPress, collecting geospatial data in the field, and general research topics.

For more information, visit www.library.tufts.edu/ginn.

Hirsh Health Sciences Library, Boston Campus

The Hirsh Health Sciences Library provides resources to support the education, research and clinical mission of the Tufts schools on the Boston campus. This includes the Schools of Medicine and Dental Medicine, the Sackler School of Graduate Biomedical Sciences, the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, and the Jean Mayer U.S.D.A. Human Nutrition Research Center on Aging at Tufts University, as well as the Tufts Medical Center. Library services are integrated into the curricula of the Boston Campus schools, where librarians teach information management skills and instruct the students in how to access a variety of resources directly and through the learning management system, TUSK (<http://tusk.tufts.edu>). The staff works with students both in the classroom and one-on-one to answer questions and teach research skills. These activities are closely tied to the educational goals of each of the schools. The library staff also works closely with faculty and clinicians to meet all of their information needs for both research and patient care. Also, students and clinical faculty receive their first tier of computing support at the library, where the staff can do basic repairs and offer software support, system scanning and reinstallation. Laptops and iPads are also lent to library patrons to augment their study or work. With the completion of the Sackler Center renovation in 2009, the library developed into a Boston campus student center, with a café, easy access to the library resources, quiet study spaces, and a variety of computing facilities. At 38,000 square feet, the space comfortably seats 800 patrons, with accommodations for both individuals and groups. Classrooms, computer labs, and seminar rooms are equipped with state-of-the-art presentation equipment and relevant software for teaching and studying. Public computer workstations are positioned throughout the library, and building-wide wireless allows access to the Tufts Network and the internet.

The Hirsh Health Sciences Library works with the Tufts Libraries to provide access to over 57,000 electronic journals, over 5,000 of which are focused on biomedical topics, and over 4,000 electronic biomedical textbooks. These electronic collections are continually growing to meet the needs of the students and faculty. For more information please visit www.library.tufts.edu/hsl.

Webster Family Veterinary Library, Grafton Campus

The Webster Family Veterinary Library, located in the Franklin M. Loew Veterinary Medical Education Center, contains the largest collection of clinical veterinary medicine literature and resources in New England. It includes materials on medicine and surgery for large, small, and exotic animals; animal welfare; wildlife diseases and ecology; infectious diseases; conservation medicine; laboratory animal science; and veterinary practice management. The 7,000 volume John A. Seaverns Equine Collection, covering all aspects of horsemanship, is one of the largest of its kind. With representative titles covering five centuries, the collection provides valuable insight into the role of the horse through the ages. It is especially strong in horse racing, hunting, and the equestrian arts. For more information, visit www.library.tufts.edu/vet.

Digital Collections and Archives (DCA)

Encompassing the university archives and managing the Tufts digital library, the DCA supports the teaching and research mission of Tufts University by ensuring the enduring preservation and accessibility of the university's permanently valuable records and collections. The DCA assists departments, faculty, and staff in managing records and other assets. The DCA collaborates with members of the Tufts community and others to develop tools to discover and access collections to support teaching, research, and administrative needs. For more information, visit <http://sites.tufts.edu/dca>.

Technology Services

Tufts Technology Services (TTS) is the central IT department providing students with a rich array of IT products and services. Understanding that technology is essential to the Tufts community, TTS provides students accessible, flexible and well-supported technology services including email, network connectivity, online learning and collaboration, secure transmission of networked data, and student information system (SIS). Below are some IT services available to the Tufts community:

- Accounts and passwords
- Box (Cloud storage for sharing of files)
- Cisco Jabber (communications tool)
- Computer labs
- Computer purchases and maintenance
- Geographical information systems (GIS)

- IT Security tools

- Microsoft Office 365 (on Tufts owned machines as well as personally owned devices)

- Network services

- Printing

- Software licensing

- Student Information System (SIS)

- Trunk collaboration and learning environment

- Tufts High Performance Computing Cluster (HPC)

- Tufts Projects

- Tufts Secure Wireless

- Tufts Virtual Private Network

- WebEx Conferencing Tools

To see and access all IT products and services, visit us at <https://it.tufts.edu>.

TTS offers 24/7 IT Support to the community. To request IT help, please call* 617-627-3376 or email (it@tufts.edu). Walk-in support is available on the Medford Campus at Eaton Hall, Monday–Friday from 9 a.m. – 5 p.m.

*Calling is recommended for faster service.

Writing Fellows Program

The Writing Fellows Program unites faculty and students to enhance the quality of student writing. Professors and courses participating in the program receive the support of Writing Fellows, highly trained undergraduate tutors who assist students with writing in designated courses. Nominated by faculty and selected through a competitive application process, Writing Fellows are assigned to particular classes related to their major fields of interest. They work closely with the same 10–12 students on drafts of papers throughout the semester. Professors participating in the program receive training and feedback on creating effective writing assignments, responding to student writing, and integrating other aspects of sound writing pedagogy into their courses. The program aims to foster the process of writing by making time and energy for review and revision. Its basic philosophy is that writing is a process and must be taught, learned, and practiced as such. Peer-to-peer collaboration within the writing process works across the curriculum to make students at Tufts better, more engaged writers. The Writing Fellows Program is sponsored by the Academic Resource Center (ARC), and the ARC staff is also available to consult with professors, departments, and

teaching assistants about any issue related to writing pedagogy. For more information, visit <http://uss.tufts.edu/arc/writingtutoring/wf.asp> or contact the director of the ARC at 617-627-4345.

Technology and Teaching

Tufts Technology Services (TTS) Educational & Scholarly Technology Services (ESTS) is a university-wide group that offers assistance in developing effective uses of technology for teaching, learning and scholarly collaboration. We welcome 1:1 meetings with faculty to discuss ways that technology might enhance their teaching and student learning, and we offer a number of online tools and platforms developed to support classes across the University.

Classroom Response System (Clickers): ESTS maintains a set of equipment that faculty can borrow as they're experimenting for the first time with classroom response systems. We provide orientation to the i>clicker software and to effective practices in formulating questions and integrating clickers into a course. We provide Tufts schools, departments, and individual faculty with information about ordering i>clicker for use in their programs. Visit the website <https://it.tufts.edu/clickers> for more information.

Spark: ESTS offers a suite of Web 2.0 tools for communication and collaboration across Tufts University called Spark. Tools include wikis, blogs, podcast publishing, forums, media markups for Web-based video annotation, Google Maps collections, and Web meetings (Adobe Connect). For more information, visit <http://spark.uit.tufts.edu>.

Trunk: Trunk is a university-wide online environment designed to facilitate teaching, learning, and assessment at Tufts. Trunk enables the sharing of knowledge and new models of collaboration within and across disciplines. To access course sites, project sites, and "my workspace," visit <http://trunk.tufts.edu>. For assistance, access online resources at <http://sites.tufts.edu/trunksupport>, or send an e-mail to trunk@tufts.edu.

VUE (Visual Understanding Environment): VUE is an open-source project based at Tufts University. The VUE project is focused on creating flexible tools

for managing and integrating digital resources in support of teaching, learning and research. Through VUE, faculty and students use a visual concept-mapping interface to design customized, resource-linked semantic networks that can be viewed, shared and edited online. For more information, visit <http://vue.tufts.edu>.

TUSK (Tufts University Sciences Knowledgebase):

Tufts University Hirsh Health Sciences Library, with the support of the Medical, Dental, and Veterinary schools, has created a dynamic multimedia knowledge management system (TUSK) to support faculty and students in teaching and learning. TUSK provides a portal to an integrated body of knowledge and ways to personally organize the vast array of health information through its online curricular materials and related applications.

One-on-one consultations: ESTS staff are available to consult with faculty on the use of technology in a course. Our educational technologists help instructors identify new ways of approaching teaching challenges and suggest ways of integrating technology to meet their goals. We provide information about contemporary technologies that can be used to enhance education and provide guidance on the effective use of available tools.

To request a consultation, send an email to edtech@tufts.edu. For a complete list of tools and services, visit <http://it.tufts.edu>.

Center for Interdisciplinary Studies

The Center for Interdisciplinary Studies (CIS) provides a dynamic hub for a range of academic programs that share a common interest in the integration of multiple perspectives and methodologies in the creation of knowledge about and understanding of our diverse world. The center is committed to building links between and among academic programs, fostering interdisciplinary and innovative approaches in the classroom, sponsoring speakers and conferences, and promoting collaborative interdisciplinary research at all levels of Arts and Sciences across Tufts. See below for a list of the academic programs affiliated with CIS.

In addition to supporting the collective interests of interdisciplinary programs, CIS administers the Interdisciplinary Studies major and the CIS Senior Thesis option.

Interdisciplinary Studies Major

The Interdisciplinary Studies major offers students the opportunity to create a self-designed, individual concentration that draws on courses from at least two of the following six areas of study: humanities, arts, social sciences, natural sciences, mathematics (quantitative), and engineering.

Students proposing an Interdisciplinary Studies major must have a high degree of initiative and self-discipline. The Interdisciplinary Studies major consists of an integrated program of at least ten credits plus a two-semester thesis or honors thesis (for eligible students) or a substantial project comparable in scope to a thesis, including a written component. A student who wishes to pursue an Interdisciplinary Studies major must submit a detailed application describing the planned program of study. The student selects an advisory committee of three faculty members who support the application, including representatives from three departments in at least two of the six areas listed above. At least two of the committee members must be full-time members of the Arts and Sciences faculty with the rank of lecturer or above; at least one of the committee members must be a tenured or tenure-track member of the Arts and Sciences faculty. In consultation with this advisory committee, the student develops a rationale for the major, selects courses, and outlines the thesis plan. The proposal is reviewed for approval by the CIS Board or its designated subcommittee.

Note: Two credits used to fulfill another major may be used toward the Interdisciplinary Studies major; students may not triple major if one major is in Interdisciplinary Studies.

For specific information and application guidelines, visit the Center for Interdisciplinary Studies website: <http://cis.tufts.edu>.

CIS Senior Thesis

Arts, Sciences, and Engineering students who wish to write a senior thesis outside their major area of concentration may be eligible to write a CIS senior thesis. The student must satisfy the CIS Board or its designated subcommittee that the topic falls outside the purview of any department or interdisciplinary program and that significant course work and/or faculty-directed research relevant to the thesis topic has been accomplished. The student

must assemble a committee of three faculty readers with expertise in the disciplines involved, one of whom will serve as the chair of the committee and be responsible for submitting the final grade. One member of the committee must be from a department or program in which the student is majoring. The proposed thesis topic must be approved by the CIS Board or its designated subcommittee. Application instructions and relevant timeline can be found on the CIS website.

Students who would like to be recommended for degrees with honors by a department or program that requires a thesis should be aware that a CIS thesis will not usually count as a substitute for an honors thesis within the department or program. However, once the thesis proposal is approved by the CIS Board or its designated subcommittee, eligible students can apply to the Thesis Honors Program by filing the appropriate paperwork at Dowling Hall. If the CIS thesis is to qualify as an honors thesis, the chair of the thesis committee must be a member of the department or program in which the student is majoring.

Affiliated Programs

For information about majors and/or minors offered by interdisciplinary programs at Tufts please see the relevant program website. The academic programs affiliated with the collective enterprise of the Center for Interdisciplinary Studies include:

- Community Health
- Environmental Studies
- Film and Media Studies
- International Literary and Visual Studies
- International Relations
- Judaic Studies
- Latin American Studies
- Leadership Studies
- Medieval Studies
- Middle Eastern Studies
- Multimedia Arts
- Peace and Justice Studies
- Urban Studies
- Women's, Gender, and Sexuality Studies

For more information, visit the Center for Interdisciplinary Studies website: <http://cis.tufts.edu>.

Other interdisciplinary programs at Tufts include:

Biochemistry

Biopsychology

Chemical Physics

Cognitive and Brain Sciences

Consortium of Studies in Race, Colonialism, and Diaspora (RCD)

For more information on these programs, students should consult the individual program website and/or program director.

Engineering Project Development Center

The Engineering Project Development Center (EPDC) is a computer cluster and collaboration space in Anderson Hall that supports the undergraduate engineering curriculum. This facility enables students to take their projects from the initial idea stage to the final product and presentation stage. The facility is used for everyday study and homework assignments as well.

In the teamwork area students can work in their project groups, brainstorming and developing their ideas. After finalizing their design plans, they move to the computational side, where a number of industry standard software packages are at their disposal. This is where the real design work takes place, as students apply skills acquired in the classroom to their projects on state-of-the-art PC workstations.

The use of modelling software in engineering is ubiquitous and it is important that engineering students are able to develop intuitive, practical skills through exposure and routine use of the most common applications in their fields.

For more information, please see <http://ase.tufts.edu/epdc> or call 617-627-2402.

Academic Resource Center

The Academic Resource Center, located in Dowling Hall, provides academic assistance to students who wish to study more effectively. Free peer tutoring in many subjects is available during designated drop-in hours and by appointment in Dowling Hall, in the residence halls, and around campus. Students may obtain a tutor by accessing the Online Tutor Finder via SIS.

In addition to tutoring, undergraduate tutors conduct review sessions before examinations in a large number of courses and organize study groups for interested students. They also conduct workshops on study strategies and exam preparation.

Writing assistance is available for undergraduate and graduate students at any stage of the writing process. Writing tutors hold tutoring appointments and drop-in hours for students seeking assistance with writing assignments, personal essays for applications, and larger projects such as senior theses and dissertations. Oral communications tutors help students improve their presentation skills.

Time Management & Study Strategy Consultants are available to provide individualized support for students who wish to improve study strategies, motivation, or time management.

For more information, visit <http://uss.tufts.edu/arc> or call 617-627-4345.

Student Accessibility Services

Tufts University is committed to providing support for all students so that they have the opportunity to achieve their academic potential. The university welcomes students with disabilities and values the diversity each student brings to our community. The Student Accessibility Services (SAS) Office is committed to providing support and equal access for students with disabilities.

The SAS Office provides reasonable accommodations to all qualified students. The SAS Office works with students who have a wide array of disabling conditions, including learning disabilities, attention deficit hyperactivity disorder, sensory and mobility impairments, and chronic illnesses (physical and psychological). Information about resources to assist students and the process for arranging reasonable curricular and co-curricular accommodations can be obtained through the director of Student Accessibility Services in Dowling Hall and at the website listed at the bottom of this entry.

In an effort to facilitate accommodations for students, the SAS Office collaborates with students, faculty, and staff to develop accommodations in the curricular and co-curricular realms. Each student and his/her program of study are given individual attention to consider the student's personal needs within the learning outcomes of a course and

overall plan of study. The SAS Office will arrange academic accommodations such as note takers, extra time on exams, exam proctors, and when applicable reduced course loads. Co-curricular accommodations including single rooms, dining, and special equipment requests are also originated in the SAS Office.

Questions about Tufts' policies and processes to request accommodations may be addressed to the SAS Office. For more information, see <http://uss.tufts.edu/arc/disability> or call 617-627-4539.

Career Center

Tufts Career Center offers resources and programs for undergraduates, graduate students, and alumni in the School of Arts and Sciences and the School of Engineering. We help students with all facets of career development and job search by providing individual career advising, job and internship listings, on-campus interviews with recruiters, résumé critiques, career fairs, alumni presentations, networking opportunities, interview preparation, business etiquette training, grad school advising and more. Staff members are available to help students make career decisions, set realistic goals, and develop skills and strategies to realize these goals. Students may schedule an appointment with a career advisor in advance or take advantage of our drop-in hours in Dowling Hall and Engineering buildings. Students are encouraged to use the Career Center as early as their first year, to continue throughout their tenure at Tufts, and to use our alumni services. The Career Center website (<http://careers.tufts.edu>) provides up-to-date information on programs and panels, career fairs, and professional development events. The site also provides links to a wealth of career planning and job search resources; information on applying to graduate school, internship opportunities, and funding resources such as Career Center internship grants; full-time job listings; cover letter and résumé advice; self-assessments and skills inventories, as well as information about jobs, employers, and industries. Students may connect with alumni through the Tufts Career Networking Group on LinkedIn to gather information about a wide variety of careers. Online workshops and YouTube videos allow students to access the information they need on a 24/7 basis. Students may also learn more about the Career Center through our blog, Twitter,

and Facebook page. The Career Center is located on the seventh floor of Dowling Hall, 419 Boston Avenue. Appointments may be scheduled in advance by calling 617-627-3299.

Tufts Health and Wellness

Tufts University Health Service (TUHS) is located at 124 Professors Row, across from Fletcher field and the tennis courts on the Medford/Somerville campus. During the academic year, the hours are 8:00 a.m. to 6:00 p.m. on Monday/Tuesday/Thursday, 10:00 a.m. to 6:00 p.m. on Wednesday, 8:00 a.m. to 5:00 p.m. on Friday, and 10:30 a.m. to 5:00 p.m. on Saturday and Monday holidays. TUHS is staffed by physicians, nurse practitioners, physician assistants, and nurses, and has an on-site certified laboratory. The Health Service provides primary care and urgent health care to the undergraduate and graduate students on the Medford/Somerville campus. We work closely with local hospitals should hospitalization be required.

Prior to registration, each student is required to submit a pre-entrance health questionnaire and immunization history. Undergraduate athletes are additionally required to submit a physical examination report. Tufts University policy requires that each student have medical coverage under an insurance plan with benefits that meets Massachusetts state requirements. The university offers a comprehensive health insurance plan at a reasonable cost for students and, if necessary, their spouses/partners and children.

All full-time students are charged automatically for the Tufts student health insurance plan. If students are covered under their parents' or other private insurance plan and they do not want the university's student plan, it may be waived by completing a waiver online prior to the cutoff date. For a complete explanation of the health fee, see Expenses. For more information, visit <http://ase.tufts.edu/healthservice>.

Department of Health Promotion & Prevention

The Department of Health Promotion & Prevention utilizes a public health approach with a focus on the impact of the environment on healthy communities. Through a continuum of education and prevention efforts, the Department of Health Promotion & Prevention provides programs and

resources related to alcohol and drugs, nutrition, physical activity, sleep, stress management among others. We support early intervention, access to services and promoting a culture of recovery and healthy life choices for all. The Department of works in collaboration with student health groups including Balance Your Life, Another Option and the Tufts Health Collaborative.

The Alcohol and Drug Program uses an integrated, multi-pronged approach to substance use, misuse, and abuse on campus. Focus is placed on the personal and the individual as well as the environmental factors that influence alcohol and drug use, in an effort to promote wellness in our community and to optimize the academic success of our students.

Program offerings include prevention education, outreach and training programs, addiction counseling, support group services, assessments by a professional clinician, treatment referral and information, support for family members and children of addicts, information on policies and procedures, and opportunities for student leadership and campus dialogue.

The Program is located at the Tufts Health Service, 124 Professors Row. For more information, call 617-627-5495.

Counseling and Mental Health Service

The Tufts University Counseling and Mental Health Service (CMHS) is located at 120 Curtis Street, and is open Monday through Friday from 9:00 a.m. to 5:00 p.m. CMHS is staffed by professionally trained counselors who have special expertise in working with college students. Our goal is to help students address their concerns and build on their strengths, in order to make the most of their college experience. Although we do provide services for students in mental health crises, we make every effort to assist students before their concerns may develop into more serious problems.

At CMHS, we care about protecting students' privacy, and believe that counseling is most effective when students feel comfortable speaking openly with their counselor. We abide by professional codes of ethics regarding confidentiality, as well as by state and federal laws protecting private health information.

Counseling services are provided to eligible students at Tufts free of charge. This includes full-time

undergraduate students and those graduate students who are covered by the comprehensive health fee. If students are seen for psychiatric medication, the initial consultation with the prescribing clinician is free of charge. Subsequent visits can be charged to insurance or paid for out of pocket.

Additionally, CMHS offers after-hours crisis intervention in the case of potentially dangerous or life-threatening mental health emergencies.

CMHS also provides information and applications for graduate and professional school tests, including the Miller Analogies Test. For more information, visit <http://ase.tufts.edu/counseling>.

Services for Undergraduate Commuter Students

For the undergraduate student who commutes from their residence, it is very important to have a home base on campus. The Hillside House is a place to connect with other commuters during your time at Tufts, and should be used as a jumping off point to engage the greater Tufts community. We encourage commuters to get involved in student organizations, co-curricular activities, and campus social life.

Tufts offers a number of resources to students in order to make commuter life a welcoming and inclusive experience. The Hillside House, located on campus at 32 Dearborn Road in Somerville, is the headquarters and a home-like environment for the commuting population. The fifteen-room house has facilities for cooking, recreation, studying, and overnight stays. It serves as a gathering place for commuters throughout the day and night, and is a great location to rest or study in between classes, have a group/team meeting for a class project, simply stop in to see friends, or countless other reasons. The commuter house has individual lockers so that students may keep their belongings safe in between classes. Similar to residence halls, Hillside House is open 24 hours each day and 7 days a week while school is in sessions. Access to the building for all undergraduates who commute from home is granted via your student ID.

Staying overnight on campus at the house may be an important resource for students to attend an evening program or when traveling between home and campus during the winter months may be difficult due to weather conditions. The university employs two co-managers who reside in the house whenever school is in session. They are responsible

for making arrangements for commuting students to stay overnight, and to plan special events for the commuting population. Students may stay overnight as often as they wish, provided space is available.

Founded in 1963, the Off-Hill Council is the campus organization for commuters. The council is responsible for coordinating special events for commuters that may include both commuters and residential students.

For more information, contact Chris Di Fronzo, Director of the Commuting Program, in Dowling Hall at 617-627-3903.

Campus Life

The Office for Campus Life coordinates a wide range of services where the student always comes first. The Office for Campus Life serves as a resource for life outside of the classroom, promoting and encouraging a healthy balance between curricular and co-curricular experiences and opportunities. The staff of the Office for Campus Life is responsible for student leadership development, campus programming, group advising and mentoring, as well as the daily operations of the Mayer Campus Center, Hayes House and Curtis Hall. Finally, the Office for Campus Life takes a leadership role in the planning and implementation of New Student Orientation. Students looking for opportunities to become involved on campus with affiliated student organizations should visit <http://ocl.tufts.edu> or contact the office at ocl@tufts.edu or 617-627-3212.

International Center

The International Center (I-Center) provides immigration advising and visa documentation for approximately 1,254 students, faculty, and research scholars, representing more than 100 countries on all three campuses (Arts & Sciences and Engineering, Veterinary School and the Nutrition School & Human Nutrition & Research Center). Additionally, the office provides counseling and advising services to undergraduate and graduate students as needed. A small emergency loan fund exists to assist students with short-term financial need.

The I-Center processes visa documents for nonimmigrant students, faculty, and research scholars. Tufts is legally required to report to the U.S. Citizenship and Immigration Services

(USCIS) on compliance issues, such as full-time registration and local addresses.

The I-Center coordinates a number of programs throughout the year for both undergraduate and graduate students. Every August, the I-Center sponsors a four-day undergraduate pre-orientation program for international and American first-year students. Undergraduate volunteer host advisors, both international and American, are trained to lead the program. The I-Center, in conjunction with the International Club, co-sponsors the Parade of Nations culture show and the Oliver Chapman Leadership Award. This award is given to a senior who has been active with the international community, either on the Tufts campus or off campus in the local community. The recipient will be a person who has reached out to the international community and who has had an impact on the lives of Tufts students or on a group or community outside of Tufts. The I-Center serves as advisor to the International House (a special interest house) and to the International Club.

The I-Center also provides a one-day orientation for graduate international students which introduces new students to their new academic and intercultural environments. The Intercultural Conversation Program (ICP) is available for graduate students who wish to meet with a partner on a regular basis to practice spoken English and to develop a friendship. Students from Tufts exchange program worldwide, enrolled at Tufts for one or two semesters, also receive immigration support and programming through the I-Center, in cooperation with the Tufts Programs Abroad Office.

The I-Center works closely with the Office of Career Services to provide workshops designed specifically for international students. These workshops cover interviewing skills, international alumni networking and provide ways to approach the U.S. job market. Attorney immigration workshops are offered, which provides information on immigration options for U.S. employment following graduation. The Director of the I-Center hosts alumni reunion events worldwide, re-connecting alumni and fostering friendships formed at Tufts.

The I-Center is located at 20 Sawyer Avenue.

For more information, visit <http://ase.tufts.edu/icenter>, call 617-627-3458, fax 617-627-6076, or email internationalcenter@tufts.edu.

Africana Center

The Africana Center was founded in 1969 to meet the needs and concerns of Tufts students of African descent. The center supports the academic mission of the university by providing students access to a full range of academic, cultural and social resources. In addition, the director of the center works closely with the administrative and academic offices of the university on issues of interest to students, and advocates proactively on their behalf. The center is committed to helping students succeed at the university and preparing them to take leadership roles in their chosen fields.

Programs: The center implements programs such as the Annual Orientation Retreat, a year-long Peer Advisors program for incoming freshmen, Black History Month events and a variety of end of semester activities, all of which are designed to encourage and support the intellectual growth and awareness of Tufts undergraduates. Additionally, there are bi-weekly facilitated group discussions with the Black Women's Collective and Black Men's Group. The center also provides culturally focused lectures, workshops, concerts and films that reflect and celebrate the intellectual tradition of Black people in the Diaspora.

Resources: There is an on-site library with resource materials, a computer lab for student use, and a multi-purpose room that can be reserved for meetings or events. The staff of the center also serves as a liaison to the following student organizations and assists with leadership development and programming initiatives: Pan African Alliance (PAA); the Caribbean Club; African Student Organization (ASO); BlackOut and Envy step teams; Emerging Black Leaders Symposium (EBLS); the Black Student Union; and the residential unit, Capen House. All students are invited to visit the Africana Center (8 Professors Row).

For additional information, e-mail africana@tufts.edu, call 617-627-3372, fax 617-627-3382, or visit <http://ase.tufts.edu/africana>.

Asian American Center

The Asian American Center, founded in 1983, is a resource for the university and for Asian/Asian American communities, fostering a supportive envi-

ronment for the academic and personal development of students through its programs and services. The center recognizes the mono- and multi-racial East Asian, Southeast Asian, and South Asian cultures and identities present in the Tufts community, and advocates for students to ensure a successful college experience.

The center sponsors educational programs (often in collaboration with other centers/offices, academic departments, and student organizations) focusing on issues and topics pertaining to Asians in the United States and the diaspora and provides opportunities for social engagement. The Peer Leader Program, a yearlong leadership training program, is coordinated through the center, and annual programs include the Community Building Outing for first-years, Discover Asian America (a community learning opportunity in Boston's Chinatown), alumni networking events, and Day of Remembrance (a commemoration of Japanese American internment during WWII). Asian American Month, recognized nationally during May, is celebrated in November at Tufts with a variety of educational, social, and cultural programs.

The center has a lounge and offers meeting space and opportunities for informal intercultural learning among students of different Asian ethnicities. The center staff works with student groups through the Pan Asian Council, a collaborative of presidents from the Asian student organizations (Asian American Alliance, Chinese Students Association, Hong Kong Students Association, Japanese Culture Club, Korean Students Association, Singapore Students Association, Taiwanese Association of Students at Tufts, Thai Students Association, Tufts Association of South Asians, and Vietnamese Students Club).

The director provides academic and personal advising on course selection, majors and careers, transition to college, and identity formation and development. In order to ensure that Asian/Asian American student needs are being met on campus, the director also works closely with other offices, programs and departments throughout the academic year. The director also serves as advisor to the Asian American House (Start House), a residential unit.

The center is located in Start House, 17 Latin Way. For more information, visit <http://ase.tufts.edu/asianam>, call 617-627-3056, or e-mail asianamcenter@tufts.edu.

Latino Center

The Latino Center, founded in 1993, provides resources for the Latino student population at Tufts. The center's primary mission is to create a supportive environment for students by offering programs and services that build a strong Latino community on campus.

In collaboration with the Association of Latin American Students (ALAS), the center coordinates Latino Heritage Month in October. Programs throughout the year include the Latino Peer Leader Program and Retreat for first-year students, the Latina Women's Group, Mujeres, and the Latino Men's Group.

The center offers a friendly space for studying, group meetings, or informal conversation. Resources include a computer lab; a library of books, periodicals, and videos reflecting Latino culture and experience; and a bulletin board of job listings. A newsletter, *Noticias*, is published by the center. The director offers academic, career, and personal advising focusing on a wide variety of topics such as course selection, cultural identity issues, discrimination, family concerns, culture shock, and successful adaptation to the university environment. The director is the advisor to ALAS and to La Casa, the residential house on campus.

The Latino Center is located at 226 College Avenue. For more information, visit <http://ase.tufts.edu/latinocenter> or call 617-627-3363.

Lesbian, Gay, Bisexual, and Transgender Center

Tufts LGBT Center is a welcoming and intentional space that is open to the entire campus community. Founded in 1992, the center offers a mix of social and educational events, trainings, and advising for all Tufts students, faculty, and staff on issues related to gender and sexuality, as they are inflected by race, class, ability, and other markers of identity. The center includes a television lounge, computers, library, conference room, and study areas. The LGBT Center is a resource for anyone who is exploring gender or sexuality from personal, political, or academic perspectives.

The center staff coordinates a first-year peer mentoring group called Team Q that does outreach to and programming for new Tufts students. The LGBT Center also hosts a series of peer-led discussion groups including Loving Ourselves as

Queer Students of Color in Action (LOQSOCA), Bi/Pan Group, Queer Women's Group, Ace Space (for asexual students), and T-Time (for trans and gender non-conforming students). The director of the LGBT Center facilitates a confidential Questioning/Coming Out group for students who are struggling with or working through their feelings about their sexuality or gender.

Twice per semester, the center hosts Qrunch: A Queer Brunch Convo series, focusing on different topics related to gender and sexuality. The center also hosts a variety of speakers, events, and field trips throughout the year. These events are open to all members of the Tufts community. The LGBT Center offers trainings on gender identity and expression; pronoun fluency; and an introduction to the language of sexuality and gender. These trainings are available for staff, faculty, and students.

The center director represents LGBTQ concerns throughout the entire university, and also meets individually with students to discuss personal and academic issues. Additionally, the director advises the Rainbow House (small-group student housing) and works closely with numerous organizations and programs, including the Social Justice Leadership Initiative, the Queer Student Alliance (student org), OStem (student org), the LGBT Faculty-Staff Caucus, the Campus Diversity Council, the Group of Six, the Office for STEM Diversity and more, including representatives from the Grafton and Boston campuses.

The LGBT Center is located at 226 College Avenue on the second and third floors. We are typically staffed Monday through Friday from 9 a.m. to 5 p.m.—come by to hang out, speak with a staff member, meet up with friends, check out a book or video from our lending library, use one of our computers, or find a quiet place to study. Free safer-sex information and supplies are also available. The Center's website and Facebook page feature information about programs, events, and resources at Tufts and beyond. Sign up for our weekly newsletter by e-mailing lgbt@tufts.edu.

Please stop by or connect with us through these channels: phone, 617-627-3770; website, <http://ase.tufts.edu/lgbt>; Facebook, <https://www.facebook.com/tuftslgbtcenter>; and Twitter, <https://twitter.com/TuftsLGBTCenter>.

Women's Center

The Tufts Women's Center is a welcoming, gender-inclusive space that is open to the entire campus community. Founded in 1972, the center provides opportunities for dialogue and education about issues specific to women and more broadly related to the experiences of gender that impact all of our lives.

The Women's Center is committed to fostering student leadership and helping students identify and understand societal structures that relate to issues of power, privilege, and oppression. In this pursuit, the center offers programs that focus on the experiences of women and people of all gender identities, with special attention to how other aspects of identity such as race and ethnicity, sexual orientation, gender expression, socioeconomic class, and citizenship status impact our experiences of gender. Some of our programming includes Dinner and a Movie, First Friday Lunch Speaker Series, and our annual Symposium on Gender and Culture.

Students who want to get more involved should consider attending the Women's Center Student Collaborative, SAGE (Students Acting for Gender Equality). SAGE's mission is to foster an intentional and collaborative community in which students educate themselves on gender issues while gaining the skills necessary to productively work towards gender justice at Tufts and beyond. SAGE runs a gender-inclusive first-year and transfer student peer mentoring program called SAGE Advice, where SAGE peers address common challenges and gender- and identity-related issues that often accompany the transition to college. SAGE also offers Peer Education programs on "Mapping Gender" and "Intentional Space" that are self-reflective and interactive peer-led workshops for fellow Tufts students.

The director of the Women's Center, Steph Gauchel (steph.gauchel@tufts.edu), represents the special concerns of women on university committees and advocates for students regarding issues related broadly to gender. The director also provides academic and personal advising on course selection, majors and careers, transition to college, and identity formation and development.

The center, located at 55 Talbot Ave., is typically open Monday–Friday, 9–5 p.m. Late-night study is on M, T, and W from 7 to 11 p.m. during the semester. Please stop by. All members of the Tufts community are welcome!

For more information or to join our e-list, send an email to womenscenter@tufts.edu, call 617-627-3184, visit our website at <http://ase.tufts.edu/womenscenter>, or find us on Facebook!

Religious and Philosophical Life

The University Chaplaincy is a dynamic hub supporting religious, spiritual, ethical, and cultural life for all members of the Tufts community. We provide pastoral care, support religious and philosophical communities, educate about spiritual and ethical issues in society and the world, and promote multifaith engagement.

Reporting to the university president, the university chaplain leads the chaplaincy team, which currently includes four associate chaplains (Catholic, Jewish, Muslim, and Protestant); a Humanist in Residence; chaplain interns; music, program, and administrative staff; and student workers. The University Chaplaincy works with roughly 20 campus religious and philosophical communities that offer over 18 weekly gatherings and many special programs. Beyond its work supporting these communities, the University Chaplaincy offers its own tradition-specific and interfaith programming and services for the whole university. The department also manages the care and use of Goddard Chapel, the Granoff Family Hillel Center, and the Interfaith Center.

Please visit our website (<http://chaplaincy.tufts.edu>), find us on Facebook, or e-mail chaplaincy@tufts.edu for more information about specific programs, services, communities, and ways to get involved. All members of the Tufts community are always welcome.

The University Chaplain is the Reverend Greg McGonigle. His office is in Goddard Chapel, 3 The Green, Medford, MA 02155, and he can be reached at 617-627-3427 or greg.mcgonigle@tufts.edu.

Catholic Chaplaincy (Interfaith Center, 58 Winthrop Street)

The Catholic Chaplaincy celebrates Mass during term on Sundays at 10:00 p.m. in Goddard Chapel. Many other activities are planned by the student leadership team working with the Catholic Chaplain. The Catholic Chaplain is Lynn Cooper, M.Div. Her office is in the Interfaith Center, and she can be reached at 617-627-2044 or at lynn.cooper@tufts.edu.

Humanist Chaplaincy**(Interfaith Center, 58 Winthrop Street)**

The Humanist Chaplaincy offers Small Group Reflections several times each month as well as larger educational programs and opportunities for caregiving conversations with the Humanist in Residence. The Humanist in Residence is Walker Bristol. His office is in the Interfaith Center, and he can be reached at 617-627-0544 or at walker.bristol@tufts.edu.

Jewish Chaplaincy**(Granoff Family Hillel Center, 220 Packard Avenue)**

The Jewish Chaplaincy and Hillel Foundation offer a wide range of religious, cultural, educational, and social activities. Hillel holds weekly Shabbat services and dinners, and Jewish students may celebrate all Jewish holidays at Hillel. The Jewish Chaplain is Rabbi Jeffrey Summit. His office is in the Granoff Family Hillel Center, and he can be reached at 617-627-3242, jeffrey.summit@tufts.edu, or www.tuftshillel.org.

Muslim Chaplaincy**(Interfaith Center, 58 Winthrop Street)**

The Muslim Chaplaincy gathers for weekly prayer during term on Fridays at 1:00 p.m. in the Interfaith Center. Many other activities are planned by the student leadership team working with the Muslim Chaplain. The Muslim Chaplain is Celene Ibrahim-Lizzio, M.Div. Her office is in the Interfaith Center, and she can be reached at 617-627-2065 or at celene.ibrahim_lizzio@tufts.edu

Protestant Chaplaincy**(Interfaith Center, 58 Winthrop Street)**

The Protestant Chaplaincy gathers for worship during term on Sundays at 7:00 p.m. in Goddard Chapel. Many other activities are planned by the student leadership team working with the Protestant Chaplain. The Protestant Chaplain is Chanta Bhan, M.T.S., M.Div. Her office is in the Interfaith Center, and she can be reached at 617-627-2097 or at chanta.bhan@tufts.edu.

Tufts University Art Gallery

Located in the Shirley and Alex Aidekman Arts Center, the Tufts University Art Gallery offers 7,000 square feet of exhibition space in the Tisch Family Gallery, the Koppelman Gallery, the Remis

Sculpture Court, and the Slater Concourse Gallery. The Gallery also manages and develops the University's Permanent Art Collection, comprising some 2,000 objects spanning the 3rd century BCE to the present and a public art program and mobile website, *Museum Without Walls*. The Contemporary Art Circle is a friends group of supporters of the visual arts and includes alums, parents, arts professionals, and art aficionados.

The Tufts University Art Gallery organizes four to six major exhibitions annually of timely, idea-driven, and socially engaged art, in addition to hosting six community-curated exhibitions in the Slater Concourse Gallery and one by students in the Museum Studies program. The exhibitions program reflects the Gallery's mission of exploring new, global perspectives on art and art discourse and the University's distinctive emphasis on active citizenship and globalization.

During the summer, the gallery unveils invited or commissioned public art projects and outdoor sculpture on the Medford campus as part of its Museum Without Walls public art and education outreach program (<http://tuftsart.toursphere.com>). The Remis Sculpture Court is a multi-purpose event and exhibition space. The Slater Concourse Gallery presents projects proposed by Tufts students, clubs, faculty, or staff that resonate with the university curriculum and reflect the rich texture of the Tufts community. The Concourse is open by proposal submission twice annually, and exhibitions rotate monthly during the academic year.

Educational and interpretive programs expand on the exhibitions and include self-guided audio commentary tours via your cell phone; a free, discussion-based tour program of directed looking at art on view called Voice Your Vision; curatorial walkthroughs; artist's talks; lectures; film screenings; and panel discussions. Major exhibitions are accompanied by a book, catalogue, or brochure.

All exhibitions and events at the Tufts University Art Gallery are free and open to the public. The gallery is closed to the public on University holidays, during winter and spring breaks, and during the summer months, when programming takes place out-of-doors on the Medford campus.

For more information, visit <http://artgallery.tufts.edu>.

Balch Arena Theater

Every year the Balch Arena Theater presents three major faculty-directed productions which invite students to work closely with professional directors and designers. Opportunities are provided for involvement in acting, directing, design, stage management, and arts administration.

The Balch also hosts up to ten undergraduate-directed productions annually, ranging from original works to musicals. The Balch Arena Theater is the home of many of the university's drama groups, including Pen, Paint, and Pretzels, the university's oldest umbrella student theater organization.

The summer season offers students a chance to work in Magic Circle Theater for children ages eleven to fifteen, and in Creative Arts for children ages seven to ten.

The theater also hosts dance performances, lectures/demonstrations, and other special events. The theater's box office, costume shop, lighting shop, and scene shop employ students to support the many theater-related activities throughout the year.

Athletic Facilities

The athletic program at Tufts provides students with numerous opportunities to compete in intercollegiate, intramural, and club sports, and to engage in general recreation. The intercollegiate athletics program at Tufts features thirty-one varsity sports, most of which compete as members of the NCAA Division III, ECAC, and NESCAC. Twenty-three club sports offer competitive sport that is student run and open to all who are interested. The athletic program also offers a wide selection of intramural sports that are designed to be more recreational in nature, as well as a wide variety of health and fitness related activities.

The Gantcher Family Sports and Convocation Center offers a 200-meter track and four indoor tennis courts; the Steve Tisch Sports and Fitness Center offers the Ames Human Performance Center, which features the Lunder Fitness Center. Cousens, Chase, and Jackson Gymnasiums, Carzo Cage, Hamilton Pool, and several fields are also available for recreation except when varsity teams are practicing or hosting events. Permission and reservations may be required for some facilities. Schedules of the various recreational facilities are published in a brochure available from the athletic

program office in the Steve Tisch Sports and Fitness Center, 3rd floor. For more information, visit <http://ase.tufts.edu/athletics> or call 617-627-5005.

Osher Lifelong Learning Institute

The Osher Lifelong Learning Institute at Tufts University is a vibrant, membership-based organization of older adults who seek intellectual stimulation in a convivial atmosphere. No tests, no pressure, and no grades—just the joy of learning.

While the program is open to adults of all ages, it is designed primarily for those who have already retired or are nearing retirement. Members share the common bonds of intellectual curiosity and the experience of their generation. They are self-motivated learners, eager to share opinions, knowledge, and expertise with humor and mutual respect.

Originally called the Tufts Institute for Learning in Retirement, the program was established in the fall of 2000 under the sponsorship of the Tufts Alumni Council and the College of Arts and Sciences. In 2005 it was renamed the Osher Lifelong Learning Institute at Tufts University in acknowledgement of generous support from the Bernard Osher Foundation. In the time since, the program has attracted hundreds of “third agers” from Greater Medford and beyond, providing them with an opportunity to socialize, engage their minds, and satisfy their intellectual curiosity.

Membership benefits include admission to our Lunch & Learn speaker series; use of Tisch Library and its many resources; participation in our EDventures activities (a book club, history club, movie club, Dine Out group, and more); a subscription to our weekly eNews; an opportunity to submit original work for our literary magazine; and invitations to special events not open to the general public. In addition, only members are entitled to register for our many classes and workshops, which are typically offered on the Medford campus on Mondays and Fridays and at our satellite campus (Brookhaven at Lexington, a not-for-profit retirement community) on Wednesdays.

For more information, visit our website (www.ase.tufts.edu/lli), give us a call (617-627-5699), or email our office (osherlli@tufts.edu).

Departments, Programs, and Research Centers

In the following section you will find descriptions of departments and programs, with their degree requirements and lists of their faculty. Descriptions of courses can be found online at <http://go.tufts.edu/sis>.

Detailed course descriptions can also be found in handbooks issued by individual departments and programs. These handbooks often describe courses not listed in the online bulletin.

Courses numbered 1 through 99 are for undergraduate credit only; those numbered 100 through 199 are for both undergraduate and graduate credit; those numbered 200 through 299 are intended primarily for graduate credit, although undergraduates may take these courses for credit with the permission of the instructor and/or department.

Africana Studies

DIRECTOR:

Professor H. Adlai Murdoch, *Romance Languages*

AFRICANA STUDIES MAJOR

Africana Studies is an interdisciplinary field that focuses on the people of the African continent and people of African descent in the global African Diaspora. The Africana Studies major exposes students to the historical, political, social, economic, and cultural systems and institutions that frame the lived conditions and experiences of Africana peoples in the countries of the African continent and in its diasporic populations. In addition, Africana Studies critically interrogates the various socio-historical contexts in which racialized western epistemologies developed, while examining such neglected areas of study as the important contributions to human labor, political and cultural expression, social development, and science and industry made by people of African descent in the modern era. Africana Studies offers an interdisciplinary approach to the philosophical foundations of knowledge production and highlights the complex interaction between resistance, identity and culture in providing an enabling context for a range of

identitarian expressions by Africans and peoples of African descent. It also provides a critical approach to selected historical, social and cultural processes that are essential to an enhanced understanding of contemporary globalization.

Africana Studies as it is structured today grew out of the curricular transformation generated by the international process of decolonization and by the changes wrought by the civil rights and Black Power eras that called for social, political, and economic justice in the United States and abroad and demanded a more diverse and inclusive educational agenda. As also is true for the related fields of Asian American Studies and Latino Studies, the field has grown and expanded since its origins more than four decades ago. Africana Studies in the contemporary era incorporates varied disciplinary and interdisciplinary approaches, but retains its distinctive focus on social justice. The field also highlights key moments of black resistance and revolution as well as 19th and early- and mid-20th century intellectual movements focusing on various political, linguistic, and cultural factors undergirding the experiences of peoples of Africa and its global diaspora.

The goal of an in-depth study of Africa and the African Diaspora is the development of critical thinking, research, and writing skills that emerge from an increased awareness of the political, social, cultural, and historical roles played by peoples of African descent as well as the socio-political and economic challenges that continue to be faced by that global community. The primary goal of the program is to give students a broader and more contextualized understanding of the scope and substance of the black experience in a variety of related areas. Graduates of Africana Studies Programs go on to careers in academia, government, education and public service. The intellectual skills acquired in this discipline are also an excellent preparation for careers in public health, public policy and urban planning, journalism, law and criminal justice, business, and the international sector.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The major in Africana Studies consists of ten interdisciplinary and disciplinary courses drawn from African studies, African Diaspora studies, African American studies, and courses focused on

comparative studies or topics relevant to Africana studies. Of these ten courses, four are core courses and six are electives.

Four core courses

1. A gateway course in history focusing on Africa, African Diaspora, or African America (U.S.) or courses that highlight the connections and divergences between Africa and the African Diaspora
2. A course that focuses on analysis of race and racism in Africa or the Diaspora
3. A course that focuses on the history and culture of the peoples of Africa and the African Diaspora, including confrontations of peoples of Africa or the African Diaspora with colonial or other oppressive powers, or discourses on what it means to be an African or to reside in the global African Diaspora
4. A course that focuses on contemporary African and African Diaspora societies and cultures, including social and cultural processes of contemporary globalization involving Africa and its Diaspora

Six elective courses

Six elective courses with at least three courses drawn from the following focus options: African Studies, African Diaspora Studies, and African American Studies.

5. A student interested in concentrating in African Studies, African Diaspora Studies, or African American Studies must take at least one core or elective course whose primary focus is outside their chosen concentration. Options 5A-5C are separate options for elective courses.
 - 5A. African Studies (courses with focus within African continent)
 - 5B. African Diaspora Studies (courses on regional, transregional, transnational, African Diaspora themes)
 - 5C. African American Studies (courses on the national black experience in the United States)
6. Up to two elective courses that focus on comparative aspects of race, ethnicity, immigration, or issues that highlight other forms of difference or focus on a topic relevant to Africana Studies. Elective courses must have topics that focus, for example, on immigrant communities, health

disparities, or the law and judicial systems—to name three—that relate to the historical and/or contemporary experiences of Africana people. Students wishing to offer such courses towards the Africana major that are not listed in the Africana Studies roster of published courses must consult with instructors for permission. Permission for independent study on an appropriate Africana topic must be approved by an Africana Studies committee.

7. Up to one course (may be two half-credit courses) that focuses on participatory cultural aspects of Africa or the Diaspora.
8. Up to one course of faculty-supervised internship in an Africana organization or an organization that significantly services Africana people or an Africana community, or on community-based research in which the student's project focuses on an Africana community. The student must write a paper analyzing their experiences in this internship or produce a research paper or project.

Africana Studies majors are encouraged to fulfill their foreign language requirement in a language of Africa or the African Diaspora, e.g., Twi, Swahili, or Arabic, or one that will assist work in areas of Africa or the Diaspora, e.g., French, Portuguese.

Majors in Africana Studies may take up to five courses that are also counted towards another major. Up to four courses may be transferred from other institutions (e.g. non-Tufts programs abroad). At least three courses of the major must be at the 100 level. Up to two courses of independent study (including senior honors thesis) may be counted towards the major. Courses with grades lower than C- will not be accepted towards the major. The foregoing is a minimal program. For many purposes further preparation involving additional language and additional 100-level courses is needed.

AFRICANA STUDIES MINOR

The Africana Studies Minor requires six disciplinary and interdisciplinary courses drawn from African studies, African Diaspora studies, African American studies, and comparative studies or topics relevant to Africana studies. Of these six courses, four are core courses and two are electives.

1. Four core courses as outlined for the major.
2. Two elective courses drawn from any two of the elective options for the major.

Students are encouraged to declare their interest in an Africana Studies minor not later than the beginning of their senior year. One elective may be an independent study course (including senior honors thesis); three courses may be counted towards a major; normally up to two courses may be transferred from other institutions. At least one course of the minor must be at the 100 level. Courses with grades lower than C- will not be accepted towards the minor.

For more detailed information, please visit the website <http://ase.tufts.edu/africanastudies/>.

American Studies

INTERIM DIRECTOR:

Professor Lisa Lowe, *English*

FACULTY:

Professor Pawan Dhingra, *Sociology*

Professor Frances Sze-Ling Chew, *Biology*

Associate Professor Jennifer Allen *Public Health and Community Medicine*

Associate Professor Heather Curtis, *Religion*

Associate Professor Natalie Masuoka, *Political Science*

Associate Professor Christina Sharpe, *English*

Associate Professor Sarah Sobieraj, *Sociology*

Associate Professor Ichiro Takayoshi, *English*

Associate Professor Greg Thomas, *English*

Associate Professor Sabina Vaught, *Education*

Associate Professor Monica White Ndounou,
Drama and Dance

Associate Professor Adriana Zavala, *Art and Art History*

Assistant Professor Alexander Blanchette, *Anthropology*

Assistant Professor Helen B Marrow, *Sociology*

Assistant Professor Noe Montez, *Drama and Dance*

Assistant Professor Stephan Pennington, *Music*

Assistant Professor Cora Roelofs, *Community Health*

Senior Lecturer Jean Wu, *American Studies*

Lecturer Thomas Chen, *American Studies*

Lecturer Steven D. Cohen, *Education*

Lecturer Ronna Johnson, *English/American Studies*

Professor of the Practice Jennifer Burton,
Drama and Dance

Drama and Dance

American Studies is an interdisciplinary field that studies the paradigmatic narratives that shape our received understandings of the American past and present. American Studies considers contexts such as settler colonialism, slavery, labor, capitalism, immigration and war, all of which have influenced the ideas, history, culture and society of the United States. Students examine how political, economic and social differences inform and are reproduced by institutions and in public areas such as the law, education, work, health and the environment. Students attend to the intersecting dynamics of race, class, religion, region, gender and sexuality, and consider how these dynamics are mediated by literature, music, the visual arts and popular culture. The American Studies program is part of the Consortium of Studies in Race, Colonialism, and Diaspora.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

To graduate with a Bachelor of Arts degree in American Studies, a student must complete ten courses, including one Foundation course, AMER 10-20; one Integrative Seminar, AMER 181-190; one History course with at least two-thirds of course content focused on some aspect of the U.S.; and five credits that form a thematic interdisciplinary cluster, including at least two courses at the 100+ level. The last two courses are American Studies 198, Senior Special Project, taken in either the fall or spring semester of the senior year, plus one elective course (content to coordinate with coursework of interdisciplinary cluster); OR American Studies 199, Senior Honors Thesis, taken in both semesters of the senior year. The Senior Special Project or Honors Thesis must integrate or expand some aspect of the interdisciplinary cluster's theme. Note: AP courses may not count toward the American Studies major. A grade of C- or better is required for a course to count toward the major.

Interdisciplinary clusters: The major themes of the American Studies Program can be explored in depth through interdisciplinary clusters. Students select five courses from departments throughout the university which will relate to a cluster's theme. (Students may also design their own cluster by writing a proposal describing the theme, intellectual rationale and course content for the proposed

cluster.) The capstone Senior Special Project or Honors Thesis must expand on some aspect of the cluster.

The director and other faculty advisors work closely with students in tailoring individual programs reflecting particular interests and providing a framework for the continued integration of knowledge at more advanced levels. The American Studies program office is located at 110 Eaton Hall. For more information, call 617-627-2311, visit <http://as.tufts.edu/americanStudies>, or e-mail the program administrator, cynthia.sanders@tufts.edu.

Anthropology

Associate Professor Rosalind H. Shaw, *Chair; Memory, violence, temporality, post-conflict, transitional justice, children & youth; West Africa*

Professor David M. Guss, *Urban and aesthetic anthropology, placemaking, cultural performance, myth and ritual, popular culture; Latin America*

Professor Deborah Pacini Hernandez, *Comparative Latino Studies, racial and ethnic identity, popular music, globalization; Latino community studies*

Associate Professor Stephen M. Bailey, *Biological and nutritional anthropology; growth and body composition, methodology; the Americas, China*

Associate Professor Amahl Bishara, *Media, human rights, the state, journalism, democracy, the politics of place, knowledge production; the Middle East*

Associate Professor Sarah Pinto, *Medical anthropology, gender, mental health, reproduction, cultures of biomedicine, kinship, body, global feminism; India*

Assistant Professor Alex Blanchette, *Ecology, labor, green capitalism, biotechnology, animals, modernity, alienation, food politics, industrial agriculture; USA*

Assistant Professor Tatiana Chudakova, *Medical anthropology, science & technology, environment, ethnicity, indigeneity, nationalism, post-socialism; Russia; North Asia*

Assistant Professor Nick Seaver, *Computing, algorithms, sound, music, knowledge, attention, taste, classification, media technologies, science & technology studies*

Senior Lecturer Cathy Stanton, *Tourism, museums, myth & ritual, cultural performance, culture-led redevelopment, mobilities, farm history/heritage*

Anthropologists study global human experience, combining social, cultural, biological, archaeological, and linguistic approaches within a single discipline. Our questions and topics are diverse, including (for example) the relationship between power and culture, how human bodies relate to their environments, and the study of social distinctions through archaeological methods. While in the past anthropology was typically the study of non-Western societies, today anthropologists also work “at home”—wherever in the world that “home” is. Ethnography, cultural anthropology’s signature set of research methods, helps researchers view social interactions and cultural practices with new eyes, and is in demand in the workplace. This combination of disciplinary breadth, global and local understanding, and hands-on research makes Anthropology a strong major and an excellent preparation for a wide range of careers.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Anthropology

Ten courses, including: one gateway (introductory level) sociocultural anthropology course (Anthropology 10-39); one gateway biological anthropology or archaeology course (Anthropology 40-59); Anthropology 130; and seven additional anthropology courses, at least one of which must be an area focused course numbered below 160, and two of which must be upper-level seminars (Anthropology 160-189).

Please note: We recommend taking the theory course (Anthropology 130) in the junior year. The department encourages majors to explore the possibility of undertaking an internship (Anthropology 99) or independent study (Anthropology 191-199). A minimum of 50% of courses counted toward the Anthropology major must be completed at the Tufts University home campus or in Tufts University-sponsored programs abroad. A maximum of two courses cross-listed in other Tufts departments may be counted toward the Anthropology major. Students must achieve a grade of C- or better for a course to count for credit toward the major.

For more detailed information, please visit the website <http://ase.tufts.edu/anthropology>.

Applied Mathematics

(FOR DEGREE REQUIREMENTS, SEE MATHEMATICS.)

Applied Physics

(FOR DEGREE REQUIREMENTS, SEE PHYSICS AND ASTRONOMY.)

Arabic

(SEE GERMAN, RUSSIAN, AND ASIAN LANGUAGES AND LITERATURES.)

Archaeology

DIRECTOR:

Professor R. Bruce Hitchner, *Classics*

PROGRAM COMMITTEE:

Professor David M. Guss, *Anthropology*

Professor Jack Ridge, *Earth and Ocean Sciences*

Associate Professor Stephen M. Bailey, *Anthropology*

Associate Professor David M. Gute, *Civil and Environmental Engineering*

Associate Professor Steven W. Hirsch, *Classics*

Lecturer David J. Proctor, *History*

Lecturer Matthew Harrington, *Classics*

Lecturer Lauren A. Sullivan, *Anthropology*

Our understanding of the majority of the human past, for which the written record is nonexistent or minimal, is based on a material record. Archaeology examines this record of human activity to recover and interpret information about past societies and cultures. There are many subdisciplines within archaeology, reflecting both the specific periods and regions into which we divide the human past, and the different approaches to the recovery and analysis of the evidence about that past.

Tufts offers a general interdisciplinary undergraduate major in archaeology, incorporating courses from the arts, humanities, natural sciences, and social sciences. Ideally, a student in archaeology will combine course work with firsthand experience in recovery, conservation, and interpretation of material remains.

The archaeology program is affiliated with the Center for Materials Research in Archaeology and Ethnology (CMRAE) based at M.I.T., an alliance of Boston-area programs that offers specialized course work in the scientific dimensions of archaeological study. Students are encouraged to take appropriate course work at the universities affiliated in the Boston Consortium (Boston College, Boston University, Brandeis University).

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The undergraduate major consists of eleven courses, including a core of four required courses plus a selection of seven elective courses distributed among three broad subject areas. Students are advised to complement their archaeology major with a second major or a minor in a related field. Archaeology majors are strongly encouraged to pursue some independent research project or field research component in archaeology either as part of a senior thesis or a summer scholar's project. This can include, among other things, participation in excavations, museum work, archaeological preservation, etc.

Eleven to thirteen courses distributed as follows:

I. Four courses in core curriculum:

1. **Anthropology 39** (may substitute **ANTH 20** or **27**)
2. **Archaeology 30** (cross-listed as **ANTH 50**; formerly **ANTH 30**)
3. **Archaeology 27** (cross-listed as **CLS 27** and **FAH 19**)
4. **Earth and Ocean Sciences 2**

II. Seven courses from History, Natural/Social Sciences and Archaeology. (Only courses which have direct content, theoretical, or technical relevance to archaeology are included here.

However, other courses in History, the Natural Sciences, and Archaeology may be considered for inclusion if approved by a faculty advisor in the archaeology program. Transfer courses from other institutions limited to two unless approved by advisor.)

- a. Two History courses taken from CLS 26, 37, 38, 47, 85, 86, 142, 143, 144, 146, 147, 185, 186; HIST 6, 13, 17, 23, 40, 50, 51, 72, 76, 105, 148, 149, 151

- b. Two Natural/Social Science courses taken from ANTH 40, 49 (formerly 20), 126, 132, 150, 182; Biology 7 or 10 (student may not count both BIO 7 and BIO 10), 143, 144; CHEM 2, 8; EOS 32
- c. Three Archaeology courses taken from ARCH 26, 49, 51, 52, 91, 92, 128, 160, 163, 164, 167, 168, 187, 188, 190, 191, 192; Classics 26, 87, 88, 160, 163, 164, 167, 168, 187, 188; FAH 103, 104, 105, 106

III. Interdisciplinary Capstone (optional)—
Archaeology 193 and 194 or other approved courses

GRADUATE PROGRAM

Master of Arts in Classical Archaeology

(SEE CLASSICS FOR PROGRAM DESCRIPTION.)

For more detailed information, please visit the website <http://ase.tufts.edu/archaeology>.

Architectural Studies

DIRECTOR (2015–2016):

Associate Professor Daniel Abramson, *Art and Art History*

ADVISORY COMMITTEE:

Robyn Gittleman, *Director, Experimental College*

Professor Masoud Sanayei, *Civil and Environmental Engineering*

Tufts offers several curricular paths for students interested in the study of architecture and the built environment. The various curricular paths in architectural studies provide opportunities to study architecture as a liberal arts or engineering major or minor and, if desired, help prepare for future graduate study and careers in architecture and other allied disciplines, such as landscape architecture, urban planning, and historic preservation. All the curricular paths emphasize architecture's interdisciplinary character and take full advantage of course offerings in both the College of Liberal Arts and the School of Engineering.

In addition to the courses of study outlined below, students interested in pursuing graduate studies in architecture should take one or two semesters of calculus (Mathematics 32-34) and physics (Physics 11-12), and are encouraged to take Drama 10 for public speaking.

For more information, contact Professor Daniel Abramson (Art and Art History) or Professor Masoud Sanayei (Civil and Environmental Engineering).

COLLEGE OF LIBERAL ARTS

Major in Architectural Studies

The Department of Art and Art History offers an interdisciplinary major in Architectural Studies for students in the College of Liberal Arts that teaches students understanding of the built environment from multiple perspectives through the development of basic skills in analyzing, interpreting, engineering, designing, and engaging imaginatively and actively with the current and historical built environment.

The built environment is defined broadly, from stage scenery and interior design to civil engineering and urban planning, in order to reflect historical and contemporary experience and to encompass the richness of Tufts' curricular assets, which besides the offerings of the Art and Art History Department, include the university's School of Engineering, its graduate department in Urban and Environmental Policy and Planning, and its affiliation with the School of the Museum of Fine Arts. The Architectural Studies major totals twelve courses: seven core classes and five multidisciplinary electives. The major's core curriculum provides a foundation in art and architectural history and theory, in engineering and design, and in the humanistic and social science aspects of architecture. Architectural Studies majors then design their own elective program of upper-level study from designated courses in architectural history, studio art, civil engineering, the humanities, and the social sciences. (Students may take no more than three half-credit courses towards the major's requirements.) As a capstone, senior majors in their final semester complete a senior integrative project, either as an independent research project or an internship in a professional office. Several opportunities exist for study abroad. Completion of an intensive summer architectural design course from an accredited architecture school (e.g., Career Discovery at Harvard's Design School) exempts majors and minors from the FAM 22 requirement. For more information see <http://ase.tufts.edu/art/architecture/>.

Required Core Curriculum

1. **Art History 8** Introduction to Architecture, 1400 to the Present
2. **Art History 1** Introduction to World Art I
3. **FAM 22** Design: Architectural
4. Engineering core course: **Engineering 5, 23, 39, or 80**; or **Engineering Psychology 61**; or **Engineering Science 5, 18, 25, or 27**
5. Humanities/Social Sciences core course (Asterisked [*] course from Area C below)
6. Upper-level architectural history class (**FAH 115, 120, 123, 125, 126, 127, 190, 191, 192, 195, 196, or 198** [architecture]; or **193**; or **CE 120**)
7. **Art History 98** Architectural Studies Senior Project Seminar

Multidisciplinary Electives

Five courses chosen from at least three of the following four disciplinary areas.

- A. Architectural and Art History
- B. Studio Art
- C. Humanities and Social Sciences
- D. Civil Engineering

A. ARCHITECTURAL AND ART HISTORY

- Art History 2** Introduction to World Art II
Art History 15/115 Japanese Architecture
Art History 19 Classical Archaeology
Art History 21/121 Early Islamic Art
Art History 23 Art and Politics of the Middle Ages
Art History 25/125 Medieval Architecture
Art History 28/128 Medieval Art in the Mediterranean
Art History 34/134 Renaissance Venice
Art History 90/190 British Architecture
Art History 92/192 Special Topics [architecture]
Art History 95/195 Boston: Architecture and Urbanism
Art History 103 Aegean Archaeology
Art History 104 Greek Art and Archaeology
Art History 105 Tyrrhenian Archaeology
Art History 106 Roman Art and Archaeology
Art History 120 Armenian Art, Architecture, and Politics
Art History 123 Byzantine Art and Architecture
Art History 126 Monasteries and the Arts
Art History 127 Cathedrals and the Arts
Art History 192 Special Topics (Architecture)
Art History 192A Armenian Architecture and Sculpture
Art History 196 Museum Architecture

- Art History 198** Histories of Modern Architecture
Art History 199 Senior Honors Thesis
Civil Engineering 120 The Art of Building
Drama 119 History of Style and Décor

B. STUDIO ART

- FAM 20** Design: Foundation
FAM 21 Design: Intermediate to Advanced
FAM 22 Design: Architectural
FAM 23 Design: Advanced Architectural
FAM 26 Drawing: Foundation
FAM 39 Graphic Design
FAM 54 Painting: Foundation
FAM 63 Perspective Drawing
FAM 77 Sculpture: Foundation
FAM 93 Watercolor
Drama 19 Principles of Theatrical Design
Drama 20 Stage Engineering
Drama 21 Computer-Assisted Design
Drama 29 Scene Painting
Drama 93-02 Architectural Styles and Designs
Drama 94-02 Advanced 3-D Design
Drama 125 Scene Design

C. HUMANITIES AND SOCIAL SCIENCES

(Courses with asterisk count toward core requirement.)

- *Anthropology 20** Global Cities
Anthropology 42 Extreme Environments
Anthropology 128 Mesoamerican Archaeology
Anthropology 183 Urban Borderlands
***Anthropology 186** Theatres of Community
Economics 30 Environmental Economics and Policy
Economics 127 Urban Economics
***English 116** The Country and the City
***History 123** Industrial America and Urban Society
***History 143** South Asian Urban History
***History 161** Vienna
History 193 Cities and Modernity of South Asia
History 290 Material Culture
Philosophy 52 Aesthetics
Philosophy 186 Phenomenology and Existentialism
Political Science 15 Politics and the City
***Political Science 195** Politics of Sustainable Communities
Psychology 27 Perception
Psychology 53 Engineering Psychology
Psychology 130 Advanced Engineering Psychology
***Sociology 113** Urban Sociology
***Sociology 149/UEP 181** Homelessness in America
***Sociology 180** Cities of the Global South

- *UEP 101 Land Use Planning
- *UEP 105 Urban Planning and Design
- *UEP 113 Housing Policy
- *UEP 171 Planning Challenges
- UEP 173 Transportation Planning
- *UEP 178 Urban Policy and Planning
- *UEP 181 Homelessness in America
- *UEP 200 Land Use Planning
- *UEP 264 Green Urban Design
- UEP 271 Community Economic Development
- *UEP 272 Real Estate Development and Finance
- UEP 284 Developing Sustainable Communities
- *UEP 294-08 Regional Planning

D. ENGINEERING

(Courses with asterisk count toward core requirement.)

- Civil and Environmental Engineering 1** Introduction to Civil and Environmental Engineering
- Civil and Environmental Engineering 22** Structural Analysis
- Civil and Environmental Engineering 24** Steel Design
- Civil and Environmental Engineering 25** Reinforced Concrete Design
- Civil and Environmental Engineering 53** Engineering Economy
- Civil and Environmental Engineering 185** Legal Issues of Engineering
- Civil and Environmental Engineering 188** Engineering Design with CAD
- ***Engineering 5** Skyscrapers: Architecture and Engineering
- ***Engineering 23** Building Big: Infrastructure Engineering
- ***Engineering 39** Bridge Design
- ***Engineering 80** Structural Art
- ***Engineering Psychology 61** Human Factors and Ergonomics
- Engineering Psychology 161** Human Factor Product Design
- Engineering Science 2** Introduction to Computing in Engineering
- ***Engineering Science 5** Introduction to Mechanics (Statistics and Dynamics)
- Engineering Science 9** Applied Mechanics (Strength of Materials)
- ***Engineering Science 18** Computer Aided Design w/Lab
- ***Engineering Science 25** Environment and Technology

- ***Engineering Science 27** Public Health Engineering
- Engineering Science 52** Engineering Management
- Engineering Science 88** CAD for Engineers
- ***Engineering Science 93-01** Bridge Engineering
- Environmental Studies 193** Introduction to Geographic Information Systems
- GIS 101** Introduction to Geographic Information Systems
- GIS 102** Advanced Geographic Information Systems

SCHOOL OF ENGINEERING

BSE Degree Program in Architectural Studies

A bachelor of science in engineering with a program in architectural studies is available for students interested in a professional career in architecture or in historical, aesthetic, and engineering aspects of buildings and other structures. This program, offered jointly by the department of civil and environmental engineering and the department of art and art history, provides a solid foundation in both the technical aspects of structural systems and the aesthetic and functional characteristics of buildings from an architectural and art history point of view. The flexibility of the BSE degree allows greater concentrations in both art history and studio courses than would otherwise be possible, providing a coherent basis for graduate work in architecture or design. The faculty advisor for this program is Professor Masoud Sanayei.

DEGREE REQUIREMENTS

A minimum of 38 courses is required, to be distributed in the following categories:

1. Eleven introductory courses as required for the professional degrees in engineering (see school of engineering information);
2. Engineering science: **Engineering Science 5, 9, 88**, and an engineering science elective;
3. Civil engineering: **Civil and Environmental Engineering 2, 22, 42**; plus three from **Civil and Environmental Engineering 24, 25, 81, 123, 124, 125, 146, 149, and 188**;
4. Architectural Studies: **Art History 1, 8, 98, 198**; two studio courses, including architectural design (**FAM 22**) and either **FAM 20, 26, or 63**; one elective (selected from disciplinary areas A, B, C above);
5. Humanities and social science: five courses;
6. Free electives: five courses

UNDERGRADUATE MINOR PROGRAMS

Architectural Studies

The Department of Art and Art History offers a minor in architectural studies for both liberal arts and engineering students consisting of five courses:

1. **Art History 1** Introduction to World Art I
2. **Art History 8** Introduction to Architecture, 1400 to the Present
3. Studio Art (**FAM 22**; or **20, 23, 26**; or **DR 21**)
4. **Engineering 5, 23, 39**, or **80**; or **Engineering Psychology 61**; or **Engineering Science 5, 18, 25**, or **27**
5. Upper-level architectural history class (**FAH 115, 120, 123, 125, 126, 127, 190, 191, 195, 196, 198**, or **192** [architecture]; or **CE 120**)

Note: Engineering students minoring in architectural studies replace the engineering requirement with an approved course from the major's disciplinary areas A, B, or C (see above).

Architectural Engineering

The Department of Civil and Environmental Engineering offers a minor in architectural engineering for students in the College of Liberal Arts. The faculty advisor for this minor is Professor Masoud Sanayei.

Art and Art History

Professor Peter Probst, *Chair; African art, memory and monuments, historic preservation, cultural property, theories of value, historiography*

Professor Andrew McClellan, *Director of Museum Studies; Baroque-rococo art, museum history and theory (n leave fall 2015)*

Professor Malcolm Turvey, *Sol Gittleman Professorship in Film and Media Studies, film history and theory*

Associate Professor Daniel Abramson, *Director of Architectural Studies; Architecture from Renaissance to contemporary, Europe and America*

Associate Professor Cristelle Baskins, *Italian Renaissance art, secular painting and narrative, and gender and women's studies*

Associate Professor Ikumi Kaminishi, *Director of Undergraduate Studies; Asian art and architecture, Buddhist painting, narrative studies*

Associate Professor Christina Maranci, *Arthur H. Dadian and Ara Oztemel Associate Professor of Armenian Art and Architecture; Byzantine art and architecture*

Associate Professor Karen Overbey, *Director of Graduate Studies; Medieval art and architecture, relics and reliquaries, early Irish art*

Associate Professor Eric Rosenberg, *American art, modern and contemporary art*

Associate Professor Adriana Zavala, *Transfer of Credit Representative, Art History; Modern and contemporary Latin American art, art of Mexico, gender and women's studies*

Assistant Professor Eva Hoffman, *Islamic art and architecture, portable arts*

Assistant Professor Jeremy Melius, *Modern art and art writing, critical theory and aesthetics, historiography, histories of sexuality (on leave 2015–16)*

Assistant Professor Jacob Stewart-Halevy, *Contemporary art, historiography and theory of conceptual and contemporary art*

SECONDARY APPOINTMENTS:

Susan Lush, *Associate Dean of Academic Affairs, School of the Museum of Fine Arts*

Patrick Carter, *Tufts Studio Arts Coordinator and Transfer of Credit Representative for Studio Art Courses, School of the Museum of Fine Arts*

Amy Ingrid Schlegel, *Director, Tufts University Art Gallery; Curatorial studies*

Our program aims to provide students with a critical and globally informed understanding of the history of art and visual culture. Understanding the sources, aesthetics, and significance of images that people use to communicate—whether in the confined world of art or beyond—is crucial for anyone wanting to play an active part in society. Students taking art history classes can expect to learn how to look at and write about works of art. Yet they will also learn about the historical and trans-cultural contexts in which visual works emerge and operate. Thus, students taking classes in art history will find themselves immersed in questions of politics, identity, religion, economics, mobility, communication, and many other exciting issues.

As a humanistic discipline, the history of art emphasizes scholarly investigation and critical analysis over technical training. However, majors are encouraged to take studio courses as part of their program and to take advantage of Tufts' affiliation with the School of the Museum of Fine Arts.

UNDERGRADUATE PROGRAM

The department offers the bachelors of art degrees in art history and in architectural studies.

Art History Concentration

For the bachelor of art degree in art history, ten courses are required for the major: Introduction to World Art I and II and 100; two courses pre-1700; two courses post-1700; and three electives, one of which may be an approved course in a related field (e.g. history, literature, studio art). At least one of the courses in the major must be taken as an upper-level seminar (Art History 198-xx). An art History AP score of 5 exempts majors from Introduction to World Art I and II requirements; two other art history courses are taken in their place.

We believe in the value of exposure to the full breadth of artistic achievement across time and cultures and therefore require all majors to take the two introductory courses, FAH 1 and FAH 2, offered in the fall and spring each year. We strongly recommend that students take these courses early in their course of study, as they allow students to acquaint themselves with different fields and periods and with different faculty. The two surveys are designed as a springboard to the more specialized upper level (two- and three-digit) courses. Students often choose a major advisor based on their experience in the survey. As with all humanistic disciplines, art history is underpinned by certain theories and methods; these are at work in each and every course, but they are also the focus of FAH 100, Theories and Methods of Art History, also a required class for majors, normally taken in the senior year.

Art History Minor

For the minor in art history, 5 courses are required with at least one course taken at the 100 level. Three of the 5 courses should be taken on the Tufts campus, including the 100 level.

FAH 1 Introduction to World Art I, two courses pre-1700, two electives or

FAH 2 Introduction to World Art II, two courses post-1700, and two electives

For inquiries about the art history major or minor, please contact the department at 617-627-3567 or visit the website <http://ase.tufts.edu/art/undergraduate/>.

Architectural Studies (see also listing above)

The Department of Art and Art History offers an interdisciplinary major and minor in architectural studies for students interested in the study of architecture's history, theory, and social practice. The major's core curriculum provides a foundation in art and architectural history and theory, in engineering and design, and in the humanistic and social science aspects of architecture. Architectural studies majors then design their own elective program of upper-level study from designated courses in architectural history, studio art, civil engineering, the humanities, and the social sciences. In spring of the senior year, all majors complete an integrative project, either as individual or honors study, or through an internship.

For the minor in architectural studies, students take five designated courses from the major's core curriculum, which provide a basic foundation in architecture's interdisciplinary aspects.

The architectural studies program is designed specifically to provide a broad-based liberal arts education in architecture. It may also help students prepare for graduate study and careers in architecture and other allied disciplines, such as landscape architecture, urban planning, and historic preservation.

For details, see full description under Architectural Studies. The faculty adviser for architectural studies is Associate Professor Daniel Abramson.

For more information please see the entry for "Architectural Studies" above and also the website <http://ase.tufts.edu/art/architecture>, or email daniel.abramson@tufts.edu.

Senior Honors Thesis

Seniors in Art History and Architectural Studies who qualify for the Thesis Honors program (normally restricted to those whose names have appeared on the Dean's List at least two times before their senior year) may spend their final year writing an honors thesis. Senior theses are demanding but rewarding for both student and faculty.

They require a good deal of discipline and focus on the student's part, but in return they can take you well beyond the classroom and can develop useful research, writing and organizational skills.

In spring semester of junior year, prospective thesis writers, including those studying abroad, should begin consulting with their advisors about possible thesis topics and research plans. By the last Friday of classes of the junior year, all prospective thesis writers, including those studying abroad, must submit to the director of undergraduate studies a single-page prospectus listing the proposed thesis title, department advisor and relevant coursework, plus a short description of the thesis content and research plan. If approved by the department at this preliminary, prospectus stage, the student may then proceed to the proposal stage in close consultation with the advisor. By the first Friday of classes of the senior year, a three- to five-page proposal must be submitted to the director of undergraduate studies listing the thesis title, department advisor, and at least one additional committee member, and also including a lengthier description of the proposed project accompanied by a full research bibliography. The department in mid-September grants or denies approval for the proposed thesis to move forward.

Completed senior theses are due the second to last Friday of April, to be considered for the department's Madeline Harrison Caviness Thesis Prize. Theses are publicly presented in ten-minute talks at a luncheon held the day after the conclusion of spring classes. Defenses are conducted in late April or early May. After the defense, a final copy of the thesis, in electronic form, must be submitted to the Tisch Library archive and to the department. Seniors' theses are taken into consideration when awarding academic honors or department prizes.

GRADUATE PROGRAM

The Department of Art and Art History offers the Master of Arts degree in Art History, which has two tracks. The M.A. program normally takes two years to complete.

Entering graduate students choose one of the following tracks:

- M.A. in Art History
- M.A. in Art History and Museum Studies

Applicants for the master of arts degree are expected to have a bachelor's degree or its equivalent.

The undergraduate major in Art History is the best preparation for this program, but not mandatory. Applicants who have undergraduate degrees in other fields but have minored in Art History or have taken three or four undergraduate art history courses are also encouraged to apply.

The following is required for application: a verbal GRE general test score, a recent writing sample, a personal statement, three letters of recommendation, and reading knowledge of one foreign language.

Master of Arts: Art History

The master's program in art history is designed to provide a broad historical understanding of the visual arts, in addition to developing critical thinking and methodological skills. Students engage these ideas through course work, seminars, independent research, and teaching experience. Students complete their degrees either by writing a thesis or submitting two qualifying papers; either option involves an independent research topic designed by the student in consultation with a faculty advisor. M.A. students from our program are successful in applying to and completing Ph.D. programs.

Requirements for the M.A. degree in Art History:

- Reading knowledge of one foreign language upon entry
- Eight semester courses in art history at the advanced (100 and above) level
- Historiography and Methodology (FAH 101)
- At least three (3) seminars
- Optional one second foreign language course in lieu of a lecture course
- Comprehensive exam
- At least one semester TA or RA (subject to enrollments and funding)
- M.A. thesis or two qualifying papers (QPs).

For inquiries about the program, please contact the director of the graduate program, Associate Professor Karen Overbey, at karen.overbey@tufts.edu or 617-627-2597.

Master of Arts: Art History and Museum Studies

The master's program in Art History and Museum Studies is designed to give students advance qualification in art history and a broad introduction to museum work. The program is offered for those hoping to work in art collection-related fields. It provides students with skills to integrate theoretical study of art history with practical concerns of displaying, managing, and interpreting art objects in a variety of museum studies simultaneously. Graduates of this program typically pursue careers in museums, art galleries, art publishing, museum education, teaching, art libraries, visual resource collections, or auction houses.

Requirements for the M.A. degree in Art History and Museum Studies:

- Reading knowledge of one foreign language upon entry
- Six semester courses in art history at the advanced (100 and above) level
- Historiography and Methodology (FAH 101)
- At least two (2) seminars
- Five courses in Museum Studies, including a museum internship
- Comprehensive exam
- At least one semester TA or RA (subject to enrollments and funding)
- M.A. thesis, or two QPs, or one QP and an additional Art History seminar

For inquiries about the program, please contact the advisor to the M.A. in Art History and Museum Studies, Professor Andrew McClellan, andrew.mcclellan@tufts.edu.

Policy on Summer Courses (for both tracks)

Courses taken through Tufts Summer Session with the intention of fulfilling a degree requirement must be approved by the student's department. Provided that the course is required for the degree, the graduate school will pay the summer tuition for full-time students (courses taken in excess of the degree requirements, directed and independent studies, special topics courses, audited courses, and language courses taken to prepare for the language exam are excluded). Students who withdraw from a course or receive a grade below B- will be responsible for paying for the course. All graduate students must pay the \$50 registration fee.

STUDIO ART

Studio Art Courses

Through a cooperative agreement between Tufts University and the School of the Museum of Fine Arts, Boston (the Museum School), students may elect courses in studio art for credit at Tufts. Classes are taught both on the Tufts campus, in studios located in Lane Hall and Jackson Gym, and at the Museum School in Boston. More than eighty studio credits are offered to Tufts students.

Studio art courses taught at Tufts University's Medford campus include drawing, painting, design, calligraphy, photography, sculpture, architecture, and watercolor. These courses can be found in the Tufts online course descriptions by department under "Studio Art—Medford Campus" and are labeled with the FAM course prefix. The Museum School offers expanded course offerings in the above areas, as well as ceramics, sculpture, animation, video, metals, and printmaking. Courses are taught on weekdays, evenings, and Saturdays at the Museum School campus in Boston. These courses can be found in the Tufts online course descriptions by department under "Studio Art—Museum School" and are labeled with the FAMB course prefix (credit value conversion: 2.00 SMFA credits = 0.5 Tufts credits; 4.00 SMFA credits = 1.0 Tufts credits).

Students must register for FAM or FAMB studio courses through the Tufts student registration system.

Students who have questions about studio courses or transfer of credit, or need help in planning a comprehensive program of study, should contact Patrick Carter (patrick.carter@tufts.edu), Studio Coordinator at Tufts, Department of Art and Art History, 11 Talbot Avenue.

Studio Art Degree Programs

There is no studio art major at Tufts, but two programs offered in cooperation with the School of the Museum of Fine Arts, Boston, are available to students with strong preparation in this area. Both require admission to the Museum School and have an academic component. One of the B.F.A. degree programs is available through the College of Special Studies; the other is the combined five-year B.F.A. and B.A. or B.S. degree program. Interested students may contact Susan Lush at the School of

the Museum of Fine Arts Academic Affairs Office at 617-369-3610 or the Museum School Admissions Office, 617-369-3626, 800-643-6078, or admission@smfa.edu.

MASTER OF FINE ARTS: STUDIO ART

The master of fine arts degree offers students concentration in the visual arts. Students may concentrate in a single medium or may work in an interdisciplinary manner, drawing on diverse studio offerings to expand upon their particular area of concentration. For more information on the program, please visit the School of the Museum of Fine Arts website at www.smfa.edu/program-overview or contact academicaffairs@smfa.edu.

Asian American Studies

Director:

Senior Lecturer Jean Wu, *American Studies*

Asian American Studies is an interdisciplinary academic field dedicated to the examination of the historical and contemporary experiences of Asian Americans, which includes the diasporic East Asian, Southeast Asian, South Asian, and Pacific Islander populations whose lives and labor shape and are shaped by the United States and the Americas. It applies the methods and perspectives of traditional academic disciplines, including but not limited to history, sociology, anthropology, education, psychology, and literature, to understanding the histories, communities, cultures, and experiences of Asian Americans. Asian American Studies was founded jointly with Black Studies and Ethnic Studies as a result of efforts for curricular transformation that were part of the national movements for racial and social justice of the 1960s and 1970s. Though the field has grown and expanded since it was initiated over four decades ago, it retains a focus on addressing social disparities in the U.S. and the world as they relate to Asian Americans.

A minor in Asian American Studies provides a coherent program of study for students who wish to critically examine Asian American experiences and wish to develop a specialization in Asian American Studies alongside their degree pursuits. The AAS minor requires six credits:

1. One introductory survey/foundation course on Asian American experiences with at least a third of its content on Asian American history
2. At least one course focused on race in which Asian American experiences are addressed in a U.S. sociopolitical context; these courses should include at least one major module/unit on Asian American histories, experiences, and/or cultures
3. At least one course with full focus on Asian American experiences beyond the foundation
4. Up to two elective courses that, while they may not have direct Asian American content, must address issues or topics relevant to the historical and/or contemporary experiences of Asian Americans. Examples of these types of topics include but are not limited to immigration, educational access, bilingualism, health disparities, labor relations, environmental justice, media representations, cultural resistance productions, comparative race and ethnic studies, etc. Students wishing to count these courses towards the minor in Asian American Studies must consult with the course instructor for permission to focus independent work (e.g., a paper) on an appropriate Asian American topic; all elective courses must be approved by the Asian American Studies Steering Committee.
5. An integrative capstone course or project that focuses on an Asian American community. The capstone project must be approved by the AAS committee and may be fulfilled in one of three ways:
 - a. A faculty-supervised internship in an Asian American organization or organization that significantly services Asian American communities. Students must produce a final paper analyzing their experience.
 - b. A community-based research course in which the research focus is on an Asian American community.
 - c. An independent research paper or project on the Asian American experience with AAS faculty or other AAS-approved faculty advisor.

Minors in Asian American Studies may take up to two courses as independent study or as transfer courses from other institutions or that are counted towards a major or a foundation requirement. Courses with grades lower than C- will not be accepted towards the minor.

ASIAN AMERICAN STUDIES >

ASTRONOMY >

ASTROPHYSICS >

BIOCHEMISTRY >

SPECIAL NOTE ON LANGUAGES

The minor does not require proficiency in Asian languages because the language of the field of Asian American Studies (i.e. the scholarly literature) is English. Moreover, we do not want to discourage students from other majors, especially students with pre-professional plans, from taking the minor because of a language requirement that would require them to add additional credits to their program of study. A student who decides to pursue proficiency in an Asian language may count one course at the advanced level (e.g., JPN 21, CHNS 21 or above, or equivalent in another Asian language) towards one of the elective courses in the minor. We also encourage students interested in strengthening their knowledge of one or more Asian languages to seek an internship or project as their capstone experience that will allow them to interact with newer immigrants, who will be less likely than more established Asian Americans to speak English.

For more detailed information, please visit

<http://as.tufts.edu/AsianAmericanStudies/>

Astronomy

Professor Kenneth R. Lang, *Astronomy*

Associate Professor Danilo Marchesini, *Astronomy/*

Astrophysics

Assistant Professor Anna Sajina, *Astronomy/Astrophysics*

Adjunct Senior Lecturer Robert F. Willson, *Tufts University School of Medicine; Astronomy*

The science of astronomy concerns the general picture of the universe in its broadest sense, from atoms to assemblages of galaxies. Courses in astronomy fall under the Department of Physics and Astronomy, which also offers concentrations in astrophysics at both the undergraduate and graduate levels.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Minimum Grade Policy

The undergraduate concentration requires a minimum GPA of 2.0 in the courses applied to a major, and no more than one course with a grade less than C-. This policy applies to all majors offered by the department for students entering September 2013 or later.

Major in Astrophysics

The major in Astrophysics requires four courses in astronomy more advanced than Astronomy 10; two courses in mathematics more advanced than Mathematics 42 or 44; and four courses in physics more advanced than Physics 2 or 12, including Physics 13 and 64 or equivalent laboratory experience. One mathematics course and either one physics course or one astronomy course may be replaced by an approved advanced course in a related field. Research experience is strongly recommended.

UNDERGRADUATE MINOR PROGRAM

Minimum Grade Policy

The program requires the completion of five courses, with a minimum grade of C-. Prematriculation credits may not be applied towards the requirements for the minor. The minimum grade policy applies to students entering September 2013 or later.

Minor in Astrophysics

The minor in Astrophysics requires five courses, at least three of which must be courses in astronomy numbered 15 or higher. The remaining courses may be selected from among Physics 11, 12 (or 1, 2), 13, and courses in physics or astronomy numbered 15 or higher.

GRADUATE PROGRAM

Advanced degrees (master's and doctoral) are offered through the Department of Physics and Astronomy in observational astrophysics. Details are given under Physics and Astronomy. Additional advanced courses may be taken through a cooperative program with Boston University.

For more detailed information, please visit the website <http://ase.tufts.edu/physics>.

Astrophysics

(FOR DEGREE REQUIREMENTS, SEE ASTRONOMY OR PHYSICS AND ASTRONOMY.)

Biochemistry

(FOR DEGREE REQUIREMENTS, SEE BIOLOGY OR CHEMISTRY.)

Bioengineering

Professor Mark Cronin-Golomb, *Biomedical Engineering; Optical instrumentation, laser tweezers, atomic force microscopy, nonlinear optics*

Professor Sergio Fantini, *Biomedical Engineering; Biomedical optics, near-infrared spectroscopy, diffuse optical imaging*

Professor David L. Kaplan, *Biomedical Engineering/ Chemical and Biological Engineering; Biopolymer engineering, biomaterials, tissue engineering, regenerative medicine*

Professor Krishna Kumar, *Chemistry; Novel methods for rational design and construction of artificial proteins, molecular enzymes, and self-assembling biomaterials*

Professor Barry A. Trimmer, *Biology; Central processing of sensory information by receptors, second messengers and synaptic networks in insect model system, neural control of soft-bodied locomotion*

Professor David R. Walt, *Robinson Professorship in Chemistry; Surface, polymer and materials chemistry, fluorescence resonance energy transfer, immunosensors, corrosion sensing, neurotransmitter sensing, micro- and non-sensors, cell-based biosensors, and sensors based on principles of the olfactory system*

Associate Professor Caroline G. L. Cao, *Mechanical Engineering; Endoscopy and surgery, human factors, remote instrumentation, human-machine interface*

Associate Professor Irene Georgakoudi, *Biomedical Engineering; biomedical imaging*

Associate Professor Kyongbum Lee, *Chemical and Biological Engineering; Biochemical and biomedical engineering, metabolic engineering, tissue engineering, bioinformatics, and systems biology*

Research Associate Professor Aurelie Edwards, *Chemical and Biological Engineering; Biological transport phenomena involving fluid and solute transport in living tissues (kidney and eye) to address organ function, disease origin, and drug delivery*

Research Assistant Professor Greg Altman, *Biomedical Engineering; Collagen-based matrices, ligament formation, impact of mechanical forces on human adult stem cell differentiation, bioreactor system, in vitro tissue formation and development*

Bioengineering is the integration of physical, chemical, or mathematical sciences and engineering principles for the study of biology, medicine, behavior, or health. The bioengineering programs provide comprehensive education and research at the School of Engineering and the School of Arts

and Sciences in collaboration with Tufts' medical, dental, veterinary, and nutrition schools.

A number of part- and full-time degree programs and certificates are offered in the fields of biomedical engineering, biotechnology, and drug discovery and assessment. Biomedical engineering involves the application of state-of-the-art technology to device design and fabrication; biotechnology includes protein expression, folding and assembly, biomaterials and tissue engineering, and biofilms as examples; drug discovery and assessment includes disease markers, resistance mechanisms, and new drug discovery.

For information on programs in bioengineering, please contact the bioengineering center office at 617-627-2580.

UNDERGRADUATE PROGRAMS

Biomedical Engineering

(SEE BIOMEDICAL ENGINEERING FOR A DESCRIPTION OF THE PROGRAMS.)

Biotechnology

(SEE BIOTECHNOLOGY FOR A DESCRIPTION OF THE PROGRAMS.)

GRADUATE PROGRAMS

Graduate degree programs are tailored to the background and goals of the individual student. Degree programs may be pursued on a part-time or full-time basis. Master's programs may be either course-based or thesis research-based.

Doctoral programs may be pursued part-time, with a one-year residency requirement.

BIOENGINEERING FACULTY ADVISOR:

Associate Professor Kyongbum Lee, *Chemical and Biological Engineering*

The School of Engineering offers a master's degree program in Bioengineering. This interdisciplinary program provides a broad engineering and biotechnology curriculum, while offering a focus on a specific engineering track that best fits students' interests and career choices. This combination gives our bioengineering graduates professional flexibility, a distinct competitive advantage in the ever-changing field of bioengineering.

The Bioengineering master's program has six tracks:

- Bioinformatics
- Biomaterials
- Biomechanical Systems and Devices
- Cell and Bioprocess Engineering
- Environmental Biotechnology
- Signals and Systems

For more detailed information, including descriptions of the core curriculum and the individual tracks, please visit the website <http://engineering.tufts.edu/bioengineering>.

Biomedical Engineering

(SEE BIOMEDICAL ENGINEERING FOR A DESCRIPTION OF THE PROGRAMS.)

Biotechnology

(SEE BIOTECHNOLOGY FOR A DESCRIPTION OF THE PROGRAMS.)

CERTIFICATE PROGRAMS

Four-course graduate-level certificate programs are designed for science, engineering, and medical professionals seeking graduate-level programs to expand their knowledge of biomedical science, biotechnology, and engineering. The certificates are offered in conjunction with the departments of biology, chemistry, chemical and biological engineering, and biomedical engineering. The certificate programs can be completed on a part-time, non degree basis by students who are seeking professional training in the field or preparing for a degree program. In most cases, courses taken as a certificate student can be transferred into a related master's degree program. The programs are open to students who have already earned a bachelor's degree.

Bioengineering

The certificate program in bioengineering consists of an interdisciplinary course of study that allows students to focus on areas such as biomedical instrumentation, biomedical optics, biomaterials/biotechnology and tissue engineering. Courses are taught by faculty in engineering as well as experienced clinical professionals from Tufts' health science schools.

The certificate requires four courses.

One bioengineering introductory course:

Biomedical Engineering 250 Introduction to Biomedical Engineering I (focus on biomedical engineering and instrumentation) or
Biomedical Engineering 162 Molecular Biotechnology (focus on molecular biology and engineering aspects of biotechnology)

One physiology course (choose five modules):

Biomedical Engineering 121/122 Engineering Challenges in Physiology I and II (modules include general, neurology/nose, skeletal/bone, respiratory, cardiovascular, renal, gastrointestinal, endocrine, eye, dental)

One engineering elective in biomedical instrumentation, biomedical optics, biomaterials, biotechnology, or tissue engineering

One capstone course:

Biomedical Engineering 100 Design of Medical Instrumentation or
Biomedical Engineering 164 Biomaterials and Tissue Engineering

For more detailed information, please visit the website <http://engineering.tufts.edu/bme/>.

Bioengineering Certificate Program

FACULTY ADVISORS:

Professor Mark Cronin-Golomb, *Biomedical Engineering*
Professor David L. Kaplan, *Biomedical Engineering / Chemical and Biological Engineering*

The booming biomedical industry demands skilled professionals whose expertise can cross traditional boundaries of science and engineering. Companies are seeking electrical engineers who understand the medical uses of diagnostic imaging instrumentation, biotechnology professionals with training in tissue engineering to develop tissue implants, and mechanical engineers who are well-versed in biomaterials to design artificial joints.

The certificate in Bioengineering addresses this need through a highly interdisciplinary course of study that allows students to focus on biomedical instrumentation, biomedical optics, biomaterials/

biotechnology and tissue engineering or other related areas of study. Courses are taught by faculty in engineering as well as experienced clinical professionals from Tufts' world-renowned health science schools.

The program is open to students with at least a bachelor's degree in engineering, science, or health science.

With this certificate engineers can launch careers in biomedical instrumentation design. Clinical practitioners and technicians can shift careers to biomedical equipment sales. It is also a useful technology complement for executives, medical professionals, and policy makers interested in the application of technology to the medical, business or legal profession.

The certificate requires the completion of four courses.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

Biology

Professor Sergei Mirkin, *Department Chair, White Family Chair in Biology; Molecular genetics*

Professor Frances Sze-Ling Chew, *Vice Chair; Ecology, plant-insect interactions*

Professor Susan G. Ernst, *Developmental biology*

Professor Catherine Freudenreich, *Molecular biology and genetics*

Professor Michael Levin, *Vannevar Bush Professor and Director of Tufts Center for Regenerative and Developmental Biology; Morphological and behavioral information processing living systems*

Professor Sara M. Lewis, *Evolutionary and behavioral ecology*

Professor Colin M. Orians, *Ecology, plant-herbivore-environment interactions*

Professor Jan A. Pechenik, *Invertebrate zoology, marine invertebrate reproduction*

Professor J. Michael Reed, *Conservation biology, ornithology, behavior*

Professor L. Michael Romero, *Physiological endocrinology, physiology of stress*

Professor Barry A. Trimmer, *Henry Bromfield Pearson Professor of Natural Sciences; Neurotransmitters and receptors in insects, intracellular signals*

Associate Professor Harry A. Bernheim, *Organismal physiology, immunology*

Associate Professor Elizabeth Crone, *Population ecology, theoretical ecology, plant-animal interactions*

Associate Professor George S. Ellmore, *Draupner Ring Scholar; Plant development, experimental plant morphology, anatomy*

Associate Professor Juliet Fuhrman, *Immunology and parasitic diseases*

Associate Professor Kelly A. McLaughlin, *Cell biology, cell signaling of organogenesis*

Associate Professor Mitch McVey, *Molecular biology, genomic instability*

Associate Professor Philip T. B. Starks, *Evolutionary dynamics of parasite and host populations*

Assistant Professor Erik B. Dopman, *Evolution and genetics of natural populations*

Assistant Professor Stephen M. Fuchs, *Biochemistry and molecular biology, interplay between protein structure and protein function*

Assistant Professor Julia Svoboda Gouvea, *Education; Biology education*

Assistant Professor Eric D. Tytell, *Biomechanics and neural control of locomotion*

Assistant Professor Benjamin Wolfe, *Microbiology, ecology and evolution of microbial communities*

Senior Lecturer Susan Koegel, *Cell biology and immunology*

Lecturer Michelle Gaudette, *Molecular biology, gene regulation of development*

Lecturer Ekaterina "Kate" Mirkin, *Genetics*

Research Associate Professor Dany S. Adams, *Role of ion flux during morphogenesis of vertebrate embryos*

SECONDARY APPOINTMENTS:

Adjunct Professor David L. Kaplan, *Biomedical Engineering; Biotechnology, biomaterials*

Adjunct Associate Professor Mark Pokras, *Cummings School of Veterinary Medicine at Tufts University, Department of Environmental and Population Health; Wildlife medicine*

Biology is the scientific study of living organisms. Derived from the search for organized understanding of plants and animals in their natural environments, contemporary biology is increasingly successful in characterizing the basic molecular processes that are essential to all forms of life. Modern experimental studies on the origin, evolution, and physiological mechanisms of life are of profound philosophical importance and provide

the underlying foundation for research in biology and for the teaching of biology. They also provide the basic knowledge used in applied fields such as medicine, biotechnology, and environmental biology.

Biology students should aspire to understand the central principles governing life processes at both molecular and higher levels. An increased comprehension of the problem-solving methods of science, as used within the laboratory and in the analysis of contemporary environmental and biosocial problems, should be a concomitant goal. Biology majors, especially those preparing for graduate work, are expected to learn how to critically evaluate original research literature. This can be done by enrolling in seminar courses that are designed to investigate topics by utilizing the primary literature. Small class sizes in seminars allow students to present papers and participate in class discussions.

Laboratories are available for study and research in selected areas of biochemistry, neurobiology, immunology, endocrinology, molecular biology, cell biology, genetics, physiology, plant sciences, behavior, and ecology. Controlled-environment rooms, marine and freshwater aquaria, and a greenhouse are among the diversified resources for the experimental work. Fieldwork experience at marine laboratories or other biological stations is encouraged.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Biology

Ten courses, including eight courses in biology numbered 13 or higher (with the exception of Biology 16, 91, 93, and 94), at least six of which must be completed with a grade of C- or better, and either two courses in chemistry (chosen from Chem 1, 2, 11, 12, 51, 52) or two courses in physics (chosen from Physics 1, 2, 11, 12). At least four of the eight biology courses must be taken at Tufts. It is recommended that students take at least one seminar course. The eight biology courses must include Bio 13, 14 and 41 and at least one course each in the biology of cells (Group A), biology of organisms (Group B), and biology of populations (Group C). The particular group in which a course is categorized for this purpose is indicated at the end of the course description. Absence of such

designation indicates that the course cannot be used to fulfill any group of the distribution requirements, although the credits are applicable toward the total required for a major.

At least two courses in biology must include a laboratory study, and one of these must be above the level of Biology 14. In fulfilling this laboratory requirement, students may choose from among those biology courses for which laboratory is specified in the course description, with the following exceptions: Biology 93, 94, and 187.

Biology 193 or 194 may be used as only one of the eight biology courses for completion of the concentration requirements; on approval of a petition to the department, a maximum of two such courses may be applied toward the major. In no case may more than one of these courses be used to fulfill the laboratory requirement.

The foregoing is a minimal program. For many purposes, additional preparation in related sciences and calculus is needed. A course in calculus and laboratory courses in both organic chemistry and physics are strongly advised. A course in statistics should be included when advanced work in ecology, evolution, or genetics is anticipated. Medical schools require a year of general chemistry, a semester of organic chemistry, a year of physics, and a year of biology, all with laboratory. A semester of biochemistry is required. Calculus and psychology are recommended. Students planning to enter graduate school or seeking employment in biological research should take more than the minimal number of laboratory courses required for the biology major.

To be eligible for a summa cum laude degree, a student must have done biology research equivalent to Biology 93. Comparable research in related fields will also be considered. Participation in the Thesis Honors Program will entail writing and defending a thesis based on laboratory or field research.

Major in Biochemistry

The Biochemistry major requires Chemistry 1, 11, or 16 and Chemistry 2 or 12; Chemistry 51/53, 52/54, 31, 42, 171, and 172; Biology 13, 41, 50 (or Chemical and Biological Engineering 163), and 105. Course work in mathematics (Mathematics 34) and physics (Physics 2 or 12) is required as a prerequisite to Chemistry 31. The following sequence of courses is suggested for students concentrating in biochemistry: first year, Chemistry 1

(or 11) and 2 (or 12), Biology 13, Mathematics 32; second year, Chemistry 51/53, 52/54, and 171, Mathematics 34, Physics 1 and 2 (or 11 and 12); third year, Chemistry 172, Biology 41, 105, and 50 (or Chemical and Biological Engineering 163); fourth year, Chemistry 31 and 42.

Major in Biopsychology

Biopsychology is an interdepartmental major for students particularly interested in neurobiology and behavior. There are ten required courses: five in biology and five in psychology. These include the following: Cells and Organisms (Biology 13), General Genetics (Biology 41), Animal Behavior (Biology 130), one course in animal physiology (chosen from among Biology 75, 110, 115, 117, 134), and an elective in biology; Statistics (Psychology 31 or Biology 132), Experimental Psychology (Psychology 32), Brain and Behavior (Psychology 103), plus two electives from among Psychology 22, 26, 27, 29, 40, 41, 42, 46, 48, 49, 104, 112, 117, 123, 127, 128, 129, 142, 146, 154, and 159. Biopsychology majors may not double major in psychology or biology. Majors are encouraged to elect an advanced laboratory course in either department. Consult the departments of either biology or psychology for details about this program.

Course Selection for Undergraduates

For students with an interest in biology or the health sciences and a strong high-school science background, Biology 13 is the most appropriate beginning course, and may be taken concurrently with Chemistry 1 or 11. Biology 13 and 14 are normally prerequisites for more advanced work in biology.

Students interested in biology but not planning to major in the sciences might take Biology 1, 2, 6, 7, 8, 10 or 12. None of these may be counted among the eight courses in biology used to satisfy the concentration requirements.

GRADUATE PROGRAM

Before beginning advanced study in a specialty, all graduate students in biology are expected to have the broad course work and laboratory experience that is equivalent to the requirements for an undergraduate major in this department. The student's entrance committee will determine what

courses, if any, should be taken in the first year to fulfill these requirements. Graduate instruction and research opportunities are offered in six areas: 1) ecology, behavior, and evolution; 2) global change biology; 3) genetics and molecular biology; 4) developmental biology; 5) physiology, neurobiology and biomechanics.

More information is available at <http://ase.tufts.edu/biology>.

Master of Science

A candidate for the master's degree in biology must complete at least eight different graduate-level courses, of which at least four must be in the Department of Biology. All courses must be approved by the committee appointed to guide the student's work. Courses taken at recognized marine laboratories or field stations may be offered for credit. No more than two credits may be transferred from another institution.

Research Master of Science Degree: A research master of science student must take six courses for letter grades (B- or better) including one required seminar (normally either Biology 243, Topics in Molecular and Cell Biology, or Biology 244, Topics in Evolutionary Ecology). No more than one of these six may be guided individual study (Biology 293 or 294). Also required for the research master of science are two research courses (Biology 295 and 296) and preparation and successful defense of an original thesis. A student in a research master's program is normally expected to serve as a teaching assistant for at least one semester.

Course-work Master of Science Degree: A course-work master of science student must take eight courses for letter grades (B- or better) including one required seminar (normally either Biology 243, Topics in Molecular and Cell Biology, or Biology 244, Topics in Evolutionary Ecology).

Students in the B.S.-M.S. combined-degrees program are normally required to prepare an original thesis.

Doctor of Philosophy

A candidate for the Doctor of Philosophy degree is expected to plan and undertake a program of advanced study and research in consultation with a faculty committee. The candidate is required to serve as a teaching assistant for at least two semesters.

During the first year, students are expected to complete at least two research rotations (Bio 253/254). Following completion, students must choose and be accepted into the laboratory of a faculty member under whose direction they will carry out their research and prepare their dissertations.

Entry into the Ph.D. degree program is not official until the candidate passes a qualifying procedure. The procedure includes a written examination in the candidate's field of special interest and related areas, and the preparation and defense of a detailed written thesis research proposal.

For more detailed information, please visit the website <http://ase.tufts.edu/biology>.

Biomedical Engineering

Professor David Kaplan, *Chair and Stern Family Professor; Biopolymer engineering, biomaterials, tissue engineering, regenerative medicine*

Professor Mark Cronin-Golomb, *Optical instrumentation, laser tweezers, atomic force microscopy, nonlinear optics*

Professor Sergio Fantini, *Biomedical optics, near-infrared spectroscopy, diffuse optical imaging*

Professor Fiorenzo Omenetto, *Frank C. Doble Professor; Ultrafast nonlinear optics, medical optics*

Associate Professor Irene Georgakoudi, *Biomedical spectroscopic imaging and characterization, in vivo flow cytometry, biomedical instrumentation*

Assistant Professor Lauren Black, *Cardiovascular tissue engineering, tissue mechanics and visualization, computational modeling, myocardial infarction, regenerative medicine, cardiogenesis*

Assistant Professor Xiaocheng Jiang, *Nanobiotechnology, microfluidic biotechnology, bioelectronics, biomaterials*

Assistant Professor Catherine K. Kuo, *Regenerative medicine, tissue engineering, stem cells, biomaterials, developmental biology*

Assistant Professor Qiaobing Xu, *Biomaterials, drug delivery, micro/nanofabrication, tissue engineering*

Research Professor Barbara Brodsky, *Collagen folding and degradation*

Research Professor Zoia Monaco, *Chromosome biology, genome stability, gene expression, human artificial chromosome*

Research Associate Professor Alessandra Balduini, *Regulation, environment and pathology of megakaryocytes to platelets*

Research Assistant Professor Daniela Moralli, *Chromosome biology, cytogenetics, human artificial chromosome*

Research Assistant Professor Bruce Panilaitis, *Vaccine development, metabolic engineering, immunology*

Research Assistant Professor Angelo Sassaroli, *Near-infrared spectroscopy, functional brain imaging*

Research Assistant Professor Xiaoqin Wang, *Silk fibroin-based controlled drug delivery, tissue engineering using silk biomaterials, protein structure and function relationship*

SECONDARY APPOINTMENTS:

Adjunct Professor Peter Bergethon, *Pfizer Inc./Boston University School of Medicine; Computational neurology*

Adjunct Professor John Castellot, *Tufts University School of Medicine; Cellular and molecular biology, vascular systems*

Adjunct Professor Jonathan Garlick, *Tufts University School of Dental Medicine; Tissue models to study human disease processes in stratified squamous epithelium*

Adjunct Professor Jim Harden, *University of Ottawa; Biomolecular assemblies, biomaterials, computational biophysics, cell mechanics, complex fluids*

Adjunct Professor Krishna Kumar, *Department of Chemistry; Novel methods for the rational design and construction of artificial proteins, molecular enzymes, and self-assembling biomaterials*

Adjunct Professor Lorenz Meinel, *University of Wuerzburg; Drug delivery interfaces*

Adjunct Professor Michael Levin, *Department of Biology; Regenerative and developmental biology*

Adjunct Professor Eric Miller, *Department of Electrical and Computer Engineering; Signal and image processing algorithms*

Adjunct Professor John Richmond, *New England Baptist Hospital, Tufts Medical Center; Ligament formation, treatment of injuries of the anterior cruciate ligament, regulation and proliferation of growth factor expression in arthrofibrosis*

Adjunct Professor Igor Sokolov, *Department of Mechanical Engineering; Condensed matter, soft condensed matter and biomedical research, energy-related materials and sustainability, surface science and engineering*

Adjunct Professor Barry Trimmer, *Department of Biology; Central processing of sensory information by receptors, second messengers and synaptic networks in an insect model system, neural control of soft-bodied locomotion*

Adjunct Professor Gordana Vunjack-Novakovic, *Columbia University; Transport phenomena, tissue engineering and bioreactors*

Adjunct Professor David Walt, *Department of Chemistry; Bioanalytical chemistry, materials chemistry, biochemistry, and nanoscience*

Adjunct Professor Pam Yelick, *Tufts University School of Dental Medicine; Molecular genetic analyses of craniofacial cartilage, bone, and tooth development*

Adjunct Associate Professor Luis Dorfmann, *Department of Civil and Environmental Engineering; Mechanical properties and behaviors of materials, couple field phenomena, fracture, cavitation and failure processes, characterization and modeling of soft materials*

Adjunct Associate Professor Blaise Frederick, *McLean Hospital; Magnetic resonance equipment and techniques for the study of psychiatric illness in Alzheimer's disease and substance abuse*

Adjunct Associate Professor Carl Kirker-Head, *Cummings School of Veterinary Medicine at Tufts University; Bone growth and remodeling, bone repair in response to injury, bone grafting, surgical and other orthopaedic disease models, musculoskeletal vascular disease, bone and soft tissue biomechanics, skeletal tissue engineering, orthopedic device development*

Adjunct Associate Professor Thomas Schnelldorfer, *Tufts University School of Medicine; Cancer metastases*

Adjunct Associate Professor Sameer Sonkusale, *Department of Electrical and Computer Engineering; Mixed-signal VLSI design, sensor electronics*

Adjunct Assistant Professor Bree Aldridge, *Tufts University School of Medicine; Identifying determinants of mycobacterial tolerance to antibiotic stress in cases of tuberculosis*

Adjunct Assistant Professor Niall Lennon, *Broad Institute of MIT & Harvard; Molecular biology, cell biology, nano biotechnology, genomics*

The biomedical engineer is responsible for design and development of the technology and devices that are at the heart of the far-reaching improvements in human health that have been occurring over the last few decades. These advances include better tools for understanding disease and health, as well as better ways to both treat disease and maintain health. The rapid expansion of the field of biomedical engineering is due to many factors, including 1) scientific and technological advances in the life sciences, materials science, and the engineering disciplines; 2) the increasing recognition of the role of interdisciplinary strategies to solve complex biomedical problems; and 3) the aging of the population, leading to increasing healthcare needs and the associated demands and costs. The vision of the Biomedical Engineering

Department is to promote integrative research, education, and entrepreneurship at the forefront of biomedical science and engineering. The mission of the Biomedical Engineering Department is to advance the field of biomedical engineering through an interdisciplinary approach to education, design, and research.

UNDERGRADUATE PROGRAMS

Bachelor of Science in Biomedical Engineering

The bachelor of science in biomedical engineering (B.S.B.M.E.) is a degree program that combines training in design, research, and practical methods, with a solid math, science, and engineering curriculum to provide education with breadth and depth in the field. A key aspect of biomedical engineering is its interdisciplinary nature; introductory courses in mathematics, statistics, biology, chemistry, and physics, together with foundation/concentration engineering courses, build the basis for creating the synergy among these disciplines that is required in the practice of biomedical engineering. The mission of the bachelor of science degree in biomedical engineering is to provide students with undergraduate educational experiences that provide a sound basis for professional practice in biomedical engineering, life-long learning, and leadership roles in the biomedical engineering field.

The curriculum leading to the bachelor of science degree in biomedical engineering is intended to prepare students to continue with graduate study either in biomedical engineering or medicine, or to enter professional practice as an engineer or designer of biomedical systems. The curriculum includes intensive instruction in math, sciences and engineering disciplines, design and research projects, and biomedical engineering-specific courses, culminating in a year-long senior capstone project.

The student outcomes of the B.S.B.M.E. specify that, by the time of graduation, all graduates will be able to:

- Apply fundamental knowledge of mathematics, statistics, physical sciences, biology, physiology, and engineering for the solution of problems at the interface of engineering and biology;
- Make measurements on and interpret data from living systems, addressing the problems

associated with the interaction between living and non-living materials and systems;

- Communicate effectively, work as part of a multidisciplinary team, and have an awareness of professional and ethical responsibilities to have a positive impact on society;
- Recognize the importance of life-long learning in order to expand one's knowledge base;
- Participate in creative and integrative design projects and independent research projects.

On the basis of the program educational objectives of the B.S.B.M.E., graduates of the program will:

- Be successful in tackling open-ended biomedical engineering problems in a quantitative and systematic fashion;
- Be motivated to continuously expand their knowledge and be creative and innovative in their contributions to the field of biomedical engineering;
- Perform, manage, or lead original engineering design and research projects in an ethical and professional manner; carry this out at the highest levels in private industry, research laboratories, medical school, or graduate and professional schools.

The program leading to this degree is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

A sample course schedule for the B.S.B.M.E. program (38 credits) is listed below. Of the thirty-eight course credits required for the professional degrees accredited by the Engineering Accreditation Commission of ABET, a minimum of 9.5 course credits must be completed in college-level math and basic science subjects appropriate to the discipline, and a minimum of 14.5 course credits must be completed in engineering topics, consistent with ABET general and program criteria.

First Year

FALL TERM

Mathematics 32

Physics 11 (+ lab)

English 1

Engineering Science 93

SPRING TERM

Mathematics 36

Physics 12 or **Chemistry 1** (+ lab)

Engineering Science 2

Humanities or social sciences or arts elective

Sophomore Year

FALL TERM

Mathematics 42

Biology 13

Chemistry 1 or **Chemistry 2** or **Physics 12** (+ lab)

Engineering Science 5

Biomedical Engineering 50

Biomedical Engineering 3 (half credit)

SPRING TERM

Mathematics 51

Chemistry 2 or **Physics 12** (+ lab)

Engineering Science 7

Humanities or social sciences or arts elective

Biomedical Engineering 4 (half credit) or **Biomedical Engineering 131**

Junior Year

FALL TERM

Biology 41

Engineering Science 3

Engineering Science 8

Biomedical Engineering 121

Biomedical Engineering 5 (half credit) or **Biomedical Engineering 153**

SPRING TERM

Biomedical Engineering 51

Biomedical Engineering 62

Biomedical Engineering 100

Foundation elective

Humanities or social sciences or arts elective

Biomedical Engineering 6 (half credit)

Senior Year

FALL TERM

Probabilities and Statistics elective

Biomedical Engineering 153 or **Biomedical Engineering 165**

Concentration elective

Humanities or social sciences or arts elective

Biomedical Engineering 7

SPRING TERM**Biomedical Engineering 131 or Biomedical Engineering 154**

Concentration elective

Humanities or social sciences or arts elective

Free elective

Biomedical Engineering 8

The selection of elective courses described above may be altered for program flexibility. The assignments here reflect one possible way of meeting the requirements for the degree. A list of appropriate foundation and concentration electives is available from the department.

Second Major in Biomedical Engineering

The second major in biomedical engineering is offered to engineering students. Students must enroll in conjunction with another engineering undergraduate departmental major. For the second major in biomedical engineering, students are required to complete ten courses. No more than five of these courses may be used to fulfill the concentration requirement of the first major. All ten courses must be taken for a letter grade. The ten credits required for the second major in biomedical engineering are as follows:

1. **Biology 13 or Engineering Science 11b**
2. **Physics 12 or Chemistry 2**
3. Probability and Statistics elective
4. **Engineering Science 3 or Engineering Science 5**
5. Engineering elective
6. **Biomedical Engineering 50**
7. **Biomedical Engineering 62 or Biomedical Engineering 100**
8. **Biomedical Engineering 153 or Biomedical Engineering 131**
9. Biomedical Engineering elective
10. Biomedical Engineering elective

Second Major in Biomedical Sciences

The second major in biomedical sciences is offered to liberal arts students. Students must enroll in conjunction with another undergraduate departmental major. For the second major in biomedical sciences, students are required to complete ten courses. No more than five of these courses may be used to fulfill the concentration requirement of the first major. All ten courses must be taken for a letter grade. The ten credits required for the second major in biomedical sciences are as follows:

1. **Biomedical Engineering 50**
2. **Biomedical Engineering 62**
3. Three Biomedical Engineering elective courses
4. Five elective courses related to biomedical sciences, including independent studies, research, and design projects, that are approved by the BME Second Major Advisor.

GRADUATE PROGRAMS

The Department of Biomedical Engineering offers programs leading to the degrees of master of engineering (M.Eng.) for students seeking an education at an advanced level in biomedical engineering, and master of science (M.S.) and doctor of philosophy (Ph.D.) for students preparing for careers in which research is a central activity. Students can be accepted either into the M.Eng. program, into the M.S. program, or directly into the Ph.D. program. An M.Eng. or M.S. degree is not required for students to apply to the Ph.D. program. Students who receive the M.Eng. or M.S. degree at Tufts and wish to continue their studies toward the Ph.D. need to be formally accepted into the Ph.D. program.

The M.S. and Ph.D. programs in the Department of Biomedical Engineering are strongly research-oriented, with emphasis on independent research work reflected in the candidate's thesis or dissertation. Because biomedical engineering is a multidisciplinary field, students are expected to work in collaboration with scientists in diverse fields including engineering, health, and life sciences. The required courses consist of foundation courses and elective courses. The purpose of the foundation courses is to provide a broad background in biomedical engineering, and to introduce the research activities in the department. The purpose of the elective courses is to provide in-depth knowledge in specific areas of biomedical engineering as a solid basis for students to excel in their research work. It is advisable that M.S. and Ph.D. students first identify a field of interest and a research advisor, and then select elective courses around the research topic of choice. At the discretion of the research advisor, students who lack suitable preparation in some areas may be given the opportunity to take or audit additional undergraduate-level courses, and students who are already qualified may be exempt from some courses. Transfer of a limited number of graduate course credits is also possible.

BIOMEDICAL ENGINEERING >

BIOPSYCHOLOGY >

BIOTECHNOLOGY >

GRE and TOEFL (if applicable) are required for admission into the programs. Prospective students can obtain more admission information, financial aid information and application forms at <http://gradstudy.tufts.edu>.

Master of Engineering

The department offers a program leading to the master of engineering (M.Eng.) degree in biomedical engineering. The M.Eng. program is aimed at students who desire to acquire broad knowledge in biomedical engineering. The emphasis is on multidisciplinary interfaces in the areas covered by biomedical engineering.

Ten credits are required for the M.Eng. degree: two foundation courses (2 credits), seven graduate courses (7 credits), and a project (1 credit).

Master of Science

The department offers a program leading to the master of science (M.S.) degree in biomedical engineering.

Ten credits are required for the M.S. degree: two foundation courses (2 credits); four graduate courses, which can include special topics courses (4 credits); research seminars for at least two semesters (2 half-credits); and a thesis (3 credits).

Doctor of Philosophy

The department offers a program leading to the Ph.D. degree in biomedical engineering. Thirty credits are required for a Ph.D. with prior B.S. degree: three foundation courses (3 credits); graduate elective courses, which may be special topics courses (at least 5 credits); research seminars for at least four semesters (4 or more half-credits); and a thesis (up to 20 credits). Twenty credits are required for a Ph.D. with prior M.Eng. or M.S. degree: three foundation courses (3 credits), graduate elective courses (at least 1 credit), research seminars for at least four semesters (2 or more credits), and a thesis (up to 14 credits).

For more detailed information, please visit the website <http://engineering.tufts.edu/bme>.

Biopsychology

(FOR DEGREE REQUIREMENTS, SEE BIOLOGY OR PSYCHOLOGY.)

Biotechnology

FACULTY ADVISOR:

Professor David Kaplan, *Biomedical Engineering/Chemical and Biological Engineering*

Biotechnology has applications in a number of diverse fields, including recent growth in gene therapy, protein and tissue engineering, bioinformatics and bioremediation. The tools of biotechnology are now universally applied both to basic research efforts and to large-scale manufacturing processes, and the field is continuing to grow at a rapid pace.

SECOND MAJOR IN BIOTECHNOLOGY

This program is offered as a major only in conjunction with enrollment in a regular undergraduate major, ordinarily excluding interdisciplinary programs. The biotechnology program has been designed with two tracks: a science track for undergraduate students enrolled in the College of Liberal Arts, and an engineering track for undergraduate students enrolled in the School of Engineering.

Core Curriculum

Engineering Science 11 Engineering and Biology or

Biology 13 Cells and Organisms

Biology 41 Genetics

Biomedical Engineering/Chemical and Biological

Engineering 62/162 Molecular Biotechnology

One laboratory course from:

Biology 50 Experiments in Biology II

Biomedical Engineering 175 Tissue Engineering Laboratory

Chemical and Biological Engineering 163 Recombinant DNA Techniques

Chemical and Biological Engineering 168 Biotechnology Processing Projects Laboratory

Track Curricula

SCIENCE TRACK

Two core courses:

Biology 105 Molecular Biology

Biology 152 Biochemistry and Cellular Metabolism or

Biology/Chemistry 171 Organic Chemistry of Living Systems: Biochemistry

Four electives from:

- Biology 103** Developmental Biology
- Biology 104** Immunology
- Biology 106** Microbiology
- Biology 153** Topics in Biochemistry
- Biology 177** Topics in Inflammation
- Biology 184** Topics in Developmental Biology
- Biomedical Engineering/Biology/Chemical and Biological Engineering 162** Molecular Biotechnology
- Biomedical Engineering 165** Drug Delivery
- Chemical and Biological Engineering 160** Biochemical Engineering
- Chemical and Biological Engineering 161** Protein Purification
- Biomedical Engineering/Chemical and Biological Engineering 153** Biomaterials and Regenerative Medicine
- Biomedical Engineering/Chemical and Biological Engineering 154** Tissue Engineering and Regenerative Medicine
- Chemical and Biological Engineering 166** Principles of Cell and Microbe Cultivation
- Chemical and Biological Engineering 167** Metabolic and Cellular Engineering
- Chemistry 135** Biophysical Chemistry

Up to two credits of research may be counted toward electives.

ENGINEERING TRACK

Two core courses:

- Chemical and Biological Engineering 161** Protein Purification
- Chemical and Biological Engineering 166** Principles of Cell and Microbe Cultivation

Four electives from:

- Biology 103** Developmental Biology
- Biology 104** Immunology
- Biology 105** Molecular Biology
- Biology 106** Microbiology
- Biology 152** Biochemistry and Cellular Metabolism
- Biology 153** Topics in Biochemistry
- Biology 177** Topics in Inflammation
- Biology 184** Topics in Developmental Biology
- Biomedical Engineering 165** Drug Delivery
- Chemical and Biological Engineering 160** Biochemical Engineering
- Chemical and Biological Engineering 62/162** Molecular Biotechnology

- Biomedical Engineering/Chemical and Biological Engineering 153** Biomaterials and Regenerative Medicine
- Biomedical Engineering/Chemical and Biological Engineering 154** Tissue Engineering and Regenerative Medicine
- Chemical and Biological Engineering 167** Metabolic and Cellular Engineering
- Chemistry 135** Biophysical Chemistry
- Chemistry 171** Organic Chemistry of Living Systems: Biochemistry

Two credits of research may be counted toward electives.

MINOR IN BIOTECHNOLOGY ENGINEERING

The minor in biotechnology engineering is offered to students in the School of Engineering and the College of Liberal Arts. Five courses are required for this minor.

One course from the following:

- Biology 152** Biochemistry and Cellular Metabolism or
- Biology/Chemistry 171** Biochemistry

Two courses from the following:

- Chemical and Biological Engineering 161** Biochemical Separation
- Biomedical Engineering/Chemical and Biological Engineering/Biology 62/162** Molecular Biotechnology
- Chemical and Biological Engineering 166** Principles of Cell and Microbe Cultivation

One course from the following:

- Biology 50** Experiments in Biology II
- Biomedical Engineering 175** Tissue Engineering Laboratory
- Biomedical Engineering/Chemical and Biological Engineering 163** Recombinant DNA Techniques
- Chemical and Biological Engineering 168** Biotechnology Processing Projects Laboratory

One course from the following:

- Biology 103** Developmental Biology
- Biology 104** Immunology
- Biology 105** Molecular Biology
- Biology 106** Microbiology
- Biology 153** Topics in Biochemistry
- Biology 177** Topics in Inflammation
- Biology 184** Topics in Developmental Biology
- Chemistry 135** Biophysical Chemistry

Chemical and Biological Engineering 160 Biochemical Engineering

Biomedical Engineering/Chemical and Biological Engineering 153 Biomaterials and Regenerative Medicine

Biomedical Engineering/Chemical and Biological Engineering 154 Tissue Engineering and Regenerative Medicine

GRADUATE PROGRAMS

Tufts sponsors graduate training in biotechnology through joint programs with the departments of ChBE, BME, biology, and chemistry, and the Gordon Institute of Engineering Management. Master's degree programs may be entirely course-based (such as the practice-oriented master of engineering degree) or research-based (thesis). Doctoral degree programs may be pursued part-time with a one-year residency requirement. For information about the programs, please refer to the cosponsoring department.

Biology/Biotechnology (M.S./Ph.D.)

Degree programs are designed for students whose interests are in molecular biology and the applied aspects of biotechnology, and who prefer a program emphasizing biology rather than engineering (cosponsored by the Department of Biology).

Biotechnology Engineering (Ph.D.)

Degree programs are designed for students who are interested in the engineering aspects of biotechnology (sponsored by the Departments of Chemical and Biological Engineering and Biomedical Engineering).

Chemistry/Biotechnology (M.S./Ph.D.)

Degree programs are designed for students with interests in chemistry and the applied aspects of biotechnology, and who prefer a program emphasizing the chemical aspects of biotechnology (cosponsored by the Department of Chemistry).

Engineering Management with Specialization in Biotechnology (M.S.)

The master's degree program is designed for working professionals in management or desiring to move into management positions. The program emphasizes a project approach to learning (cosponsored by the Gordon Institute of Engineering Management).

CERTIFICATE PROGRAMS

Tufts offers three graduate-level certificate programs to qualified students in conjunction with the departments of biology, chemical and biological engineering, biomedical engineering, and chemistry. The certificate programs can be completed on a part-time, non-degree basis by students who are seeking professional training in the field or preparing for a degree program. In most cases, courses taken as a certificate student can be transferred into a related master's degree program. The programs are open to students who have already earned a bachelor's degree. Four courses are required for each certificate.

Certificate Program in Biotechnology

The certificate program in biotechnology emphasizes molecular biology practices and state-of-the-art cloning and expression techniques to explore aspects of biotechnology.

Two core courses from the following:

Biology 105 Molecular Biology

Biology 152 Biochemistry and Cellular Metabolism

Biology 153 Topics in Biochemistry

Biomedical Engineering/Chemical and Biological Engineering 153 Biomaterials and Regenerative Medicine

Biomedical Engineering/Chemical and Biological Engineering 154 Tissue Engineering and Regenerative Medicine

Chemistry 171 Organic Chemistry of Living Systems: Biochemistry

Chemistry 172 Advanced Biochemistry

Chemical and Biological Engineering 161 Protein Purification

Chemical and Biological Engineering 162 Molecular Biotechnology

Chemical and Biological Engineering 166 Principles of Cell and Microbe Cultivation

One of these three laboratory courses:

Biomedical Engineering 175 Tissue Engineering Laboratory

Biomedical Engineering/Chemical and Biological Engineering 163 Recombinant DNA Techniques

Chemical and Biological Engineering 168 Biotechnology Processing Projects Laboratory

One elective course in biology, chemical and biological engineering, biomedical engineering, or chemistry that is relevant to biotechnology.

Certificate Program in Biotechnology Engineering

The certificate program in biotechnology engineering emphasizes state-of-the-art bioprocessing principles, utilizing industry-based projects and case studies.

Two core courses:

Chemical and Biological Engineering 161 Protein Purification

Chemical and Biological Engineering 166 Principles of Cell and Microbe Cultivation

One laboratory course:

Biomedical Engineering/Chemical and Biological Engineering 163 Recombinant DNA Techniques or
Chemical and Biological Engineering 168 Biotechnology Processing Projects Laboratory or

Biomedical Engineering 175 Tissue Engineering Laboratory

One elective course in biology, chemical and biological engineering, biomedical engineering, or chemistry that is relevant to biotechnology.

For more detailed information, please visit the website <http://engineering.tufts.edu/chbe>.

Biotechnology and Biotechnology Engineering Certificate Programs

FACULTY ADVISOR:

Professor David L. Kaplan, *Biomedical Engineering/Chemical and Biological Engineering*

The field of biotechnology is vibrant, with constant new developments and advances that are generating opportunities for scientific exploration and employment. New biotechnology-derived pharmaceutical products are gaining FDA approval, the sequencing of the human genome will lead to tremendous new opportunities in disease prevention, and transgenic plants and animals are offering new options in large-scale production of products. The ability to manipulate the genetic content of microbial, insect, animal, and plant cells has led to a variety of commercial applications in medicine, nutrition, materials science, and the environment.

Through industry-based projects and case studies, the certificate courses cover the fundamentals and practical considerations in the field, including construction of recombinant DNA and the production of enzymes, therapeutic proteins, vaccines and small-molecule primary and secondary metabolites. The curriculum features modern techniques for separation and purification of small and large biomolecules, including techniques specially designed for today's biotechnology products. In addition, production and separation case studies emphasize process economics, GMP, and QA/QC.

The program is open to students with a bachelor's degree and a background in biology, chemistry, or engineering. Students who lack the necessary biology or engineering background can take primer courses during the summer.

Two certificate programs are available. Each certificate requires four courses.

For more information, contact the program administrator, Angela Foss, at 617-627-2320, or visit <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

Chemical and Biological Engineering

Professor Kyongbum Lee, *Chair; Metabolic engineering, tissue engineering, systems biology*

Professor Maria Flytzani-Stephanopoulos, *Robert and Marcy Haber Professor in Energy Sustainability; Environmental catalysis, clean energy technologies, nanostructured oxides, fuel cells*

Professor Christos Georgakis, *Modeling, optimization and process control, batch processing*

Associate Professor Jerry H. Meldon, *Mass transfer, reaction-separation coupling*

Associate Professor Matthew Panzer, *Inorganic and hybrid quantum dot/organic optoelectronic devices*

Associate Professor Daniel F. Ryder, *Modeling, process control, bioprocess engineering*

Associate Professor Emmanuel S. Tzanakakis, *Stem cell engineering, tissue engineering, computational biology*

Associate Professor Hyunmin Yi, *Nanobiofabrication, smart biopolymers, BioMEMS*

Assistant Professor Ayse Asatekin, *Advanced membranes for clean water and separations, macromolecular design, self-assembling polymers*

Assistant Professor James Van Deventer, *Protein engineering, non-canonical amino acids, cancer, directed evolution, yeast display*

Assistant Professor Nikhil Nair, *Systems bioengineering, synthetic biology, protein engineering, metabolic engineering*

Professor of the Practice Derek Mess, *Thermal barrier coating, solid oxide fuel cell ceramics*

Research Professor Darryl Williams, *Nanobiotechnology, STEM education*

SECONDARY APPOINTMENTS:

Professor Linda M. Abriola, *Civil and Environmental Engineering; Groundwater hydrology, contaminant fate and transport*

Professor David L. Kaplan, *Biomedical Engineering; Biotechnology, biomaterials, tissue engineering*

Assistant Professor Qiaobing Xu, *Biomedical Engineering; Biomaterials, drug delivery, micro/nanofabrication, tissue engineering*

Chemical engineering builds on the sciences, especially chemistry and biology, to design processes and products that are useful for society. Chemical engineers tend to be the broadest of all engineers and thus are employed in a wide range of industries. Besides being well-trained in sciences, they appreciate the central role of economics, as they are often concerned with the production of products that will be sold and bought at an affordable price. Their professional skills are required wherever engineering and chemistry or biology intersect. This occurs not only in the chemical industry but also in the biological, environmental, health, legal, and medical fields. Chemical engineers are researchers, designers, producers, and managers. Petroleum, paints, plastics, paper, detergents, pharmaceuticals, vaccines, microchips, drugs, processed foods, fertilizers, conventional and nuclear fuels, insecticides, rocket propellants, synthetic fibers, and rubber are among the many products they help create.

Students who major in chemical engineering have considerable flexibility in choosing a program and are assisted in doing so by a departmental advisor. A student may choose a curriculum leading to the professional degree of Bachelor of Science in chemical engineering or a curriculum leading to the more general Bachelor of Science in engineering. The professional degree curriculum is accredited by the Accreditation Board for Engineering and

Technology (ABET) and prepares its recipients for professional practice or graduate study. Most of the recipients of this degree follow various engineering careers. Many students also use the professional degree curriculum as preparation for further study in medicine, law, business, or science.

The general engineering degree curriculum is similar to that of a science major in the College of Liberal Arts. It allows more electives than the professional degree curriculum, as well as more courses in the humanities and social sciences. This curriculum is intended for students who desire an understanding of engineering fundamentals and will make their careers in related fields such as medicine, business and law. This degree is not ABET accredited.

Undergraduates are encouraged to participate in the department's research programs and independent study for degree credit.

UNDERGRADUATE PROGRAM

Bachelor of Science in Chemical Engineering

The mission of the B.S.Ch.E. degree program offered by the Chemical and Biological Engineering Department is to provide its undergraduate students:

- a. A strong foundation in the pure sciences, including biology, chemistry, mathematics and physics.
- b. A solid understanding of the fundamental chemical engineering sciences, coupled with quantitative skills, so as to provide a basis for a successful professional career within the technology fields.
- c. Training in communication skills consistent with the requirements of both the technical professions and the broader community in which they live.
- d. A capacity and desire for the pursuit of lifelong learning. The faculty is committed to accomplishing this mission through the integration of teaching and research.

The goals of the B.S.Ch.E. program are to:

- a. Provide students a sound technical foundation in both the traditional and emerging areas of chemical engineering. In particular, the Tufts B.S.Ch.E. program emphasizes the incorporation of the biological sciences into the technical foundation throughout the curricula.

- b. Provide quality instruction emphasizing the logical identification and solution of problems; the solution of complex quantitative problems using computational methods; and the application of engineering analysis to the chemical and biological sciences.
- c. Offer a high-quality instruction that not only encompasses the technical content but also makes students aware of the societal implications of technology.
- d. Provide students the opportunity to formulate, analyze, and solve engineering problems within a team structure, and to communicate their findings in both written and oral forms.
- e. Encourage and provide opportunities to sample specialized areas through elective courses, minor programs, industrial internships, and independent research, and as such, to foster an appreciation for lifelong education.

A suggested program of required courses and free electives for the bachelor of science degree in chemical engineering (accredited program) follows.

First-Year Program

FALL TERM

Engineering Science 93

Mathematics 32 Calculus I

Chemistry 1 or **11** Chemical Fundamentals with Laboratory

English 1 Expository Writing

SPRING TERM

Engineering Science 2 Introduction to Computing in Engineering

Mathematics 36 Applied Calculus II

Chemistry 2 or **12** Chemical Principles with Laboratory

Physics 11 General Physics I with Laboratory
Humanities/social sciences/arts elective

Sophomore Year

FALL TERM

Chemistry 31 and **33** Physical Chemistry I with Laboratory

Mathematics 42 Calculus III

Chemical and Biological Engineering 10 Chemical Process Principles

Biology 13 or **Engineering Science 11** Cells and Organisms with Laboratory or Fundamentals of Biological Systems
Humanities/social sciences/arts elective

SPRING TERM

Chemical and Biological Engineering 11 Chemical Engineering Thermodynamics

Chemical and Biological Engineering 39 Applied Numerical Methods for Chemical and Biological Engineers

Mathematics 51 Differential Equations

Engineering Science 10 Introduction to Materials Science
Humanities or social sciences elective

Junior Year

FALL TERM

Chemical and Biological Engineering 21 Transport Phenomena I

Chemistry 51 and **53** Organic Chemistry I with Laboratory
Engineering Science 3 Introduction to Electrical Systems with Laboratory
Humanities or social sciences elective

SPRING TERM

Biology 152 Biochemistry and Cellular Metabolism

Chemical and Biological Engineering 22 Transport Phenomena II

Chemical and Biological Engineering 102 Reactor Design
Chemical and biological engineering elective

Senior Year

FALL TERM

Chemical and Biological Engineering 45 Chemical and Biological Separations

Chemical and Biological Engineering 51 Chemical and Biological Engineering Unit Operations Laboratory (half credit)

Chemical and Biological Engineering 109 Process Dynamics and Control

Chemical and Biological Engineering Foundation elective
Chemical and Biological Engineering Concentration elective

SPRING TERM

Chemical and Biological Engineering 52 Chemical and Biological Engineering Projects Laboratory

Chemical and Biological Engineering 60 Product and Process Design

Chemical and Biological Engineering Concentration elective

Humanities/social sciences/arts elective
Free elective

Approved Foundation Elective Courses

Three foundation electives are required and are to be chosen from the following list. Exceptions must be approved by the department.

- Chemistry 32** Physical Chemistry II
- Chemistry 42** Quantitative Analysis
- Chemistry 52** Organic Chemistry II
- Chemistry 61** Inorganic Chemistry
- Chemistry 132** Chemical Kinetics and Dynamics
- Chemistry 133** Quantum Mechanics
- Chemistry 135** Biophysical Chemistry
- Chemistry 136** Spectroscopy and Molecular Structure
- Chemistry 141** Instrumental Analysis
- Chemistry 150** Intermediate Organic Chemistry
- Chemistry 151** Physical Organic Chemistry
- Chemistry 152** Advanced Organic Synthesis
- Chemistry 155** Organic Spectroscopy
- Chemistry 161** Advanced Inorganic Chemistry
- Chemistry 162** Chemistry of Transition Elements
- Chemistry 163** Diffraction Methods of Structure Determination

- Biology 41** General Genetics
- Biology 46** Cell Biology
- Biology 104** Immunology
- Biology 105** Molecular Biology
- Biology 106** Microbiology
- Biology 134** Neurobiology
- Biology 152** Biochemistry and Cellular Metabolism

Physics beyond Physics 12

For natural science courses accepted towards the Engineering degrees, refer to the School of Engineering list posted in the student services website. The following Chemical and Biological Engineering course is also accepted as natural science elective in addition to the School of Engineering list:

- CHBE 163** Recombinant DNA Techniques

The Senior Honors Thesis in Chemical and Biological Engineering

The Senior Honors Thesis program in ChBE is intended for those students who have a record of high performance in both Foundation and ChBE concentration courses and who have developed an interest and some background in a well-focused research topic. Students interested in writing a

Senior Honors Thesis should consult their advisors, the guidelines described under Thesis Honors Program in this bulletin, and the ChBE Department Web pages.

Premedical, Predental, and Preveterinary Preparation via the Chemical Engineering Curriculum

Students interested in entering medical, dental, or veterinary school after graduation can satisfy professional school entrance requirements while working toward a bachelor's degree in the Department of Chemical and Biological Engineering. Modern medical practice and research is increasingly dependent on engineering methods and devices. Automatic instruments now monitor and assist body function. New synthetic materials repair and even replace body tissue. Mathematical equations that describe the flow of fluids in pipes apply to the flow of blood in veins. The kidney, lung, and heart functions have analogies in chemical engineering process equipment.

Computers are used in diagnosis and research. Given these important areas in medicine, there is a need for students to combine undergraduate engineering with graduate medical training. Two kinds of preparatory programs are suggested by the department. The first is the professional degree program in chemical engineering; a student choosing this program must complete all the requirements for the accredited bachelor of science degree in chemical engineering. Courses required for entrance into medical, dental, or veterinary school are met through selection of electives, summer school, or an increase in course load.

The second program has greater flexibility and leads to the non-accredited bachelor of science degree in engineering, described above. This program gives students a foundation in engineering fundamentals and the possibility of satisfying professional school entrance requirements and pursuing individual interests in other fields through selection of electives.

UNDERGRADUATE MINOR PROGRAMS

In addition to completing the courses for the concentration requirement, an undergraduate may elect to enroll in a minor program in a different, although possibly related field. All courses used in fulfillment of the minor program must be taken for a grade. No more than two courses used to fulfill a

foundation or concentration requirement may be counted toward fulfillment of the minor. Students may not complete both a minor and a concentration in the same discipline.

Biotechnology Engineering Minor

Five courses are required to obtain this minor: Biology 152 or Chemistry 156; two courses from the following: Chemical and Biological Engineering 62, 161, or 166; one course from the following: Biology 50, Chemical and Biological Engineering 163 or 168; and an elective chosen from an approved list. No more than two courses used to fulfill a foundation, distribution, or concentration requirement may be counted toward the minor.

Chemical Engineering Minor

Five courses are required: Chemical and Biological Engineering 10, 11, 39, 102; and a chemical engineering elective approved by the minor committee. All courses must be taken for a grade. No more than two courses used to fulfill a foundation, distribution, or concentration requirement may be counted toward the minor.

SECOND MAJOR IN BIOTECHNOLOGY

This program is offered as a major only in conjunction with enrollment in a regular undergraduate major, ordinarily excluding interdisciplinary programs. The biotechnology program has been designed with two tracks: a science track for undergraduate students enrolled in the College of Liberal Arts, and an engineering track for undergraduate students enrolled in the School of Engineering.

Core Curriculum

Biology 1 Introduction to Biology or **Biology 13** Cells and Organisms

Biology 41 Genetics

Chemical and Biological Engineering/Biology 62
Molecular Biotechnology

One laboratory course from:

Biology 50 Experiments in Molecular Biology

Chemical and Biological Engineering 163 Recombinant DNA Techniques

Chemical and Biological Engineering 168 Biotechnology Processing Projects Laboratory

Track curricula

SCIENCE TRACK

Two core courses:

Biology 105 Molecular Biology

Biology 152 Biochemistry and Cellular Metabolism

Four electives from an approved list provided by the department. Up to two credits of research may be counted toward electives.

ENGINEERING TRACK

Two core courses:

Chemical and Biological Engineering 161 Protein Purification

Chemical and Biological Engineering 166 Principles of Cell and Microbe Cultivation

Four electives from an approved list provided by the department. One credit of research may be counted toward electives.

CERTIFICATE PROGRAMS

The Chemical and Biological Engineering Department offers three graduate-level certificate programs to qualified students through the Office of Graduate Studies. The certificate programs, Biotechnology, Biotechnology Engineering and Bioengineering, can be completed on a part-time, non-degree basis by students who are seeking professional training in the field or preparing for a degree program. In most cases, courses taken as a certificate student can be transferred into a related master's degree program. The programs are open to students who have already earned a bachelor's degree. Four courses are required for each certificate.

A certificate builds on the strength of existing Tufts courses and programs. As a certificate student, you have the flexibility to choose courses that were created exclusively for a certificate program, as well as the traditional Tufts graduate and undergraduate courses. In order to accommodate working professionals' schedules, most certificate courses are offered in the late afternoon and evening.

Certificate students may apply later for a related master's or doctoral program at Tufts. Once you have been accepted, you are permitted to transfer four applicable certificate courses into a graduate program.

GRADUATE PROGRAM

The Department of Chemical and Biological Engineering offers instruction leading to the degrees of master of science, master of engineering, and doctor of philosophy. General GRE test scores are required of applicants to all graduate degree programs.

Master of Science or Master of Engineering with Major in Chemical Engineering

Candidates for the master's degree programs in chemical engineering usually hold a bachelor of science degree in chemical engineering or in chemistry, with a suitable background in engineering subjects. A strong background in mathematics, biology, chemistry, and physics is essential. Students with degrees in physical science or other engineering disciplines may become candidates upon satisfactory completion of certain upper-level undergraduate courses. A highly recommended alternative to formal enrollment in academic-year, undergraduate chemical engineering courses is the intensive two-course summer sequence of Chemical and Biological Engineering 1 and 2, which are offered periodically. Successful completion of these courses qualifies a student to apply to the master's degree programs.

Students enrolled in the Master of Science degree program must take seven courses for letter grades. No more than one of these seven may be guided individual study. Generally, at least five credits are from a list of chemical engineering courses; the remaining courses may be in allied fields. A thesis (three credits) is also required, along with an oral examination covering the field of the student's thesis. Only students in the Master of Science degree program may apply for financial assistance.

Students enrolled in the Master of Engineering degree program must take ten courses for letter grades. Generally, at least eight credits are from a list of chemical engineering courses; the remaining courses may be in allied fields.

Master of Engineering or Master of Science with Major in Bioengineering: Cell and Bioprocess Engineering

Cell and Bioprocess Engineering is a new track option of the master's degrees in Bioengineering offered by the School of Engineering. Candidates

for this track usually hold a bachelor of science degree in chemical or biochemical engineering with a suitable background in chemical and biological sciences. Candidates with degrees in biology, biochemistry and strong background in mathematics, chemistry, and physics will also be considered. Students with degrees in physical science or other engineering disciplines who have no background in biology may become candidates upon satisfactory completion of appropriate undergraduate courses. For students without undergraduate engineering degrees, a highly recommended alternative to formal enrollment in academic-year undergraduate chemical engineering courses is the intensive two-course summer sequence of Chemical and Biological Engineering 1 and 2, which are offered periodically. Successful completion of these courses qualifies a student to apply for the master's program. All Bioengineering master's degree candidates must take a common core curriculum totaling four credits. Candidates of the Cell and Bioprocess Engineering track must also take four required courses from a list of approved track-specific courses. An additional two graduate-level elective courses are needed to complete the ten-credit Master of Engineering degree. Students accepted into the program will have the option of petitioning the admissions committee to pursue a Master of Science degree. A student petitioning the committee must have identified a research advisor who agrees to accept the student to their laboratory. Students enrolled in the Master of Science degree program must complete a two-credit thesis (in lieu of the elective credits) in addition to the eight credits of coursework.

Doctor of Philosophy

Doctoral degrees are offered both in Chemical Engineering and in Biotechnology Engineering. Candidates for the Doctor of Philosophy degree, except when otherwise recommended by the department, will have completed the seven courses required for the Master of Science degree. A qualifying examination must be satisfactorily completed. This examination is usually taken after one full year of residence.

In addition to satisfying the university requirements for the Doctor of Philosophy degree, a candidate must satisfactorily complete a program of courses (established by the candidate's committee)

and write a doctoral dissertation. The doctoral dissertation is considered the candidate's major task. It must represent a significant contribution to the field and contain material worthy of publication in a recognized professional journal.

For more detailed information, please visit the website <http://engineering.tufts.edu/chbe>.

Chemical Physics

(FOR DEGREE REQUIREMENTS, SEE CHEMISTRY OR PHYSICS.)

Chemistry

Professor Krishna Kumar, *Chair; Organic chemistry and chemical biology*

Professor Terry E. Haas, *Physical inorganic and materials chemistry*

Professor Jonathan E. Kenny, *Physical and environmental chemistry*

Professor Samuel P. Kounaves, *Analytical, environmental, and planetary chemistry*

Professor Elena Rybak-Akimova, *Inorganic and bioinorganic chemistry*

Professor Mary Jane Shultz, *Surface chemistry, environmental and materials chemistry*

Professor Robert D. Stolow, *Organic chemistry, conformational studies*

Professor E. Charles Sykes, *Physical chemistry*

Professor David R. Walt, *University Professor, Robinson Professorship in Chemistry; Bioorganic and materials chemistry*

Associate Professor Albert Robbat Jr., *Analytical chemistry*

Associate Professor Samuel W. Thomas III, *Organic and materials chemistry*

Associate Professor Arthur L. Utz, *Physical and materials chemistry*

Assistant Professor Clay Bennett, *Bioorganic, chemical biology and synthetic chemistry*

Assistant Professor Joshua A. Kritzer, *Bioorganic chemistry and chemical biology*

Assistant Professor Yu-Shan Lin, *Theoretical and biophysical chemistry*

Assistant Professor Charles R. Mace, *Bioanalytical and materials chemistry*

Assistant Professor Rebecca A. Scheck, *Bioorganic chemistry and chemical biology*

Senior Lecturer Sergiy Kryatov, *Inorganic chemistry and chemical education*

Lecturer Lynne S. Batchelder, *Physical chemistry*

Chemistry, the central science, offers exciting challenges to professionals who seek a fundamental understanding of the world we live in, and creative solutions to the problems confronting the global community. Chemistry offers more than hope in our attempts to feed, clothe, and house our burgeoning populations: It offers possibilities. In the search for renewable substitutes for scarce energy sources and minerals, chemistry provides the basic framework for materials scientists. As the medical community fights to conquer new and old diseases and improve the health of our populations, chemical principles guide the paths of investigators, suggesting correlations in results, and pointing the way toward ultimate solutions.

On a national level, chemistry provides the key to the future. In monitoring, cleaning up, and protecting our environment, chemistry can and must be wisely applied. The U.S. chemical industry remains one of the healthiest branches of the national economy: it employs almost a million people in high-paying manufacturing jobs. Chemicals are one of the few commodity groups in which the U.S. has maintained a good international trade balance during the past decade. From community health to economic well-being, chemistry can be expected to maintain its preeminent role in shaping and protecting our nation's future.

The study of chemistry is appropriate to many different career goals, including medicine, law, physical and social sciences, engineering, and public policy. The Department of Chemistry at Tufts is well equipped to provide basic and advanced chemistry education to undergraduates. It offers a wide variety of courses, newly expanded and improved facilities, an active teaching and research faculty, and a favorable faculty-to-student ratio. Students who participate in research receive a great deal of personal attention from their faculty advisor, and have excellent opportunities for undertaking senior projects and honors theses. They may choose from a broad range of research projects, because the faculty is involved in all the traditional areas of chemical research, as well as many of the exciting new interdisciplinary endeavors.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The chemistry department offers four majors: 1) an American Chemical Society (ACS)–certified major, 2) a chemistry major, 3) a chemical physics major, and 4) a biochemistry major. Each of these four majors must be completed with a minimum GPA of 2.00 for the courses applied to the major.

Additionally, no more than one course (of any credit value) with a grade below a C– may be applied to any of these majors. The ACS-certified degree includes a certificate issued by the American Chemical Society and is recommended for those whose career goals include employment as a professional chemist or scientist, involvement in research, or graduate school in chemistry. Courses leading to a certified major include research that offers students an opportunity to work closely with members of the department’s renowned research faculty. The major in chemical physics is intended for those students who desire a more theoretical, physics-oriented education. The biochemistry major is recommended for those students with an interest in biologically oriented chemistry. The chemistry major offers greater flexibility in course selection. Students with interest in any of these majors should look for more information on the department’s website at <http://chem.tufts.edu>.

ACS-Certified Major in Chemistry

Foundation: Chemistry 1, 11 or 16 and Chemistry 2 or 12. Core courses: Chemistry 31, 32, 33, 34, 42, 51, 52, 53, 54, 61, 63, 171, and one additional course in intermediate or advanced chemistry that has one of the following courses as a prerequisite: Chemistry 32, 42, 52, 61, or 171. Research: Chemistry 81 and 82 (or Chemistry 195 and 199, Senior Thesis). Also required are Mathematics 32 and 34 (or 39 and 44) and Physics 1 (or 11) and 2 (or 12). For more information please visit the department’s website at <http://chem.tufts.edu>.

Major in Chemistry

Foundation: Chemistry 1, 11, or 16 and Chemistry 2 or 12. Intermediate: Chemistry 31, 33, 42, 51, 52, 53, 54; four additional courses in intermediate or advanced chemistry, excluding Chemistry 34. Two of the four additional chemistry courses may be substituted with intermediate or advanced courses in related fields (for details, please visit the depart-

ment’s website at <http://chem.tufts.edu>). Only one course of undergraduate research, either Chemistry 82 (Research II) or Chemistry 199 (the second semester of Senior Thesis) may be counted toward the four additional courses in intermediate or advanced chemistry. Also required are Mathematics 32 and 34 (or 39 and 44) and Physics 1 (or 11) and 2 (or 12).

Major in Chemical Physics

Foundation: Chemistry 1, 11, or 16; Chemistry 2 or 12; Physics 1 or 11; Physics 2 or 12. Concentration: Ten credits of more advanced, one-credit courses—four credits in Chemistry (with a prerequisite of Chem 2 or 12), four credits in Physics (with a prerequisite of Phys 2 or 12), and two credits in mathematics (Math 70 or courses with a prerequisite of Math 42, 44, or 70). The courses must include the following: Physics 13; one credit in advanced laboratory training, either Physics 64 (counts as one advanced physics course) or both Chemistry 33 and 34 (count as one advanced chemistry course); either Chemistry 31 or Physics 52; either Chemistry 32 or Physics 61; and either Chemistry 51 or Chemistry 61. Faculty advisors in the chemistry and physics departments are available for consultation on the chemical physics program.

Major in Biochemistry

Chemistry 1, 11, or 16 and Chemistry 2 or 12; Chemistry 51/53, 52/54, 31, 42, 171, and 172; Biology 13, 41, 50 (or Chemical and Biological Engineering 163), and 105. Course work in mathematics (Mathematics 34) and physics (Physics 2 or 12) is required as a prerequisite to Chemistry 31. The following sequence of courses is suggested for students concentrating in biochemistry: first year, Chemistry 1 (or 11) and 2 (or 12), Biology 13, Mathematics 32; second year, Chemistry 51/53, 52/54, and 171, Mathematics 34, Physics 1 and 2 (or 11 and 12); third year, Chemistry 172, Biology 41, 105, and 50 (or Chemical and Biological Engineering 163); fourth year, Chemistry 31 and 42.

GRADUATE PROGRAM

The Department of Chemistry offers M.S. and Ph.D. degrees in chemistry, chemistry/biotechnology and chemical physics. Students interested in the joint chemistry/biotechnology or chemical

physics program should look for more information on the department's website at <http://chem.tufts.edu>.

In the first year of graduate study, entering students meet with the department's graduate committee and are placed into a series of core courses in each of the traditional areas of chemistry: analytical, inorganic, organic, and physical. These courses are intended to ensure that by the end of the first year the student has an adequate grounding in the fundamentals of chemistry. Each student then takes additional advanced courses in his/her area of specialization.

Master of Science

A candidate for the master of science degree in chemistry is expected to have a satisfactory background in physics, mathematics, and chemistry. All master's degree candidates are required to pass (B- or better) eight formal classroom graduate courses in chemistry or approved, related fields. Four of these courses must be in chemistry. Two may be approved independent study (293, 294). Alternatively, a student may elect to take six formal classroom courses and two credits of research (295, 296). The courses must be chosen in consultation with the graduate committee. Students may also elect to prepare a master's thesis which they must then present and defend before their research committee.

Doctor of Philosophy

The doctorate in chemistry is awarded to students who have demonstrated a broad familiarity with the science of chemistry and a thorough knowledge of their specialized field, and who have displayed competence in planning and conducting chemical research.

By the end of the third semester, each graduate student must pass (with a B- or higher) one formal classroom course in each of the four traditional areas of chemistry. At least six formal graduate courses in chemistry (exclusive of research) are required for the degree and must be completed satisfactorily by the end of the fourth semester. Additional courses in chemistry or related fields may be required by individual research supervisors. Selection of a research supervisor is usually made during the first year on the basis of common interest. The student and research supervisor

nominate two faculty members to serve on the student's doctoral committee. The doctoral committee (in conjunction with the student's research advisor) takes over the advisory function from the graduate committee and guides the student's research to promote his/her development as an independent investigator.

Doctoral students must also satisfy the following requirements:

- 1) Serve as a teaching assistant
- 2) Present a research topic to the research committee by the end of the third semester
- 3) Present a study topic as a public seminar and defend it in a private meeting with the research committee by the end of the fourth semester
- 4) Submit a third-year research report to the research committee by the end of the sixth semester
- 5) Prepare and defend an original research proposal by the end of the eighth semester
- 6) Defend a thesis

The department is actively engaged in research in the areas of organic, inorganic, physical, and analytical chemistry, as well as the interdisciplinary areas of bioorganic, environmental, and materials chemistry. For more information concerning research interests, facilities, and financial aid, please see the booklet Graduate Program in Chemistry, available on the department's website at <http://chem.tufts.edu>.

CHILD STUDY and HUMAN DEVELOPMENT

ELIOT-PEARSON DEPARTMENT OF CHILD STUDY and HUMAN DEVELOPMENT

Professor David Henry Feldman, *Chair; Cognitive development, developmental and educational theory, creativity*

Professor Marina Bers, *Math, Science and Technology/ Engineering Initiative; Educational technology, impact of new technologies for personal, social and moral development, use of technology in hospitals, museums, schools and communities*

Professor M. Ann Easterbrooks, *Family development, social and emotional development, infancy*

Professor Richard M. Lerner, *Bergstrom Chair in Applied Research in Youth Development; Director, Institute for Applied*

Research in Youth Development; Application of developmental science across the life span, personality and social development in adolescence, university-community collaboration and outreach scholarship

Professor Maryanne Wolf, *John DiBiaggio Chair in Citizenship and Public Service; Director, Center for Reading and Language Research; Dyslexia, cognitive neurosciences, cognition, developmental psycholinguistics, reading development and intervention*

Associate Professor Kathleen A. Camara, *Family relationships, social development, research methodology*

Associate Professor Calvin Gidney III, *Linguistics, literacy, sociolinguistic development, language of African-American children, language in children's television, development of children's language attitudes*

Associate Professor Francine Jacobs, *Child and family policy, program evaluation*

Associate Professor Tama Leventhal, *Neighborhood influences on children, youth, and families; social policy*

Associate Professor Christine McWayne, *Early childhood education; low-income, urban-residing children's school success; family engagement in children's early education; community-based research collaborations*

Associate Professor Jayanthi Mistry, *Cultural perspectives on development; navigating multiple cultural worlds and identities; interpretive methods in the study of children and families*

Associate Professor Ellen E. Pinderhughes, *Influences on family socialization processes among families with children at risk for problematic outcomes; adoption and foster care*

Assistant Professor Sasha Fleary, *Pediatric psychology, child health*

Senior Lecturer Julie Dobrow, *Director, Communication and Media Studies; Effects of media on children, ethnic and gender representations in media*

Senior Lecturer Martha Pott, *Coordinator of Capstone Internships for M.A. Applied Program; Education, personal-social development*

Senior Lecturer W. George Scarlett, *Deputy chair; Children's play; religious and spiritual development; behavior and classroom management; organized youth sports*

Lecturer Cynthia Ballenger, *Early childhood education, culture and early childhood education, sociolinguistics*

Lecturer Bruce Johnson, *Early childhood curriculum, early care and education policy, teacher professional development*

Lecturer Kerri Modry-Mandell, *Fieldwork Administrator; Pediatric psychology, developmental psychopathology*

SECONDARY APPOINTMENTS:

Adjunct Professor Laurie Miller, *Professor of Pediatrics and Adjunct Professor of Nutrition (Friedman School); Medical and developmental issues related to international adoption, health, nutrition, and developmental studies of rural children in Nepal and Uganda; interventions to improve nutritional outcomes*

Assistant Research Professor Kristina Schmid Callina, *Institute for Applied Research in Youth Development, The role of hope in Positive Youth Development; Educational and out-of-school time programs to promote character development among youth*

Assistant Research Professor Jana H. Chaudhuri, *Tufts Interdisciplinary Evaluation Research (TIER)*

Associate Research Professor Jessica Goldberg, *Tufts Interdisciplinary Evaluation Research (TIER)*

Assistant Research Professor Lacey J. Hilliard, *Institute for Applied Research in Youth Development; social group processes, gender development, social and emotional learning, positive media and technology engagement*

Assistant Research Professor Sara K. Johnson, *Institute for Applied Research in Youth Development; civic engagement, identity development, advanced statistical methods*

Assistant Research Professor Jun Wang, *Institute for Applied Research in Youth Development, the development and socialization of emotion regulation and self-regulation, adult-child interaction, sociocultural influence on development*

The Department offers an interdisciplinary array of courses and experiences, which are complemented with observations and field work with children in a wide range of applied settings, including hospitals, schools, clinics, day care centers, educational television studios, museums, and juvenile courts. Students completing the Child Study and Human Development major select from the following areas of specialization or focus: child and family health, early childhood education, developmental theories, children and the arts, technology and media, and child and family policy. Those majoring in child study and human development receive a strong foundation in applied developmental science, an interdisciplinary field that generates and uses theory and research about human development to improve the lives of children, youth, and families around the world.

Students who complete the major are likely to continue on to graduate work in child-related disciplines (e.g., pediatrics, clinical child psychology), or employment in various fields, such as early childhood education, clinical psychology, pediatric

psychology, law and juvenile justice, public policy, and other disciplines that have the health, education, and welfare of children as their primary goal. For those preparing for careers in early childhood education, the Department offers a teacher preparation program leading to preK-2nd grade initial licensure that students can complete as undergraduates (provided they are admitted into this program by their first semester of junior year), as well as a 4 + 1 joint BA/MAT program leading to preK-2nd grade initial licensure. See below for more details.

DEPARTMENT FACILITIES

Eliot-Pearson Children's School

Architecturally attached to the Department of Child Study and Human Development, the Eliot-Pearson Children's School is a laboratory school serving eighty children ages 2.9 to 8 (preschool through second grade). Classrooms are fully integrated, including children with special needs and children and families from diverse cultural and economic backgrounds. The school is an exemplary early-childhood program, modeling innovative developmental education and curricula. Observation facilities and practicum sites provide exceptional training and research opportunities for Tufts undergraduate and graduate students and early-childhood professionals from across New England. The children's school also offers a range of programming for parents and families. For more information, visit <http://ase.tufts.edu/epcs/>.

Evelyn G. Pitcher Curriculum Resource Laboratory

Adjoining the department is the Evelyn G. Pitcher Curriculum Resource Lab, a multi-purpose space with art/workshop studio, computers to access curricular resources online, seminar space with audio-visual capabilities, and a lending library of resource books and early childhood classroom materials. The lab hosts workshops, seminars and conferences for Tufts students, alumni and early childhood teachers and administrators from surrounding cities and towns, focusing on evidence-based best practices that support children's language and literacy development as well as science, technology, engineering, mathematics, and nature studies/sustainability education in urban settings. For more information, visit <http://ase.tufts.edu/pitcherCurriculumLab/>.

Institute for Applied Research in Youth Development

The institute creates programs and projects that use the framework of applied developmental science to promote healthy, positive development among diverse children, adolescents, families, and communities. For more information, visit <http://ase.tufts.edu/iaryd>.

Center for Reading and Language Research

The center offers a variety of research, teaching, and internship opportunities to students and faculty and a range of services to the surrounding communities. For more information, visit <http://ase.tufts.edu/crlr>.

Developmental Technologies Research Group (DevTech)

Established and directed by Dr. Marina Umaschi Bers, DevTech aims to understand how new technologies can play a positive role in children's development and learning. <http://ase.tufts.edu/devtech/>.

Tufts Interdisciplinary Evaluation Research (TIER)

(formerly Massachusetts Healthy Families Evaluation)

Tufts Interdisciplinary Evaluation Research (TIER) is committed to conducting high-quality, collaborative evaluation research that contributes to expanding usable knowledge in fields such as applied developmental science, policy science, and urban planning, and to improving policies and programs for children, families, and communities. <http://ase.tufts.edu/tier/about/index.htm>.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Child Study and Human Development

The major in Child Study and Human Development requires ten courses, including Child Development 1 (no substitutes allowed), and an additional course with a developmental theory focus. With departmental approval, one "related fields" course can be from outside the department. Students are required to have at least one fieldwork or research experience as well as three courses from within one of the Department's four areas of specialization or focus (see above). Please see the Department's website at <http://ase.tufts.edu/epcshd/undergraduate> for complete information on requirements.

Early Childhood (Pre-K to Grade 2), 4 + 1, Joint B.A./M.A.T. Program

With a focus on urban education, students choosing this option will receive a B.A. in Child Study and Human Development (10 credits) and then an M.A.T. after one more year. During their undergraduate years, the students will need to take two courses in Child Study and Human Development beyond the requirement for the B.A. These courses will be credited towards the M.A.T. degree. The M.A.T. year includes a significant tuition reduction as well as the possibility of other financial aid. See description below of the M.A.T. program.

UNDERGRADUATE MINOR PROGRAM

The Department of Child Study and Human Development offers a minor in child study and human development. Five courses are required, two of which are to be chosen from Child Development 1, 51 or 151, 61 or 161, and 155. Three additional electives are to be chosen from other course offerings within the department.

AMERICAN SIGN LANGUAGE (ASL)

The department offers three levels of American Sign Language. Undergraduates completing all three can have ASL fulfill Part I or Part II of the foreign language (foundation) requirement.

GRADUATE PROGRAMS

The Department of Child Study and Human Development offers the master of arts degree, a joint master of arts degree with the Department of Urban and Environmental Policy and Planning, the master of arts in teaching (M.A.T.) degree, and the Ph.D. degree. Along with the standard material sent to the graduate school, applicants for admission to these graduate programs must include a statement of two to three typewritten pages describing their motivation for applying for graduate work in child study and human development and the ways in which they envision using the education received at Tufts. Except in the case of Tufts undergraduate seniors, scores from the Graduate Record Examination are required. The deadline for applications is January 1, although applications received after January 1 are considered, based on the availability of places. For more detailed information please visit the website <http://ase.tufts.edu/epcshd/graduate>.

Master of Arts (M.A.)

The master of arts degree requires the satisfactory completion of a ten-credit course of study. Students interested in engaging in child study and human development research conclude the program by writing a thesis; students interested in the more applied, practical aspects of child study and human development conclude the program with an intensive supervised internship. Each route offers a combination of required and elective courses. The M.A. degree program serves child study and human development students with a broad range of professional and intellectual interests. Graduates enter positions in human services agencies, research organizations, schools and early childhood programs, advocacy groups, and institutions of higher education. A significant percentage of graduates continue their studies in Ph.D., Psy.D., and other programs in developmental or clinical psychology; in law schools; in medical schools; and in other degree-granting post-MA programs.

Master of Arts (M.A.) Program with Urban and Environmental Policy and Planning

The master of arts degree offered jointly by the Department of Child Study and Human Development and the Department of Urban and Environmental Policy and Planning is a fourteen-credit graduate program in child and family policy. Students matriculate in two nationally renowned departments at Tufts and fulfill the general requirements for each, including courses in developmental psychology, policy planning and analysis, and research methods and statistics. In addition, they follow a specific course of study in child and family policy, culminating in a master's thesis. Contact either department for more information.

Master of Arts in Teaching (M.A.T.) Early Childhood (PK-Grade 2)

This two-year (12.5 credits) program is committed to preparing early childhood teachers for urban education settings. In addition to a focus on early childhood curriculum and pedagogy, coursework and field placements emphasize multidisciplinary study of poverty and declining city neighborhoods' effects on children and families, immigrant families and their young dual language learners, and social and educational policy. Particular signatures of the program include Science, Technology, Engineering,

and Mathematics (STEM) teaching and learning; a focus on teaching and learning with dual language learners (DLLs); and inclusive classroom settings. Students integrate a developing theoretical understanding of the unique needs and abilities of young learners with extensive practical experiences in our lab school (<http://ase.tufts.edu/epcs/>) and in urban public school classrooms.

Doctor of Philosophy (Ph.D.)

The doctoral program in child study and human development prepares individuals for either academic or applied settings involving children, youth, and their families. Such settings include schools, hospitals, social service agencies, the arts and media, courts, clinical research centers, and policy organizations, as well as colleges and universities. Accordingly, intensive training in theory and research methodology is involved, as well as extensive field experience. Applicants should have a strong background in the behavioral sciences.

Course work during the first two years emphasizes the major theoretical orientations of the field and research methods and statistics. The remaining courses are selected in accordance with the student's academic plan, which is decided by the student and his or her advisors.

On completion of course work and an internship, students are required to undergo a qualifying review. Two major papers related to theory and research in child study and human development are submitted, and the student's progress and course of study in the doctoral program are reviewed. Successful completion of this review is a prerequisite to further doctoral study.

Internships are selected according to the participant's career interests, with students serving as supervised trainees in the service and research functions of the particular setting. The remainder of the program is devoted to participation in research and the completion and defense of a dissertation.

Ph.D. in Human Developmental Economics (HDE)

The Eliot-Pearson Department of Child Study and Human Development (CSHD) and the Economics Department offer a joint Ph.D. program in Human Developmental Economics (HDE). This interdisciplinary doctoral program provides theoretical and methodological training in human development through the integrative study of social, emotional,

economic, and behavioral processes as they contribute to socialization, decision making, and positive human development. Training involves course work in both departments, field work, theoretical and empirical qualifying papers, and dissertation research. Students focus their dissertation study in economics or human development based on the electives taken.

For more detailed information, please visit the website <http://ase.tufts.edu/epcshd>.

Chinese

(FOR DEGREE REQUIREMENTS, SEE GERMAN, RUSSIAN, AND ASIAN LANGUAGES AND LITERATURES.)

Civil and Environmental Engineering

Professor Kurt D. Pennell, *Chair, Bernard M. Gordon Senior Faculty Fellow in Environmental Engineering; Contaminant remediation, engineered nanomaterials, environmental toxicology, metabolomics*

Professor Linda M. Abriola, *University Professor; Groundwater hydrology, multiphase flow and transport in porous media*

Professor Laurie G. Baise, *Geotechnical and geosystems engineering, seismic hazard analysis, geohazards*

Professor Steven C. Chapra, *Louis Berger Chair of Civil and Environmental Engineering; Water quality modeling, advanced computer applications in environmental engineering*

Professor David M. Gute, *Environmental and occupational epidemiology*

Professor Daniel A. Kuchma, *Design, behavior, and modeling of concrete structures*

Professor Shafiqul Islam, *Hydroclimatology, hydroepidemiology, water diplomacy*

Professor Masoud Sanayei, *Structural engineering, bridge structural health monitoring, building floor vibrations*

Professor Richard M. Vogel, *Water resources, environmental statistics, hydrology and hydraulics*

Emeritus Professor Linfield C. Brown, *Water quality modeling, environmental engineering and statistics*

Emeritus Professor Lewis Edgers, *Geotechnical and geo-environmental engineering*

Associate Professor Wayne Chudyk, *Drinking water quality and toxic materials, groundwater monitoring*

Associate Professor Luis Dorfmann, *Structural engineering and solid mechanics*

Associate Professor John L. Durant, *Chemical fate and transport, water quality, urban air pollution*

Associate Professor Stephen H. Levine, *Environmental, ecological and economic systems modeling*

Associate Professor Babak Moaveni, *Structural engineering, structural health monitoring, structural dynamics*

Associate Professor C. Andrew Ramsburg, *Environmental remediation, emerging contaminants, water reuse*

Associate Professor Christopher Swan, *Faculty Fellow, College of Citizenship and Public Service; Geotechnical and geo-environmental engineering*

Assistant Professor Daniele S. Lantagne, *Public health engineering, global health, water-borne pathogens*

Assistant Professor Robert C. Viesca, *Applied mechanics in earth sciences and engineering*

Professor of the Practice Brian Brenner, *Bridge design, structural engineering*

Professor of the Practice Eric M. Hines, *Structural engineering*

Research Professor John T. Germaine, *Geotechnical, laboratory testing, soil behavior, physical properties*

Research Assistant Professor Natalie L. Cápiro, *Environmental biotechnology and bioremediation*
Senior Lecturer Mark A. Woodin, *Environmental and occupational epidemiology*

Senior Lecturer James F. Limbrunner, *Hydrology, integrated water resources management*

Emeritus Senior Lecturer Lee R. Minardi, *Computer-aided design, geometric modeling, applied mechanics*

Lecturer Anne Marie C. Desmarais, *Environmental health*

Lecturer Magaly Koch, *Remote sensing and geographic information systems*

SECONDARY APPOINTMENTS:

Adjunct Professor Doug Brugge, *Tufts University School of Medicine; Public health, community medicine*

Adjunct Professor Grant Garven, *Earth and Ocean Sciences; Groundwater geology and hydrology*

Adjunct Professor Jeffrey K. Griffiths, *Tufts University School of Medicine; Global health, infectious diseases*

Adjunct Professor Mark Kachanov, *Mechanical Engineering; Solid mechanics, applied mathematics*

Adjunct Professor Elena Naumova, *Associate Dean; Gerald J. and Dorothy R. Friedman School of Nutritional Science and Policy, Public health, infectious diseases, biostatistics, epidemiology, nutrition and growth*

PART-TIME FACULTY:

Visiting Scholar Andrey I. Egorov, *Environmental health, surveillance, epidemiology of waterborne infections*

Visiting Scholar Richard P. Hooper, *Hydrology and catchment biogeochemistry, information systems*

Visiting Scholar Annette T. Huber-Lee, *Integrated water and land planning, economics of water*

Visiting Scholar Paul H. Kirshen, *Water resources planning and management, impacts of climate change*

Lecturer Po-Shang Chen, *Structural Engineering*

Lecturer David J. Hatem, *Professional and Legal issues*

Lecturer Michael Paster, *Geotechnical engineering*

Lecturer Damian R Siebert, *Geotechnical Engineering*

Lecturer Stephen G. Zemba, *Air pollution control*

Civil and Environmental Engineering (CEE) is one of the most diverse engineering disciplines, encompassing environmental and water resources engineering, geosystems engineering, public health engineering, and structural engineering. Civil and environmental engineers are responsible for the planning, design, construction, and operation of structures and facilities that are essential to the environment and infrastructure of a sustainable society. Traditionally these structures included buildings, highways, water and waste treatment plants, tunnels, airports, harbors, railroads, bridges, and dams. Today, civil and environmental engineers are involved in a wide range of engineered and natural systems that contribute to a modern society and protect the environment and public health. These activities include the development and testing of new materials, structural health monitoring and rehabilitation, management and protection of watersheds and water supplies, mathematical modeling of built and natural environments, bioremediation and exposure assessment.

Structural engineers are involved the planning, design and monitoring of buildings, bridges, dams, vehicle frames, and special structures such as power transmission towers and wind turbines. The activities of structural engineers range from analysis and design of basic structural components such as beams, columns and floor slabs to the study of material properties and biomechanics.

Geosystems engineers specialize in the study of soil and rock mechanics and in the analysis of problems of soil response to loads, groundwater flow, and environmental contaminants. Geosystems

engineers evaluate the hazard related to landslides and earthquakes and design a variety of earth structures such as dams, embankments, landfills and containment structures for hazardous waste sites, as well as foundations for bridges, buildings, and offshore platforms.

Environmental engineers seek to protect human health and the environment through the planning and design of air and water pollution control facilities, treatment and disposal of hazardous wastes, and the development of treatment technologies for persistent and emerging contaminants such as nanomaterials and chlorinated solvents. Water resource engineers are concerned with the planning, design and operation of water resource systems and the restoration of rivers and watersheds. Water resource engineers are involved in projects ranging from flood control works to hydropower stations, water supply systems, and storm-water systems.

Public health engineers assess the impacts of environmental exposures to biological, chemical and physical hazards on human health, design engineered controls for water-borne diseases and other human health risks, and measure and predict the effects of environmental factors on the occurrence and transmission of disease.

UNDERGRADUATE PROGRAM

The Department of Civil and Environmental Engineering (CEE) offers two primary undergraduate degrees: the Bachelor of Science in Civil Engineering (B.S.C.E.) and the Bachelor of Science in Environmental Engineering (B.S.EV.E.). The programs leading to the B.S.C.E. and B.S.EV.E. degrees are accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET), and satisfy the degree requirements needed to take the Fundamentals of Engineering (FE) examination, an important step toward registration as a licensed professional engineer. Depending upon a student's background and interests, there are numerous opportunities to utilize advanced placement credits, obtain a minor, complete dual majors, and participate in study abroad and internship programs. The overall goals of the B.S.C.E. and B.S.EV.E. programs are for students to learn the fundamental engineering principles, to master engineering methods for solving challenging

problems, and to effectively communicate engineering solutions to both technical and non-technical audiences. The CEE faculty is dedicated to accomplishing these goals through the integration of teaching, research, and professional practice.

Bachelor of Science in Civil Engineering

B.S.C.E. degree program prepares students for a career in civil and environmental engineering. The B.S.C.E. provides instruction in one of four subareas: environmental engineering, geotechnical engineering, structural engineering, and water resources engineering. The mission of the B.S.C.E. program is to provide students with an educational experience that builds a sound foundation for professional practice and provides technical skills that serve as a basis for career advancement and life-long learning. Program objectives are achieved by developing a broad understanding of civil and environmental engineering, fundamental engineering principles, and connections with the humanities, arts, and social sciences. The curriculum emphasizes the application of basic sciences, computing, and mathematics for engineering design. Students completing the B.S.C.E. program are also well qualified for graduate study in engineering, architecture, construction, business management, and law.

DEGREE REQUIREMENTS

The B.S.C.E. program is accredited by the Engineering Accreditation Commission of ABET (www.abet.org). Following the guidelines of the School of Engineering, a total of thirty-eight courses are required to fulfill the B.S.C.E. degree requirements. Of these thirty-eight course credits, a minimum of 9.5 course credits must be completed in college-level math and basic science subjects appropriate to the discipline, and a minimum of 14.5 course credits must be completed in engineering topics, consistent with ABET general and program criteria. Introductory science and engineering requirements account for ten courses, with six humanities, social science and arts electives, and two free electives. Eight courses provide an engineering foundation. Twelve courses fulfill the degree concentration requirements. Within the concentration requirement, there are five required core courses (CEE 1, 12, 22, 32, and 42), three

concentration electives, three design electives, and a capstone design course (CEE 81). The three design electives are selected from at least two sub-disciplines: structural engineering, water resources engineering, environmental engineering and geotechnical engineering. An example sequence of courses for the B.S.C.E. degree is provided below.

Freshman Year

FALL TERM

ES 93 First Year Engineering Elective

MATH 32 Calculus I

PHY 11 General Physics I

ENG 1 Expository Writing

SPRING TERM

ES 2 Intro. to Computing in Engineering

MATH 36 Applied Calculus II

CHEM 1 Chemical Fundamentals

Natural Science Elective

Sophomore Year

FALL TERM

ES 5 Intro. to Mechanics: Statics and Dynamics

ES 18 Computer Aided Design

MATH 42 Calculus III

PHY 12 General Physics II or **CHEM 2** Chemical Principles

Humanities/Art/Social Science (HASS) Elective

SPRING TERM

ES 9 Applied Mechanics: Strength of Materials

CEE 1 Intro. to Civil and Environmental Engineering

MATH 51 Differential Equations

Foundation Elective

HASS Elective

Junior Year

FALL TERM

ES 8 Fluid Mechanics

ES 55 Numerical Methods for Engineers

CEE 22 Structural Analysis

CEE 42 Intro. to Geotechnical Engineering

HASS Elective

SPRING TERM

ES 56 Probability and Statistics

CEE 12 Hydraulic Engineering

CEE 32 Environmental Engineering Principles

Foundation Elective

Design Elective

Senior Year

FALL TERM

EM 51 Engineering Management

Design Elective

Concentration Elective

Concentration Elective

Free Elective

SPRING TERM

CEE 81 CEE Capstone Design

Design Elective

Concentration Elective

HASS Elective

Free Elective

Bachelor of Science in Environmental Engineering

The Bachelor of Science in Environmental Engineering (B.S.EV.E.) is designed for students who desire focused instruction in environmental engineering, including greater emphasis on chemical and biological principles. The B.S.EV.E. program emphasizes the development of an in-depth understanding of environmental engineering principles, with applications to water and wastewater treatment, water resources engineering, environmental remediation, air quality control, and public health engineering. The mission of the B.S.EV.E. program is to provide students with undergraduate educational experiences that serve as a sound basis for professional practice in environmental engineering, as well as the necessary preparation for advanced study at the graduate level.

DEGREE REQUIREMENTS

The B.S.EV.E. program is accredited by the Engineering Accreditation Commission of ABET (www.abet.org). Following the guidelines of the School of Engineering, a total of thirty-eight course credits are required to fulfill the B.S.EV.E. degree requirements. Of these thirty-eight course credits, a minimum of 9.5 course credits must be completed in college level math and basic science subjects appropriate to the discipline, and a minimum of 14.5 course credits must be completed in engineering topics, consistent with ABET general and program criteria. Introductory science and engineering requirements account for ten courses, with six humanities, social science and arts electives, and two free electives. Eight courses serve as engineering foundation, including two foundation electives.

Twelve courses fulfill the degree concentration requirements. Within the concentration requirement, there are five required core courses (CEE 12, 30, 32, 132 and ES 27), four concentration electives, two design electives, and a capstone design course (CEE 81). The two design electives are selected from CEE 112 (Water Resources Engineering), CEE 133 (Water and Wastewater Plant Design), CEE 136 (Air Pollution Control), and CEE 143 (Site Remediation). An example sequence of courses for the B.S.EV.E. degree program is provided below.

Freshman Year

FALL TERM

ES 93 First Year Engineering Elective

MATH 32 Calculus I

CHEM 1 Chemical Fundamentals

ENG 1 Expository Writing

SPRING TERM

ES 2 Intro. to Computing in Engineering

MATH 36 Applied Calculus II

CHEM 2 Chemical Principles

PHY 11 General Physics I

Sophomore Year

FALL TERM

ES 5 Intro to Mechanics: Statics and Dynamics

MATH 42 Calculus III

CHEM 31 Physical Chemistry

BIO 13 Cells and Organisms

Humanities/Art/Social Science (HASS) Elective

SPRING TERM

EOS 2 Environmental Geology

MATH 51 Differential Equations

ES 27 Public Health Engineering

CEE 32 Environmental Engineering Principles

EM 52 Technical Communication

Junior Year

FALL TERM

ES 8 Fluid Mechanics

CEE 30 Environmental Chemistry

ES 56 Probability and Statistics

CEE 187 Geographical Information Systems

HASS Elective

SPRING TERM

CEE 12 Hydraulic Engineering

CEE 132 Environmental Engineering Processes

Concentration Elective

Foundation Elective

HASS Elective

Senior Year

FALL TERM

Design Elective

Concentration Elective

Concentration Elective

HASS Elective

Free Elective

SPRING TERM

CEE 81 Capstone Design

Design Elective

Concentration Elective

HASS Elective

Free Elective

In addition to the B.S.C.E. and B.S.EV.E., the department also offers the following undergraduate degree programs.

Bachelor of Science in Engineering (BSE)

The Civil and Environmental Engineering department administers three programs of study that lead to the Bachelor of Science in Engineering (B.S.E.) degree. These programs offer students a curriculum that replaces the engineering concentration and design requirements with focused study in a related discipline.

Bachelor of Science in Engineering – Program in Architectural Studies

The B.S.E. program in architectural studies is available for students interested in a professional career in architecture or in the historical, aesthetic, and engineering aspects of buildings and other structures. This program, offered jointly by the Department of Civil and Environmental Engineering and the Department of Art and Art History, provides a solid foundation in both the technical aspects of structural systems and the aesthetic and functional characteristics of buildings from an architectural and art history perspective. The flexibility of the B.S.E. degree allows greater concentrations in both art history and studio courses

than would otherwise be possible, while providing a coherent basis for graduate work in architecture or design. The faculty coordinator for this program is Professor Masoud Sanayei. A minimum of thirty-eight course credits is required. For details, see <http://engineering.tufts.edu/cee/undergraduate/majors/bseArchitectural.htm>.

Bachelor of Science in Engineering (B.S.E.) – Program in Environmental Health

The Bachelor of Science in Engineering (B.S.E.) program in environmental health is offered for students wishing to pursue professional careers at the intersection of public health, health sciences and engineering. Historically, programs in environmental health were established to promote research on the control of infectious disease, the purification of water supplies, and the sanitary disposal of human waste. Today, focal points of concern have been broadened to such challenging issues as non-point source environmental pollution; the influence of the built environment on the health of populations; epidemiological aspects of chronic illnesses; occupational health; international aspects of environmental health, particularly in developing nations; risk assessment and risk management. The faculty coordinator for this program is David M. Gute. A minimum of thirty-eight course credits is required. For details, see <http://engineering.tufts.edu/cee/undergraduate/majors/bseEnvironmental.htm>.

Bachelor of Science in Engineering – Program: Planned Specific to Area of Interest

This Bachelor of Science in Engineering (B.S.E.) program is intended to allow students broader flexibility to develop a degree program that is specific to their area or areas of interest. In consultation with their faculty advisor, students develop a plan of study that focuses on a specific area or integrates several areas of interest. A minimum of thirty-eight course credits is required. The faculty coordinator for the B.S.E. planned program is Kurt Pennell. For details, see <http://engineering.tufts.edu/cee/undergraduate/majors/bse.htm>.

Bachelor of Science in Engineering Science (B.S.E.S.)

The Bachelor of Science in Engineering Science is designed for students seeking a technically based engineering science degree program. The program requires a minimum of 38 credits, which consists of ten introductory courses that cover math and sciences, six humanities credits, and two free electives. Students may then select eight foundation electives in natural sciences, mathematics, and engineering, followed by twelve concentration electives that focus on their interests in engineering and natural sciences. The faculty coordinator for the B.S.E.S. program is Daniele Lantagne. For details, see <http://engineering.tufts.edu/cee/undergraduate/majors/bses.htm>.

Bachelor of Science (B.S.)

The Bachelor of Science (B.S.) degree program provides a broad liberal education within the School of Engineering, but a less technical one than any other degree in the School of Engineering. Students working toward this degree normally place a heavier emphasis on the humanities and social sciences than students working in the other programs. This degree program recognizes the unique value of engineering as preprofessional education for business administration, city planning, dentistry, medicine, law, and other professions, as well as for the student who wishes to combine engineering with other disciplines. Faculty from the Department of Civil and Environmental Engineering will supervise, with consent, programs of study. This program requires a minimum of 36 course credits. For details see: <http://engineering.tufts.edu/cee/undergraduate/majors/bs.htm>.

UNDERGRADUATE MINOR PROGRAMS

Architectural Engineering Minor

The Department of Civil and Environmental Engineering offers a minor in Architectural Engineering for students in the College of Liberal Arts. This minor provides curricular recognition for the technological track in Architectural Studies (see Architectural Studies section). The faculty advisor for this minor is Professor Masoud Sanayei. The Liberal Arts faculty contact is Associate Professor Daniel Abramson.

Foundation courses (three required):

ES 5 Intro to Mechanics: Statics and Dynamics

ES 9 Applied Mechanics: Strength of Materials

ES 18 Computer Aided Design

Elective courses (select two):

ES 2 Intro. to Computing in Engineering

ES 93 First Year Engineering Elective (approved by advisor)

CEE 1 Intro. to Civil and Environmental Engineering

CEE 22 Structural Analysis

CEE 120 The Art of Building

Architectural Studies Minor

The Department of Art and Art History offers a minor in architectural studies that is open to students from both the School of Engineering and the College of Liberal Arts. For details, see full description under Architectural Studies. The faculty advisor for this minor is Associate Professor Daniel Abramson. The Engineering contact faculty is Professor Masoud Sanayei.

Geoengineering Minor

The Department of Civil and Environmental Engineering offers a geoengineering minor that is available to all non-CEE majors. The faculty advisor for this minor is Professor Laurie Baise.

Foundation courses (five required):

ES 5 Intro. to Mechanics: Statics and Dynamics

ES 9 Applied Mechanics: Strength of Materials

CEE 12 Hydraulic Engineering

CEE 42 Intro. to Geotechnical Engineering

Elective course (select one):

CEE 112 Hydrology and Water Resource Engineering

CEE 113 Groundwater Hydrology

CEE 146 Foundation Engineering

CEE 149 Earth Support Systems

Prerequisites for the above courses are MATH 36 and PHY 12.

Geology Minor

The Department of Earth and Ocean Sciences offers a minor in geology available to students in the School of Engineering. For details, see the Department of Earth and Ocean Sciences section. The faculty advisor for this minor is Professor Anne Gardulski. The Engineering contact faculty is Professor Laurie Baise.

GRADUATE PROGRAMS

Doctor of Philosophy (Ph.D.)

Students entering the doctoral program in Civil and Environmental Engineering should meet the admission requirements of the graduate school, gain acceptance by the Civil and Environmental Engineering faculty, and hold a Master of Science or Bachelor of Science degree in Civil and Environmental Engineering or a related discipline. The Ph.D. is a research-oriented degree that requires in-depth knowledge of a specific topic of study. Programs of study are highly individualized, but consist of two main components: course work and independent research.

The outcomes for the Ph.D. graduate program are: (1) an in-depth technical knowledge related to one of the subdisciplines within Civil and Environmental Engineering (Environmental Health, Environmental Engineering and Water Resources, Geosystems Engineering, or Structural Engineering and Mechanics); (2) an ability to conduct independent research on a topic in Civil and Environmental Engineering; (3) a scholarly contribution in the field of study with a demonstrated record of scholarship; and (4) communication of results of research activity both orally and in writing.

PROGRAM OF STUDY

Students are required to complete the equivalent of a three-year program of full-time graduate study for the doctoral degree. In general, the first two years of the Ph.D. program will be devoted to course work; a minimum of fifteen courses beyond the baccalaureate level must be completed. Students who enter the program with a Master of Science degree may complete a reduced course load, depending on the master's degree field of study.

QUALIFYING EXAMINATION

For admission to doctoral candidacy, a Ph.D. student must successfully complete a qualifying examination. Typically, this examination is taken after the student has completed the major part of their required course work, preferably within eighteen months of matriculation. The qualifying examination is administered by faculty members in the student's subdiscipline area and consists of written and oral components. The qualifying examination is designed to evaluate the student's overall knowledge of their discipline based on their

program of study, and their ability to interpret and critique relevant research concepts and formulate responses to both fundamental and applied problems.

DISSERTATION

The final requirement for the doctorate degree is a dissertation. The dissertation demonstrates the candidate's ability to perform independent research of high quality and conveys expertise in relevant research techniques and methodologies. The Ph.D. candidate must prepare a written dissertation proposal that describes their research topic in detail, including, but not limited to, a justification, objectives and hypotheses, methods, anticipated results, and schedule. The dissertation research proposal must be presented to and approved by a dissertation committee that consists of the student's faculty research advisor and at least three additional faculty members with relevant expertise. At least one member of the committee must be from outside the department, and one member must be from outside Tufts University. It is also required that the majority of the committee members be graduate faculty (full-time faculty holding a doctoral degree). The dissertation committee evaluates the research proposal based on technical merits and potential contributions to the field of Civil and Environmental Engineering, and the ability of the student to successfully complete the proposed research. Upon completion of the approved research, scholarly competence is demonstrated through the preparation of a written dissertation of the research. The doctoral candidate must orally defend the content and conclusions of the dissertation in an open forum before the dissertation committee.

For more information, please refer to the CEE website: <http://engineering.tufts.edu/cee/graduate/phd.htm>.

Master of Science (M.S.)

Instruction leading to the Master of Science degree is offered with concentrations in environmental and water resources, environmental health, geosystems, and structural engineering and mechanics. Candidates for the master's degree program in environmental and water resources engineering, geosystems engineering, and structural engineering and mechanics are expected to have an adequate back-

ground in science, mathematics, and engineering science. Candidates for the master's program in environmental health should have a background that emphasizes natural and applied sciences with adequate preparation in mathematics, biology and chemistry. The School of Engineering requires that graduate applicants submit Graduate Record Examination (GRE) scores.

Students who lack adequate undergraduate preparation in a related field, such as biology for environmental engineering, mathematics for structural engineering, or fluid mechanics for water resources engineering, may be required to take such course work in addition to their graduate program of study.

A written thesis is required for the M.S. degree program, and two of the ten required courses may be taken as master's thesis research. Students are expected to form a thesis committee and present a thesis proposal to their committee within twelve (12) months of entering the M.S. program. The thesis committee should be composed of at least three members, with the chair being the student's advisor within the Department. One of the committee members may be from outside the Department of Civil and Environmental Engineering. As part of the degree program, the master's candidate must complete a written thesis, which must be defended orally and approved by the committee.

The outcomes for the M.S. graduate program are (1) an ability to apply knowledge of technical skills when working in one of the Civil and Environmental Engineering tracks (Environmental Health, Environmental Engineering and Water Resources, Geosystems Engineering, and Structural Engineering and Mechanics); (2) an ability to conduct and assess research, with mentorship, related to topics in a sub-discipline of Civil and Environmental Engineering; (3) written and verbal communication of research and technical results.

For more information, please refer to the CEE website: <http://engineering.tufts.edu/cee/graduate/ms.htm>.

Master of Engineering (M.Eng.)

The Master of Engineering program provides a practice-oriented alternative to the Master of Science programs offered by the Department of Civil and Environmental Engineering. It responds

to the need to provide engineering students with advanced-level expertise in a civil and environmental engineering specialty, some technical breadth in a related specialty, and familiarity with engineering tools used by the profession. The program is designed for individuals who desire to pursue a career in engineering practice within the private or public sector. We strongly encourage continuing education by engineering practitioners on a part-time basis. The program provides substantial technical depth beyond the bachelor's degree.

The outcomes for the M.Eng. graduate program are (1) an ability to apply knowledge of technical skills when working in one of the Civil and Environmental Engineering tracks (Environmental Health, Environmental Engineering and Water Resources, Geosystems Engineering, and Structural Engineering and Mechanics); (2) an ability to use both engineering tools and management tools acquired during M.Eng. study when practicing in Civil and Environmental Engineering; (3) engagement in life-long learning related to the technical discipline.

INTERDISCIPLINARY PROGRAMS

Water: Systems, Science and Society (WSSS)

The Water: Systems, Science and Society (WSSS) graduate program was established to provide the interdisciplinary perspectives and tools to manage water related problems throughout the world. Students participating in the WSSS program must enroll in and fulfill the requirements of a graduate degree within one of the participating schools to ensure a strong knowledge base in their chosen field. WSSS students take courses in three of four core areas and participate in cross-cutting seminars. Students in the research track work on interdisciplinary, problem-focused projects in one of six research areas. Students in the practicum track complete a professional interdisciplinary experience and participate in a special WSSS research practicum.

The WSSS requirements are completed in addition to the student's degree requirements, but through the use of electives and co-listed courses, the WSSS program usually will not add significant time to a graduate degree program. Upon satisfactory completion of these activities, students receive a Certificate in Water: Systems, Science, and

Society as well as their graduate degree. Details of the program are available at the WSSS website:

<http://www.tufts.edu/water/about.html>.

Bioengineering (M.S. and M.Eng.)

The Bioengineering program provides a broad engineering and biotechnology curriculum, while offering a focus on a specific engineering track that best fits students' interests and career objectives.

The bioengineering master's program has six tracks: Bioinformatics, Biomaterials, Biomechanical Systems and Devices, Cell and Bioprocess Engineering, Environmental Biotechnology, and Signals and Systems.

The bioengineering master's program has two components: an interdisciplinary core curriculum, including one class outside of students' chosen sub-specialty to increase the breadth of bioengineering knowledge, and courses required by the student's home department for each chosen track. The majority of students in CEE will select the Environmental Biotechnology track. Additional information on this program is provided on the School of Engineering website: **<http://engineering.tufts.edu/bme>**.

For graduate students who are interested in Urban and Environmental Policy, the Department of Civil and Environmental Engineering participates in a joint degree program offered in association with the Department of Urban and Environmental Policy and Planning.

CONTINUING EDUCATION PROGRAMS

Post-Baccalaureate in Civil and Environmental Engineering

The post-baccalaureate (post-bac) program is intended for academically talented, highly motivated students, with at least a bachelor of science or bachelor of arts degree (B.S. or B.A.) in disciplines with relevant mathematics and science content. The 1-year program is designed to prepare students for graduate study in Civil and Environmental Engineering. Accepted students develop an individualized plan of study based on their academic background and goals. A total of five Tufts courses are required to complete the program.

Core Engineering requirement:

ES 5 Intro. to Mechanics: Statics and Dynamics

Foundation elective (select one):

ES 8 Fluid Mechanics

ES 9 Applied Mechanics: Strength of Materials

Concentration Elective (select one):

CEE 12 Hydraulic Engineering

CEE 22 Structural Analysis

CEE 32 Environmental Engineering Principles

CEE 42 Intro. to Geotechnical Engineering

Elective courses (select two in consultation with your advisor)

Students in the post-bac program must satisfy all course prerequisites listed on Tufts Bulletin. Courses numbered above 100 can be used for graduate credit, and are transferable into the Tufts graduate program. Completion of the post-bac program does not guarantee admission into the graduate program. Students may take ES 5 and/or ES 9 during the summer session. Please see the Tufts Summer Session for more information:

<http://ase.tufts.edu/summer>.

Certificate Program in Environmental Management

A five-course graduate-level certificate program in Environmental Management is designed for students with a bachelor's degree and at least two years of work experience. Additionally, students should have some knowledge of current environmental issues and should have undergraduate coursework in natural or physical science, mathematics, or engineering. The certificate programs can be completed on a part-time, non-degree basis by students who are seeking professional training in the field or are preparing for a degree program. In most cases, courses taken as a certificate student can be transferred into a related master's degree program in the Department of Civil and Environmental Engineering.

Certificate students must complete five graduate course credits from the clusters listed below. Students must take at least one course from each concentration area listed below. The remaining two courses for the certificate can be selected from any of the areas.

Environmental Technology

CEE 113 Groundwater Hydrology

CEE 136 Air Pollution Control

CEE 138 Hazardous Waste Treatment

CEE 139 Bioremediation

CEE 143 Site Remediation

CEE 172 Fate and Transport of Environmental Contaminants

Environmental Law, Management, and Policy

CEE 185 Environmental Law, Management, and Policy

CEE 187 Geographic Information Systems (GIS)

CEE 207 Environmental Law

CEE 265 Corporate Management of Environmental Issues

CEE 267 Methods in Environmental Impact Assessment

Health, Safety, and the Environment

CEE 154 Principles of Epidemiology

CEE 158 Occupational and Environmental Health

CEE 164 Epidemiological Methods

CEE 167 Environmental Toxicology

CEE 168 Exposure Assessment

CEE 173 Health Effects and Risk Assessment

CEE 175 Hazardous Materials Safety

CEE 194 Field Methods for Global Health

CEE/MPH 241 Biology of Water and Health

MPH 205 Biostatistics

Students may take other courses to fulfill the track requirements with permission of the program advisor, Lecturer Anne Marie C. Desmarais. For more detailed information, please refer to the CEE website <http://engineering.tufts.edu/cee/graduate>.

Certificate Program in Epidemiology

Offered in collaboration with Tufts' School of Medicine, the Friedman School of Nutrition Science and Policy, and the Department of Civil and Environmental Engineering, this interdisciplinary program is designed to help students understand, integrate, and apply epidemiologic methods and research. The program is especially appropriate for clinicians, professionals in public health and human service agencies, lawyers, industrial hygienists, pharmaceutical or biotechnology professionals, environmental engineers or scientists, and individuals involved in citizen activist groups focusing on human health issues. It's also useful for individuals who are considering a career in epidemiology and/or public health but are not yet ready to commit to a full master's degree program. Open to individuals with a bachelor's degree, the certificate requires the completion of five courses as follows:

Foundation courses (two):

CEE 154 Principles of Epidemiology

CEE 164 Epidemiologic Methods

Biostatistics (select one, may be exempted by prior coursework):

BIO 132 Biostatistics

MPH 205 Principles of Biostatistics

MPH 259 Fundamentals of Biostatistics

Elective courses (select two in your area of interest or expertise); examples include:

MPH 204 Occupational and Environmental Health

MPH 220 Cardiovascular Epidemiology

MPH 222 Survey Research Methods and Data Management

MPH 224 Infectious Disease Epidemiology

MPH 226 Cancer Epidemiology

MPH 240 Environmental Epidemiology

CEE 137 Public Health

CEE 158 Occupational and Environmental Health

CEE 167 Environmental Toxicology

CEE 173 Health Effects and Risk Assessment

CEE/MPH 241 Biology of Water and Health

UEP 281 Toxic Chemicals and Human Ecology

Other courses may be selected with the approval of the Program Advisor, Senior Lecturer Mark A. Woodin. An optional internship is available to students desiring a professional experience in the use of epidemiology. The internship would count as an elective and be started after all other coursework is completed. For more information, please visit the Epidemiology Graduate Certificate program website: <http://gradstudy.tufts.edu/programs/certificates/epidemiology.htm>.

Classics

Professor Ioannis D. Evrigenis, *Chair; Political Science; Political theory*

Professor Gregory R. Crane, *Winnick Family Chair in Technology and Entrepreneurship; Greek literature, computers and classics*

Professor R. Bruce Hitchner, *Roman history and archaeology, international relations*

Associate Professor Steven W. Hirsch, *Greek, Roman, and Near Eastern history*

Associate Professor Joanne H. Phillips, *Latin and Greek literatures, Greek and Roman medicine*

Assistant Professor Marie-Claire Beaulieu, *Greek religion, epigraphy, Medieval Latin*

Assistant Professor Riccardo Strobino, *Greek, Latin, and Arabic Traditions*

Lecturer J. Matthew Harrington, *Greco-Roman space and architecture, post-Augustan Latin literature, satire, comparative Greek and Latin grammar (PIE Linguistics)*

Lecturer Anne Mahoney, *Classical tradition and reception; linguistics; ancient drama; ancient mathematics; Latin, Greek, and Sanskrit language and literature*

Lecturer Andreola Rossi, *Greek & Roman epic, Greek & Roman historiography, the history and culture of the Augustan period and Latin language*

Lecturer Susan E. Setnik, *Greek and Latin language*

AFFILIATED FACULTY:

Professor Ioannis D. Evrigenis, *Political Science; Political theory*

Assistant Professor Jennifer Eyl, *Religion; Early-Christianity, Gender and sexuality In antiquity, Hellenistic philosophies*

Assistant Professor Christiana Olfert, *Philosophy; Ancient philosophy, Early Modern philosophy, ethics*

Lecturer David J. Proctor, *History; Medieval Western Europe, Southeastern Europe, Byzantium, church-state relations*

The Department of Classics is dedicated to the study of Greek and Roman culture and to clarifying and assessing its continuing impact on contemporary life. Classics is more than the study of the Greek and Latin languages; it can liberate the student from the parochialisms of both time and place. The role of the contemporary individual in relation to society can be examined through the history, archaeology, art, architecture, science, philosophy, religion, mythology, and especially the literatures of Greece and Rome.

Classics constitutes an interdisciplinary study of the cultures of the ancient Mediterranean, Near East, and Europe. Despite the period of antiquity in which it concentrates, the field of classics is constantly changing in light of new discoveries, new methodologies, new interpretations, and new relationships with other areas of study. In many ways, classics offers the undergraduate student an ideal educational opportunity to integrate different fields and methodologies, and to study intrinsically interesting and time-tested topics in the literature, mythology, art, archaeology, history, and science of Greece and Rome.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Majors in the Department of Classics meet the requirements of four classes of students:

- 1) those who have no professional interest in classics but who wish to bring together disparate distribution and foundation requirements for a coherent liberal arts major;
- 2) those who want a combined major in Latin, Greek, or Classical Studies and one of the natural sciences, social sciences, or humanities;
- 3) those who want an intensive study of Greek or Latin preparatory to postgraduate study in another field, such as law, theology, medicine, philosophy, history, English, or modern languages;
- 4) those who are professionally interested in the classics and who plan to do postgraduate study in the field and then teach or engage in research or museum work.

Major in Classical Studies

Ten courses are required, usually distributed as follows: Classics 31 and 32; two courses from either Classics 37, 38, or Classics 27, 164, 168; two additional classics courses numbered above 100; two other courses offered by the Department of Classics (strongly recommended are Latin 3 and above, and Greek language courses); and two courses that may be in related fields.

Major in Greek

Ten courses: four courses in Greek, one of which may be Greek 7 (intermediate level), depending on a student's prior level of preparation, and at least three at the 100 level; Classics 31 (Classics of Greece); Classics 37 (History of Greece); and four other courses in the department, of which at least two must be at the 100 level.

Major in Latin

Ten courses: five in Latin above the intermediate level, including at least three at the 100 level; plus Classics 32 (Classics of Rome); Classics 38 (History of Rome); and three other courses in the department, of which two must be at the 100 level.

Major in Greek and Latin

Ten courses: six courses in Greek and Latin above the intermediate level, of which four must be at the 100 level; four other courses offered by the department.

Interdisciplinary Major in Archaeology

A detailed description of this major can be found in the alphabetical listings in this bulletin under Archaeology.

PLACEMENT FOR ENTERING UNDERGRADUATE STUDENTS

Students with two years of secondary school preparation in Latin are usually placed in Latin 3. Students with three or four years of preparation in Latin are usually placed in Latin 3, or 21, 22, depending on CEEB examination or previous records, together with placement examination and individual consultation. In Latin as in other languages, the student is urged not to prejudge his or her college courses on the basis of secondary school experience. Students who place above Latin 3 may complete the language requirement in any one of the three available options, including classical studies (see information concerning foundation requirements). Students with scores of four or five on the Advanced Placement Examination or with an Achievement Test score of 720 or above will be given advanced placement into Latin 21 or above and acceleration credit of one course. With a score of three, students will be placed into Latin 21 or above; with a score of two, into Latin 3. During orientation every student is encouraged to discuss any unusual placement problem with members of the department so that in every case the student is placed in the appropriate course.

Students with two years of secondary school preparation in ancient Greek are normally placed into Greek 2 or Greek 7. Students with three or four years of preparation in ancient Greek are normally placed in Greek 7 or above, depending on previous records, together with placement examination and individual consultation. In ancient Greek, as in other languages, the student is urged not to prejudge his or her college courses on the basis of secondary school experience.

UNDERGRADUATE MINOR PROGRAM

The Department of Classics offers minors in Latin, Greek, Greek archaeology, Roman archaeology, Greek civilization, and Roman civilization. Details are available from the departmental office.

GRADUATE PROGRAM

Master of Arts in Classics

The master's program in classics at Tufts is designed for students who wish to go beyond the bachelor's level to attain a broader and deeper knowledge of the classics for one or more of the following purposes: teaching, further graduate study, digital technology, or publishing. With its strong language component and faculty strength in literature, history, archaeology, and digital humanities, this program particularly suits those who want either to consolidate and improve their language, research, and teaching skills in preparation for a Ph.D. degree at another institution or to teach classics at the secondary level.

REQUIREMENTS

Candidates must successfully complete ten graduate courses in Classics. Two must be in upper-level Latin and two must be in upper-level Greek; one must be in history; and one must be in classical archaeology. Candidates will usually have completed the equivalent of an undergraduate Latin or Greek major. If not, additional courses will be required for completion of the master's degree.

Reading knowledge of Latin or Greek and one modern foreign language (usually German or French) is tested by examination.

To demonstrate research and presentation, the candidate may submit for evaluation by a faculty committee either two qualifying papers (written for courses at Tufts and revised as necessary after completion of the course) or a thesis. The thesis normally counts as two of the required ten courses. Students usually find that writing a thesis takes a full term of uninterrupted work. An oral examination based on the qualifying papers or thesis is required.

A comprehensive written examination integrating course work with knowledge of the reading lists in Greek and Latin literature is required.

Master of Arts in Classics with Initial Teacher Licensure in Latin and Classical Humanities

The master's program in classics with licensure allows students to pursue intensive study of the classical world beyond the bachelor's level and simultaneously to acquire the credentials for a professional teaching career in public education. Students in this program have an opportunity to study literature, history, archaeology, and digital humanities in the Classics Department. Concurrently they prepare for a career in teaching (grades 5-12) through coursework and supervised teaching offered by the Education Department at Tufts. In strengthening their language, research, and teaching skills, graduates are also prepared to pursue a Ph.D. degree at another institution.

REQUIREMENTS

Candidates must successfully complete six graduate courses in Classics. Two must be in upper-level Latin and two must be in upper-level Greek. Candidates will usually have completed the equivalent of an undergraduate Latin or Greek major. If not, additional courses will be required for completion of the master's degree.

Candidates must successfully complete seven graduate courses in Education: one at the introductory level; one in human development and learning; one in the social, cultural, and historical foundations of education; one in exceptionalities in learning; two courses in second language instruction with an emphasis in Latin and Greek; and one in supervised teaching worth two credits.

Reading knowledge of Latin or Greek and one modern foreign language (usually German or French) is tested by examination.

To demonstrate research and presentation, the candidate may submit for evaluation by a Classics faculty committee either two qualifying papers (written for courses at Tufts and revised as necessary after completion of the course) or a thesis. The thesis normally counts as two of the required six courses. Students usually find that writing a thesis takes a full term of uninterrupted work. An oral examination based on the qualifying papers or thesis is required.

A comprehensive written examination integrating course work with knowledge of the reading lists in Greek and Latin literature is required.

CLASSICS >

CLINICAL PSYCHOLOGY >

COGNITIVE AND BRAIN SCIENCES >

COGNITIVE SCIENCE >

COLONIALISM STUDIES >

Master of Arts in Classical Archaeology

The master's program in classical archaeology at Tufts is designed to provide students with the material-cultural, social, historical, and artistic contexts needed to interpret the material remains of classical antiquity in preparation for further graduate study, for professional field archaeology, or for museum work. In combination with faculty strength in literature and ancient history, this program particularly suits those who want to consolidate and improve their language and research skills in preparation for a Ph.D. degree at another institution.

REQUIREMENTS

Candidates must successfully complete ten graduate courses in Classical Archaeology and related fields. Four must be in classical archaeology; three must be in upper-level Latin and/or in upper-level Greek; and one must be in ancient history. Candidates will usually have completed the equivalent of an undergraduate major in Classics, Ancient Art, or Archaeology and have attained intermediate levels in both Latin and Greek. If not, additional courses will be required for completion of the master's degree.

Both fieldwork and laboratory work are requirements, either as documented past experience or to be fulfilled during completion of the master's degree.

Reading knowledge of Latin or Greek and one modern foreign language (usually German or French) is tested by examination.

To demonstrate research and presentation skills, the candidate may submit for evaluation by a faculty committee either two qualifying papers (written for courses at Tufts and revised as necessary after completion of the course) or a thesis. The thesis normally counts as two of the required ten courses. Students usually find that writing a thesis takes a full term of uninterrupted work. An oral examination based on the qualifying papers or thesis is required.

A comprehensive written examination integrating course work with a general knowledge of classical archaeology and of the reading lists in Greek and Latin literature is required.

For more detailed information, please visit the website <http://ase.tufts.edu/classics>.

Clinical Psychology

(FOR DEGREE REQUIREMENTS, SEE PSYCHOLOGY.)

Cognitive and Brain Sciences

(FOR DEGREE REQUIREMENTS, SEE PSYCHOLOGY.)

Cognitive Science

A joint Ph.D. in Cognitive Sciences is offered through the departments of Child Development, Computer Science and Psychology. Prospective students apply to one of the departments participating in the cognitive science Ph.D. program and indicate in their application their intention to apply to the joint program. Once admitted to the program, students will have to complete the Ph.D. requirements of their home department as well as those of the Cognitive Science program, and their research will have to be in the intersection of a field in their home department and cognitive science.

For further information, see <http://cogsci.tufts.edu> or contact Matthias Scheutz <matthias.scheutz@tufts.edu> for Computer Science/Cognitive Science, Gina Kuperberg (gina.kuperberg@tufts.edu) for Psychology/Cognitive Science, or Maryanne Wolf (maryanne.wolf@tufts.edu) for Child Development/Cognitive Science.

(FOR MAJOR IN COGNITIVE AND BRAIN SCIENCES, SEE PSYCHOLOGY.)

(FOR MINOR IN COGNITIVE AND BRAIN SCIENCES, SEE PHILOSOPHY.)

Colonialism Studies

DIRECTOR:

Associate Professor Kris Manjapra, *History*

EXECUTIVE BOARD:

Professor Lisa Lowe, *English*

Associate Professor Kamran Rastegar, *German, Russian, and Asian Languages and Literatures*

ADVISORY FACULTY:

Professor Brian Hatcher, *Religion*

Professor H. Adlai Murdoch, *Romance Languages*

Professor Deborah Pacini Hernandez, *Anthropology*

Associate Professor Elizabeth Remick, *Political Science*

Associate Professor Pearl Robinson, *Political Science*

Associate Professor Rosalind H. Shaw, *Anthropology*

Associate Professor Sabina Elena Vaught, *Education*

Associate Professor Adriana Zavala, *Art and Art History*

The Colonialism Studies minor is designed to offer students a strong foundation to understand processes of colonialism, anticolonial independence movements, and the national and transnational effects that result from colonialism.

The minor requires five courses: one introductory survey course (see the course listing on the Colonialism Studies website); two courses with a full or partial focus on the processes of colonialism, focusing on the same world region or on the comparison between two or more world regions; one additional course that contributes to the analytical understanding of power relations through political, economic, gender-based, historical, or cultural analysis; and a senior capstone project or option course.

The senior capstone project is an independent study culminating in an original piece of work intended to draw together a student's experience at Tufts. The project should reflect an understanding of and facility with the conceptual approaches explored during the completion of the minor. The capstone project will be evaluated by two members of the Colonialism Studies committee.

As an alternative to the senior capstone project, a student has the option of taking an approved Colonialism Studies course during the first or second semester of senior year, and fulfilling the capstone requirement by writing a research paper (minimum 15 pages), or completing an oral presentation or a performance, which integrates the knowledge and methodologies from the course with other conceptual approaches explored in courses taken for the minor. In the case of the option course, the capstone project will be evaluated by the course instructor and one other member of the Colonialism Studies committee.

The choice of capstone or option course must be approved by the Colonialism Studies committee before it begins.

In completing the above requirements, students must select courses distributed across at least three departments/programs.

Students in the minor are strongly recommended to pursue the study of a foreign language to an advanced level.

Students interested in pursuing a Colonialism Studies Minor should register with Cynthia Sanders, Program Administrator, 110 Eaton Hall, 617-627-2311, Cynthia.Sanders@tufts.edu

For more detailed information, please visit the website <http://as.tufts.edu/ColonialismStudies/>

Communications

(SEE FILM AND MEDIA STUDIES.)

Community Environmental Studies

FACULTY ADVISOR:

Barbara Parmenter, *Urban and Environmental Policy and Planning*

Environmentalists and concerned citizens alike face the challenge of keeping pace with politically and technically complex issues. The considerable sophistication of the environmental movement constantly creates new challenges for conservation and preservation, environmental justice, and safety and health in the workplace and community.

The certificate in Community Environmental Studies (CES) provides professional training for careers in today's rapidly evolving environmental field. CES's interdisciplinary curriculum is designed to clarify career goals for those who may be considering environmental work, and to enhance the skills of professionals already in the field. The certificate is offered by the graduate Department of Urban and Environmental Policy and Planning.

The certificate requires the completion of four courses—one core and three electives—in such varied subjects as environmental policy, land use planning, sustainability, mediation, law and economics.

The program is open to individuals with a bachelor's degree and is especially suited to those in community and environmental organizations who want to increase their expertise; midcareer professionals who want to apply their skills to environmental concerns; and business people working with communities on issues relating to sustainability, the environment and public health.

For more information, contact the Program Administrator, Angela Foss, at 617-627-2320, or visit <http://ase.tufts.edu/uep/Degrees/Certificate.aspx>

Community Health

DIRECTOR:

Jennifer Allen, Associate Professor of Public Health and Community Medicine

POLICY BOARD:

Carol Baffi-Dugan, Associate Dean of Undergraduate Education, Director for Health Professions Advising

Jonathan Garlick, Professor of Oral Pathology, Tufts University School of Dental Medicine

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David Gute, Associate Professor, Department of Civil and Environmental Engineering

Sarah Pinto, Associate Professor, Department of Anthropology

Rosemary C.R. Taylor, Associate Professor of Sociology and Community Health

Karen Kosinski, Assistant Professor Public Health and Community Medicine

Keren Ladin, Assistant Professor, Community Health Program and Occupational Therapy

Fernando Ona, Assistant Professor, Public Health and Community Medicine

Cora Roelofs, Assistant Professor of Public Health and Community Medicine

Carolyn Rubin, Assistant Professor, Public Health and Community Medicine

Mark Woodin, Senior Lecturer, Department of Civil and Environmental Engineering

Shalini A. Tendulkar, Lecturer, Community Health Program

Pamela Schoenberg Reider, Program Administrator, Internship Coordinator

Community Health (sometimes called Public Health) is an interdisciplinary field focused on the prevention of disease, promotion of health, and prolongation of life among communities and/or populations as a whole. Community health actions, programs and policies aim to provide conditions in which people can be healthy. In addition, Community Health is focused on the elimination of inequities in health status across communities and/or populations. Community Health spans diverse aspects of health and society and encourages students to explore health issues from a variety of disciplinary perspectives, including, but not limited to: anthropology, sociology, biology, psychology, history, economics, engineering, nutrition, philosophy, classics and political science. Through courses and fieldwork, Community Health students analyze: (1) social, economic, political and environmental factors that influence health and illness, (2) how communities define and develop solutions to address priority health issues, (3) the formation of health care policy in the United States with a comparative look at other countries, and (4) the institutions that plan, regulate, and deliver health care services and public health programs.

PRIMARY MAJOR

The primary major in Community Health, available as of fall 2015, offers undergraduates an opportunity to explore issues surrounding health, health care, community and society. In addition to a broad academic experience, students complete a 150-hour internship for which they receive one academic credit.

CORE REQUIREMENTS FOR PRIMARY MAJOR

To complete a major in Community Health, students must take a total of twelve courses. There are seven required courses and students may select five approved electives.

REQUIRED COURSES

1. Introduction to Community Health (CH 1) *
2. Health care in America: Policies and Politics (CH 2)
3. Introduction to Global Health (CH 56) or approved equivalent
4. Community Health Research Methods (CH 30) or approved equivalent
5. Fundamentals of Epidemiology (CE/CH 54)**

6. Introduction to Statistics (CH 31) or approved equivalent
7. Community Health Internship (CH 180)***

* It is **STRONGLY** recommended that students take CH 1 as their first Community Health course.

**CEE 154 Principles of Epidemiology may substitute for those in the bachelor's/MPH program. All others must take CH 54.

***Students must complete prerequisites. See Course Requirements at CHP. *Note:* the internship may only be completed by second semester juniors or seniors.

ELECTIVE COURSES FOR PRIMARY MAJOR

- Community Health majors are required to select and complete five electives as follows:
- One mid- level or upper-level CH elective
- One upper- level CH elective
- Two CH or approved electives in another Department or Program
- One upper- level approved elective with a research component

Information about mid- and upper-level courses, as well as approved electives and research courses are available on the Community Health website (<http://ase.tufts.edu/commhealth>) or from the Community Health office (see below for contact information).

EXPERIENTIAL LEARNING: INTERNSHIP (CH 180)

The internship is an integral part of the Community Health Program and is required for both primary and secondary majors. For many students, the 150-hour internship proves to be one of the most valuable learning experiences in the program, establishing a link between theory and practice. The Community Health Program provides assistance to students in finding an internship, and students have considerable latitude in selecting a placement. Placements have included community health centers, local hospitals, schools, social service agencies, advocacy organizations, government offices, or shelters. Area placements have included sites such as the Boston Center for Refugee Health and Human Rights, the Boston Childhood Lead Poisoning Prevention Program, the Dana-Farber Cancer Institute, the Massachusetts Coalition for Occupational Safety and Health, the Children's

Hospital Young Parents Program, the AIDS Action Committee, offices at the State House, the Haitian Coalition, and the Mystic River Watershed Association. Students are required to do their internships in the Greater Boston Area so that the Community Health Internship Coordinator and assigned faculty member can be in close contact with the internship Site Supervisor. To receive academic credit, a grade of B- or better is required for the internship.

SECONDARY MAJOR

Until fall of 2015, Community Health was offered as a secondary major, meaning that students had to choose a primary major in another field. Students in the Class of 2018 or earlier may choose a secondary major in Community Health. Students in the class of 2019 and beyond may only complete Community Health as a primary major.

To complete Community Health as a secondary major, students must complete a total of 10 courses. There are five required courses and students may select five approved electives, choosing at least one course from the following clusters: Science of Health, Frameworks for Understanding Health, Health/Health Care Policy, Inquiry and Evidence, and a course that

CORE REQUIREMENTS FOR SECONDARY MAJOR

1. **Introduction to Community Health (CH 1)**
2. **Health care in America: Policies and Politics (CH 2)**
3. **Fundamentals of Epidemiology (CE/CH 54)****
4. **Introduction to Statistics (CH 31) or approved equivalent***
5. **Community Health Internship (CH 180)**

ELECTIVES FOR SECONDARY MAJOR

In addition to the above core courses, students taking Community Health as a secondary major are required to take five electives across the following clusters: (1) Science of Health; (2) Frameworks for Understanding Health; (3) Health/Health Care Policy. At least one of these five courses must be approved as a Research Course, one approved as an Inquiry and Evidence course, and at least one must be approved as a Comparative/Cross-cultural Course. Clusters are defined below. Courses available within each of these clusters are available at the Community Health website (<http://ase.tufts.edu/commhealth>) or the Community Health Program Office.

Science of Health: The sciences have a particular lens for looking at health issues that focuses on the biological or technological causes and cures for disease. Although health and health care result from a complex mix of biological, social, political, and cultural phenomena, anyone claiming a thorough knowledge of health issues must have some basic knowledge of the scientific/technological framework for looking at them.

Frameworks for Understanding Health: In Community Health 1 and 2, students are introduced to a broad range of health concepts and health areas. By taking at least one course in this cluster, students will have an opportunity to explore one area in greater depth. Students will be exposed to different frameworks, theories, and/or lenses with which to view community health issues and concepts.

Health/Health Care Policy: The policy environment controls how resources are distributed and helps to determine how communities perceive their options. Students need to understand current U.S. and/or international policy and have the opportunity to learn methods for developing further understanding.

Cross-Cultural or Comparative Views of Health: Students are required to take at least one course with a cross-cultural or comparative focus that encourages understanding health in different cultures or communities.

Inquiry and Evidence: Students must take at least one course that trains them in how to systematically ask and answer research questions. Such courses are offered across an array of disciplines.

Research: Secondary majors must complete a major research paper or project. This requirement can be satisfied by taking a course with a research component, by completing a research-based fieldwork or independent study focused on health, or by completing an honors thesis focused on health issues. Students may petition to have an independent study (conducted under Community Health 193) or a fieldwork experience (conducted under Community Health 199) count toward the Research requirement if the student's project has a substantial research component. Such a course will

be assigned to a cluster depending on the topic. Work completed in Sociology 102, Civil and Environmental Engineering 164, or Community Health 197/198 will similarly be assigned to a cluster based on the topic of the research. Students may petition to have honors theses or independent studies from their primary major count toward the Research requirement if the project involves research in a health area and a member of the Community Health faculty is on the student's committee. Permission to count such a course must be obtained in advance.

PROGRAM POLICIES

Pass/Fail: No course submitted for credit in the major can be taken on a pass/fail basis.

Academic Standing: All courses submitted for credit in the major must have a grade of C- or better, with the exception of the internship. Students must pass the internship (CH 180) with a grade of B- or better.

Courses taken at Other Institutions: Students may petition courses taken abroad for major credit, but no more than three courses taken at other institutions may count toward the major. Students may petition a course to count for major credit when they have a course syllabus, which is typically after they return. This process is a separate one from that of transferring the credit to Tufts, which students do through the online system. The CH Transfer of Credit representative will advise them on what will likely count for CH credit. See the CH website for more information.

More information may be obtained from the program office at 112 Packard Avenue, by calling 617-627-3233, or by e-mail (chp@tufts.edu). Visit our website at <http://ase.tufts.edu/commhealth>.

Computer Engineering

(FOR DEGREE REQUIREMENTS, SEE ELECTRICAL AND COMPUTER ENGINEERING.)

Computer Science

Associate Professor Soha Hassoun, *Chair; Computational systems biology, computer-aided design for integrated circuits*

Professor Lenore J. Cowen, *Computational biology, theory of computation, algorithm design and analysis*

Professor Kathleen Fisher, *Programming languages*

Professor Robert J. K. Jacob, *Human-computer interaction*

Professor Roni Khardon, *Machine learning, artificial intelligence, computational learning theory*

Professor Matthias Scheutz, *Artificial intelligence, cognitive science, human-robot interaction*

Professor Diane L. Souvaine, *Vice Provost for Research; Computational geometry, algorithm design and analysis*

Associate Professor Anselm C. Blumer, *Artificial intelligence, machine learning, computational biology*

Associate Professor Alva Couch, *Network and system administration, scientific computing and visualization*

Associate Professor Samuel Z. Guyer, *Compilers, programming languages*

Associate Professor Norman Ramsey, *Programming languages and systems, functional programming*

Associate Professor Donna Slonim, *Computational biology*

Assistant Professor Remco Chang, *Visualization, visual analytics, computer graphics*

Assistant Professor Fahad Dogar, *Networking, distributed systems, mobile computing, cloud computing*

Assistant Professor Benjamin Hescott, *Computational complexity, approximation and parallel algorithms, computational biology*

McDonnell Family Assistant Professor of Engineering Education Ben Shapiro, *Engineering education, educational technology, human-computer interaction, video games and simulation, social computing*

Lecturer Ming Chow, *Computer games, computer security and privacy*

Lecturer Christopher Gregg, *Heterogeneous and parallel computing*

Lecturer Bruce Molay, *Specializes in teaching the introductory sequence of Computer Science*

Lecturer Mark Sheldon, *Data structures, programming languages, software systems, software design*

Research Assistant Professor Ethan Danahy, *Technology solutions for engineering education*

Visiting Assistant Professor Gregg Aloupis, *Computational geometry*

SECONDARY APPOINTMENTS:

Adjunct Professor Bruce Boghosian, *Mathematics; Quantum computing, scientific and distributed computing*

Adjunct Professor Christoph Börgers, *Mathematics; Applied mathematics and computing*

Adjunct Professor Gregory Crane, *Classics; Ancient Greek literature, computing and its impact on learning*

Adjunct Professor Misha Kilmer, *Mathematics; Numerical linear algebra, linear algebra, scientific computing and visualization*

Professor Eric L. Miller, *Electrical and Computer Engineering; Signal and image processing*

Professor Karen Panetta, *Electrical and Computer Engineering; Human-computer interaction, multimedia studies*

Professor Douglas Preis, *Electrical and Computer Engineering; Scientific computing, visualization*

Adjunct Associate Professor Marina Bers, *Child Development; Human-computer interaction, collaborative learning systems, virtual communities*

Adjunct Assistant Professor Shuchin Aeron, *Electrical and Computer Engineering; Statistical signal processing, network information theory*

The department offers undergraduate programs in computer science for both liberal arts and engineering students, M.S. and Ph.D. degree programs, and several non-degree graduate programs. Both the Arts and Sciences and Engineering programs are included in the general accreditation conferred on the University by NEASC. In addition, the Bachelor of Science in Computer Science (B.S.C.S.) program offered through the School of Engineering is accredited by the Computing Accreditation Commission (CAC) of ABET, Inc. (<http://www.abet.org>).

UNDERGRADUATE CONCENTRATION REQUIREMENTS—COLLEGE OF LIBERAL ARTS

Major in Computer Science

The major in Computer Science requires ten courses: eight courses in computer science and two courses in related fields. The computer science courses must be more advanced than Computer Science 11 and must include Computer Science 15, 40, 80 or 105, 160, and 170. Only one of Comp 80 or Comp 105 may be counted toward the major. The related fields' courses are Mathematics 34, 36 or 39 and Computer Science 61 (Mathematics 61

may be substituted for Computer Science 61). The introductory courses Computer Science 10 and 11, as well as Mathematics 4, 14, 30, and 32, do not count toward the major. No more than one Directed Study (93, 94, 193, 194) may be counted toward the major. All ten courses to be counted toward the major must be completed with a grade of C- or better. The above are minimal requirements for the concentration. For students who desire a stronger program, the following courses are recommended: Computer Science 97, 98, 111, 181; Mathematics 70, 145, 161 and 162.

For an ABET CAC accredited program, see the B.S.C.S. in the School of Engineering, described below.

UNDERGRADUATE CONCENTRATION REQUIREMENTS—SCHOOL OF ENGINEERING

Bachelor of Science in Computer Science

The mission of the Computer Science in Engineering program is to provide graduates with the durable knowledge necessary to become future leaders in the rapidly evolving discipline of Computer Science as well as in other computer-related fields. We aim to give each graduate a solid foundation in both Computer Science theory and programming practice, and to prepare each graduate for further advanced study in Computer Science and related fields. We aim to expose each graduate to the challenges and research problems involved in creating new kinds of computer software. We aim to give graduates the skills and commitment to lifelong learning necessary to prepare them to be effective employees or graduate students in computer-related fields. The faculty is dedicated to accomplishing this mission through integration of teaching and research. The Bachelor of Science in Computer Science (B.S.C.S.) program offered through the School of Engineering is accredited by the Computing Accreditation Commission (CAC) of ABET, Inc. (www.abet.org).

Our program objectives include success in industry careers and graduate school. Two to five years after graduation, graduates of the B.S.C.S. program will have:

- 1) succeeded and advanced in professional careers in or related to computing or software.
- 2) been admitted to and advanced in graduate study in computer science.

Outcomes of the B.S.C.S. program include that:

- 1) Graduates should be able to use computer science theory to analyze algorithms and to reason about properties of programs, including structure, behavior, and performance.
- 2) Graduates should be able to solve problems by using principled methods to create, extend, and improve software.
- 3) Graduates should have had practice applying their knowledge and skills to open-ended problems with more than one good answer.
- 4) Graduates should have practice working in teams.

Additionally, the B.S.C.S. degree aims to empower our students with ABET Computing Accreditation Commission outcomes a–k, including:

- a. An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- d. An ability to function effectively on teams to accomplish a common goal.
- e. An understanding of professional, ethical, legal, security and social issues and responsibilities.
- f. An ability to communicate effectively with a range of audiences.
- g. An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- h. Recognition of the need for and an ability to engage in continuing professional development.
- i. An ability to use current techniques, skills, and tools necessary for computing practice.
- j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.
- k. An ability to apply design and development principles in the construction of software systems of varying complexity.

The Bachelor of Science in Computer Science (B.S.C.S.) requires thirty-eight courses including introductory, foundation, breadth, and concentration courses. Introductory courses (10 credits) include an Engineering Science 93 course; Engineering Science 2; Math 32, 36, and 42; Computer Science 61 (Math 61 may be substituted for Computer Science 61); Physics 11; Chemistry 1 or 16; Physics 12 or Chemistry 2; and a natural science elective. For natural science courses accepted towards the Engineering degrees, refer to the School of Engineering list posted in the student services website. The foundation requirement (5 courses) includes Computer Science 11 and 15, Engineering Science 3 and 4, and a statistics course chosen from MATH 161 and 162, ES 56, EE 104, BME 141, BIO 132, PHY 153. The breadth requirement (10 courses) includes English 1 or 3; one course in ethics and social context (Philosophy 24 or Engineering Management 54); five courses in Humanities, Arts, or Social Sciences; and three courses chosen either from Humanities, Arts, and Social Sciences, or from selected courses covering the broader context of engineering. Allowable courses in Humanities, Arts, and Social Sciences are those listed as fulfilling the distribution requirement in those categories in the School of Arts and Sciences. A list of selected courses appropriate for the last three credits of the breadth requirement is available from the department and includes courses in Humanities, Arts, Social Science, Engineering Management, and Engineering Psychology, and introductory courses in selected School of Engineering departments. The concentration requirement (11 courses) includes Computer Science 40, 160, 170, 97, 98, and 80 or 105; and five elective courses in computer science, three of which must be numbered above 100. Only one of Computer Science 80 or Computer Science 105 may be counted toward the degree. At most one credit of Independent Study or Research (COMP 93, 94, 191, 193, 194) and one credit of thesis (COMP 197) may be utilized as concentration electives. For a research experience, students should consider partly fulfilling concentration elective requirements via a senior thesis.

At the student's option, one concentration elective may be replaced by a one-credit course in Mathematics, selected from the following choices:

- Math 51** - Differential Equations (formerly **MATH 38**)
- Math 63** - Number Theory (formerly **MATH 41**)
- Math 70** - Linear Algebra (formerly **MATH 46**)
- Math 72** - Abstract Linear Algebra (formerly **MATH 54**)
- Math 87** - Mathematical Modeling and Computation
- Math 126** - Numerical Analysis
- Math 128** - Numerical Linear Algebra
- Math 135** - Real Analysis I
- Math 136** - Real Analysis II
- Math 145** - Abstract Algebra I
- Math 146** - Abstract Algebra II
- Math 151** - Applications of Advanced Calculus (cross-listed as **Mechanical Engineering 150**)
- Math 152** - Nonlinear Partial Differential Equations
- Math 158** - Complex Variables
- Math 161** - Probability
- Math 162** - Statistics
- Math 163** - Computational Geometry

The following sample program is one way of satisfying the above requirements; further information regarding options and procedures is available from the department.

First Year

FALL TERM

Mathematics 32

Physics 11

English 1

Engineering Science 93

SPRING TERM

Mathematics 36

Computer Science 11 Introduction to Computer Science

Chemistry 1 or 16

Engineering Science 2

Sophomore Year

FALL TERM

Mathematics 42

Computer Science 15 Data Structures

Engineering Science 3 Introduction to Electrical Engineering

Physics 12 or Chemistry 2

Breadth elective (humanities, social sciences, arts, or engineering)

SPRING TERM

Computer Science 61 Discrete Mathematics
Engineering Management 54 Engineering Leadership
Engineering Science 4 Introduction to Digital Logic Circuits
 Natural Science elective
 Breadth elective (humanities, social sciences, arts, or engineering)

Junior Year

FALL TERM

Computer Science 40 Machine Structure and Assembly-Language Programming
Computer Science 160 Algorithms
Engineering Science 56 Statistics
 Humanities, social sciences, or arts elective
 Breadth elective (humanities, social sciences, arts, or engineering)

SPRING TERM

Computer Science 105 Programming Languages
Computer Science 170 Theory of Computation
 Computer science elective
 Computer science elective
 Humanities, social sciences, or arts elective

Senior Year

FALL TERM

Computer Science 97 Senior Capstone Project I
 Computer science elective
 Computer science elective
 Humanities, social sciences, or arts elective Free elective

SPRING TERM

Computer Science 98 Senior Capstone Project II
 Computer science elective
 Humanities, social sciences, or arts elective
 Humanities, social sciences, or arts elective
 Free elective

UNDERGRADUATE MINOR PROGRAM

Minor in Computer Science

The undergraduate minor in Computer Science consists of five courses, including Computer Science 15; two courses chosen from Computer Science 40, 105, 160, and 170; Computer Science/Math 61; and one additional course in computer science numbered above 15. Only one of Computer Science 80 or 105 may be counted toward the minor. All such courses to be counted toward the minor must be completed with a grade of C- or better.

POSTBACCALAUREATE PROGRAM IN COMPUTER SCIENCE

The postbaccalaureate program in computer science offers the student with a bachelor's degree, but few computer science courses, the opportunity to earn the equivalent of an undergraduate minor in computer science by completing the requirements for the minor. It is designed to give the student with a nontechnical, liberal arts degree the introductory knowledge base to enter the technology field or continue on for graduate study in computer science. For more information, visit the website www.cs.tufts.edu.

The program requires five Tufts courses:

COMP 15 Data Structures*
COMP 61 or **Math 61** Discrete Math

Choose two:

COMP 40 Machine Structure and Assembly Language Programming
COMP 105 Programming Languages**, ***
COMP 160 Algorithms***
COMP 170 Theory of Computation***

One elective:

One computer science elective above **COMP 15**

*Prerequisite course **COMP 11**: Introduction to Computer Science is available for individuals without a previous programming course.

Only one of **Computer Science 80 and **105** may be counted toward the program.

***Courses numbered above 100 award graduate credit, and are transferable into the Tufts Master of Science in Computer Science program upon acceptance to the program.

CERTIFICATE PROGRAMS

Certificate Program in Computer Science

The four-course, graduate-level certificate program in computer science is for the student with a bachelor's degree in computer science or a closely related field with approved work experience. The program is designed for those who wish to update their skills and broaden their knowledge to meet the challenges of and opportunities available in today's rapid-paced technology field. For more information, contact the program administrator,

Angela Foss, at 617-627-2320 or visit the website <http://www.cs.tufts.edu/Other-Graduate-Programs/computer-science-certificate-program.html>

The certificate requires four graduate-level courses in Computer Science. This flexible program allows the student to cluster course electives around a particular interest or specialty area. Courses may be chosen from our regular department offerings or from our COMP 150 Special Topics offerings, which are offered in particularly “hot” area of interest, or in a unique specialty area of Tufts faculty.

Certificate Program in Human-Computer Interaction

In an interdisciplinary collaboration between the Department of Psychology, the Department of Computer Science, the Department of Mechanical Engineering–Human Factors Engineering Program and the Department of Occupational Therapy at Tufts, this four-course, graduate-level certificate is designed to train the next generation of computer professionals for tomorrow’s complex challenges. The program is open to individuals with a bachelor’s degree, and is designed to be pursued on a part-time basis by computer programmers, Web designers, human factors professionals, software engineers, and user interface designers who wish to develop or enhance their user-interface design and implementation skills. For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://www.cs.tufts.edu/Other-Graduate-Programs/hci-certificate-program.html>.

The certificate requires four courses.

1. Two foundation courses:

COMP 171 Human-Computer Interaction
PSY 53 Introduction to Engineering Psychology or **ENP 61** Introduction to Human Factors Engineering

2. One or more of the following:

COMP 106 Object Oriented Programming for GUIs
ENP 161 Human Factors in Product Design
ENP 162 Man-Machine System Design
ENP 166 Applied Design of Software User Interfaces
PSY 130 Advanced Engineering Psychology

3. Electives:

COMP 20 Web Programming
COMP 175 Computer Graphics
EE 120 Computer Animation for Technical Communications
OTS 105 Assistive Technology
ENP 215 Interface Design in Complex Systems

(Students may substitute other Tufts graduate courses, subject to the approval of the certificate advisor.)

GRADUATE PROGRAMS

Master of Science

The Master of Science degree requires ten course credits at the 100 level or above. At least eight credits must be earned by taking approved courses. The remaining two credits may be earned in several ways, including taking approved courses, completing a master’s thesis, or participating in an independent study or research experience. At least four of the courses must be in computer science, and at least two of the courses must include a serious programming component. To use courses offered outside the Department of Computer Science, the student must obtain the approval of the department. Students must also demonstrate competency as expected from a high-quality undergraduate program in computer science, in particular in the areas of Discrete Mathematics, Computer Architecture and Assembly Language, Programming Languages, Data Structures and Analysis of Algorithms, and Theory of Computation.

These topics are covered, respectively, in Computer Science 61, 40, 105, 160, and 170. The courses 105, 160, and 170 may be taken as part of the master’s degree program. Each student must complete a master’s project or thesis demonstrating mastery of computer science research and/or software development skills. The project requirement includes a written report which must be approved by a member of the faculty. Substantial projects, typically involving research, can count up to one credit through the courses Computer Science 293 and 294. The project requirement may also be satisfied by a written master’s thesis, defended orally, counted as between one and two credits, through the courses Computer Science 295 and 296.

COMPUTER SCIENCE >

COMPUTER SCIENCE CERTIFICATE PROGRAM >

CONSORTIUM OF STUDIES IN RACE, COLONIALISM, AND DIASPORA (RCD) >

Doctor of Philosophy

Students must have a master's degree in computer science or a related field to be admitted to the Ph.D. program. Applicants to the Ph.D. program who do not have a master's degree will instead be considered for admission to the M.S./Ph.D. program. Doctoral study consists of preliminary coursework and study, qualifying exams, and creative research culminating in a written dissertation. Detailed requirements and procedures for the Ph.D. program are outlined on the department Web pages at <http://www.cs.tufts.edu>.

For more detailed information, please visit the website <http://www.cs.tufts.edu>.

Computer Science Certificate Program

FACULTY ADVISOR:

Associate Professor Anselm C. Blumer

With technology advancing at a rapid pace, opportunities for advanced applications of computer science are limitless. Professionals with experience and knowledge of the “hottest” topics in computer science—machine learning, computational biology, advanced programming languages, robotics, networks and cloud computing, visualization, parallel and distributed computing—are rapidly advancing in salary and opportunity. This four-course graduate-level program will update your skills and broaden your knowledge in computer science, through a “design your own specialty certificate” taught by Tufts’ renowned faculty in computer science. Completion of the certificate requires grades of B- or better in all courses. Courses are transferable into the Tufts M.S. program upon acceptance to that program.

The program is open to individuals with at least a bachelor's degree in computer science, or a closely related field with approved work experience. Individuals completing the Post-Bac Computer Science Minor Program are also encouraged to apply.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

Consortium of Studies in Race, Colonialism, and Diaspora (RCD)

DIRECTOR:

Associate Professor Adriana Zavala, *Art and Art History*

The Consortium of Studies in Race, Colonialism, and Diaspora is the academic home for Africana, American, Asian American, Colonialism and Latino Studies—all programs that link innovative, progressive, and outstanding scholarship and learning on race, colonialism, and diaspora. Our work is interdisciplinary and intersectional in nature, combining topics and methods drawn from the humanities and social sciences and foregrounding the analytical, thematic, theoretical, and political linkages across existing programs in Africana Studies, American Studies, Asian American Studies, Colonialism Studies, and Latino Studies. The consortium allows for independent work within each major or minor of study, and also provides the opportunity to make connections across the specific areas and themes.

The programs housed within RCD connect the study of race, class, gender, and sexuality within the United States with the study of modern colonialisms in Africa, Asia, the Caribbean, Latin America, and the Middle East, and the social and cultural formations of diasporas. Students have the opportunity to be involved in the comparative and relational study of slavery in the Americas and its aftermath; the study of indigeneity within settler colonial societies; war, empire and militarization; and the movement, displacement, and settlement of peoples across the globe in a variety of time periods, including the contemporary era. Linking academic studies on race, colonialism, and diaspora, RCD features events, programs, exhibits, and workshops addressing these convergences.

Each of the five programs offers unique curricula leading to a major (Africana, American Studies) or minor (Africana, Asian American, Colonialism, or Latino Studies). Each of the five programs has a core faculty drawn from department across Arts & Sciences.

NOTE: Students should check the RCD website (<http://as.tufts.edu/RaceColonialismDiaspora>) for more information and the respective major or minor program website for requirements of each program and a list of courses that meet the requirements and/or meet with the director of the program that interests them.

Students interested in more information about the RCD and its programming may contact Associate Professor Adriana Zavala, Art and Art History, 617-627-2423, adriana.zavala@tufts.edu; or Cynthia Sanders, Program Administrator, 110 Eaton Hall, 617-627-2311, Cynthia.Sanders@tufts.edu

Students interested in Africana Studies should contact Professor H. Adlai Murdoch, Romance Languages, Olin Center, 180 Packard Ave, H.Murdoch@tufts.edu, 617-627-4801.

Students interested in American Studies or Asian American Studies should contact Cynthia Sanders, Program Administrator, 110 Eaton Hall, 617-627-2311, Cynthia.Sanders@tufts.edu

Students interested in Colonialism Studies should contact Professor Kris Manjapra, Program Director, 107 Eaton Hall, Kris.Manjapra@tufts.edu, 617-627-2930.

Dance

Full-time Lecturer Renata Celichowska, *Director of Dance; Modern, ballet, dance research and education, and creative process*

Senior Lecturer Daniel McCusker, *Modern, ballet, repertory and creative process*

Full-Time Lecturer Cristina Rosa, *Afro-Brazilian dance forms, modern, creative process, dance research and cross-cultural studies*

The Dance Program of Drama and Dance offers dance courses appropriate for both students new to dance and students with previous dance experience. The objectives of this non-conservatory program are to foster the development of creative resources and techniques, to introduce performance analysis, and to contextualize dance as an element of culture. This liberal arts approach encourages students to create integrative links with other disciplines. Students may minor in dance, and dance courses may be used toward the drama major (see Drama), and toward the fulfillment of arts, world civilization

and cultural distribution requirements. Dance performances choreographed by faculty, students and Boston-area artists are presented on campus throughout each semester.

Dance Minor

The Dance minor requires five credits of six to eight half- and full-credit courses focusing upon techniques and processes for performing, creating, and analyzing movement materials in and outside of “western” traditions within their cultural and/or historical context. Requirements include one western experiential dance form, one non-western or diasporic experiential course, one creative process course, 6-8 dance elective courses, and a half-credit capstone research project (choreographic, performative or written). Only lecture courses in dance may be submitted for transfer approval, except for those in Tufts abroad programs. More information about dance may be obtained at 617-627-2555, at the department office or at <http://ase.tufts.edu/drama-dance/dance/>.

Drama and Dance

(FOR DANCE INFORMATION, SEE DANCE.)

Professor Heather S. Nathans, *Chair; Theatre history, dramatic literature and criticism, directing*

Professor Barbara Wallace Grossman, *Theatre history, dramatic literature and criticism, directing, voice*

Professor Laurence Senelick, *Fletcher Professor of Oratory; Director of Graduate Studies in Drama; Dramatic literature and theory, theatre and film history*

Assistant Professor Natalya Baldyga, *Theatre history, dramatic literature and theory, directing*

Assistant Professor Noe Montez, *Theatre history, dramatic literature and theory, directing*

Associate Professor Monica White Ndounou, *Theatre history, film studies, dramatic literature and criticism, acting*

Senior Lecturer Daniel McCusker, *Dance*

Senior Lecturer Ted Simpson, *Head of Design; Set design*

Senior Lecturer Sheriden Thomas, *Head of Acting*

Lecturer Renata Celichowska, *Director of Dance; Dance studies*

Lecturer Linda Ross Girard, *Costume design*

Lecturer Brian J. Lilienthal, *Lighting design*

Lecturer John Mulligan, *Technical theatre*

Professor of the Practice Jennifer Burton, *Filmmaking and film studies*

The Department of Drama and Dance celebrates the power of scholar-artists to engage with their society, pose challenging questions, and re-imagine the role of the arts in contemporary culture.

The undergraduate Drama program provides a strong liberal arts approach to the intellectual, historical, and aesthetic dimensions of dramatic performance. The Drama program integrates acting, design, dramatic literature, dramaturgy, directing, filmmaking, playwriting, screenwriting, technical theatre, and theatre history. The curriculum fosters creative, critical, and collaborative thinking. The Dance program offers a rich array of training and performing opportunities in styles including African dance, ballet, Kathak, hip-hop, jazz, modern, musical theatre, and Latin.

Drama and Dance courses and performances explore a wide range of styles and techniques. Students develop their powers of intellect and imagination. They learn to think precisely in the moment, to speak confidently in public, to write with clarity and intelligence, and to work productively with others.

The M.A./Ph.D. Program in Drama trains scholar-artists for the academic profession, with a focus on performance history, dramatic literature, and theory. The program emphasizes research with primary materials as well as field research. Students are encouraged to pursue their own scholarly interests under the guidance of faculty both in this department and in others on campus. The program is small enough to allow close relationships between students and faculty, with each degree candidate receiving personal attention.

PERFORMANCE ACTIVITIES

The production program allows students to explore all areas of theatre and dance outside the classroom. They are involved in every aspect of production, from backstage work as stage managers and crew members to directing and/or choreographing shows, designing, performing, and even producing. Students experience the joys and challenges of live performance, as well as the satisfaction of working as part of a creative ensemble on a project for a significant period of time.

We stage three major faculty-directed productions per year in Drama, plus two faculty-directed Dance concerts. The season is rounded out by numerous student-directed shows each semester, as

well as our twice-annual “Dance Mash-Up.” Students may receive course credit for their involvement in departmental productions. Courses and productions are open to all Tufts students, regardless of major.

Several student groups are active throughout the year in the theatre and other spaces on campus. These groups include Pen, Paint, and Pretzels (3Ps), the largest theatre organization at Tufts; Torn Ticket II, which is dedicated to musical theatre; and Bare Bodkin, specializing in student-written work. There are other performance opportunities with Cheap Sox (improvisational comedy), HYPE! (mime), and Traveling Treasure Trunk (children’s theatre).

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Drama

The major in drama provides a balanced mix of study and practice, understanding and process, creativity, adaptability, and analytical thinking. With its focus on effective communication and imaginative exploration, a drama major is one of the best preparations for a variety of careers, as well as for graduate professional training and work in a theatre arts specialization. Drama majors often complete double majors in combination with many other departments and programs.

The drama major consists of eleven course credits and related requirements, including:

- 1) Five course credits in history, literature, and/or theory of drama, three of which are required: Drama 2 (Ancient and Medieval Theatre), Drama 3 (Early Modern Theatre), and Drama 4 (Modern and Postmodern Theatre). The other two courses are electives from an approved list.
- 2) A theatre technology course chosen from the following offerings: Drama 16 (Costume Technology), Drama 17 (Theatre Technology), Drama 20 (Stage Engineering), or Drama 29 (Scene Painting).
- 3) A design course chosen from the following offerings: Drama 18 (Lighting Design), Drama 125 (Scene Design), or Drama 126 (Costume Design).
- 4) Two course credits in acting/directing/movement or studio dance/voice (excluding Drama 80).
- 5) Two electives in the student’s specific area of interest, at least one of which must be an upper-

level course. A maximum of two one-half course credits of Drama 80 and/or 81 may be used to fulfill the requirements for the major.

6) A noncredit run crew on a faculty-directed major production (assistant stage manager, light board operator, sound board operator, costume crew, deck crew).

7) A noncredit prep crew on a faculty-directed major production consisting of thirty hours of production-related preparatory work in a given semester.

8) Each drama major is expected to gain experience in the creative aspects of drama and/or dance through involvement in the production program of the university. Graduating magna cum laude or summa cum laude with a drama major is contingent not only on scholastic achievement, but on significant participation in productions.

Students considering a drama major will find it advantageous to complete at least one of the required history/literature courses, the crew requirements, and an introductory-level course in either studio dance/acting or design/technology by the end of the sophomore year. This will allow greater flexibility in scheduling course work and more opportunities for advanced-level production responsibilities later on.

We strongly recommend that students who plan to pursue professional training or graduate school take more than the eleven-course credit minimum, especially in their intended area of specialization.

UNDERGRADUATE MINOR PROGRAMS

Minor in Drama

The drama minor consists of a minimum of five courses taken in the department: two in literature/history (including either Drama 2, 3, or 4) and three other courses selected in a plan approved by the designated minor advisor. Drama minors have the option of choosing an emphasis in acting, directing, design, technical theatre, or theatre studies. Drama minors are also required to serve on either one prep crew or one run crew for a departmental major production.

Interdisciplinary Minor in Film Studies

This interdisciplinary minor is offered through the Film and Media Studies program. For more information, see the Film and Media Studies website at <http://ase.tufts.edu/cms>.

Interdisciplinary Minor in Multimedia Arts

This interdisciplinary minor is offered through the Film and Media Studies program. For specific information about the policies governing requirements and electives, visit <http://ase.tufts.edu/cms/mma.html>.

GRADUATE PROGRAM

For admission to graduate work in drama, a prospective student must present a completed undergraduate record of high scholastic proficiency with a firm grounding in drama and theatre arts. Other desirable foundation subjects include cultural studies, art history, music, philosophy, psychology, sociology, history, and literature.

The program of study leading to the doctor of philosophy or master of arts degree in drama embraces dramatic literature, dramatic theory and criticism, and theatre history and research. It is expected that applicants for admission will already have attained a level of proficiency in the creative and/or performance aspects of theatre.

Courses of study for the satisfaction of the residence requirement do not include theatrical practice or stage performance. Dramaturgy or assistant direction for a faculty-directed play may be used for credit once. Depending on the individual student's educational background, intellectual capabilities, and professional aims, certain courses in other disciplines—anthropology, art history, Chinese, classics, English, French, German, history, Italian, Japanese, music, philosophy, Russian, sociology, and Spanish—may be taken for credit toward advanced degrees in drama, upon consent of the graduate advisor of the Department of Drama and Dance.

Master of Arts

In general, the student is expected to offer for admission the equivalent of a Tufts bachelor of arts degree with a major in drama. A student whose undergraduate preparation is not equivalent may be admitted provisionally and may be required to complete more than the minimum eight courses or make up deficiencies at no degree credit.

REQUIREMENTS AND RESIDENCE

A minimum of eight courses of graduate-level work in residence is required for the degree. Additionally, the student must satisfy the following requirements to qualify for the master of arts degree in drama:

- 1) The student must demonstrate a reading knowledge of a foreign language by passing an examination or an approved course no later than the end of the first year. A student whose undergraduate record indicates successful performance in a language course at the advanced level may be exempt.
- 2) Understanding of the basic principles and practices of design and technical theatre is to be demonstrated in the student's prior experience or by satisfactory completion of Drama 17, 125 or 126, taken without credit during the first year of residence.
- 3) The student must demonstrate an understanding of the principal theories and methods of acting. This requirement may be fulfilled either by satisfactory completion of Drama 10, taken without credit during the first semester of residence, or by presentation of evidence of study and experience in acting.
- 4) Unless a student's undergraduate record indicates completion of two courses or their equivalent in history of the theatre, Drama 137 and 138 must be taken for credit.
- 5) The student must take a minimum of four courses in graduate seminars selected from the following: Drama 220, 231, 235, 236, 240, 244, 248, 249, 251, 252, 254, 255, 258, 259, 261, 262, 263, or other special topics seminars offered by the department. Also, certain related courses in other departments may be credited toward the master of arts degree in drama (not more than one in a semester), with prior consent of the advisor.
- 6) The student must demonstrate an ability to deal with the concepts and problems of a particular area of scholarly specialization at a level of distinction. The student must satisfy this requirement by completing a scholarly thesis (one semester of Drama 295 or 296).

POLICY ON INCOMPLETE GRADES

Any graduate student with more than one incomplete grade at the end of a term's study will receive warning that his or her status in the program is in jeopardy. Any student on financial aid or assistantship who has more than one incomplete grade at the end of a term's study will have his or her appointment withdrawn.

All incomplete grades must be completed no later than six weeks after the end of the semester or summer session in which the incomplete was awarded or the student will be required to withdraw from the program.

The above stipulations may be waived only by petition of the student, supported with the appropriate medical or university documentation, and the voting consent of the graduate faculty.

Doctor of Philosophy

For admission to the program the applicant is generally expected to offer the equivalent of a Tufts master of arts degree in drama and to provide evidence of experience in theatrical production on his or her résumé. A student whose prior preparation is not equivalent may be admitted provisionally and required to take additional courses achieving a grade not lower than B- to make up deficiencies at no degree credit.

REQUIREMENTS AND RESIDENCE

Course work extending approximately three academic years beyond the B.A. degree, normally 18 courses (including two courses for dissertation research), is required. Part-time study or less than full-time residence in the Ph.D. program is discouraged. Eight seminars within the department are required of all Ph.D. students, including two seminars in dramatic or performance theory and Drama 220: Introduction to Research Methods and Materials (to be taken on entering). With prior consent of the advisor, certain advanced courses outside the department may be credited toward the Ph.D. degree (not more than one course in a semester).

Students with a master's degree may be credited toward the doctorate with up to six courses in their previous graduate study that satisfy course requirements for the Tufts doctorate in drama. However, acceptance into candidacy for the doctoral degree ordinarily depends on the quality of work done in the student's first year of residence at Tufts. Transfer of courses is not automatic, and each case is judged on its individual merit by the graduate faculty. A student may apply for transfer of courses earned through graduate work in other schools only after the satisfactory completion of at least one semester of residence at Tufts.

POLICY ON INCOMPLETE GRADES

Doctoral candidates should note the restrictions on incomplete grades stated in the section on the master's degree.

FOREIGN LANGUAGE

A student must demonstrate a reading knowledge of two foreign languages. Because a significant amount of material in this program can be read only in primary sources, the student is expected to satisfy the language requirements by passing an examination or accepted course in one language no later than the end of the first year of residence, and the other language prior to taking the comprehensive examinations. A student whose undergraduate record indicates successful performance in a language course at the advanced level may be exempt.

COMPREHENSIVE EXAMINATIONS

After the last semester of courses, the student will complete comprehensive examinations to establish his or her candidacy for the doctoral degree. These examinations will be both written and oral.

DISSERTATION

The candidate for the doctoral degree must prove competence in independent research by preparing and completing a dissertation on a subject chosen and planned with the approval of the department's graduate faculty and written under the supervision of an advisor. Ordinarily the student will complete the dissertation while in residence, although for special reasons he or she may be permitted to finish it elsewhere within the time limit established by the graduate school.

COURSES AVAILABLE IN THE DOCTORAL DEGREE PROGRAM

Although each course is not offered every year, the student may expect to find most of them available during the period of residence. A doctoral candidate is expected, as part of the course load, to enroll in a minimum of two seminars each semester (200-level courses).

For more detailed information, please visit the website <http://ase.tufts.edu/drama-dance>.

Earth and Ocean Sciences

Professor Jack C. Ridge, *Chair; Quaternary, glacial, and environmental geology; geomorphology; paleomagnetism*

Professor Grant Garven, *Groundwater geology and hydrology, groundwater chemistry*

Associate Professor Anne F. Gardulski, *Sedimentology, structural geology, stratigraphy*

Assistant Professor Molly McCanta, *Igneous and metamorphic petrology, mineralogy, planetary geology*

Assistant Professor Andrew C. Kemp, *Coastal systems, sea level change, oceanography, modern and paleo-climate change*

Senior Lecturer Jacob S. Benner, *Paleoecology, stratigraphy, ichnology, GIS applications*

ASSOCIATED FACULTY:

Professor Samuel Kounaves, *Chemistry; Analytical, environmental, and planetary chemistry*

Associate Professor Laurie Baise, *Civil and Environmental Engineering; Geotechnical and earthquake engineering*

The Earth and ocean sciences are an interdisciplinary exploration of Earth's 4.5-billion-year history and a study of the geological processes that form and shape the rocks and minerals of our planet and other planetary bodies. Earth and ocean sciences have their own bodies of knowledge, but also draw on principles from biology, chemistry, astronomy, physics, and mathematics. Earth scientists are involved in studying a great variety of problems, such as the search for natural resources including water, unraveling the causes and effects of climate change, tracing the evolution of organisms and ecosystems through geologic time, and understanding the origin of the bodies in our solar system. The program in Earth and Ocean Sciences, complemented by courses in supporting sciences, will prepare students well for graduate study or careers in an array of fields. Tufts University has well-equipped geological laboratories and an excellent collection of geologic materials for study and research. Research experiences with faculty and field trips in the northeastern and southwestern United States offer abundant opportunities for the study of a great variety of geological phenomena.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The Department of Earth and Ocean Sciences offers two programs: the geological sciences major, for students who wish to pursue graduate study in Earth and ocean sciences and related fields, or work at entry-level jobs; and the geology major, which emphasizes breadth and flexibility for students seeking a double major, teaching certification, entry to medical programs, or careers in multidisciplinary fields such as environmental law.

Geological Sciences Major

Students intending to continue with Earth and ocean sciences after graduation should complete the following courses: EOS 1, 2, 11, and 22. In addition, students must select a total of six more courses from the following groups: three courses from EOS 12, 13, 32, and 42; one course from EOS 131 and 133; and two courses above EOS 9 or from approved related fields courses. In addition, students must complete Mathematics 32, Chemistry 1 or 11, and Physics 1 or 11, and select two courses from Mathematics 34, Chemistry 2 or 12, Physics 2 or 12, and one course in statistics, selected from Mathematics 21 and Biology 132. The Chemistry and Physics courses must be taken with labs. Research experience and a six-week summer field camp are strongly recommended.

Geology Major

Students electing this option should complete EOS 1 and 2, eight other EOS courses (except EOS 9), plus Chemistry 1 or 11 and Physics 1 or 11 with labs. Approved related fields science courses may replace as many as three of the upper-level EOS courses for Arts and Sciences students. Engineering students with a double major in geology may use upper-level engineering courses to substitute for up to two of the upper-level EOS courses with prior written consent. No more than a total of four upper-level EOS courses may be replaced by engineering and related fields courses for engineering students.

UNDERGRADUATE MINOR PROGRAMS

Geology Minor

The Department of Earth and Ocean Sciences offers a minor in geology available to students in the School of Engineering. The faculty advisor for this minor is Professor Anne Gardulski.

Five courses are required for the minor. They normally include:

- EOS 1** The Dynamic Earth
- EOS 2** Environmental Geology
- EOS 22** Structural Geology or **EOS 32** Geomorphology
- EOS 131** Groundwater

One elective selected from the following:

- EOS 22** Structural Geology
- EOS 32** Geomorphology
- EOS 42** Sedimentology and Stratigraphy
- EOS 115** Quaternary and Glacial Geology
- EOS 132** Groundwater Chemistry and Quality
- EOS 133** Field Methods in Hydrogeology

Note that EOS 1, 2, 22, 131, 132, and 133 are generally offered every year, but EOS 32, 42, and 115 are offered in alternate years. Schedule planning for these courses is important.

Geoscience Minor

The Department of Earth and Ocean Sciences offers a minor in geoscience available to Arts and Sciences students who are majoring in archaeology, biology, chemistry, computer science, mathematics, physics and astronomy, or quantitative economics. The faculty advisor for this minor is Professor Anne Gardulski.

Five courses are required for the minor. They normally include:

- EOS 1** The Dynamic Earth
- EOS 2** Environmental Geology

Three electives are also selected, in consultation with the faculty advisor. These courses are intended to complement the student's major and scientific or mathematical interests.

Geoengineering Minor

The Department of Civil and Environmental Engineering offers a minor in geoengineering available to students of the College of Liberal Arts and the School of Engineering, except those majoring in civil and environmental engineering. Professor Lewis Edgers is the advisor for the minor. Five courses are required:

- Engineering Science 5** Applied Mechanics (Statics)
- Engineering Science 9** Applied Mechanics (Strength of Materials)

Civil and Environmental Engineering 12 Introduction to Hydraulic Engineering

Civil and Environmental Engineering 42 Introduction to Geotechnical Engineering

One elective selected from:

Civil and Environmental Engineering 112 Hydrology and Water Resource Engineering

Civil and Environmental Engineering 113 Groundwater

Civil and Environmental Engineering 146 Foundation Engineering

Civil and Environmental Engineering 149 Earth Support Systems

Prerequisites for the above course sequence are Mathematics 34 and Physics 12.

For more detailed information, please see the website <http://eos.tufts.edu>.

Economics

Professor Daniel Richards, *Chair; Industrial organization, macroeconomics*

Professor Marcelo Bianconi, *Macroeconomics, international economics, finance*

Professor Ujjayant Chakravorty, *Resource and environmental economics, energy and water resources, climate change*

Professor Yannis Ioannides, *Max and Herta Neubauer Chair in Economics; macroeconomics, growth, urban economics, housing*

Professor Gilbert E. Metcalf, *Director of Graduate Studies; Public finance, applied microeconomics*

Professor George Norman, *Cummings Family Chair in Entrepreneurship and Business Economics; industrial organization, spatial economics, microeconomics*

Professor Lynne Pepall, *Industrial organization, applied microeconomics*

Professor Enrico Spolaore, *Political economics, international economics, macroeconomics, economic growth/development*

Professor Jeffrey Zabel, *Econometrics, labor economics*
Associate Professor Drusilla Brown, *International trade theory and policy*

Associate Professor David Dapice, *Economic development, macroeconomics, public finance*

Associate Professor Thomas Downes, *Public finance, economics of education*

Associate Professor David Garman, *Applied econometrics*

Associate Professor Edward Kutsoati, *Director of Undergraduate Studies; Money and financial markets, applied microeconomics*

Associate Professor Melissa McInerney, *Health and labor economics*

Associate Professor Margaret McMillan, *Development economics*

Assistant Professor Kyle Emerick, *Agricultural economics, economic development, food and nutrition*

Assistant Professor Alan Finkelstein Shapiro, *Macroeconomics, macro-labor, international macroeconomics, monetary economics*

Assistant Professor Laura Gee, *Applied microeconomics, behavioral and experimental economics*

Assistant Professor Kelsey Jack, *Environmental economics, economic development, behavioral economics*

Assistant Professor Muthoni Ngatia, *Development economics, applied microeconomics*

Assistant Professor Sahar Parsa, *Macroeconomics, finance*

Assistant Professor Adam Storeygard, *Development and growth, urban economics*

Senior Lecturer Anna Hardman, *Urban economics, housing, international migration, development economics*

Professor of the Practice Christopher Manos, *Finance, entrepreneurship*

Professor of the Practice Judith Bentkover, *Health economics*

SECONDARY APPOINTMENTS:

Adjunct Professor Michael Klein, *International economics, macroeconomics*

Adjunct Professor William Masters, *Development economics, food and food industry*

Adjunct Assistant Professor Jenny Aker, *Development economics*

The mission of the department is to teach students to be critical thinkers and to use the discipline of economics to analyze and solve problems associated with important economic, political and social issues. These issues range from international economic relations to economic development, growth, income inequality, environment, education, housing and competition policy. The courses that we offer, along with our continuing interaction with other scholars at Tufts and elsewhere, help prepare our students to be leaders in the community at large after they leave the university.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Courses that can be offered to meet the concentration requirement in economics must satisfy the department's policies as outlined in the Economics Department Handbook, available from the department or on the department's website at ase.tufts.edu/economics/default.aspx. The handbook contains information on grading standards, acceptability of courses taken at Tufts and elsewhere, and other details of the concentration requirements.

There are two options available for the student who wishes to concentrate in economics. Option I, the major in economics, is less structured and allows greater flexibility in the choice of courses. Option II, the major in quantitative economics, is designed for students with an interest in mathematics and statistical methods. This option is best for those who are contemplating graduate study in economics or the more quantitative areas of business and finance.

Each economics major must complete three levels of courses: mathematics courses, normally completed by the end of the sophomore year; core courses, which cover the elements of economic theory and method; and elective courses. Elective courses are selected by the student but must meet criteria summarized below and detailed in the handbook. Normally, students should satisfy the prerequisite prior to enrolling in any core course, and should complete the core courses prior to taking elective courses. A minimum grade of C- is required for all core and elective courses used to satisfy these concentration requirements.

Both Option I and Option II place restrictions on the student's choice of electives; these restrictions are summarized below.

Option I: Major in Economics

PREREQUISITE

Principles of Economics (Economics 5) or equivalent.

MATHEMATICS COURSE(S)

Mathematics 32, or any higher-level mathematics course approved by the department. Students can waive all or part of this requirement by showing adequate prior preparation as determined by the

Departments of Economics or Mathematics (for example, through the Advanced Placement tests). Students may substitute Mathematics 14 and 30 for Mathematics 32. Students who make this substitution and who complete a second concentration must keep in mind that, for purposes of determining the number of courses that can overlap between the economics concentration and the second concentration, the economics concentration requires ten courses.

CORE COURSES

Four core courses are required: Intermediate Microeconomics (Economics 11), Intermediate Macroeconomics (Economics 12), Statistics (Economics 13), and Basic Econometrics (Economics 15). These courses serve as prerequisites for most upper-level economics courses. In place of Economics 13, students can take Mathematics 162, Engineering Science 56, Electrical Engineering 104 or Economics 201. Courses in other Tufts departments are normally not accepted as substitutes for Economics 13. In place of Economics 15, students can take Economics 107 or Economics 202. In place of Economics 18, students can take Economics 205.

ELECTIVE COURSES

Majors must successfully complete five upper-level economics courses numbered Economics 20 or above. At least three of these five courses must be courses numbered at the 100 level or above. See the handbook for details.

Beginning with the class of 2019, all majors are required to take at least one upper level seminar class. Upper level seminars are courses that focus on a specialized topic in the field of economics. Because of this specialized focus, all seminars have at least one of the core courses (Economics 11, Economics 16, Economics 12/18, Economics 13, Economics 15/107) as a prerequisite. In addition, seminars are small classes that place an emphasis on class interactions, the writing of papers, and the reading of journal articles. Seminar courses provide alternative ways to have "hands-on" research experience that satisfy the seminar requirement. This experience could be offered by a required research paper. However, courses that ask students to complete a series of short policy briefs, a critical literature review, or a group project that requires substantive research and writing all count as

seminars. Courses that satisfy the seminar requirement are listed with an ampersand (&) in the Department's Course Offerings.

Option II: Major in Quantitative Economics

PREREQUISITE

Principles of Economics (Economics 5) or equivalent.

BASIC MATHEMATICS COURSES

Mathematics 32 and 34. Students can waive all or part of this requirement by showing adequate prior preparation as determined by the Departments of Economics or Mathematics. Students should be aware that Mathematics 39 and 44 can be offered as substitutes for Mathematics 32, 34, and 42.

CORE COURSES

Five core courses are required: Intermediate Microeconomics (Economics 11); Statistics (Economics 13), Foundations of Quantitative Economics (Economics 16) or Microeconomic Theory I (Economics 203), Quantitative Intermediate Macroeconomics (Economics 18) or Macroeconomic Theory I (Economics 205), and Econometrics (either Economics 107 or 202). Students must complete Economics 11 before taking Economics 16 or 203. In turn, students must complete Economics 16 or 203 before taking Economics 18 or 205. One core mathematics course is also required: Mathematics 70 or 72. No course offered as a core course can also be used as an elective course. In place of Economics 13, students can take Mathematics 162, Engineering Science 56, Electrical Engineering 104 or Economics 201.

ELECTIVE COURSES

Quantitative economics majors must complete four additional upper-level economics courses numbered Economics 20 or above. There are three restrictions on choice. First, at least three of these four courses must be suitable courses at the 100 level or higher. Second, at least one elective course must be open only to students who have completed the relevant quantitative prerequisite course (Economics 16, 18, or 107) or its equivalent.

The third restriction varies depending on the student's graduation year. Beginning with the class of 2019, all majors are required to take at least one

upper level seminar class. Upper level seminars are courses that focus on a specialized topic in the field of economics. Because of this specialized focus, all seminars have at least one of the core courses (Economics 11, Economics 16, Economics 12/18, Economics 13, Economics 15/107) as a prerequisite. In addition, seminars are small classes that place an emphasis on class interactions, the writing of papers, and the reading of journal articles. Seminar courses provide alternative ways to have "hands-on" research experience that satisfy the seminar requirement. This experience could be offered by a required research paper. However, courses that ask students to complete a series of short policy briefs, a critical literature review, or a group project that requires substantive research and writing all count as seminars. Courses that satisfy the seminar requirement are listed with an ampersand (&) in the Department's Course Offerings.

Quantitative Economics majors graduating before 2019 must include in their four electives *either* at least one of the upper level seminar classes described above; *or* at least one of the 100-level economics courses that are explicitly designated as a "research-paper course," or a senior thesis credit. Research-paper courses are denoted with an asterisk (*) in the Course Offerings on the department's Web page (ase.tufts.edu/economics/courses/offerings.htm).

Recommendations for Honors

To receive the department's recommendation for summa or magna cum laude, eligible candidates must demonstrate outstanding intellectual force. Included in the ways the department judges this attribute are active contribution in classes; superior performance in the core courses of intermediate micro and macro theory, statistics, and econometrics; quality of projects pursued, especially class and seminar papers; and quality of a written thesis and its defense. Students wishing to be reviewed for magna or summa honors must complete at least one economics course which is explicitly designated as a "research-paper course" by the department, and which has Economics 11/16, 12/18, or 13 as a prerequisite. Research-paper courses are denoted with an asterisk (*) in the course offerings on the department's Web page (ase.tufts.edu/economics/courses/offerings.htm).

UNDERGRADUATE MINOR PROGRAM

Minor in Economics

The minor in economics is designed for students who have done substantial work in economics but who do not choose to complete all the requirements for a concentration. The structure of the minor is similar to that of the concentration in economics. The basic course provides a foundation for the treatment of the theory and method that are used in the core courses, and these core courses are prerequisites for most elective courses. This hierarchy of courses makes it difficult to complete the minor in fewer than three semesters. The five-course requirement for the minor is given below.

Please note that no more than one course can be transferred to meet the minor requirements. Second, all courses used in fulfillment of the minor must be taken for a grade. A grade of C- or better must be obtained in the basic, core and elective courses. Finally, a maximum of two courses used in the fulfillment of a foundation, distribution, or concentration requirement can be used for fulfillment of requirements for a minor.

BASIC COURSE

Principles of Economics (Economics 5) or equivalent

CORE COURSES

Intermediate Microeconomic Theory (Economics 11 or 16 or 203) and either Intermediate Macroeconomics (Economics 12 or 18 or 205) or Statistics (Economics 13 or 201, Mathematics 162, Engineering Science 56, or Electrical Engineering 104)

ELECTIVE COURSES

Minors must successfully complete two elective courses in economics. These two elective courses must include one from Economics 12 or above and one from Economics 100 or above. Exceptions will be made for those who wish to use both Economics 86 and Economics 87 as electives and for those who wish to use Economics 15 as their upper-level (above Economics 100) elective. Courses offered to complete the core may not be counted as electives.

Minor in Finance

The minor in Finance is a six-course interdisciplinary minor that gives students a foundation in the formal economics of financial markets and supplements that foundation with important mathematical and philosophical tools. The courses in the minor address the study of intertemporal pricing, theoretical and empirical analysis of decision-making under uncertainty, and both positive and normative issues in settings of asymmetric information.

As described below, the six courses in the minor include the three core classes, two electives, and a capstone seminar. Within this structure, Economics 50 may not be double-counted for both a Finance minor and either an Economics or a Quantitative Economics Concentration. Either Economics 157 or Philosophy 197 may be taken in connection with a concurrent internship with the consent of the course instructor and the Finance minor advisor. At most, one Finance minor elective may be double-counted as an Economics or Quantitative Economics major elective.

CORE COURSES

The core classes for the minor in Finance are Economics 50, Introduction to Finance; Mathematics 32, Calculus 1; and either Philosophy 24, Introduction to Ethics, or Philosophy 38, Rational Choice.

ELECTIVE COURSES

Finance minors must complete any two of the following classes to fulfill their elective requirement: ELS 103, Entrepreneurial Finance; Economics 150, Financial Economics; Economics 151, Monetary Economics; Economics 152, Topics in Money and Finance; Economics 154, Uncertainty Methods in Economics and Finance; Economics 159, Quantitative Financial Economics; and Economics 169, Quantitative International Finance.

CAPSTONE COURSE EXPERIENCE

In order to fulfill the Capstone Course requirement, each Finance minor must complete either Economics 157, Topics in Finance and Entrepreneurship, or Philosophy 197, Ethics, Law and Society.

For questions about the minor in Finance, please contact Professor Chris Manos, who serves as advisor to the program.

GRADUATE PROGRAM

Master of Science

The Economics Department offers a Master of Science (M.S.) program. Candidates normally will have completed the work required for a baccalaureate degree. Although concentration in Economics is not required, some exposure to the subject is preferred, especially in the areas of intermediate theory, mathematics and statistics. Students lacking this minimum training, but possessing a good background in a related discipline, may be admitted with the understanding that additional work will be required. The department offers a mathematics review course (Math Camp), which lasts one week and takes place at the end of August, before the first day of classes in the Fall term. All applicants, except Tufts undergraduates in arts and sciences, must submit the Graduate Record Examination (GRE) with their application.

The Master of Science Program in Economics has two tracks: Course-Based and Research-Based. The M.S. Course-Based track is an eight-credit program, which can be completed in one year, without a thesis. The M.S. Research-Based track is a twelve-credit program to be completed in two years, with a master's thesis.

All entering students will be admitted to the Master of Science program in Economics and will be asked about their potential interest in pursuing either the M.S. Course-Based or the two-year M.S. Research-Based degree. All students are required to complete the three core sequence classes: Statistics and Econometrics; Microeconomic Theory I and II; and Macroeconomic Theory I and II. The standard course load for a full-time student is four courses per semester.

Course-Based Master of Science in Economics

The Course-Based track requires completion of six core courses (**Economics 201–Economics 206**), and two electives, for a total of eight credits. Electives include courses offered in the Department of Economics, courses offered in other departments at the School of Arts, Sciences, and Engineering, and at the Fletcher School, as well as at other consortium schools (Boston College, Boston University, and Brandeis University). In order to receive the Master of Science Course-Based degree, a student must complete a one-year residency requirement and must pass eight semester courses.

Research-Based Master of Science in Economics

The requirements for the Research-Based degree, in addition to the eight-credit course requirements of the Course-Based track, include four extra credits: two master thesis credits, an Economics Research Seminar, and an Applied Econometrics course. To be admitted into the Research-Based Master of Science degree in the second year, students must demonstrate good standing in the first year of the program.

Specifically, a full-time M.S. Research-Based student will have to (1) show math competency by the end of the first (Fall) semester; (2) receive a final grade of B or better in all six courses (**Economics 201–Economics 206**), and a grade of A or better in at least two of those classes; (3) demonstrate ability to conduct independent research. Students in the M.S. Research-Based degree must complete twelve credits. The thesis must be a major research project conducted under the supervision of the member of the department. The completed thesis must be presented and successfully defended in an oral examination administered by a thesis committee. In order to receive the Master of Science Research-Based degree, a student must complete a two-year residency requirement and must pass twelve semester courses.

Financial aid, scholarships, teaching and research assistantships and other opportunities are available. The department considers all teaching and research experience to be an integral part of the program.

JOINT MASTER OF SCIENCE IN ECONOMICS AND URBAN AND ENVIRONMENTAL POLICY

In addition to the regular master's program, the Economics Department also offers a two-year program, in conjunction with the Department of Urban and Environmental Policy and Planning, leading to the joint degree of Master's in Economics and Urban and Environmental Policy. Applicants to this program must be accepted by both departments.

For more detailed information, please visit the website: ase.tufts.edu/economics/default.aspx.

Education

Professor David Hammer, *Chair; science and engineering education*

Associate Professor Bárbara M. Brizuela, *Director, STEM Education; Mathematics education*

Associate Professor Sabina Elena Vaught, *Director, Educational Studies*

Assistant Professor Julia Svoboda Gouvea, *Science education*

Assistant Professor Shameka Powell, *Educational Studies, Literacy*

Assistant Professor Michelle Wilkerson-Jerde, *Mathematics education*

Research Assistant Professor Jessica Watkins, *Science and engineering education*

Senior Lecturer Linda Beardsley, *Director, Teacher Education and School Partnerships*

Senior Lecturer Steve Cohen, *History and political science/political philosophy education*

Senior Lecturer Steven Luz-Alterman, *Co-Director, School Psychology*

Senior Lecturer Laura Rogers, *Co-Director, School Psychology*

Lecturer Susan Barahal, *Director, Art Education*

Lecturer Pamela Bower-Basso, *Art education*

Lecturer Brian Gravel, *Director, Elementary STEM Education; Science education*

Lecturer Silas Pinto, *School psychology*

Lecturer Ryan Redmond, *Middle and high school education*

Lecturer Cynthia Robinson, *Director, Museum Studies*

Lecturer Erin Seaton, *Learning and development*

The department is home for the study of, simply put, how people learn and how to help people learn. Much of our work focuses on K–12 schools, but we study education in other contexts as well, including museums and universities. Many of our students are preparing to work in schools, as teachers or as school psychologists; some are preparing for careers in museums and some for careers in education research. Students in other departments may take our courses who plan to become professors, for example, or designers of educational technology.

Our programs for prospective educators prepare students for the scholarship of professional practice, such as in teachers’ exploration and assessment of their students’ ideas and reasoning, in school psychologists’ examination of children’s strengths

and needs, or in museum educators’ study of visitors’ learning experiences.

Scholarship in education also includes research, such as in studies of the cultural, historical, and philosophical influences that shape schools as institutions, in investigations of the nature and dynamics of learning in particular academic disciplines, or in analyses of teachers’ thinking. Faculty in the department conduct research on learning and teaching in STEM disciplines (Science, Technology, Engineering, and Mathematics) as well as on educational inequities and the dynamics of race, gender, and power in institutional contexts. Students have opportunities to participate in this research, which often takes place in collaboration with other academic departments on campus as well as with the Center for Engineering Education and Outreach.

UNDERGRADUATE PROGRAMS

As of Fall 2016, students with a primary major in another department may have a secondary major or a minor in Education. The major requires 10 credits of coursework, the minor 5. Students pursuing a major or a minor choose one of two concentrations:

Educational Studies focuses on social and cultural foundations with particular attention to race, gender, sexuality, and other dimensions of societal organization. Students will study “critical theory” with respect to educational practices and institutions.

Teaching and Learning focuses on education within academic disciplines (art, history, a science, math, languages, engineering). Students will work with their major advisor to construct a program, generally related to their primary major and interests.

For detailed requirements and other information, please visit ase.tufts.edu/education/programs/.

GRADUATE PROGRAMS

The department offers a range of graduate programs. Some may be completed on a part- or full-time basis. To accommodate employed teachers who must conduct advanced work on a part-time basis, a considerable portion of the department’s graduate instruction is offered during late afternoon, evening, and summer sessions.

There are three Master of Arts in Teaching (M.A.T.) programs for licensure in Massachusetts: (1) Visual Art, in collaboration with the School of the Museum of Fine Arts in Boston; (2) Elementary STEM Education; and (3) Middle and High School Education in English, political science/political philosophy, history, engineering, mathematics, general science, earth science, biology, chemistry, physics, French, Spanish, and Japanese. The department also supports two Master of Arts (M.A.) programs toward credentials in German and in Latin and the classical humanities, in collaboration respectively with the Department of German, Russian, and Asian Languages and Literatures and the Department of Classics, as well as an M.A. program in collaboration with the Shady Hill School in Cambridge.

The Master of Arts/Educational Specialist program (M.A./Ed.S.) in School Psychology prepares students for for state licensure and national certification as school psychologists. The M.A. in Museum Education prepares students for careers in museum settings.

The M.A. in Educational Studies focuses on the study of race, gender, sexuality, class, and other categories of identity, culture, and institutional and structural power. The Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) programs in STEM Education focus on the study of learning and teaching in STEM disciplines.

For more information on any program, please see ase.tufts.edu/education/programs/.

Master of Arts in Teaching (M.A.T.) Degree: Middle and Secondary

The department's state-approved M.A.T. degree programs prepare candidates to teach in a range of academic fields; completion of an M.A.T. satisfies requirements for initial licensure in Massachusetts. The Urban Teacher Training Collaborative (UTTC) provides opportunities for students to work as year-long interns in one of our partnering public schools, including the Boston Arts Academy, Codman Academy, Linden STEAM Academy, Malden High School, Mission Hill K–8 School in Boston, and Somerville High School. The UTTC is the oldest program of its kind in the region, with a long-standing commitment to teacher preparation.

Master of Arts in Teaching (M.A.T.) Degree: Elementary STEM

The department offers a state-approved program in elementary education, with a specialization in STEM fields. Students are prepared to teach all subjects in a general education classroom, while spending additional time developing expertise in the teaching of science, technology, engineering, and mathematics. Students in this program are placed in partnering urban districts (in collaboration with the UTTC) as interns throughout the entire school year. Graduates receive initial teaching licensure for elementary grades 1–6, and they have the opportunity for an additional license in Moderate Special Needs.

Master of Arts (M.A.) Degrees: German and Latin and Classical Humanities

The MA in German with Teaching Licensure is a 14-credit program satisfying requirements for initial state licensure in German, offered in conjunction with the Department of German, Russian, and Asian Languages and Literatures.

The MA in Classics with Teaching Licensure is also 14 credits, satisfying requirements for initial state licensure in Latin and Classical Humanities, offered in conjunction with the Department of Classics.

Master of Arts (M.A.) Degree: Tufts/Shady Hill Cooperative Program

In this program, participants work and study as apprentices at the Shady Hill School in Cambridge throughout the school year. Shady Hill apprentices are eligible to apply for Massachusetts licensure for grades 5 to 8. Apprentices who wish to be licensed for grades 8 through 12 must complete at least 150 hours of additional student teaching.

Master of Arts in Teaching (M.A.T.) Degree: Art Education

This program prepares the artist to teach in elementary, middle, and high schools with a critical focus on both contemporary visual culture and traditional arts. It is offered in affiliation with the School of the Museum of Fine Arts, Boston, and leads to licensure as a teacher of visual art for grades pre-K to 8, or 5 to 12. The M.A.T. is a 12-month program of study in education foundations, art theory and curriculum, and studio art.

Master of Arts (M.A.)/Educational Specialist (Ed.S.)**Degrees: School Psychology**

This three-year program combines advanced course work with a specific sequence of field-based training and supervision in the core areas of assessment, intervention and consultation. These are anchored in a developmental perspective promoting the social, emotional and intellectual growth of children and adolescents. Problem-solving methods are emphasized as critical to understanding and proposing solutions to challenges in educational settings. Students complete a minimum of 1,950 hours of supervised field experience over the three years. Attendance during the summers is required. Students earn the Master of Arts and Educational Specialist degrees leading to initial licensure as a school psychologist in Massachusetts and eligibility for national certification.

Master of Arts (M.A.) Degree: Museum Education

This interdisciplinary program prepares students for museum careers such as teaching; outreach; community engagement; evaluation; and school, family, teacher, and public program development and management. Graduates work in art, history, science, and children's museums all over the world.

Master of Arts (M.A.) Degree: Educational Studies

Students in this program explore education as a site and dynamic of critical scholarly analysis through the disciplinary strands of the field, including history, sociology, anthropology, and philosophy. The program offers students the opportunity to examine a range of education topics in relation to the study of race, gender, sexuality, class, and other categories of identity, culture, and institutional and structural power. Additionally, students are trained to engage these topics through theoretical frames such as feminist and queer theories, critical race theory, socio-cultural theories, and others.

Master of Science (M.S.), Doctor of Philosophy (Ph.D.)**Degrees: STEM Education**

Students work in mathematics, science, and/or engineering education. The M.S. program is preparation for research, curriculum development, and teacher development in school districts, research institutions, and other educational settings, as well as for further study. The Ph.D. program is

preparation for research leadership, including as faculty in higher education. The program involves collaborating faculty from Child Development, Mechanical Engineering, Computer Science, Biology, Chemistry, Mathematics, Physics and Astronomy, the Center for Engineering Educational Outreach, and the Center for Science and Mathematics Teaching.

Master of Science (M.S.), Doctor of Philosophy (Ph.D.)**Degrees: STEM Education, Physics Education Track**

The Physics Education Track is a collaboration with the Department of Physics and Astronomy, beginning in Fall 2014. Students enrolled through Education complete requirements in physics, to show proficiency across classical mechanics and electromagnetism, statistical mechanics, and quantum mechanics. (See the Physics and Astronomy listing for information about enrolling through that department.) Students' oral qualifying exams include topics in Physics, and their dissertation committees include at least one member of Physics and Astronomy.

Admission Requirements

All programs require letters of recommendation and personal statements. All except Art Education require GRE general test scores; these are waived for current and recent Tufts undergraduates.

Art education applicants submit a portfolio to the School of the Museum of Fine Arts. Applicants seeking licensure as teachers of French, German, Spanish, or other languages submit a writing sample in the language of specialization and complete an interview in that language. School psychology candidates must have completed course work in personality or developmental psychology, abnormal psychology, and statistics and should have experience in a human services setting or with children and adolescents in other settings. Ph.D. applicants submit writing samples of their scholarly work.

For more information or to apply, please see gradstudy.tufts.edu/admissions.

Massachusetts Tests for Educator Licensure

Students who plan to teach in Massachusetts must pass the Massachusetts Tests for Educator Licensure (MTEL) required for the area in which they wish

to be licensed. Students who wish to be licensed as school psychologists in Massachusetts must pass the communication and literacy portion of the MTEL. The department offers information sessions, study guides, and tutoring as needed in preparation for these exams.

Electrical and Computer Engineering

Professor Eric L. Miller, *Chair; Signal processing, image processing*

Professor Mohammed Nurul Afsar, *Microwaves, design and measurements*

Professor Jeffrey A. Hopwood, *Microelectronics, plasma engineering*

Professor Karen Panetta, *Simulation, multimedia*

Professor Douglas Preis, *Electromagnetics, signal processing, audio engineering*

Professor Aleksandar Stanković, *Alvin H. Howell Professor in Electrical Engineering; Energy processing systems, control and estimation*

Associate Professor Chong Hwa Chang, *Computer engineering, communication networks*

Associate Professor Mark Hempstead, *Computer architecture*

Associate Professor Valencia J. Koomson, *High-speed/low-noise integrated circuits for optical RF communications, optoelectronic VLSI*

Associate Professor Tom Vandervele, *Optoelectronic materials, thermophotovoltaics, photovoltaics*

Associate Professor Mai Vu, *Network information theory, energy-efficient and wireless communications, signal processing*

Associate Professor Sameer Sonkusale, *Mixed-signal VLSI design, sensor electronics*

Assistant Professor Shuchin Aeron, *Statistical signal processing in sensor networks, network information theory*

Assistant Professor Usman Khan, *Signal processing and control, graph theory*

Professor of the Practice Ronald Lasser, *Product development and innovation management*

Professor of the Practice Brian Tracey, *Signal processing, image processing, acoustics*

Research Assistant Professor Alan Hoskinson, *Plasma physics, electromagnetics, chemical sensors*

SECONDARY APPOINTMENTS:

Professor Mark Cronin-Golomb, *Biomedical Engineering; Optical instrumentation, laser tweezers, atomic force microscopy, nonlinear optics*

Professor Sergio Fantini, *Biomedical Engineering; Biomedical instrumentation, medical optics, near infrared imaging of the brain, optical mammography*

Prof William Messner, *Mechanical Engineering; Automatic control systems with an emphasis on applications to data storage systems, robotics, microfluidics, and biological systems and instrumentation*

Associate Professor Alva Couch, *Computer Science; Parallel computing, computer graphics*

Associate Professor Soha Hassoun, *Computer Science; CAD, VLSI design*

Associate Professor Jason Rife, *Mechanical Engineering; Navigation, robotics, controls*

The Electrical and Computer Engineering Department educates tomorrow's technical leaders. Our students and faculty invent and design the electrical and electronic systems, computational platforms, mathematical algorithms, and communications networks used by our society.

The department offers degree programs in electrical engineering and computer engineering for students in the School of Engineering. Minors in music engineering, computer science, engineering management, entrepreneurial leadership, and multimedia arts are also available for ECE students.

Electrical engineers apply concepts from physics and mathematics to create useful electrical devices and systems. Some examples of engineered electrical systems include communications systems, power generation, integrated circuits and electronics, fiber optic data transmission, medical image processing, and radar. The computer engineer designs devices and systems for the management of information in digital form, such as audio and video systems, microprocessor control systems, digital communications, and computer networks. As software is as crucial to robust design as hardware, the computer engineer is also a knowledgeable programmer.

The department teaches courses in digital circuits and systems, microelectronics and very large-scale integrated circuit design, computer architecture, circuits, linear systems, signal and image processing, microwaves and microwave devices, electronic materials and solar cells, power

and energy systems, communications, and control. Design is integral to all of our engineering degree programs, each of which culminates in a senior design project.

By careful selection of course work, students who follow the standard curricula listed below may also satisfy admission requirements for professional schools of medicine, dentistry, business, or law.

UNDERGRADUATE PROGRAMS

The mission of the Department of Electrical and Computer Engineering is to provide our students with educational experiences that give them a sound basis for professional practice, advanced education, active citizenship, and lifelong learning. At its core is the goal that students learn the fundamental principles of electrical and computer engineering and master engineering methods to solve challenging and diverse problems. Further, the department strives to have each student develop the leadership and communications skills necessary to relate these solutions to both technical and non-technical communities. The faculty is dedicated to accomplishing this mission through the integration of teaching and research.

Bachelor of Science in Electrical Engineering

The accredited curriculum leading to the degree of Bachelor of Science in electrical engineering is intended to qualify students to begin a professional career in electrical engineering or to proceed to advanced study. The departmental concentration electives and free electives permit the undergraduate to select additional courses in the core areas. Students may study a wide variety of topics, including sustainable energy systems, semiconductor integrated circuits, VLSI design, biomedical engineering, microwaves and telecommunications, antennas and antenna systems, digital signal and image processing, control systems, communications and information theory, semiconductor and optoelectronics materials, power electronics and power systems, computer architecture, parallel processing, computer systems, and multimedia.

The core courses of the degree program contain elements of design as well as analysis, and include associated laboratory work. They involve concepts of circuits, signals, and systems, digital and analog electronics, microprocessors, electromagnetic fields, automatic control and communication.

The objectives of the Electrical Engineering program are:

- The EE graduate will have demonstrated a professional impact in her/his employment or graduate work.
- The EE graduate will be a leader among his/her peers or a leader in innovation.
- The EE graduate's work product will reflect a concern for others.

The program leading to this degree is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). The required courses for the electrical engineering program are listed below. They are presented in one of many possible arrangements for completing the program. Of the 38 course credits required for the professional degrees accredited by the Engineering Accreditation Commission of ABET, a minimum of 9.5 course credits must be completed in college level math and basic science subjects appropriate to the discipline, and a minimum of 14.5 course credits must be completed in engineering topics, consistent with ABET general and program criteria.

First Year

FALL TERM

Engineering Science 93

Mathematics 32

Physics 11 with lab

English 1

SPRING TERM

Engineering Science 2

Mathematics 36

Physics 12 with Lab

Humanities, arts, or social sciences elective

Sophomore Year

FALL TERM

Engineering Science 3 Introduction to Electrical Systems

Mathematics 42

Mathematics 70 or 72

Chemistry 1 or 16

Humanities, arts, or social sciences elective

SPRING TERM

Engineering Science 4 Introduction to Digital Logic Circuits

Electrical Engineering 21 Electronics I with Lab

Mathematics 51

Computer Science 11

Department foundation elective

Junior Year**FALL TERM**

Electrical Engineering 14 Microprocessor Architecture and Applications

Electrical Engineering 22 Electronics II with Lab

Electrical Engineering 23 Linear Systems

Free elective

SPRING TERM

Electrical Engineering 18 Electromagnetic Waves

Electrical Engineering 31 Junior Design Project

Electrical Engineering 104, Probabilistic Systems Analysis

Department foundation elective

Natural science elective

Senior Year**FALL TERM**

Electrical Engineering 97 Senior Design Project (half credit)

Electrical Engineering 105 Feedback Control Systems

Electrical Engineering 107 Communications Systems I

Department concentration elective*

Department concentration elective*

Humanities, arts, or social sciences elective

SPRING TERM

Electrical Engineering 98 Senior Design Project (half credit)

Department concentration elective*

Department concentration elective*

Humanities, arts, or social sciences elective

Free elective

*Department concentration electives are selected from a list provided by the department. The selections are subject to the approval of the departmental advisor.

Bachelor of Science in Computer Engineering

In both required and elective courses throughout the curriculum, computer analysis is used extensively in the study of electrical systems, components, and materials. Students wishing to investigate the analysis and design of digital computers more

intensively, as well as the analysis, design, and operation of systems in which computers are an integral part, may follow the Computer Engineering program.

The objectives of the Computer Engineering program are:

- The CompE graduate will have demonstrated a professional impact in her/his employment or graduate work.
- The CompE graduate will be a leader among his/her peers or a leader in innovation.
- The CompE graduate's work product will reflect a concern for others.

The program leading to this degree is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). The required courses for the computer-engineering program are listed below. They are presented in one possible arrangement for completing the program. Of the 38 course credits required for the professional degrees accredited by the Engineering Accreditation Commission of ABET, a minimum of 9.5 course credits must be completed in college level math and basic science subjects appropriate to the discipline, and a minimum of 14.5 course credits must be completed in engineering topics, consistent with ABET general and program criteria.

First Year**FALL TERM**

Engineering Science 93

Mathematics 32

Physics 11 with Lab

English 1

SPRING TERM

Engineering Science 2

Mathematics 36

Physics 12 or Chemistry 1

Humanities, arts, or social sciences elective

Sophomore Year**FALL TERM**

Engineering Science 3 Introduction to Electrical Systems

Mathematics 70 or 72

Mathematics 42

Physics 12 or Chemistry 1

Humanities, arts, or social sciences elective

SPRING TERM

Engineering Science 4 Introduction to Digital Logic Circuits

Electrical Engineering 21 Electronics I with Lab

Mathematics 51

Computer Science 11 Introduction to Computer Science
Humanities, arts, or social sciences elective

Junior Year**FALL TERM**

Electrical Engineering 14 Microprocessor Architecture and Applications

Electrical Engineering 23 Linear Systems

Computer Science 15 Data Structures

Mathematics 61

Free elective

SPRING TERM

Electrical Engineering 18 Electromagnetic Waves

Electrical Engineering 26 Digital Logic Systems

Electrical Engineering 31 Junior Design Project

Electrical Engineering 104, Probabilistic Systems Analysis
Humanities, arts, or social sciences elective

Senior Year**FALL TERM**

Electrical Engineering 97 Senior Design Project (half credit)

Electrical Engineering 103 Introduction to VLSI Design

Electrical Engineering 126 Computer Engineering

Electrical Engineering 128 Operating Systems

Natural sciences elective

Computer engineering elective*

SPRING TERM

Electrical Engineering 98 Senior Design Project (half credit)

Computer engineering concentration elective*

Computer engineering concentration elective*

Computer engineering concentration elective*

Humanities, arts, or social sciences elective

*Computer engineering electives are selected from a list provided by the department. The selections are subject to the approval of the departmental advisor.

Bachelor of Science in Engineering Physics

The Department of Electrical and Computer Engineering, in cooperation with the Department of Physics, offers a combined program of study leading to a bachelor of science in engineering

physics. The program combines an emphasis on the mastery of the fundamental principles of physics and basic mathematical techniques with the disciplined practicality of professional engineering. Students enrolled in this program are members of the School of Engineering but will have academic advisors in both engineering and physics. While a student may enter the engineering physics program at any time, it is expected that he or she will have taken the introductory courses in basic science and mathematics common to all Tufts engineering programs. Early participation in faculty research projects is encouraged.

The program leading to this degree is not accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc.

UNDERGRADUATE MINOR PROGRAMS

(See disciplinary minor programs for restrictions.)

Computer Science

The department offers a minor in computer science for those students pursuing the B.S.E.E. or B.S.C.P.E. degree. Details are available from the Department of Computer Science.

Engineering Management

The Engineering Management minor is a leadership-focused course of study that emphasizes real-life experience and engineering practice. The minor is available to students in the School of Engineering. Details are available from the Tufts Gordon Institute.

Entrepreneurial Leadership

The Entrepreneurial Leadership Program provides hands-on educational opportunities for students interested in founding their own companies or working in entrepreneurial environments. The minor is open to all Tufts Arts and Sciences and School of Engineering students. Details are available from the Tufts Gordon Institute.

Music Engineering

The minor in Music Engineering provides students with experiences at the intersection of music and technology. Students learn the technologies behind music-making, both traditional and modern, and how new technologies can be applied to musical goals. The minor is available to students in both the

School of Engineering and the School of Arts and Sciences. The minor replaces the minor in Musical Instrument Engineering.

Multimedia Arts

This interdisciplinary minor is offered through the Film and Media Studies program. For specific information about the policies governing requirements and electives, visit <http://ase.tufts.edu/cms/mma.html>.

CERTIFICATE PROGRAM IN MICROWAVE AND WIRELESS ENGINEERING

The department offers a graduate-level certificate in microwave and wireless engineering. The certificate is offered on a part-time, non-degree basis for students seeking professional training. In most cases, courses taken in a certificate program can be transferred into a graduate degree program. For more information, see Microwave and Wireless Engineering in this bulletin, contact the program administrator, Angela Foss, at angela.foss@tufts.edu or 617-627-2320, or visit <http://gradstudy.tufts.edu/programs/certificates>.

The certificate requires five courses.

Two required courses:

EE 107 Communications Systems I

EE 117 Introduction to Microwave Devices

One or both of the following:

EE 118 Microwave Semiconductor Devices and Circuits

EE 160 Computer-Aided Design of Microwave Circuits

Two graduate-level elective courses in microwave engineering or related fields:

EE 108 Communications Systems II

EE 136 Antennas for Radar, Avionics, and Communications

EE 137 Radar Engineering

EE 148 Silicon Radio Frequency IC Design

EE 161 Microwave Integrated Circuits

EE 193SBC Satellite-Based Communications

EE 194W Wireless Communications

EE 127 Information Theory

(Students may substitute other Tufts graduate courses, subject to the approval of the certificate faculty advisor.)

GRADUATE PROGRAM

Master of Science

The department offers a program leading to the M.S. degree in electrical engineering. The master of science degree requires ten credits, usually one credit per course, and all courses must be at the 100 level or above. For full-time students, at least seven credits must be from approved, lecture-based courses. One additional credit must be the Electrical Engineering Seminar. The two remaining credits can take the form of (a) a creative thesis work, written and defended orally, and performed under the supervision of a faculty member; (b) a supervised master's project plus another approved lecture-based course; or (c) two approved lecture-based courses. Grades in all courses must be B- or better.

The ECE department also offers a specialized Signals and Systems track within the M.S. degree in Bioengineering. This track educates biotechnology engineers in (1) analysis and processing of signals with an emphasis on biomedical image processing and image formation and (2) design, control and synthesis of systems for biotechnology, e.g., development of miniaturized devices, circuits and systems, or controller design for bioreactors.

Doctor of Philosophy

The department offers a program leading to the Ph.D. in electrical engineering. Students in the program must already have a Master of Science degree in electrical and computer engineering or a related field. Applicants to the Ph.D. program who do not have the M.S. degree will instead be considered for admission as an M.S./Ph.D. student, where they will be expected to complete the Master of Science degree program, and on completion of that program will automatically be considered for admission to the Ph.D. program.

The department differentiates between admission to the Ph.D. program and Ph.D. candidacy. No students are accepted as formal doctoral candidates until they (a) have exhibited merit in a qualifying examination process and (b) have identified a faculty member who has agreed to be their dissertation supervisor. The qualifying examination is comprised of both a written examination and oral examination that must be taken within one academic year of admission to the Ph.D. program (within two academic years for part-time students).

Doctoral candidates are expected to plan a program of research under the direction of their dissertation supervisor and with the guidance of a faculty research-committee. On completion of this research, the candidate must prepare and publicly defend a dissertation.

Ph.D. students in electrical engineering must take at least eighteen credits beyond the M.S. degree. These credits include a minimum of six credits of lecture-based class work, two credits of Electrical Engineering Seminar, and a dissertation. The dissertation effort is usually assigned ten credits. At least one credit of class-based course work must be taken from outside the field of electrical and computer engineering.

Typical areas available for dissertations include solid-state materials with an emphasis on optoelectronic and solar energy applications, microwave devices and systems, power systems and control, electromagnetics, antennas, plasma engineering, signal and image processing, VLSI and mixed-analog integrated circuits, microprocessor applications, computer architecture, communication systems, information theory, computer and wireless networks, and power electronics.

For detailed information, please visit the website <http://www.ece.tufts.edu>.

Engineering Education/ Center for Engineering Education and Outreach

CO-DIRECTORS:

Professor Chris Rogers, *Mechanical engineering*

Professor David Hammer, *Education and physics*

ASSOCIATE DIRECTOR:

Merredith Portsmore

CORE FACULTY:

Research Assistant Professor Ethan Danahy, *Director of Engineering Research; Computer science*

Assistant Professor R. Benjamin Shapiro, *McDonnell Family Professor of Engineering Education; Computer science and education*

The Center for Engineering Educational Outreach has three main areas of interest: research in engineering education, outreach to the local and

global community of teachers, and educational tool development. It is best known for its work with the LEGO Group in developing ROBOLAB, the educational version of LEGO Robotics. Over 60 engineering undergraduates work with the Center every semester to go into local classrooms to help teachers bring engineering to their class.

ENGINEERING EDUCATION MINOR

In the fall of 2009, the Tufts School of Engineering approved the Engineering Education minor program. The Engineering Education minor provides students with hands-on teaching experience through the Student Teacher Outreach Mentorship Program (STOMP). Engineering students participating in STOMP visit local K–12 classrooms once a week to facilitate hands-on engineering lessons, and gain a first-hand perspective on the challenges faced by educators today.

The Engineering Education minor not only provides students with STOMP field experience, but also provides an educational foundation that will help them in their classroom visits and influence their work.

Engineering students are encouraged to obtain an Engineering Education minor if they have:

- a passion for K–12 education, but don't necessarily want to pursue a career in the field;
- a potential desire to go into the education field post-graduation, but want to explore the possibility first;
- a determination to become an educator post-graduation, and the minor experience will adequately prepare them in pursuing an M.A.T.;
- a need to be active in citizenship and public service pre- and post-graduation.

This minor is currently only open to Tufts engineering undergraduates. Students are eligible for the minor if they take five credits and participate in one field experience activity in the form of STOMP (<http://www.stompnetwork.org>) or an equivalent Education field course. The five required credits are divided among the three categories of Build, Apply, and Integrate.

If you are a Tufts Engineering student interested in the minor, please contact merredith.portsmore@tufts.edu with questions.

Master of Arts in Teaching Engineering (M.A.T.)

Tufts University Graduate School of Arts and Sciences and the Tufts University School of Engineering are proud to announce the new Master of Arts in Teaching (M.A.T.) Engineering program, which will prepare teachers for teaching engineering. Engineering has become an essential component of STEM disciplines at the middle and high school levels. There is a clear need to prepare engineering teachers who have a strong academic background in engineering as well as a research-based understanding of how students learn the concepts and design process of engineering. Engineering teachers must also have an intellectual appreciation for the ways in which mathematics and science fields intersect with engineering.

Established in 2010, the M.A.T. in Engineering was generated out of the generous support of the Kodosky Foundation as a part of a gift to Prepare Engineers as Teachers (PET). The M.A.T. in Engineering is a unique program that breaks new ground in preparing engineers as teachers in Massachusetts. Candidates in the program will undergo an authentic interdisciplinary experience working with faculty, staff, and students in the Graduate School of Arts and Sciences and the School of Engineering.

The program builds on the successful teacher preparation programs of the Tufts Department of Education and the successful collaborations the department has had with development of engineering curriculum and STEM outreach in the Tufts School of Engineering, in particular the work of the Center for Engineering Education and Outreach (CEEEO). The program is designed to create a deeply reflective, intellectual culture of considering engineering in schools that bridges the traditional tensions between research and practice in teacher preparation.

Candidates enroll in our programs to become middle or high school teachers who understand the importance of education in preparing an active, civically engaged citizenry and who know how to approach new ideas and challenges, such as how to implement standards-based education in an inclusive classroom.

The program leading to licensure endeavors to foster democratic dialogue, vitality, and change. In this way the program reflects a vision of hope and

promise for educational change in the communities with whom we place pre-service teachers to practice the skills and competencies of their prospective profession.

The Tufts M.A.T. Program leading to licensure for middle and high school teaching is ordinarily completed within one academic year and two summer semesters, but candidates may choose to extend their studies and practicum experience for a longer period of time. The candidate typically completes two summer semesters and one full academic year in a thoughtful scope and sequence of academic course work and field experiences. The field experiences are the focus of the Fall and Spring semesters; courses and field experiences are closely aligned with each other, and experienced mentors as well as university supervisors provide valuable feedback and expertise. The summer semesters are focused on academic work in the discipline for which licensure is sought and in foundations and history of educational theory. Each candidate will have an advisor in Education as well as an advisor from the School of Engineering.

Please contact Brian Gravel (brian.gravel@tufts.edu or 617-627-4201) for more information about the program, applying, or financial aid.

Research in K-16 Engineering Education

Graduate-level research in engineering education can be pursued through the Department of Education's STEM Education program or through CEEEO-affiliated faculty in the School of Engineering.

Please contact Merredith Portsmore (merredith.portsmore@tufts.edu) for more information.

Engineering Management/ Gordon Institute

The Gordon Institute offers programs in engineering leadership and entrepreneurship that provide graduate and undergraduate students with the tools they need to advance their careers, inspire teams, and bring innovative products to market. Please note that information on the entrepreneurial leadership program can be found in the entrepreneurial leadership section of this bulletin.

PROGRAM DIRECTOR:

Professor of the Practice Mary Adams Viola, *Leadership, new product development, innovation, technology strategy*

CORE FACULTY:

Lecturer Alicia Amaral, *Financial and managerial accounting*

Lecturer Frank Apeseche, *Financial and managerial accounting*

Lecturer Mark Bamford, *Conflict Resolution*

Lecturer Jennifer Braggin, *Engineering Management*

Lecturer Jerome Brightman, *Leadership*

Lecturer Gerald Brown, *Continuous quality improvement and supply chain management*

Lecturer Richard Cohen, *Conflict resolution*

Lecturer Gavin Finn, *Engineering management, new product development*

Lecturer Steve Geary, *Supply chain management*

Professor of the Practice Partha Ghosh, *Multinational strategies*

Lecturer Victoria Godfrey, *Marketing*

Lecturer Richard Goode, *Sustainability*

Senior Lecturer Amy Hirschfeld, *Technical and managerial communication*

Lecturer Ronald Jonash, *Technology strategy and innovation*

Lecturer Stacy Lennon, *Conflict resolution, leadership*

Professor of the Practice Samuel Liggero, *New product development, technology strategy*

Lecturer Bob Muray, *Business strategy*

Lecturer James Nash, *Project management and process improvement, quantitative systems*

Lecturer Kishore Pochampally, *Quantitative systems and operations management*

Lecturer Debra Reich, *Experience Design*

Lecturer Annette Sawyer, *Leadership, ethics*

Lecturer Jane Seminara, *Humanistic perspectives on leadership, ethics*

Lecturer Irina Sigalovsky, *Systematic Innovation*

Lecturer Louise Strayhorn, *Leadership*

Lecturer Abbott Weiss, *Supply chain management*

Lecturer Ewa Winston, *Humanistic perspectives on leadership, ethics*

UNDERGRADUATE PROGRAM

The Gordon Institute offers a minor in engineering management that is available to all engineering undergraduate students at Tufts. The program emphasizes real-life experience and engineering practice, not just theory. A Tufts engineering degree

combined with an engineering management minor provides students with a competitive edge and equips them to make significant contributions as soon as they enter the workplace.

Five courses are required for the minor. All five courses in the minor must be taken for a grade.

Four are designated:

EM 051 Engineering Management

EM 052 Technical and Managerial Communications

EM 153 Management of Innovation

EM 054 Engineering Leadership (or **ELS 107** with permission)

One must be selected from the School of Engineering elective options or the general course elective options listed below. EM 52 and EM 54 are courses that can be used by engineering students to fulfill their Social Science distribution requirements.

School of Engineering elective options:

Comp 171 Human Computer Interaction

Comp 180 Software Engineering

ME 102 Inventive Design

ENP 161 Human Factor Product Design

ME 108 Model Quality Control

ES 152 Engineering Systems: Stochastic Models

ES 56 Probability and Statistics

CEE 53 Engineering Economics

CEE 185 Legal Issues of Engineering

CBE 110 Introduction to Optimization

EM 155 Financial Management for High Technology Firms

General course elective options:

EC 3 Principles of Accounting (free elective)

EC 5 Principles of Economics

PS 104 Public Administration (free elective)

PSY 17 Industrial and Organizational Psychology (social science elective)

SOC 122 Organizational Behavior (free elective)

ELS 103, ELS 105, ELS 107 (social science elective) (note:

ELS 107 only as alternate to **EM 054**, Engineering Leadership, with permission)

DR 0027 Public Speaking (humanities elective)

PSY 0006 Psychology of Leadership (free elective) (note:

PSY 0006 only as alternate to **EM 054**, Engineering Leadership, with permission)

PSY 53 Engineering Psychology (free elective)

SOC 114 Sociology of Leadership (social science elective)

GRADUATE PROGRAM

The Gordon Institute offers a two-year, accredited M.S. program in engineering management (M.S.E.M.) designed for practicing engineers and other technical professionals. The program produces technical leaders who can initiate and manage change and use advanced technical and managerial knowledge to drive strategic decisions.

The Gordon Institute's curriculum includes interactive classes and intensive, real-world projects. Technical topics such as project management, product development and quantitative methods are studied along with the broader areas of business management, leadership strategies and the humanities. This multidisciplinary approach fully prepares engineers and scientists to address the many challenges presented by today's business environment. The Institute's close ties with organizations in industry and government also provide unique opportunities for experience-based learning and networking.

Three enrollment options are available: an evening program in which classes are two nights per week, a weekend program in which classes are held every other Friday and Saturday, and a Saturday program in which classes are held every Saturday. All programs have identical requirements, are four semesters in duration, and lead to a Master of Science degree in engineering management (M.S.E.M.).

For more detailed information, please visit the website <http://gordon.tufts.edu>.

Engineering Physics

(FOR DEGREE REQUIREMENTS, SEE PHYSICS AND ASTRONOMY.)

Engineering Psychology/ Human Factors Engineering

ACTING DIRECTOR:

Professor of the Practice Daniel J. Hannon, *Mechanical Engineering*

UNDERGRADUATE ADVISOR FOR LIBERAL ARTS:

Professor Holly Taylor, *Psychology*

AFFILIATED FACULTY:

Professor of the Practice Daniel J. Hannon, *Mechanical Engineering*

Professor Holly A. Taylor, *Psychology*

Professor of the Practice Michael Wiklund, *Mechanical Engineering*

The Engineering Psychology/Human Factors Engineering program is an interdisciplinary program offered jointly by the departments of mechanical engineering and psychology.

Engineering psychology, more commonly called human factors, applies knowledge of human behavior and attributes to the design of products, equipment, machines, and large-scale systems for human use. Areas of application include medical devices and systems design, transportation safety, consumer product design, and computer interface design. Students in the School of Engineering or the College of Liberal Arts will receive the bachelor of science degree from their respective colleges after meeting the general requirements set by each college.

The program prepares students for professional work and further graduate studies in this discipline. It also serves as a preparation for premedical and pre-dental students; and for those interested in careers in technology design and development, or management.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The program features fourteen courses divided into introductory and core course requirements, with specific subsets for students in the College of Liberal Arts and the School of Engineering. For engineering students, an additional twenty-two courses are required for the bachelor of science degree (see School of Engineering information). For liberal arts students, an additional twenty courses are required to meet the foundation and distribution requirements for the bachelor of science degree (see College of Liberal Arts information). The core courses can be used by these students to meet the social and natural science distribution requirements (see the online course catalog on iSIS for course descriptions).

Introductory course requirements:

Engineering Science 2 Introduction to Computing in Engineering

Psychology 1* or **Psychology 9** Introduction to Psychology or Introduction to Cognitive and Brain Sciences

*Only Psychology 1 is approved for students in the School of Engineering; students with Advanced Placement Credit for Psychology 1 should take Psychology 9.

Required for students in the College of Liberal Arts:

Engineering Science 18 Computer-Aided Design with Lab (1 credit)

Computer Science 11 or **Physics 11** Introduction to Computer Science or General Physics I

Computer Science 15, **Math 32**, or **Math 61** Data Structures, Calculus I, or Discrete Math

or

Required for students in the School of Engineering:

Engineering Science 93 Special Topics in Engineering

Computer Science 11 Introduction to Computer Science

Computer Science 15 Data Structures

Core course requirements:

Engineering Psychology 61 Introduction to Human Factors and Ergonomics

Engineering Psychology 120 Project Study in Human Systems (year-long capstone course)

Engineering Psychology 161 Human Factors in Product Design

Engineering Psychology 162 Human-Machine System Design

Psychology 17 Industrial and Organizational Psychology

Psychology 31 Behavioral Statistics

Psychology 32 Experimental Psychology

Psychology 53 Engineering Psychology

Psychology 130 Advanced Engineering Psychology

In addition to these courses, students in the College of Liberal Arts will take one Psychology elective, and it is recommended they consider taking the following courses with particular relevance to the field of Engineering Psychology: Engineering Science 5, Psychology 107, Computer Science 15, Computer Science 086 or 171, and Engineering Psychology 166.

Students enrolled in the School of Engineering must also satisfy the following distribution requirements for the Engineering Psychology Program: Mathematics 32 and 36, Engineering Science 3 or 5, Engineering Psychology 166, Computer Science 171, Mechanical Engineering 108 or Psychology 31, English 1 or 3, Psychology 107, Engineering Management 52, one approved Engineering elective, one approved Mathematics elective, two approved Natural Science electives, two approved Humanities/Arts and Social Science (HASS) electives, one approved Computer Science elective, and four approved concentration electives. There are two free electives as well. Independent study and student thesis opportunities are available.

Sample course plans can be obtained from either of the sponsoring departments.

English

Professor Joseph Litvak, *Chair; Nineteenth-century British literature, literature theory, Jewish cultural studies*

Professor Elizabeth Ammons, *Harriet H. Fay Professor of Literature; American literature, literature and environmental justice*

Professor Linda Bamber, *Women and literature, Shakespeare*

Professor Jay Cantor, *History of consciousness, modernism, creative writing*

Professor Lee Edelman, *Fletcher Professor of English Literature; Literary theory, film studies, modern poetry*

Professor John M. Fyler, *Chaucer, medieval literature*

Professor Judith Haber, *Renaissance literature*

Professor Jonathan Wilson, *Fletcher Professor of Rhetoric and Debate; American literature, creative writing*

Professor Lisa Lowe, *Comparative literature and critical theory, British empire, American studies*

Associate Professor Kevin Dunn, *Renaissance literature*

Associate Professor Sonia Hofkosh, *British Romantic literature*

Associate Professor Modhumita Roy, *World literature in English*

Associate Professor Christina Sharpe, *Multiethnic U.S. literature*

Associate Professor Greg Thomas, *African American literature*

Associate Professor Ichiro Takayoshi, *Twentieth-century American literature, Asian American literature*

Assistant Professor Jess Keiser, *Eighteenth-century British literature*

Assistant Professor John Lurz, *Twentieth-century British literature*

Assistant Professor Nathan Wolff, *Nineteenth-century American literature*

Lecturer Michael Ullman, *Non-Fiction Writing, British and Irish literature*

Professor of the Practice Natalie Shapero, *Poetry and Creative Writing*

The Department of English offers a wide range of courses in British, American, and world literatures in English; film; literary theory; and creative writing. Though diverse, these offerings are unified by the study of textual production and the styles and practices of writing in English. Courses in the department examine literary works in their most illuminating contexts: historical, social, philosophical, and political. The department's courses in expository and creative writing enable students to refine their skills through reading, frequent writing assignments, and discussion.

The department serves the interests of students who plan to become teachers or writers of literature, as well as those preparing for other professions that put a high premium on cultural analysis, effective writing, symbolic interpretation, or media studies. Among the fields our students commonly enter are law, diplomacy, journalism, public relations, publishing, teaching, and filmmaking. Students who have majored (or double-majored) in English are also seen as especially attractive candidates by medical, law, and business schools. Our courses are central to a liberal arts education, regardless of anticipated career, because they instill a mastery of critical thinking, linguistic analysis, and persuasive communication in a world that increasingly demands that we not only read but also read through the representations that we encounter.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

English majors work out a sequence of courses in consultation with their advisors. A list of approved courses for each category is available online through the English department website: <http://ase.tufts.edu/english>. Students must take ten courses listed or cross-listed in the department above English 1, 2, 3, and 4 as follows.

1) One survey course from the following:

English 20 Black World Literature (formerly **English 36**)

English 21 General View of English Literature I (formerly **English 51**)

English 22 General View of English Literature II (formerly **English 52**)

English 23 American Literature: First Contact to 1855 (formerly **English 59**)

2) Two non-survey classes in American, British, or other Anglophone literature written before 1860, including at least one course in British literature. No more than one course used to fulfill this part of the requirement may be on Shakespeare. A list of approved courses for this category is available at this link: <http://ase.tufts.edu/english/undergraduate/majorsApprovedCourses.htm>.

3) Two non-survey courses in American, British, or Anglophone literature written after 1860. A list of approved courses for this category is available at this link: <http://ase.tufts.edu/english/undergraduate/majorsApprovedCourses.htm>.

4) Five remaining courses of the student's choice from the department's listings. See course listings by semester at this link: <http://ase.tufts.edu/english/courses>.

In constructing their majors, students are expected to work with their advisors to design a coherent but wide-ranging course of study. English majors should take survey courses early in their academic career in order to establish the necessary foundation for more advanced classes. We encourage all students majoring in English to explore the full historical range of offerings; to investigate the spectrum of textual differences to be found in the study of Anglophone literatures, film, and oral traditions; and to include exposure to recent approaches in English studies, such as women's studies, literary theory, historical materialism, and cultural studies. With the help of their advisors, English majors should seek to create programs of study that expand their knowledge and challenge their preconceptions.

No more than four transfer courses may count toward fulfillment of the major.

Students should be aware that they may count toward the major no more than two creative writing courses at the introductory level in each of the areas offered (i.e. Creative Writing: Fiction, Creative Writing: Poetry, and Creative Writing: Journalism)

and no more than two intermediate level courses in each of those areas. There is no limit on the number of advanced creative writing courses a student may count. Nonfiction Writing and Intermediate Journalism may each be counted only once.

Students must receive a grade of C- or higher in any course that they wish to count toward the fulfillment of English major requirements.

UNDERGRADUATE MINOR PROGRAM

The minor in English requires students to take six courses in the department above English 1, 2, 3, and 4. The purpose of the minor is to allow students to experiment widely, or to follow a particular interest with some concentration. Therefore, each minor will be individual not only in content but also in concept. All students should try, however, to include at least one course numbered below 100 and one above 100 and should consult with faculty members as they pursue their minors. Students may count a maximum of three creative writing courses toward fulfillment of the minor in English. No more than two transfer courses may count toward fulfillment of the minor.

GRADUATE PROGRAM

The graduate program in English, American, and Anglophone world literature is varied and flexible. It offers special opportunities for literary analysis with a focus on cultural studies, literary theory, and topics in gender, race, and politics. Many of the department's period, genre, and interdisciplinary courses lend themselves to a broadly conceived program in literature and culture, including interdisciplinary work. Approved courses in other departments may be taken to that end. Admission is in the Fall semester only.

More information can be found at this link:

<http://ase.tufts.edu/english/graduate>.

Master of Arts

Master's candidates are required to complete six semester courses, with the expectation that they will enroll in three graduate seminars per semester. Because doctoral degree candidates are required to take a comprehensive examination in their third year, students are advised to take courses that offer them breadth as well as depth. At the end of the master of arts year, they will take a written examination to demonstrate their critical and analytical

skills. One month before the examination they will be assigned two texts to prepare. The examination will test their ability to integrate critical, theoretical, and contextual analyses of the texts.

At the end of the academic year, the full faculty will consider the master's candidates individually, focusing on the results of their master's examination, their academic records at Tufts, and the recommendations of the faculty who have taught them. On the basis of this appraisal, the department will recommend whether or not the candidate should be granted the master of arts; it will also determine whether or not the candidate should be admitted to candidacy in the doctoral degree program.

The required reading knowledge of a foreign language must be demonstrated to the satisfaction of the Graduate Committee (usually by an examination taken at Tufts University) in order to complete the requirements for the master of arts degree.

Doctor of Philosophy

Admission to the doctoral degree program is open to students who have completed with distinction the master's degree in English, either at Tufts or another university. Students who enter with a master's degree from another institution will enroll in three graduate seminars per semester during their initial year. At the end of that year, their work will be reviewed by the faculty, who will determine whether each candidate should continue in the program; upon receiving a positive recommendation, candidates who came to Tufts with a master's degree in hand will pass into the third-year program. Students who successfully complete the master's degree at Tufts will enter their second year of the program, receiving mentoring as teaching assistants in both literature and composition courses while taking three courses each semester, one of which will be a proseminar offering training in various aspects of the profession.

During the second and third years, doctoral candidates will increase their comprehensive knowledge while beginning to concentrate on one particular area or subject. Normally, the courses they take will be chosen from among the graduate seminars in the department, but advanced-level undergraduate courses or independent studies may be counted with the approval of the director of

graduate studies. During the third year of the program, all candidates will complete their coursework by taking two courses in the fall semester. At the same time, they will begin to teach one course per semester in the First-Year Writing Program; they will normally continue teaching through the fifth year.

At the end of the third year, each student will take a two-hour oral comprehensive examination. The examining committee will consist of three faculty members, one of whom, the chair, has been selected by the student as someone familiar with the student's work in class. In most cases, the graduate student will already have spoken with this faculty member about serving as director of her or his dissertation.

No standardized list of texts is issued for this examination. The graduate program is small and one advantage of its size is that students' individual interests can be accommodated. It is not the purpose of the examination to have everyone do the same thing. Instead, it seeks to test each student's range and breadth of knowledge. Therefore, the following guideline of periods and areas of concentration is to be used by each student to generate a foundation list of works in each period or area for which he or she will be responsible. This list is not intended to be exhaustive or exclusive; not everything the student has read will show up on the list. Critical works on periods and texts will be included on each list. This list of specific titles should be arrived at in consultation with individual faculty members and with the director of the graduate program. The list must be submitted to the director of the graduate program in English at least three months before the oral examination.

Periods and areas of concentration for the doctoral degree comprehensive examination are the following: Old English, Medieval Literature, Sixteenth-Century British Literature, Seventeenth-Century British Literature, Eighteenth-Century British Literature, American Literature before 1820, Nineteenth-Century British Literature, Nineteenth-Century American Literature, Twentieth-Century British Literature, Twentieth-Century American Literature, Contemporary World Literature, and Literary Critical Theory. Each candidate also has the option of constructing, in consultation with the chair of the committee, one special topic focused on his or her particular area of interest, in

preparation for the dissertation. Candidates will select eight of the periods or areas for particular development for the comprehensive examination. Two of those fields will be fulfilled by course work completed in graduate school. The other six will be the focus of the comprehensive oral examination. Students who do not pass the oral examination, in whole or in part, may take the examination again at a later date.

Once the student has passed the oral comprehensive, he or she will produce a prospectus for the dissertation. This must be submitted to the department not later than six months after the oral examination.

In order to complete the doctoral degree, each student is required to demonstrate by examinations or courses taken at Tufts an ability to read two foreign languages (one of which was necessary in order to fulfill the requirements for the master of arts). Alternatively, doctoral candidates may complete with a passing grade at least one graduate level course in a foreign literature. It is generally expected that this course will be done in a body of literature relevant to the student's graduate study.

Tufts in London

The Department of English cooperates with other departments in offering undergraduates a year of study in England. For more information, see Tufts Programs Abroad.

For more detailed information, please visit the website <http://ase.tufts.edu/english>.

Entrepreneurial Leadership Studies/Gordon Institute

DIRECTOR:

Senior Lecturer Inge Milde, *Entrepreneurship and business planning, field studies*

FACULTY:

Associate Dean & Executive Director TGI, *Professor of the Practice Mark Ranalli*, *Entrepreneurship and business planning, field studies*

Lecturer Alicia Amara, *Entrepreneurial finance*

Lecturer Frank Apeseche, *Entrepreneurial finance*

Lecturer Eric Braun, *Entrepreneurship and business planning*

Lecturer Yumin Choi, *Entrepreneurial finance*

Lecturer Jack Derby, *Entrepreneurial marketing*

Lecturer Gavin Finn, *Entrepreneurial marketing*

Lecturer Peter Marton, *Entrepreneurial leadership*

Lecturer Pamela Stepp, *Entrepreneurial leadership*

Lecturer Joshua Wiesman, *High Technology Entrepreneurship, Creative Design Process of Products*

Lecturer Ambereen Mirza, *Innovative Social Enterprises*

The Entrepreneurial Leadership Studies Program at Tufts provides hands-on educational opportunities for students interested in founding their own companies or working in entrepreneurial environments. The program strives to engage students in the ever-changing world of new business ventures and teaches them to develop innovative, real-world solutions to business challenges.

The program attracts top faculty and continuously works to develop industry partnerships to provide students with internship and networking opportunities. Through our rigorous curriculum and connections to alumni in business and industry, the program strives to benefit both students and the corporate community. With access to outstanding teachers, intensive coursework, guest speakers, internships, and real-world business networks, our students develop the advanced knowledge they need to become the entrepreneurial leaders of the future.

A minor in entrepreneurial leadership is available for all arts, sciences, and engineering undergraduate and graduate students interested in leadership positions at start-up companies or entrepreneurial segments of the corporate or social sector. Students are required to take four courses plus one elective course from the lists below. All courses must be taken for a grade. Students will attend lectures, discuss relevant issues with guests from the real world, complete homework assignments, take tests, participate in focused discussions of relevant issues and current events, and complete a course project on a topic central to the theme of the course.

After meeting the necessary requirements for the minor, students complete the minor certification form and return it to the Gordon Institute.

Required courses:

ELS101 Entrepreneurship and Business Planning (may substitute ELS 101.03, EC 74, BME 194 or EM 153)

ELS103 Entrepreneurial Finance (may substitute EM 55)
ELS105 Entrepreneurial Marketing

ELS107 Entrepreneurial Leadership (may substitute EM 54)

Elective courses:

ELS 141 Innovative Social Enterprises (cross-listed as **American Studies 141** and taught in partnership with Tisch College)

ELS 193, 194 Special Topics: Internship/Research

ELS 199 Entrepreneurial Field Studies: Launching the Venture

EC 3 Principles of Accounting

EC 6 Business Law

UEP 23 Negotiation, Mediation and Conflict Resolution

DR 10 Introduction to Acting

DR 27 Public Speaking

Other courses during study abroad or off-campus study if approved by the program director

Annual Events

The Entrepreneurial Leadership Studies Program organizes two annual entrepreneurial speaking events: the Lyon and Bendheim Entrepreneurial Alumni Lecture Series and the Alan Shapiro Entrepreneurial Lecture Series.

\$100k New Ventures Competition

The Entrepreneurial Leadership Studies Program manages the annual \$100k New Ventures Competition. This university-wide event attracts entries from undergraduate and graduate students, researchers, faculty, staff and alumni from across the entire University including Arts and Sciences, School of Engineering, Sackler School of Graduate Biomedical Sciences, the Fletcher School of Law and Diplomacy, the Cummings School of Veterinary Medicine, Jonathan M. Tisch College of Citizenship and Public Service, the School of Dental Medicine, the School of Medicine, and partner School of the Museum of Fine Arts. The Tufts \$100k New Ventures Competition uniquely positions itself with three competition tracks: Social Impact, Life Science, and General/High Tech.

Ideas Competition

The Tufts Ideas Competition provides early-stage startups with mentorship, funding and the support needed to catalyze their ideas and serve as a feeder for the \$100k New Ventures Competition.

For more detailed information, please visit the website <http://gordon.tufts.edu/entLeader>.

Environmental Health

DIRECTOR:

Professor David M. Gute, *Environmental and occupational epidemiology*

CORE FACULTY:

Lecturer Anne Marie Desmarais, *Risk assessment and toxicology*

Assistant Professor Daniele S. Lantagne, *Usen Family Career Development Assistant Professor, Public health engineering, global health, water-borne pathogens*

Professor Kurt Pennell, *Bernard M. Gordon Senior Faculty Fellow Groundwater remediation technologies, fate and transport of emerging contaminants, neurotoxicity of persistent organic pollutants and engineered nanomaterials*

Senior Lecturer Mark Woodin, *Epidemiology and biostatistics*

ASSOCIATED ENVIRONMENTAL HEALTH FACULTY:

Adjunct Professor Douglas Brugge, *Professor of Public Health and Community Medicine, Asthma, air pollution, environmental justice, immigrant health*

Professor Steven C. Chapra, *Water quality modeling and transport of pathogens*

Associate Professor Wayne Chudyk, *Drinking water quality and treatment*

Associate Professor John L. Durant, *Contaminant fate and transport*

Adjunct Professor Jeffrey Griffiths, *Professor of Public Health and Community Medicine, Infectious disease epidemiology, characterization of waterborne pathogens and global health*

Adjunct Professor Elena N. Naumova, *Biostatistics and infectious disease modeling*

Associate Professor Christopher Swan, *Site remediation*

The Environmental Health program, which celebrated its 50th anniversary in 2014, is an interdisciplinary program based in the Department of Civil and Environmental Engineering of the School of Engineering. Historically, professional programs in environmental health were established in schools of engineering to promote research on control of infectious disease, purification of water supplies, and sanitary disposal of human wastes. Today, the focal points of Environmental Health at Tufts has broadened to such challenging issues as environmental pollution, epidemiological aspects of chronic illnesses, occupational health, community based participatory research (CBPR), primary prevention

of water-borne disease, toxicology, and risk assessment and management.

While the program retains its traditional strength in environmental engineering, it also provides a sound background in epidemiology, biostatistics, occupational health, and toxicology. The problems and issues in environmental health can be viewed in three broad categories:

- 1) Biological: living organisms, ranging from food upon which life depends to pathogenic microorganisms responsible for disease.
- 2) Physical: nonliving things affecting people (physical agents such as heat, noise, radiation, consumer and industrial products, and chemical agents such as environmental pollutants and systemic poisons).
- 3) Social: the interrelationships within society, which include cultural values, customs, attitudes, economic status, and social-political organization.

The Environmental Health (EH) Graduate Program at Tufts University places emphasis on an interdisciplinary approach to understanding and solving current and classical environmental health problems as they manifest themselves in society. Students study environmental contaminants in air, water and land, the effects of occupational exposures to hazardous materials, risk and exposure assessment, toxicology, the epidemiological aspects of infectious and chronic diseases, the use of biostatistics in the description of the distribution of disease, and the applications of these context areas in the practice of environmental risk management in solving local and global environmental health problems.

Environmental Health at Tufts operates at the interface of the natural and built environments and has introduced the concept of Public Health Engineering, which is integrated in coursework and research. A course in Public Health Engineering is now offered through the EH faculty and is required for undergraduate students in the B.S. program in Environmental Engineering. Through this course, Tufts undergraduates understand the relationships between environmental engineering and public health. Research interests of the Tufts Environmental Health faculty and graduate students range from evaluating and understanding needs of immigrant workers in the neighborhoods surrounding Tufts to assessment and mitigation of water contamination

in resource-challenged environments in Ghana, Haiti, and India.

UNDERGRADUATE PROGRAM

Bachelor of Science in Engineering

The Department of Civil and Environmental Engineering offers a B.S.E. program in environmental health. (See Civil and Environmental Engineering for program description and requirements.)

GRADUATE PROGRAM

Master of Science in Environmental Health

Requirements:

1. **Core Courses** (four credits)

CEE 154 Principles of Epidemiology

CEE 167 Environmental Toxicology

CEE 158 Occupational and Environmental Health

CEE 194F Biostatistics

All MS and Ph.D. students must also complete four semesters of CEE 292 - Graduate EH Seminar. This is a non-credit seminar that meets for one hour per week.

2. **Thesis** (two credits)—The M.S. thesis is the culmination of concentrated study in a specific area of research within environmental health. Thesis work contributes two course credits toward the M.S. degree (**CEE-295** and **CEE-296**).

3. **Electives** (four credits)—All Environmental Health M.S. students take four electives. The following lists are not inclusive and students may take other courses after consulting with their advisors. Students are reminded that the focus of the M.S. program is to cultivate depth in the student's area of interest and courses should be selected in order to provide this depth and to select courses that will enhance the M.S. thesis research experience.

CEE 113 Groundwater Hydrology

CEE 136 Air Pollution Control

CEE 143 Site Remediation

CEE 164 Epidemiological Methods

CEE 172 Fate and Transport of Environmental Contaminants

CEE 173 Health Effects and Risk Assessment

CEE 187 Geographic Information Systems

CEE 194A Introduction to Remote Sensing

CEE 194C Environmental Informatics

CEE 194E Field Methods for Global Health

CEE 194H Global Environmental Datasets

MPH 224 Infectious Disease Epidemiology

MPH 226 Cancer Epidemiology

MPH 240 Environmental Epidemiology

MPH 206 Intermediate Biostatistics: Regression Methods

MPH 220 Cardiovascular Epidemiology

MPH 222 Survey Research Methods & Data Management

CEE 241/MPH241 Biology of Water and Health

UEP 294B Chemicals, Health, and Environment

4. **Supplemental Electives List**—Other courses of interest to EH MS students include the following. Students may substitute one of these courses for any track elective with his or her advisor's approval. This list is not all-inclusive, and students may take other courses with their advisor's approval.

CEE 138 Hazardous Waste Treatment Technology

CEE 212 Chemical Principles for Environmental and Water Resources Engineering

CEE 213 Transport Principles for Environmental and Water Resources Engineering

CEE 214 Environmental and Water Resources Systems Engineering

CEE/UEP 207 Environmental Law

CEE/UEP 265 Corporate Management of Environmental Issues

CEE/UEP 267 Methods in Environmental Impact Assessment

CEE/UEP 230 Negotiation, Mediation, and Conflict Resolution

UEP 203 Political Economy, Ethics, and Environment

In addition, on a space-available basis, students may enroll in courses offered in the Master in Public Health (M.P.H.) degree program. These courses are generally held on the Health Sciences campus in Boston.

Master of Engineering in Environmental Health

The Master of Engineering (MEng) program in Environmental Health provides a practice-oriented alternative to the Master of Science degree program. It provides students with the opportunity to concentrate on courses in Environmental Health, with focus areas in Epidemiology, Occupational and Environmental Health, Biostatistics, and Risk Assessment. The Master of Engineering program, like the Master of Science program, provides an

interdisciplinary approach to assessing classical and current environmental health problems and concerns. The program meets the needs of professionals who want to complete a Master's degree and return to work in the private or public sectors. The MEng degree is well-suited to part-time study, with many courses offered in the early morning, late afternoon, or evening.

Requirements:

A. **Required Core Courses** (four courses required):

CE 154 Principles of Epidemiology

CE 158 Occupational and Environmental Health

CE 167 Environmental Toxicology

CEE 194F Biostatistics

B. **Environmental Health Electives** (four courses required): Students should choose courses that best meet their interests and desired educational goals. Students should work closely with their advisors to select courses that will provide the best educational experience. Four courses from the Environmental Health Elective List are required. Students may take a fifth course or may elect to complete a one-credit Masters project.

CEE 113 Groundwater Hydrology

CEE 136 Air Pollution Control

CEE 138 Hazardous Waste Treatment Technology

CEE 143 Site Remediation

CEE 164 Epidemiological Methods

CEE 172 Fate and Transport of Environmental Contaminants

CEE 173 Health Effects and Risk Assessment

CEE 187 Geographic Information Systems

CEE 194A Introduction to Remote Sensing

CEE 194C Environmental Informatics

CEE 194E Field Methods for Global Health

CEE 194H Global Environmental Datasets

CEE 241/MPH 241 Biology of Water and Health

MPH 224 Infectious Disease Epidemiology

MPH 226 Cancer Epidemiology

MPH 240 Environmental Epidemiology

MPH 206 Intermediate Biostatistics: Regression Methods

MPH 220 Cardiovascular Epidemiology

MPH 222 Survey Research Methods & Data Management

UEP 294B Chemicals, Health, and Environment

Students may choose other courses with the approval of their advisor.

C. **Environmental Management Elective(s)**

(one course required): Students must choose one course from the Environmental Management Elective List. They may take an additional course from this list, the elective list in B, or they may elect to complete a one-credit Masters project.

CEE/UEP 207 Environmental Law

CEE/UEP 265 Corporate Management of Environmental Issues

CEE/UEP 267 Methods in Environmental Impact Assessment

UEP 230 Negotiation, Mediation, and Conflict Resolution

UEP 203 Political Economy, Ethics, and Environment

UEP 262 Environmental Economics

UEP 279 Water Resources Policy and Planning and Watershed Management

D. **Masters Project**—Masters of Engineering students may elect to complete a one-credit Masters Project. Students who elect this option will take a total of nine courses, four core courses, four Environmental Health electives, and one Environmental Management elective. Although any student may choose to complete a project, this option may best serve working professionals who can evaluate and assess a practice-oriented problem from their professional experience. Students who elect to complete a project should discuss their topic with their advisor. MEng students electing to complete a project do not need a formal committee, but are encouraged to ask members of the faculty to read and comment on their final report. Completed projects are submitted to the student's advisor; there is no formal presentation.

Ph.D. in Environmental Health

The requirements for the Ph.D. degree can be highly individualized depending on each student's background when he or she matriculates as a Ph.D. student. Students normally take seven courses beyond the Master's degree or 15 courses beyond the Bachelor's degree. However, students matriculating with a Master's degree in a field unrelated to Environmental Health, or whose academic background lacks specific areas within the Tufts EH Master's curriculum, may be required to take additional courses. The Ph.D. student's advisor is the final arbiter in determining his or her course requirements.

Requirements:

A. **Core Courses** (four credits)

CEE 154 Principles of Epidemiology

CEE 158 Occupational and Environmental Health

CEE 167 Environmental Toxicology

CEE 194F Biostatistics*

*Another biostatistics or environmental statistics course may be substituted with the permission of the student's advisor.

Ph.D. students who have the equivalent of one of the core courses will not be required to retake the course and, with the guidance of his or her advisor, should select another course that will provide advanced knowledge of the subject matter.

All MS and Ph.D. students must also complete four semesters of CEE 292 - Graduate EH Seminar. This is a non-credit seminar that meets for one hour per week.

B. **Electives**—Ph.D. students will take between three and eleven electives, depending on whether they matriculate with a Master's or Bachelor's degree, and based on their prior academic experiences. Courses should be selected with the guidance of the academic advisor, and should provide a conduit for each student to focus on depth in one academic area. Ph.D. students may select electives from the list of M.S. electives and/or may select other courses with the approval of their advisors. The academic advisor is the final arbiter in determining the courses taken by his or her Ph.D. student.

Environmental Management

FACULTY ADVISOR:

Lecturer Anne Marie C. Desmarais, *Civil and Environmental Engineering* annemarie.desmarais@tufts.edu

Environmental managers in industry, government, and consulting know that changes in environmental compliance requirements can lead to challenges and opportunities. Complex regulations, emerging environmental technologies, international environmental treaties, and multinational corporate environmental programs will determine the direction

that environmental managers must take in the future. The Certificate in Environmental Management provides students with the tools and techniques to understand the future of environmental management.

Students in this program take graduate-level courses offered by the Departments of Civil and Environmental Engineering and Urban and Environmental Policy to develop a five-course program that includes environmental technology, environmental health, and environmental policy. Students can take courses to enhance their knowledge for professional advancement, including life-cycle analysis, GIS, groundwater hydrology, hazardous waste treatment technology, epidemiology, toxicology, corporate environmental management, and environmental law.

The program is open to students with a bachelor's degree. Students should have undergraduate course work in engineering and the natural and physical sciences, including mathematics.

This five-course, graduate-level certificate, offered through the Department of Civil and Environmental Engineering, is designed to be pursued on a part-time basis by professionals seeking advanced training or by students preparing to enter a master's degree program. The program can also be completed full-time in one academic year. In most cases, all courses taken as a certificate student can be transferred into a master's degree program in the Department of Civil and Environmental Engineering.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://engineering.tufts.edu/cee/graduate/certenviromanagement.htm>.

Environmental Studies

PROGRAM DIRECTOR:

Professor Colin M. Orians, *Biology and Environmental Studies*

EXECUTIVE COMMITTEE:

Professor Ujjayant Chakravorty, *Economics and Environmental Studies*

Professor Jonathan E. Kenny, *Chemistry*

Professor J. Michael Reed, *Biology*

Professor Jack Ridge, *Earth and Ocean Sciences*

Professor Modhumita Roy, *English*

Associate Professor John Durant, *Civil and Environmental Engineering*

Assistant Professor Alexander Blanchette, *Anthropology and Environmental Studies*

Assistant Professor Andrew Kemp, *Earth and Ocean Sciences and Environmental Studies*

Assistant Professor Karen Kosinski, *Community Health Program*

Lecturer Ann Rappaport, *Urban and Environmental Policy and Planning*

Lecturer Ninian Stein, *Environmental Studies*

ACADEMIC ADVISORS:

Professor Elizabeth Ammons, *English*

Professor Ujjayant Chakravorty, *Economics and Environmental Studies*

Professor Jonathan E. Kenny, *Chemistry*

Professor Colin M. Orians, *Biology and Environmental Studies*

Professor J. Michael Reed, *Biology*

Professor Jack Ridge, *Earth and Ocean Sciences*

Professor Modhumita Roy, *English*

Associate Professor John Durant, *Civil and Environmental Engineering*

Associate Professor George S. Ellmore, *Draupner Ring Scholar; Biology*

Associate Professor Patrick Forber, *Philosophy*

Associate Professor David Gute, *Civil and Environmental Engineering*

Associate Professor Jeanne Penvenne, *History*

Associate Professor Albert Robbat, *Chemistry*

Associate Professor Markus Wilczek, *German*

Assistant Professor Alexander Blanchette, *Anthropology and Environmental Studies*

Assistant Professor Kyle Emerick, *Economics*

Assistant Professor Andrew Kemp, *Earth and Ocean Sciences and Environmental Studies*

Assistant Professor Kelsey Jack, *Economics*

Assistant Professor Nimah Mazaheri, *Political Science*

Assistant Professor Alisha Rankin, *History*

Assistant Professor Benjamin Wolfe, *Biology*

Director and Senior Lecturer Julie Dobrow, *Communications and Media Studies and Child Development*

Lecturer Ann Rappaport, *Urban and Environmental Policy and Planning*

Lecturer Ninian Stein, *Environmental Studies*

Environmental Studies is a multidisciplinary undergraduate program created to promote the study of our natural surroundings, designs that help minimize degradation of those surroundings, and

the social and political tools needed to preserve and improve the environment. The program provides training in social sciences, natural sciences, engineering, and humanities.

Environmental Studies is offered as a dual major in conjunction with any stand-alone major in the School of Arts and Sciences and the School of Engineering. This dual-major program (which must also satisfy the other university requirements for a degree) combines the depth of a disciplinary major, interdisciplinary training in environmentally studies, and the breadth of offering in any one of the tracks within environmental studies. Students who choose this major must find an advisor, declare the major, choose a track in consultation with their advisor, and plan a course of study.

The Environmental Studies major requires the completion of five core courses, plus five courses in a specialized track and an internship. The core curriculum requires students to master basic scientific principles of environmental processes, to examine interactions between technology and the environment, and to explore the societal context for implementing environmental policy. We recommend that students begin the major by taking Environmental Biology (Bio 7/Env 7) in the fall semester. The specific tracks include Track I: Environmental Science; Track II: Sustainability, Policy, and Equity; Track III: Environmental Communications; Track IV: Food Systems, Nutrition and the Environment; and Track V: Self-Designed with Advisor. The track courses must include one introduction to the track course; a methods or research course and three additional elective courses, one of which must be a seminar and they must represent at least two departments. Student may double-count up to three courses for their co-major and up to two for a minor in another department or program.

Track I: Environmental Science focuses on science and the tools necessary to detect, evaluate, and solve environmental problems (basic principles, theories, and methods in biology, chemistry, geology, and physics). Track II: Sustainability, Policy, and Equity focuses on human development policies and practices that can have both positive and negative effects on the natural ecosystem and human well-being, both now and in the future. Track III: Environmental Communications will require students to have knowledge of natural sciences, social sciences, and the arts and humanities

to effectively communicate complex environmental issues to diverse audiences. Track IV: Food Systems, Nutrition and the Environment focuses on cultural, policy and scientific aspects of food production and consumption. Track V: Self-Designed with Advisor is intended to allow students with the capacity to design their own environmental focus in coordination with an Environmental Studies advisor. An example of this track might be a student who coordinates with Environmental Studies' engineering and political science faculty to design a series of courses that fit within the requirements of the major on the topic of energy and public policy.

For detailed information on the program please visit the Environmental Studies website:

<http://as.tufts.edu/environmentalstudies>.

UNDERGRADUATE MINOR PROGRAM

Minor in Environmental Science and Policy for Engineers

The Environmental Science and Policy minor is only available to students in the School of Engineering (<http://as.tufts.edu/environmentalstudies/curriculum/envscienceandpolicyminor.htm>). The minor is designed to give engineering majors greater exposure to natural and social sciences, and thereby deepen their understanding of the causes and solutions to problems related to environmental sustainability. The minor focuses on the integration of knowledge and approaches from different fields for the preservation and improvement of the environment. The goal of the minor is to empower student navigation across disciplines and to prepare engineering students for interdisciplinary collaboration in the area of environmental sustainability. The faculty advisor for this minor is Associate Professor John Durant.

The minor will have three required core courses and three electives. Electives must be selected from key areas within the Environmental Studies curriculum, including one each of a select group of methods courses; an approved social science elective drawn from Anthropology, Economics, Political Science, or Urban and Environmental Policy and Planning; and an approved environmental studies seminar course. Only two of these courses may be double counted as foundation or concentration courses taken for School of Engineering majors.

LUNCH & LEARN SEMINAR SERIES

Every week during the academic year, Environmental Studies brings speakers from government, industry, academia and non-profit organizations to give presentations on environmental topics. This is a great opportunity to broaden your knowledge, meet other faculty and students and network with the speakers. Students, faculty, staff, and visitors are welcome to attend. Food is generously sponsored by the Tufts Institute of the Environment. For more information visit <http://as.tufts.edu/environmentalstudies/lunch/>

Film and Media Studies

CO-DIRECTORS:

Malcolm Turvey, *Sol Gittleman Professor of Film and Media Studies, Art and Art History*

Julie Dobrow, *Senior Lecturer, Child Study and Human Development*

CORE FACULTY:

Professor Lee Edelman, *English*

Professor James Glaser, *Dean of Arts and Sciences; Political Science*

Professor Barbara Grossman, *Drama and Dance*

Professor David Guss, *Anthropology*

Professor Hosea Hirata, *German, Russian, and Asian Languages and Literatures*

Professor Charles Inouye, *German, Russian, and Asian Languages and Literatures*

Professor Vida Johnson, *German, Russian, and Asian Languages and Literatures*

Professor Paul Joseph, *Sociology*

Professor Joseph Litvak, *English*

Professor Susan Napier, *German, Russian, and Asian Languages and Literatures*

Professor Heather Nathans, *Drama and Dance*

Professor Colin Orians, *Biology, Environmental Studies Program*

Professor Karen Panetta, *Electrical and Computer Engineering*

Professor Peter Probst, *Art and Art History*

Professor Christiane Zehl Romero, *German, Russian, and Asian Languages and Literatures*

Professor Laurence Senelick, *Drama and Dance*

Professor Stephen White, *Philosophy*

Professor Xueping Zhong, *German, Russian, and Asian Languages and Literatures*

Professor Emerita Judith Wechsler, *Art and Art History*

- Associate Professor Nancy Bauer**, *Dean of Academic Affairs for Arts and Sciences; Philosophy*
- Associate Professor Marina Bers**, *Child Development*
- Associate Professor Alessandra Campana**, *Music*
- Associate Professor Emeritus Downing Cless**, *Drama and Dance*
- Associate Professor Alva Couch**, *Computer Science*
- Associate Professor Nina Gerassi-Navarro**, *Romance Languages*
- Associate Professor Calvin Gidney III**, *Child Study and Human Development*
- Associate Professor David Locke**, *Music*
- Associate Professor Monica White Ndounou**, *Drama and Dance*
- Associate Professor Joel Rosenberg**, *German, Russian, and Asian Languages and Literatures*
- Associate Professor Modhumita Roy**, *English*
- Associate Professor Sarah Sobieraj**, *Sociology*
- Assistant Professor Amahl Bishara**, *Anthropology*
- Assistant Professor Jeremy Melius**, *Art and Art History*
- Assistant Professor Stephan Pennington**, *Music*
- Senior Lecturer Elizabeth Lemons**, *Religion*
- Lecturer Renata Celichowska**, *Drama and Dance*
- Lecturer Ming Chow**, *Computer Science*
- Lecturer Khary Jones**, *Drama and Dance*
- Lecturer Susan Kouguell**, *Drama and Dance*
- Lecturer Paul Lehrman**, *Music*
- Lecturer Nan Levinson**, *English*
- Lecturer Neil Miller**, *English*
- Professor of the Practice Jennifer Burton**, *Drama and Dance*
- Associate Director Howard Woolf**, *Experimental College*

Mass media now saturate our lives, making medialiteracy an indispensable civic skill for the 21st century. Film and MediaStudies is an interdisciplinary program that educates students about the artistic potential and social effects of film and other forms of mass communication. Theoretical and practical knowledge are equally essential for media literacy, and all students take critical studies and production courses. The program combines film with media studies due to their increasing convergence, and is international in its outlook, thereby furthering Tufts' commitment to globalism and diversity. The curriculum encompasses narrative, documentary, and avant-gardemodes in live action and animated images as well as sound and text-based platforms. In keeping with Tufts' rich liberal arts tradition, an interdisciplinary approach is

fostered by core courses in film and media analysis, history, theory, and production and supplemented by electives in a variety of departments. By learning about the theory and practice of filmmaking and other forms of mass communication on a global scale, students become more discerning and active users of media, able to understand and employ them as powerful art forms that can change society for the better.

The program offers a major and a minor, both of which prepare students well for graduate studies/professional programs, and for career opportunities in film, television, advertising, public relations, journalism and digital media.

UNDERGRADUATE MAJOR IN FILM AND MEDIA STUDIES (FMS)

The Film and Media Studies major requires the completion of twelve courses: three mandatory core courses, seven or eight elective courses and either a two or one course capstone. Students may concentrate their electives in film studies, film production, or media studies. Students must take courses from at least three different departments or programs in addition to FMS designated courses.

Core Requirements

The core requirements consist of three courses that impart essential analytical skills, historical background and theoretical underpinnings to all FMS majors. The core courses provide a coherent knowledge base and consistent language for further study of film and media, thereby helping to form a community among FMS students.

The three core courses are:

FMS 20 Art of the Moving Image

FMS 21 Global History of Cinema

FMS 22 Media Literacy OR SOC 40 Media and Society

Elective Courses

Students must take either seven or eight courses (depending on whether they take a two or one-course capstone) from the list of approved FMS electives that will be published each semester. Of these, one must be a theory course, one a film or media practice course, one a non-U.S. film or media course, and one an upper level course or seminar. Students may concentrate their electives in film studies, film production or media studies.

FILM AND MEDIA STUDIES >

FRENCH >

GERMAN, RUSSIAN, AND ASIAN LANGUAGES AND LITERATURES >

Capstone Requirement

Two-course option:

Students may do a Senior Honors Thesis or Senior Project (only students who have been on the Dean's List at least twice and have a GPA of at least 3.4 are eligible to do a Senior Honor Thesis). Students wishing to pursue a Senior Honors Thesis or Senior Project must first submit a proposal in their junior year. If the proposal is approved, students take the FMS Senior Colloquium course in the fall of their senior year (FMS 29) and the Senior Honors Thesis/Senior Project (FMS 199) in the spring.

One-course option:

Students who do not wish, or are not qualified, to do a Senior Honors Thesis or Senior Project may take an eighth elective and a one semester directed study (FMS 191) or extended paper in an advanced level course or seminar as their capstone.

INTERDISCIPLINARY MINOR IN FILM STUDIES

Students pursuing an interdisciplinary minor in Film Studies must take a core course, either Introduction to Film Studies (Drama 50/ILVS 50) or Film Theory (ILVS 92-19). Students will also take four film-related courses from approved course lists.

FILM AND MEDIA STUDIES INTERNSHIP PROGRAM

The internship program grants academic credit for internships in film, media and communications (FMS 99). Students can arrange to work at newspapers, magazines, film companies, advertising and public relations firms, television stations, radio stations, and publishing houses. Interns are required to work a minimum of 150 hours (approximately 12 to 15 hours each week), complete written requirements, and meet regularly with the faculty advisor. Consult the FMS website for eligibility and course requirements: <http://ase.tufts.edu/cms>

FMS Minor Requirements

Students pursuing a minor in Film and Media Studies must take the following courses:

The core class, Art of the Moving Image (FMS 20)
One introductory level Media/Film Practice Course from the following list:

COMP 23: Game Development

DR 22: Art of Multimedia

DR 77: Screenwriting

DR 193: Directing for Film

ENG 007: Journalism

ENG 011: Intermediate Journalism

FMS 30: Filmmaking 1

EXP 51: Introduction to Narrative and Documentary Practice

EXP 53/PHL 292: Experimental Film

EXP 55: Multi-platform Journalism

EXP 58: Social Marketing

MUS 64: Computer Tools for Musicians

- Four elective courses from the extended list of Film and Media Studies electives, published each semester

Students must take courses from at least three different departments or programs.

A capstone project is not required for the FMS minor, but students wishing to pursue one must have a GPA of at least 3.4 and obtain approval of the program director.

French

(FOR DEGREE REQUIREMENTS, SEE ROMANCE LANGUAGES.)

German, Russian, and Asian Languages and Literatures

Professor (Russian) Gregory Carleton, *Department Chair; Twentieth-century Russian literature and culture*

Professor (German and Judaic Studies) Sol Gittleman, *Alice and Nathan Gantcher University Professor of Judaic Studies; Earlier twentieth century, Yiddish literature, National Socialism, American baseball history*

Professor (Russian) Vida Johnson, *Director of Russian Program; Twentieth century, film, women writers*

Professor (Japanese) Hosea Hirata, *Director of Japanese Program; Japanese literature*

Professor (Japanese) Charles Inouye, *Co-Director of International Literary and Visual Studies Program; Japanese literature*

Professor (Japanese) Susan Napier, *Japanese literature, popular culture, anime*

Professor (German) Christiane Zehl Romero, *Goldthwaite Professor of Rhetoric; Tübingen; Professor of German; Director of German Program; Twentieth century, women writers, film, advanced language*

Professor (Chinese) Xueping Zhong, *Director of Chinese Program; Modern Chinese literature, film*

Associate Professor (German and Judaic Studies) Gloria J. Ascher, *Co-director of Judaic Studies; German literature of the eighteenth and nineteenth centuries, Sephardic studies, Ladino language and literature, Scandinavian literature*

Associate Professor (German) Daniel Brown, *Director of Swahili Studies; Director of Africa in the New World; Reformation, German drama*

Associate Professor (Arabic) Kamran Rastegar, *Director of Arabic program; Modern Arabic literature, comparative literature, cinema studies, postcolonial studies*

Associate Professor (Judaic Studies) Joel Rosenberg, *Lee S. McColester Associate Professor of Biblical Literature; Co-director of Judaic Studies; Central European writers, South African writers, film studies*

Associate Professor (German) Markus Wilczek, *Director of German Graduate Program; 18th Century to Modern, Environment*

Assistant Professor (Chinese) Ning Ma, *Pre-modern Chinese literature, comparative literature*

Senior Lecturer (Japanese) Kiyomi Kagawa, *Coordinator of Japanese language courses*

Senior Lecturer (Chinese) Jinyu Li, *Chinese language*

Senior Lecturer (German) Saskia Stoessel, *Coordinator of German language courses*

Senior Lecturer (Chinese) Mingquan Wang, *Coordinator of Chinese language courses*

Lecturer (Arabic) Thomas Abowd, *Arabic Culture*

Lecturer (Arabic) Rana Abdul-Aziz, *Coordinator of Arabic language courses*

Lecturer (Arabic) Rabab El Nady, *Arabic language*

Lecturer (Chinese) Jianping Feng, *Chinese language*

Lecturer (Arabic) Haci Osman Gündüz, *Arabic language*

Lecturer (Hebrew) Hedda Harari-Spencer, *Coordinator of Hebrew language courses*

Lecturer (Arabic) Fadi Jajji, *Arabic language*

Lecturer (Japanese) Shiori Koizumi, *Japanese language*

Lecturer (Chinese) Joanna Kuriyama, *Chinese language*

Lecturer (Japanese) Kiyoko Morita, *Japanese language*

Lecturer (German) Doris Pfaffinger, *German language*

Lecturer (Chinese) Min Wan, *Chinese language*

Lecturer (Chinese) Shaomei Wang, *Chinese language*

Lecturer (Arabic) Souhad Zendah, *Arabic literature*

The Department of German, Russian, and Asian Languages and Literatures is the administrative home to the following language and culture programs: Arabic, Chinese, German, Hebrew, Japanese, Russian, and Swahili. The Department is also closely connected to various interdepartmental programs: Film and Media Studies (FMS), International Relations (IR), International Literary and Visual Studies (ILVS), Judaic Studies, and Middle Eastern Studies.

The Department offers nine majors and two graduate degrees. The undergraduate majors are Arabic, Chinese, German Language and Literature, German Studies, Japanese, Judaic Studies, ILVS, Russian Language and Literature, and Russian and East European Studies. The graduate degrees are M.A. in German and M.A. in German with Teaching Licensure. Students can minor in Arabic, Chinese, German, Hebrew, Japanese, Judaic Studies, and Russian. (For majors in IR and Middle Eastern Studies, as well as minors in FMS, please consult their websites.)

SPECIAL MINOR FOR ENGINEERING STUDENTS

Students earning a bachelor's degree in engineering may minor in either Arabic, Chinese, German, Hebrew, Japanese, or Russian language and culture. The minor requires a total of six (6) courses:

- a. Four language courses above the beginning second-semester level: 3, 4, 21, 22.
- b. One course in the social sciences concentrating on the area in which the target language is spoken (e.g., for Arabic: History 70, 71, 72, 87, 97; for Chinese: History 40, 41, Political Science 126; for German: History 54, 59, 63, 68, Political Science 125, 147; for Hebrew: History 71; for Japanese: History 42, 43, 133, 134, 135, Political Science 131; for Russian: History 60, 61, 62).
- c. A fourth-year level language course (Arabic 121, Chinese 121, German 121, Hebrew 121, Japanese 121, Russian 121) or, in conjunction with the social science course, a directed study in the language focusing on materials relevant to that course.

Arabic

Arabic is the fifth most widely spoken language in the world and is one of the six official languages of the United Nations. The Arabic Program, with its language, literature and culture courses, offers training in the study of the Arabic language at all levels, as well as offering studies in topics relating to Arab cultures and traditions. It offers a strong foundation in Modern Standard Arabic, as well as a wide range of courses taught in English on modern and classical Arabic literatures, cinema, gender and other cultural topics.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The Arabic major is designed to offer students a strong foundation in the Arabic language, as well as providing them with training to critically engage with Arabic literary and other cultural activities, such as cinema and other media. The major in Arabic requires ten courses in all: nine courses beyond Arabic 4, plus one approved course in a different department. Of the nine departmental courses, four must be Arabic language-based courses, while five must be selected from available departmental Arabic culture courses.

- a. Language requirement: Four Arabic language-based courses above Arabic 4: Arabic 21, Arabic 22, Arabic 121, Arabic 122, or further advanced Arabic language-based courses (subject to approval of the director of Arabic). Students who place higher than Arabic 21 upon entry into the program are expected to complete ten courses in all, in consultation with the director of Arabic.
- b. Culture requirement: Five departmental Arabic literature or culture courses. Two of these five required courses may be filled by approved courses taken outside of the Medford campus.
- c. Related course: One course in a topic related to Arabic or the Middle East offered outside of Tufts' Arabic Program. Courses in this category are subject to the approval of the director of Arabic.

UNDERGRADUATE MINOR PROGRAM

The department offers a minor in Arabic requiring the completion of six courses beyond the intermediate level (ARB 3-4) and two courses in Arabic

literature or culture. Minor checklist forms are available at <http://ase.tufts.edu/grall/requirements/arabic.htm>.

Chinese

Chinese civilization is one of the longest and most continuous in the world. Home to one-fifth of the world population and undergoing rapid changes, China is playing an increasingly important role in today's world. The Chinese program offers courses that aim at helping students achieve proficiency in modern Chinese language and acquire a comprehensive understanding of Chinese literature and culture in conjunction with their social and historical contexts.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The major in Chinese requires nine courses in the program beyond Chinese 4, plus one in a related field. Those who place out of language courses still need to complete ten approved courses. At least one course from category B must be a seminar offered by the Chinese program. If qualified, a student may opt to do an honors thesis.

- a. Language requirement: 4 courses beyond Chinese 4: 21, 22, 121, 122. Students placed above 21 or higher, upon completion of 122 or its equivalent, can take more advanced language courses (123, 124, 125, 126, 127, 128), or additional culture courses, or a combination of both.
- b. Chinese 61 and four additional literature and cultural courses (taught in English) from Chinese Program offerings in the department. The four additional courses must include at least one seminar course. If approved, a student may opt to do an honors thesis, which can be counted as one seminar course. One culture course from Tufts-in-China will be counted in this category.
- c. CHNS52 or one China-related course offered by another program or department (PS 120, 126, 188-44; HIST 40, 41; FAH 13/CR13; REL 53). One culture course from Tufts-in-China will be counted in this category. Courses not listed above require approval by the Chinese program director.

- d. One seminar, or honors thesis, double counted as one course in category B. Please see category B above for more information.

UNDERGRADUATE MINOR PROGRAM

The department offers a minor in Chinese requiring the completion of six courses beyond the intermediate level (Chinese 3–4). These must include two language courses at the 100 level and two literature/culture courses. Details are available from the departmental office. Minor checklist forms are available at <http://ase.tufts.edu/grall/requirements/chinese.htm>.

CHINESE LANGUAGE COURSES

Regular classes for the first four years (1 through 122) meet three times a week; regular classes at the higher levels (123 through 128) meet twice a week. Intensive classes meet six times a week.

THE CHINESE HOUSE

The Chinese House is a language-based housing unit sponsored by the Chinese program. The mission of the Chinese House is to provide language learning experience outside of the classroom and to promote and facilitate cross-cultural exchange and understanding within the larger community at Tufts. The Chinese House provides space and opportunity for the residents and non-residents to share their Chinese learning experience and practice their Chinese. Through academic, educational and social events, students in the Chinese House reach out to the rest of the University community, enriching the life and learning experience of the larger community at Tufts. Applications are available from the Chinese program early in the spring semester.

STUDY OPPORTUNITIES IN CHINA

Tufts-in-China

The Tufts-in-China program offers a fall semester in Hangzhou, China, at Zhejiang University, one of the top seven universities in China. The combination of the city of Hangzhou and the renowned Zhejiang University makes Tufts-in-China a unique program for students of Chinese language and culture.

Well-prepared undergraduates who have successfully completed Chinese 4 (or the equivalent) by the time of departure are eligible to apply. Tufts-in-China is open to students from all majors.

German

The German program promotes an understanding of the extraordinary contributions made by German-speaking writers, artists, and thinkers to the past eight hundred years of civilization, and their implications for the contemporary world. A wide range of courses in German gives students with varied interests and goals the opportunity to attain a thorough knowledge of the language, literature, and general culture. The program also provides a significant number of courses in English so that students not conversant in German may become familiar with important aspects of German culture.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

German Language and Literature

To major in this area, a student should take nine courses above the intermediate (German 3, 4) level. These should be courses taught in German and, depending on the student's preparation, include German 21 and/or 22, 34, 44, 61, 62, and 100-level courses. A minimum of two 100-level courses taught entirely in German (121 and one literature/culture course at that level) is required. Also required is one course in a related field, such as German art, film, or history. The Tufts-in-Tübingen program (see below for description) is highly recommended for language and literature majors. Courses taken in German at the University of Tübingen in the areas of German language, literature, and culture (e.g., film) count toward the major in language and literature.

German Studies

As an alternative to the language/literature concentration, the department offers an interdisciplinary major with two options:

A. TUFTS-IN-TÜBINGEN PROGRAM

The Tufts-in-Tübingen program is a unique opportunity for students from various disciplines to spend their junior or senior year abroad experiencing the culture of German-speaking countries within the larger European context, and combining study outside of literature with their knowledge of German. All courses taken in German at the University of Tübingen in the areas of Politikwissenschaft, Volkswirtschaft, Geschichte, Kunstge-

schichte, Volkskunde, Sozial- und Kulturwissenschaft, Germanistik, and Vergleichende Literaturwissenschaft will count toward the concentration requirement of nine German courses beyond the intermediate (German 3, 4) level and one course in a related field. On returning to the Tufts Medford/Somerville campus, two 100-level courses taught in German on the Tufts campus, 121, and one 100-level literature/culture course in German will be required.

B. TUFTS-MEDFORD/SOMERVILLE

This major requires nine courses plus one course in a related field approved by the German program. It includes at least five courses above the intermediate (German 3, 4) level taught in German, including German 121, and one 100-level literature/culture course taught in German. The remainder is a combination of courses dealing with German subject matter taught through at least three of the following departments: German, Russian, and Asian languages and literatures; history; music; philosophy; or political science. Courses taken in other departments must be approved by the German program for concentration credit.

UNDERGRADUATE MINOR PROGRAM

The department offers a minor in German requiring six courses above the intermediate level (German 3, 4). These must include two courses at the 100 level taught in German at Tufts/Medford; one of them is to be German 121. Minor Checklist Forms are available at <http://ase.tufts.edu/grall/requirements/german.htm#minor>.

GERMAN HOUSE

The department sponsors a German house, which provides a pleasant residential environment and the opportunity to enjoy intensive language practice in an informal setting. Every year a native German student from Tübingen is resident director and helps the students organize a variety of social and cultural activities. Preference is given to students who are currently enrolled in a German course.

TUFTS-IN-TÜBINGEN PROGRAM

Majors in German, as well as qualified juniors and seniors from other departments, are encouraged to spend a year abroad in the department's overseas program, which normally consists of two semesters

of study at Eberhard-Karls-Universität in Tübingen under the direction of the Tufts resident director. (One semester, in the spring only, is also possible.) A minimum of two years of college-level German is required to qualify for Tufts in Tübingen, but third-year-level proficiency is strongly advised. Students who have been accepted into the program may attain it by participating in a six-week intensive language course, which will prepare them for the transition into regular courses at a German university. This course starts at the beginning of September.

GRADUATE PROGRAMS

The department offers two Master of Arts degree programs in German. These programs typically enroll a small number of highly motivated and talented students, who—together with faculty both on the Tufts campus and in Tübingen—form a supportive, stimulating, and congenial community that helps students realize their full potential. Both master's programs provide a wide range of courses in language, literature, and culture, and also the use of media, including hypermedia presentations in language and culture courses.

Tufts-in-Tübingen

All students may choose to study one year at the Eberhard-Karls-Universität in Tübingen, Germany, and one year on the Tufts campus; or they may spend both years on the Tufts campus in Medford/Somerville. The Tufts resident director in Tübingen offers an informal colloquium to acquaint students with traditional and contemporary aspects of German cultural life, and assists students in planning a program of study that draws upon university lecture courses and seminars. On the Tufts campus students do regular course work, participate in a graduate colloquium, and serve as teaching and research assistants.

Master of Arts in German

The program requires two academic years and is designed to prepare students for doctoral work in German or to provide career enhancement for fields such as international business or law, media and communications, and library science.

Master of Arts in German with Teaching Licensure

The program requires two academic years plus one summer, and is offered in conjunction with the Department of Education. It is designed to prepare highly qualified secondary school teachers.

Master of Arts in Teaching (M.A.T.)

The Department of Education, in conjunction with the German program, offers the M.A.T. degree in German as a foreign language. For more information and application materials, please contact the Department of Education.

Japanese

The Japanese program offers five levels of Japanese language instruction and introduces students to many facets of Japanese culture—especially literature, film, and visual culture. The major prepares students for careers in academics, business, law, diplomacy, or technology where an in-depth knowledge of Japanese language and culture is an invaluable asset.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The major in Japanese requires nine courses beyond Japanese 4, plus one in a related field. Those who place out of language courses still need to complete ten approved courses.

- a. Language requirement: four courses beyond Japanese 4; continuation to Japanese 123, 124 strongly recommended.
- b. Japanese 061 and four additional literature/culture courses from Japanese offerings in the department. Two of these courses must be at the 100 level, including one seminar. If qualified, a student may opt to do an honors thesis (JPN 198, 199) instead of a seminar. Only one course with a half Japanese content can count toward this category.
- c. One course in Japanese culture offered by another department and approved by the program director.

UNDERGRADUATE MINOR PROGRAM

The department offers a minor in Japanese requiring the completion of six courses beyond the intermediate level (JPN 003–004). These must

include two language courses (121, 122, or 123, 124) and two literature/culture courses. Details are available from the departmental office.

JAPANESE CULTURE HOUSE

The department administers the Japanese Culture House, a coeducational undergraduate dormitory that serves as an informal center for Japanese studies on campus. It aims to provide an experiential learning environment for students who would like to improve their language skills and deepen their knowledge of Japanese culture. It also accommodates native speakers who would like to share their knowledge of Japan with other students and take a leading role in organizing social events related to Japan. The minimum requirement to be a resident is Japanese 002 or equivalent. The selection committee considers the leadership potential of the applicants as well as the balance of gender and of linguistic levels. Together the occupants organize various cultural activities that further the understanding of Japan on campus, as well as weekly Japanese chat hours to which any student interested in practicing conversation is welcome.

STUDY OPPORTUNITIES IN JAPAN

Tufts-in-Japan

The Tufts-in-Japan program is offered at Kanazawa University, a prestigious national institution in a picturesque city rich in history. Students are strongly recommended to study in Japan during their junior year. Excellent scholarships are available. Tufts financial aid can also be used.

Judaic Studies

CO-DIRECTORS:

Associate Professor Gloria J. Ascher, *German and Judaic Studies*

Associate Professor Joel Rosenberg, *Lee S. McCollester Associate Professor of Biblical Literature; Judaic Studies*

CORE FACULTY:

Professor Sol Gittleman, *Alice and Nathan Gantcher University Professor of Judaic Studies; German and Judaic Studies*

Professor Barbara Wallace Grossman, *Drama*

Professor Joseph Litvak, *English*

Professor Jonathan M. Wilson, *English*

Lecturer Janis Freedman-Bellow, *English*

Lecturer Hedda Harari-Spencer, *Hebrew and Judaic Studies*

Lecturer Peggy Hutaff, *Religion*

Research Professor/Rabbi Jeffrey Summit, *Judaic studies*

The program in Judaic Studies encompasses study of some 4,000 years of ancient Israelite and ancient, medieval, and modern Jewish civilization, with attention to the influence of Israelite and Jewish culture on the many cultural and religious traditions that grew from it. The major in Judaic Studies comprises the courses listed below under Hebrew and Judaic Studies and a number of primary or related courses in other departments.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The major in Judaic Studies consists of ten courses—eight primary courses and two related courses. Courses in Hebrew language at the level of Hebrew 21, 22, and 121, 122 may be counted as primary courses. Courses not listed below, offered at Tufts and elsewhere, are acceptable upon approval of the program directors (Professor Gloria Ascher, Olin 332, and Professor Joel Rosenberg, Olin 322), but at least four of the primary courses must be taken at Tufts. Students majoring in Judaic Studies must have the equivalent of three years of Hebrew, or two years of Hebrew and two years of a second language related to the student's special interests within the field. Qualified students majoring in Judaic Studies are encouraged to consider participating in the Thesis Honors Program.

Primary Courses

Drama 172 Imagining the Holocaust on Stage and Screen

Drama 272 Confronting Genocide on Stage and Screen

English 159 Contemporary Jewish Fiction

English 162 Philip Roth and Company

English 164 Representing the Jew

Judaic Studies 48 Israeli Film

Judaic Studies 55 Technology and Jewish Oral Tradition

Judaic Studies 65 Introduction to Yiddish Culture

Judaic Studies 73 Aspects of the Sephardic Tradition

Judaic Studies 78 Jewish Women

Judaic Studies 84 The Sources of Jewish Tradition

Judaic Studies 91-01 Ladino Language and Culture

Judaic Studies 92-01 Introduction to Judaism

Judaic Studies 92 Special Topics

Judaic Studies 93 Directed Study

Judaic Studies 95 Topics in Jewish Literature

Judaic Studies 99 Judaic Studies Internship

Judaic Studies 126 Roots of the Jewish Imagination

Judaic Studies 132 The Book of Genesis and Its Interpreters

Judaic Studies 136 The Story of King David

Judaic Studies 142 Jewish Experience on Film

Judaic Studies 150 Music and Prayer in the Jewish Tradition

Judaic Studies 159 Contemporary Jewish Fiction (cross-listed as **English 159**)

Judaic Studies 162 Philip Roth and Company (cross-listed as **English 162**)

Judaic Studies 164 Representing the Jew (cross-listed as **English 164**)

Judaic Studies 191 Special Topics

Judaic Studies 193, 194 Advanced Directed Study

Judaic Studies 198, 199 Senior Honors Thesis

Religion 21 Introduction to the Hebrew Bible

Related Courses

Related courses establish links between Judaic Studies and other disciplines by examining such topics as countries or regions that are major sites of Jewish civilization, past or present; the life of cosmopolitan and multiethnic societies more generally; the dynamics of tradition; the impact of modernity and historical crisis on traditional societies; issues of philosophy, ethics, myth, religion, and spirituality that bear upon Jewish life and thought; issues of race, class, gender, and sexuality in the life of a culture; and the legacy of biblical and Jewish tradition in world cultures. A student may, with the approval of the program directors, substitute an appropriate course not on this list.

American Studies 16 American Identities

Anthropology 119 Peoples of the Middle East

Anthropology 132 Myth, Ritual, and Symbol

Arabic 62 Modern Arabic Literature

Arabic 64 The Literary Qur'an

Art History 22 Iconoclasm and Iconophobia: The Threat of the Image (cross-listed as **Religion 24**)

Art History 28/128 Medieval Art in the Mediterranean: Pagans, Jews, Christians, Muslims (cross-listed as **Religion 28/128**)

Classics 26 Ancient Egypt

Classics 75 Classical Mythology

Classics 148 Time and Festivals in the Ancient World

Classics 151 Ancient Philosophy

English 49 The English Bible

English 69 Contemporary Multi-Ethnic Literature
English 77 The Modern Mind
English 175 Post-Structural Literary Theory
English 177 Feminism, Literature, Theory
English 180 Psychoanalysis and Cultural Criticism
English 181 The Politics of Reading
History 70 Middle East to World War I
History 71 Middle East and North Africa since World War I
History 167 Medieval Islam
International Literary and Visual Studies 114 Politics and Literature in Russian and Eastern Europe (cross-listed as **Russian 114**)
Peace and Justice Studies 120 Sociology of War and Peace (cross-listed as **Sociology 120**)
Philosophy 16 Philosophy of Religion
Philosophy 48 Feminist Philosophy
Philosophy 55 The Making of the Modern Mind
Philosophy 126 Theories of Human Nature
Philosophy 128 Human Rights, History and Theory
Political Science 41, 42 Western Political Thought
Political Science 134 Comparative Politics of the Middle East
Religion 6 Philosophy of Religion
Religion 48 Introduction to Islam
Religion 195 Mystics
Russian 73 The Bible in Russian Literature
Sociology 110 Racial and Ethnic Minorities
Sociology 143 Sociology of Religion
Spanish 130 Civilization of Muslim Spain
World Civilizations 5 Time and Festivals
World Civilizations 6 Time and Modernity
World Civilizations 9 Memory and Identity in World Cultures I
World Civilizations 10 Memory and Identity in World Cultures II
World Civilizations 85 Film and Nation: Russia and Central Asia
World Literature 120 Central European Writers
World Literature 122 South African Writers

UNDERGRADUATE MINOR PROGRAM

The minor in Judaic Studies consists of six courses selected from those approved for the major, including at least four primary courses. Four of the six courses must be taken at Tufts and must include a course in which a substantial integrative project is produced. Two years of Hebrew or the equivalent are strongly recommended. For further information consult the program directors. Minor checklist forms are available at <http://ase.tufts.edu/grall/requirements/judaicMinor.htm#hebrew>.

MINOR IN HEBREW

The minor in Hebrew consists of Hebrew 21, 22, 121, and 122 (third- and fourth-year Hebrew language, with an introduction to modern Hebrew literature), or equivalent, and two additional courses in Hebrew-based Judaic Studies, from the following list:

English 49 The English Bible
Judaic Studies 48 Israeli Film
Judaic Studies 73 Aspects of the Sephardic Tradition
Judaic Studies 84 The Sources of Jewish Tradition
Judaic Studies 126 Roots of the Jewish Imagination
Judaic Studies 132 The Book of Genesis and Its Interpreters
Judaic Studies 136 King David and the Israelite Monarchy
Judaic Studies 150 Music and Prayer in the Jewish Tradition
Religion 21 Introduction to the Hebrew Bible

Students who place out of third or fourth-year Hebrew by language placement exam must still take a total of six courses, chosen from the above list.

Russian

The Russian Program offers two majors: one in Russian Language and Literature, and the other in Russian and East European Studies that incorporates courses taught in the departments of History and Political Science. We offer five years of Russian language courses and an array of courses in English, as well as some in Russian, that provide a survey and an in-depth study of Russian literature, culture, and film, not only for our majors but for all students who want to broaden their knowledge and understanding of the humanities, world languages, and cultures. For both majors a semester of study in Russia is strongly recommended (see below).

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Russian Language and Literature

The Russian Language and Literature major places emphasis on a sound knowledge of the Russian language, literature, and culture. Because literature has played a central role in Russia's intellectual and political life, its study provides the student with insight into Russian society, history, and culture. At the same time, the moral, philosophical, and artistic issues raised by world-renowned writers, such as

Dostoevsky, Tolstoy, and Chekhov, are universal in scope and help shape our understanding of the human condition. Russian writers have also had a major impact on the development of the novel, the short story, and drama worldwide. The major provides a firm preparation for graduate study in a variety of fields or potential employment in Russian-related areas, such as government, international business and law, journalism, teaching, translation, and consulting. Special attention is paid to developing advanced competence in Russian language, to modern and historical approaches to literature and culture, and to how literature and culture shape and influence history and politics.

The major requires ten courses as follows:

- a. Russian 21 and 22.
- b. Three advanced (100-level) courses conducted in Russian. At least one of these must be in Russian literature (Russian 131, 132, or another 100-level course in literature). At least one must be a language course (e.g., 121 or 122). An advanced course in some special topic (e.g., Russian 123, 125, 191, 192) may be substituted for Russian 121 or 122 with program approval. Students coming back from a semester in Russia are required to take one 100-level course conducted in Russian. (Students going abroad in the spring of senior year must take one 100-level course in Russian before leaving.)
- c. Four courses in Russian literature (must include Russian 60 and either 61 or 62).
- d. One additional course in Russian culture (literature, art, music, film, history, political science, or religion).

Students who place out of Russian 21, 22, 121 and/or 122 on the basis of the Russian language placement examination administered by the department still need to take ten courses to complete the major.

Russian and East European Studies

The Russian and East European Studies (REES) major offers the student training and regional expertise in a variety of disciplines that shape Russia and Eastern Europe such as history, literature, politics, and culture, as well as a solid grounding in oral and written Russian. Broadly speaking,

for the purposes of this major “Russia” entails the geographic area of the former Soviet Union including Central Asia. The major is designed for students interested in Russia and related areas who might pursue a career in this field, particularly with an orientation to graduate work in Russia/Eastern Europe, but also for students planning to enter law, business, international relations or diplomacy in which this degree would be an useful asset.

The major requires ten courses as follows:

- a. Four core language courses: Russian 21, 22, 121, 122, or the equivalent. For Russian 121 and 122 the student may substitute Russian 123, 125, or any advanced course related to the area in which all readings are in Russian. Students coming back from a semester in Russia will be required to take one 100-level course conducted in Russian. (Students going abroad in spring of senior year must take a 100-level course in Russian before leaving.)
- b. Six courses with a primary focus in the Russian and East European area chosen from the following two categories: (1) literature and culture; (2) history, politics and society. At least two courses must be taken at Tufts in each of the designated categories. One of the six courses must be an advanced special topics course, a seminar, an advanced directed study, or similarly oriented course approved by the program.

Students who place out of Russian 21, 22, 121 and/or 122 on the basis of the Russian language placement examination administered by the department still need to take ten courses to complete the major.

UNDERGRADUATE MINOR PROGRAM

The department offers a minor in Russian requiring the completion of six courses above the intermediate level (Russian 3, 4). These must include two courses at the 100 level taught in Russian and may include up to two culture courses in English. Minor checklist forms are available at <http://ase.tufts.edu/grall/requirements/russian.htm#minor>.

RUSSIAN/SLAVIC CULTURE HOUSE

The department administers the Russian/Slavic Culture House, a coeducational undergraduate dormitory that serves as an informal center for Russian and East European studies on the campus. The house sponsors dinners, films, receptions, and lectures. Residence in the house is open to all students who satisfy any of the following requirements: (1) enrollment in courses related to the Russian and East European culture area (languages, history, literature, art, political science, or economics); (2) Slavic or East European background; or (3) a strong interest in the area. Applications for residence in the house are available from the department early in the spring semester.

STUDY OPPORTUNITIES IN RUSSIA

Majors are encouraged to study in Russia for a summer, semester, or full year. Recommended programs include CIEE, ACTR, and Middlebury College. All students studying abroad are required to take a placement exam upon their return. For more information, see the Russian program faculty.

For more detailed information, please visit the website <http://ase.tufts.edu/grall/studyAbroad/>.

Greek

(FOR DEGREE REQUIREMENTS, SEE CLASSICS.)

History

Professor Beatrice F. Manz, *Chair; Middle East and Inner Asia*

Professor Ina Baghdiantz McCabe, *Darakjian and Jafarian Chair in Armenian History; Armenia and cross-cultural world history*

Professor Virginia G. Drachman, *Arthur Stern, Jr. Chair in American History; Women in the U.S., medicine and society in the U.S., modern U.S.*

Professor Leila Fawaz, *Issam M. Fares Chair in Lebanese and Eastern Mediterranean Studies; Middle East*

Professor Ayesha Jalal, *Mary Richardson Professor of History; South Asia, the Muslim world*

Professor Peniel Joseph, *Modern U.S., African American*

Professor Gary P. Leupp, *Japan*

Professor Howard L. Malchow, *Walter S. Dickson Professor of English and American History; Modern Britain, Europe*

Professor Steven P. Marrone, *Medieval, early modern Europe*

Professor Reed Ueda, *Industrial and urban U.S. history, immigration, American social history, comparative and world history*

Professor Peter Winn, *Latin America*

Associate Professor David Ekbladh, *Modern U.S., U.S. in the world*

Associate Professor Kris Manjappa, *Modern South Asia, modern Germany, intellectual history*

Associate Professor Jeanne Penvenne, *Africa, labor and social history of Mozambique*

Associate Professor Hugh Roberts, *Edward Keller Chair in North African and Middle Eastern History; Modern Algeria and Egypt, Berber politics, Islamism and political reform in North Africa*

Assistant Professor Kendra Field, *Nineteenth-century U.S., African American, Native American*

Assistant Professor Elizabeth Foster, *Modern France in the world, colonial West Africa*

Assistant Professor Alisha Rankin, *Early modern Europe*

Assistant Professor Man Xu, *Chinese history*

Lecturer David J. Proctor, *Late antique and medieval Western Europe, Byzantium, Southeastern Europe, Papal-Imperial relations*

SECONDARY APPOINTMENTS:

Professor Gregory R. Crane, *Classics; Winnick Family Chair in Technology and Entrepreneurship; Greek literature, computers and classics*

Professor Sol Gittleman, *GRALL; Alice and Nathan Gantcher University Professor of Judaic Studies; Earlier twentieth century, Yiddish literature, national socialism*

Professor R. Bruce Hitchner, *Classics; Roman history, archaeology and international relations*

Adjunct Professor John C. Perry, *The Fletcher School of Law and Diplomacy; Japanese diplomatic history*

Associate Professor Heather D. Curtis, *Religion; History of Christianity, American religious history*

Associate Professor Steven W. Hirsch, *Classics; Greek, Roman, and Near Eastern history*

Adjunct Senior Lecturer John C. Schneider, *Tisch College; U.S. urban and social history*

Lecturer Steven Cohen, *Education; History, political science and philosophy, curricula instruction, practice of teaching history and political science*

The study of history reveals the past, enlightens the present, and influences the future. Historians seek to understand how nations, societies, and individuals have lived and thought, and why they have behaved the way they did. Supplying the context that informs art, ideas, institutions, and events, history illuminates all of human experience.

Trained to examine evidence carefully and evaluate received interpretations of the past, students construct their own understanding of historical processes and occurrences, building arguments from primary sources, historians' writings and appropriate theoretical literatures. In history you also write gripping narratives, empathize with the experiences of people who have gone before and re-imagine past worlds.

The Tufts History faculty promotes a diversity of approaches and ways of understanding the past. From the history of medicine, to labor and migrant histories, to transnational and material culture, courses challenge students to analyze historical material. The department offers a wide range of courses designed to meet the needs and interests of students with differing concerns and levels of preparation. General surveys (numbered below 100) cover entire periods, fields, or geographic areas, while thematic courses (numbered 100 to 189) provide more specific, comparative, or regional perspectives. Foundation Seminars (announced each semester and numbered History 90–97) introduce undergraduate majors to the historian's craft; Research Seminars (numbered 190 to 197) provide them with the opportunity to practice it through a significant research project. Students interested in specialized work are encouraged to explore independent study or to consider the option of writing a Senior Honors Thesis.

Undergraduates may adopt history as either a major or a minor concentration. The History Graduate Program offers the M.A. degree, with the option of earning a certificate in Museum Studies, and (in a limited number of fields) the Ph.D.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The History major requires completion of a minimum of 10 courses, ordinarily to be taken within the department. History courses taken at Tufts' programs abroad or transferred from other accredited institutions may be counted toward the

minimum of ten courses. Courses taken outside of Tufts, however, do not count as graded courses. No more than four of the history major concentration requirements may be transferred from other institutions.

In consultation with their advisor (normally prior to taking such courses), majors may count up to two courses from outside the department in cases where it may be difficult or impossible to complete their concentration core (see below) within the department. Such courses may not count toward either of the seminar requirements. A minimum grade of C- is required in all courses counted towards the completion of the major. Of the ten courses, the following are required: (1) one Foundation Seminar (a high-demand course) to be completed during the sophomore year or as soon as possible after declaration of the major; (2) one course covering the pre- and early-modern period; (3) one course in U.S. history, one in European history, and one in any two of the following areas: global/transregional, Africa, Latin America, the Middle East or Central Asia, East Asia, and South Asia; (4) four or more courses to serve as a concentration core (this may be defined geographically or topically); and (5) one Research Seminar (a high-demand course) to be taken within the History Department at Tufts.

In consultation with their advisor, majors should prepare for their research seminar by taking courses, either at Tufts or abroad, that build toward this capstone experience. Ordinarily a Research Seminar will form part of the concentration core. Those intending to write a Senior Honors Thesis (see below) should plan to take their research seminar in the second semester of their junior year or, at the latest, the first semester of their senior year. In exceptional cases, thesis writers may petition to be exempt from the Research Seminar requirement.

UNDERGRADUATE MINOR PROGRAM

The department offers a minor in history requiring a minimum of five courses in history to which the following conditions apply: (1) one history course covering the pre- or early-modern period; (2) one history course in at least two of three areas: North America, Europe, other world areas (e.g., Africa, Latin America, Middle East/Central Asia, East

Asia, or South Asia); (3) three courses developed as a coherent core in consultation with the student's History advisor.

Both majors and minors: Please note that a single course may fulfill several of the concentration requirements.

DEPARTMENTAL HONORS

When nominating seniors for honors, especially magna and summa, the department looks carefully at qualitative issues—performance in Foundation and Research Seminars, evidence of sophistication in work beyond the introductory level (e.g., work in advanced courses, Senior Thesis and independent study)—and not simply the quantitative criteria of GPA and A's earned.

The Senior Honors Thesis in History

The Senior Honors Thesis program in History is intended for those students who have a record of high performance in upper-level history courses and who have developed an interest and some background in a well-focused research topic. Students interested in writing a Senior Honors Thesis should consult their advisors, the guidelines described under Thesis Honors Program in this bulletin and the History Department Web pages. For an Honors Thesis in History the thesis committee must have three members: two from History and one from an outside department. All thesis writers must enroll in the thesis seminar, HIST 198, for the fall semester of their thesis year.

GRADUATE PROGRAM

The Tufts History Department encourages students to study subjects and problems that transcend traditional academic constraints and consider national and regional histories in the broadest possible contexts. Our collaborative approach places an emphasis on global or interregional connections and comparisons, as well as on the use of interdisciplinary methods.

The Tufts History Graduate Program cultivates academic excellence and prepares students for leading roles in education and research, as well as in the fields of business, administration and world affairs.

The Tufts Graduate Program offers the M.A. degree in History or in History and Museum Studies. It also offers individual courses to students

earning a certificate in Museum Studies. The Ph.D. is offered in Modern South Asia and Global History.

Members of the History Department offer preparation at the M.A. level in regional fields that include South Asia, East Asia, Africa, Latin America, Europe and the United States. In addition to the regional fields, the department supports thematic fields, which combine interdisciplinary and comparative approaches. Students who choose not to specialize in a regional field may select a thematic field of study such as the following:

Civil Society, the Public Sphere, and the State
 Film, Media, and History
 Gender and Sexuality
 International and Intercultural Relations
 Colonialism and Postcolonialism
 Labor and Social Movements
 Nationalism and Collective Identity

Master of Arts in History

The Master's Program is a small, selective program of graduate study that emphasizes comparative understanding of historical processes. It is organized around colloquia in comparative and regional topics, the preparation of specified fields, and individual research in consultation with a faculty member.

The program is designed both to prepare students for doctoral programs in history and to enhance the historical knowledge and interpretative skills of professionals working in secondary schools, libraries, foundations, and museums. GRE scores (verbal, quantitative, analytical) and, if appropriate, TOEFL are required for admission to the graduate history program. Since the curriculum depends greatly upon individualized interaction between faculty and students, admission is contingent, in part, on an appropriate match between faculty and student interest.

Completion of the program requires proven reading proficiency in at least one foreign language or mastery of a research methodology in another discipline. Anyone who plans to meet the requirement in a foreign language or disciplinary research methodology must indicate a plan to acquire this knowledge within two years.

Normally, students are expected to complete the program within two academic years. The successful completion of ten courses is required. These courses

must include the following: the Historiography Proseminar (History 200), one Graduate Colloquium, at least one Research Seminar, and either an additional Research Seminar or one semester of directed graduate research.

Up to two of the ten courses required for the master's degree may, by prior agreement with the principal advisor, be taken in a department other than History. Students may take selected undergraduate courses, numbered 1 through 99, for graduate credit by enrollment in the related 200-level readings course by arrangement with the principal advisor and the relevant instructor. Graduate students may not take undergraduate colloquia. Appropriate courses offered by the Fletcher School will be accepted by petition for graduate credit in History.

A student may devote two out of ten courses to the writing of a thesis. In that case, only one additional course needs to be allocated for a Research Seminar or directed graduate research. In the second year of graduate study, the student will present a research project drawn from graduate course work at Tufts to an ongoing Graduate History Roundtable for critical discussion. Students will choose two fields of study to be prepared for examination. These fields may be regional or comparative in focus. Each student will consult with his or her principal advisor and a field committee to design a sequence of courses that will provide preparation for examinations in each field. Examinations must be taken at least six weeks prior to graduation. If the student chooses to write a thesis, only one field, different from the field of the thesis, need be prepared for examination.

Master of Arts in Museum Studies and History

The Tufts Museum Studies Program provides qualified post-baccalaureate students with professional training in the administration, preservation, and interpretation skills required for a career in the museum field. The Certificate in Museum Studies requires four graduate-level courses and an on-site internship. History M.A. candidates may take individual Museum Studies courses that fit into their program. Students interested in the museum studies courses or the certificate program should contact the Office of Graduate Studies or visit the website at <http://ase.tufts.edu/museumstudies>.

Criteria for admission to the Master's Program in History and Museum Studies are the same as those for the Master's Degree in History alone. The requirements for completion of a master's degree in History and Museum Studies are (1) the successful completion of eleven courses, including the Historiography Proseminar (History 200), one research course, the Museum Studies Foundation course, three Museum Studies elective courses, and the Museum Studies internship; (2) preparation of one regional or comparative field of study and examination in that field (see requirements in preceding description of master's degree in History); a thesis is optional; (3) proven reading proficiency in at least one foreign language or mastery of a research methodology in another discipline; (4) the presentation of one research project drawn from course work to the Graduate History Roundtable.

Doctor of Philosophy

The Tufts History Department offers the Ph.D. in History in two fields: Modern South Asia and Global History. The Ph.D. program in history accepts only well-prepared students who intend to work closely with a particular Tufts faculty member in a limited number of fields. Students in the Tufts M.A. program may apply to be transferred into the Ph.D. program after one year of study, and the department will consider applications from students who have completed a master's degree in history or the equivalent elsewhere.

Requirements for admission are as follows: exceptional performance in M.A. course work; proficiency on entrance in at least one foreign language (proficiency in two foreign languages is required before completion of the degree); GRE (Aptitude section only) and, if appropriate, TOEFL; detailed statement of intent, including discussion of planned dissertation field; and the written support of a primary Tufts faculty sponsor, who will have arranged for at least one other faculty advisor. Students admitted with a master's degree from another university will be allowed to transfer up to eight course credits.

Requirements for completion are as follows: proficiency in two foreign languages; completion of sixteen courses at the graduate level, including the historiography proseminar and two graduate colloquia; at least three semesters of independent readings or research; oral and written examinations

in three fields, based on course work and readings, administered by the appropriate members of the department; and a dissertation directed by the supervising faculty, to be read and defended before a committee including the advisor, at least one other member of the department, and a third faculty member in the field, drawn, if possible, from another institution. This defense will also include presenting a chapter to the Graduate-Faculty Roundtable. See additional requirements for the South Asia Ph.D. below.

Modern South Asia

The Tufts History Department has a distinguished tradition of offering doctoral training in Modern South Asian history. Successful Ph.D. candidates have gone on to obtain positions in some of the most prestigious institutions of American academe. The program provides doctoral students with an ambience geared to intense and focused research into the most pressing questions of South Asian scholarship today, while also connecting students to the larger international expertise of the Tufts History Faculty, as well as the resources of the Tufts Fletcher School of Law and Diplomacy. Students in this major field also partake of the active intellectual life surrounding South Asian studies in the Boston area, including the Center for South Asian and Indian Ocean Studies at Tufts University (<http://ase.tufts.edu/southasian>).

The Modern South Asia Ph.D. immerses students in both the breadth and the detail of a complex arena of historical inquiry. Students study local and regional specificities, and also the large-scale political, economic, social, cultural and intellectual interactions that have made South Asia a nexus for globalizing forces in the modern period.

Focus is placed on building expert skills in historical reasoning and analysis, in good writing and exposition, and in historiographic theory and debates.

Students who enter the Ph.D. program in Modern South Asian history at Tufts secure themselves a place in a scholarly tradition that has significantly influenced academic discussions in the United States and abroad by the formulation of new themes and heuristic categories, and by the impressive caliber of its work.

Additional requirements for the Ph.D. in Modern South Asian History are as follows:

- a. Language requirements: English, at least one major South Asian language, and one other appropriate language.
- b. Primary field of concentration: Nineteenth- and twentieth-century South Asia.
- c. Secondary geographic field: An appropriate field in the history of the Middle East, East Africa, Central Asia, Southeast Asia, or East Asia.
- d. Thematic field: An appropriate interdisciplinary and comparative field in topics such as nationalism, agrarian or labor history, or world history.

For more detailed information, please visit the website <http://ase.tufts.edu/history>.

Human-Computer Interaction

FACULTY ADVISOR:

Professor of the Practice Daniel J. Hannon, *Mechanical Engineering*

With hardware processing power increasing and software development techniques improving, the user interface is fast becoming the key bottleneck in developing computer products that meet market needs. When interface design does not reflect the needs of the intended user, products fail in the marketplace and enormous sums of money are spent on documentation, help lines, and training courses to overcome the difficulties of running programs. Much of this difficulty can be avoided with proper attention to both the physical and the psychological constraints of the user.

In an interdisciplinary collaboration between the Department of Mechanical Engineering, the Department of Psychology, the Department of Electrical and Computer Engineering, the Department of Computer Science, and the Department of Occupational Therapy at Tufts, this four-course, graduate-level certificate is designed to train the next generation of computer professionals for tomorrow's complex challenges. The program is open to individuals with a bachelor's degree, and is designed to be pursued on a part-time basis by computer programmers, Web designers, human factors professionals, software engineers, and user interface designers who wish to develop or enhance their user-interface design and implementation skills.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://engineering.tufts.edu/me/graduate/certhCI.htm>.

Human Factors Engineering

(SEE ENGINEERING PSYCHOLOGY/HUMAN FACTORS ENGINEERING.)

Interdisciplinary Doctoral Program

PROGRAM OFFERED:

Ph.D.

sernst@tufts.edu

617-627-3541

The Interdisciplinary Doctoral Program has been established to accommodate those interested in pursuing doctoral level studies in areas that cannot be accommodated in one of the departmental doctoral programs within Arts and Sciences or Engineering. The Graduate School of Arts and Sciences (GSAS) encourages applicants to be familiar with Tufts' graduate level offerings and with its faculty. A standing committee of GSAS, the Interdisciplinary Doctorate Overseers Committee (IDOC) serves as the admissions committee and will monitor the progress of all students matriculated into the program.

Admission to the Interdisciplinary Doctoral Program will be highly selective. The applicant must demonstrate the ability to do independent research/scholarship. Normally this will be demonstrated by having completed a master's degree with a dissertation requirement at an accredited graduate school, or in some cases by published research. Creative works such as art, musical composition, performance, and performance direction, though laudable, are not acceptable as the sole qualifications for admission into a scholarly doctoral program of study.

Admission to the Interdisciplinary Doctoral Program will be for only those qualified applicants with demonstrated proficiency in independent

study at the graduate level and whose research area is interdisciplinary and carefully matched to Tufts human, academic and physical resources.

Admissions Requirements: Application to the Interdisciplinary Doctoral Program is a two-step process.

Step One:

A regular Graduate School of Arts and Sciences application form should be submitted with all documents including GRE scores, together with the application fee, transcripts, letters of recommendation, etc.

In addition all Interdisciplinary Doctoral Program applicants must submit a description of research interests including the proposed area of dissertation work. This should include an explanation of how the project is interdisciplinary beyond what would be possible in a single department. The applicant should list faculty members that might be approached to be the principal advisor for the applicant or on the applicant's advisory committee. Applicants are encouraged to initiate informal conversations with potential principal advisors or members of an advisory committee. The description of research interests together with a list of possible advisors should not be more than one page in length.

After completion of Step One the Interdisciplinary Doctoral Committee (IDOC) will review the application to determine how it meets the requirements for the Graduate School of Arts and Sciences and notify the applicant if it is appropriate to proceed to Step two. This regular Arts and Sciences part of the application will be available for faculty members who would be potential members of the applicant's advisory committee.

Recommendation to proceed to Step Two is **NOT** acceptance into the program or the Graduate School of Arts and Sciences.

Step Two:

When recommended for the second step the applicant should contact faculty members that may be appropriate to serve as the principal advisor or members of the advisory committee and then write a more extensive description of the project.

Description of the project, limited to five single spaced pages

The description of the proposed project must show how the project will make an original contribution to the field of study. It should also indicate how the research involves methods, techniques or theoretical approaches that are characteristic of two or more disciplines. To qualify for the Interdisciplinary Doctoral Program, a study design must realize added value by the very fact of combining two or more disciplinary approaches. The candidate must provide a strong case that the project would not be appropriate for a single doctoral-granting department at Tufts and that the project would not fit easily within a traditional doctoral program at another institution. It is not sufficient that the subject matter of investigation is discussed in the literature of more than one discipline.

Confirmation of an advisory committee

The applicant must assemble an advisory committee consisting normally of at least three faculty members from Arts, Sciences and Engineering. When an applicant approaches faculty members to serve on his or her advisory committee the applicant should tell each faculty member that they can review the first step application to GSAS. Additional members of the advisory committee may be selected from other schools at Tufts and, when appropriate, other universities. As a component of the admissions process, IDOC must approve the suitability of the advisory committee. One person must agree to serve as the principal advisor and chair of the advisory committee, providing major direction for the student's progress through coursework, examinations and the dissertation. That person must be a full time tenured or tenure track faculty member of Arts, Sciences, and Engineering, situated in Medford and actively engaged in the field of the proposed research. All members of the advisory committee must submit a brief statement declaring their commitment to the project, and elaborating their specific role and responsibilities. The advisory committee should meet to review and approve the candidate's Interdisciplinary Doctoral proposal prior to its submission to IDOC.

IDOC must certify that the criteria for admission entailed by the proposal meet Tufts doctoral standards and the requirements of the Interdisciplinary Doctoral Program. If the principal advisor is

a member of a doctoral granting department, the graduate admissions committee of that department may be consulted in order to clarify whether the proposed program of study is suitable for the doctoral program of that department. In the case where the principal advisor is not a member of a doctoral-granting department, it is expected that at least one member of the advisory committee will have mentored doctoral students.

Plan of study The applicant must compile a list of graduate level courses to be taken for the degree and lay out the schedule in which they will be taken. When the proposal is presented to IDOC in its capacity as admissions committee, the candidate, the principal advisor and at least one other member of the advisory committee must be in attendance. A majority vote of IDOC in favor of the proposal will constitute a recommendation for admissions to the Dean of GSAS.

- The requirements for completion of the program should conform to the general requirements of the doctoral degree as stated in the A&S and Engineering Bulletin.
- The candidate must have at least two semesters of full-time residence on the Medford campus. Some tuition scholarship aid will be available from the graduate school, to be negotiated on an individual basis.
- The candidate must meet with his or her advisory committee at least twice a year, and a progress report must be filed with IDOC twice a year. Progress reports are due by the end of the first week of classes of the spring semester and two weeks before the beginning of classes in the fall semester. It is the responsibility of the candidate and the principal advisor to file the progress report, and failure to do so may result in a recommendation by IDOC for dismissal from the program. Any change in the committee makeup or program of study must receive prior approval by IDOC.
- The guidelines for qualifying procedures or examinations should follow the principal advisor's department's guidelines wherever possible; otherwise the candidate's advisory committee, including the principal advisor and the IDOC must approve them before the examination can take place. Both bodies may suggest changes.

- *The Dissertation Defense Committee*, which must be approved by IDOC, should consist of at least three members of the of the student's advisory committee, including the principal advisor. As with other doctoral dissertation defenses this committee must include an additional person from outside of Tufts familiar with the field, who is not a member of the dissertation working committee and is not associated with the student's research.

Interdisciplinary Studies

(SEE ALSO CENTER FOR INTERDISCIPLINARY STUDIES.)

The Center for Interdisciplinary Studies (CIS) administers the Interdisciplinary Studies major and the CIS Senior Thesis Option.

Interdisciplinary Studies Major

The Interdisciplinary Studies major offers students the opportunity to create a self-designed, individual concentration that draws on courses from at least two of the following six areas of study: humanities, arts, social sciences, natural sciences, mathematics (quantitative), and engineering.

Students proposing an Interdisciplinary Studies major must have a high degree of initiative and self-discipline. The Interdisciplinary Studies major consists of an integrated program of at least ten credits plus a two-semester thesis or honors thesis (for eligible students) or a substantial project comparable in scope to a thesis, including a written component. A student who wishes to pursue an Interdisciplinary Studies major must submit a detailed application describing the planned program of study. The student selects an advisory committee of three faculty members who support the application, including representatives from three departments in at least two of the six areas listed above. At least two of the committee members must be full-time members of the Arts and Sciences faculty with the rank of lecturer or above; at least one of the committee members must be a tenured or tenure-track member of the Arts and Sciences faculty. In consultation with this advisory committee, the student develops a rationale for the major, selects courses, and outlines the thesis plan. The proposal is reviewed for approval by the CIS Board or its designated subcommittee.

Note: Two credits used to fulfill another major may be used toward the Interdisciplinary Studies major; students may not triple major if one major is in Interdisciplinary Studies.

For specific information and application guidelines, visit the Center for Interdisciplinary Studies website: <http://cis.tufts.edu>.

CIS Senior Thesis

Arts, Sciences, and Engineering students who wish to write a senior thesis outside their major area of concentration may be eligible to write a CIS senior thesis. The student must satisfy the CIS Board or its designated subcommittee that the topic falls outside the purview of any department or interdisciplinary program and that significant course work and/or faculty-directed research relevant to the thesis topic has been accomplished. The student must assemble a committee of three faculty readers with expertise in the disciplines involved, one of whom will serve as the chair of the committee and be responsible for submitting the final grade. One member of the committee must be from a department or program in which the student is majoring. The proposed thesis topic must be approved by the CIS Board or its designated subcommittee. Application instructions and relevant timeline can be found on the CIS website.

Students who would like to be recommended for degrees with honors by a department or program that requires a thesis should be aware that a CIS thesis will not usually count as a substitute for an honors thesis within the department or program. However, once the thesis proposal is approved by the CIS Board or its designated subcommittee, eligible students can apply to the Thesis Honors Program by filing the appropriate paperwork at Dowling Hall. If the CIS thesis is to qualify as an honors thesis, the chair of the thesis committee must be a member of the department or program in which the student is majoring.

In addition to administering the Interdisciplinary Studies major and the CIS Senior Thesis, the Center for Interdisciplinary Studies provides a dynamic hub for a range of interdisciplinary academic programs at Tufts. For information about majors and/or minors offered by interdisciplinary programs, please see the relevant program website. The academic programs affiliated with the collective enterprise of the Center for Interdisciplinary Studies include:

Community Health
Environmental Studies
Film and Media Studies
International Literary and Visual Studies
International Relations
Judaic Studies
Latin American Studies
Leadership Studies
Medieval Studies
Middle Eastern Studies
Multimedia Arts
Peace and Justice Studies
Urban Studies
Women's, Gender, and Sexuality Studies

Other interdisciplinary programs at Tufts include:

Biochemistry
Biopsychology
Chemical Physics
Cognitive and Brain Sciences
Consortium of Studies in Race, Colonialism, and Diaspora (RCD)

For more information on these programs, students should consult the individual program website and/or program director.

International Literary and Visual Studies

CO-DIRECTORS:

Professor Charles Inouye, *German, Russian, and Asian Languages and Literatures*

Professor Isabelle Naginski, *Romance Languages*

The program in International Literary and Visual Studies makes possible the study of literature, film, and visual arts in an international context. ILVS students share an interest in literature, cinema, and visual arts, which they approach in an interdisciplinary, multicultural way.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Language Preparation for the Major

Students are to have or to attain competency in one foreign language (to 122 or equivalent), and are strongly urged to begin the study of a second. (In some cases, depending on the student's background, one of these might be English.)

Disciplinary focus

ILVS offers three tracks—literature, film, and the visual arts (with this third category including painting, photography, performance, etc.). A student focuses on one, but also does work in the other two.

Cultural areas

ILVS majors select a primary and a secondary area of study. This is usually a geographical area (Russia, Germany, Latin America, the Middle East), but it could be a conceptual area (the modern novel, postmodern theory). Normally, these areas reflect one's language preparation—Japanese and Japan, Chinese and China—but this is not always the case. For example, a native speaker of French might choose French and Spanish as his languages, and Spain and Japan to be his areas of cultural study. Or someone just starting Chinese and interested in film might choose China as a primary area and American film as a secondary area. In all cases, ILVS requires the study of more than one culture.

Theory courses

ILVS students are required to take courses from an approved selection of literary, film, visual, gender, and culture theory courses. Choices will vary according to disciplinary focus.

A senior project or thesis

A senior project is required. ILVS is both interdisciplinary and multicultural; therefore, the number of courses available to a student doing the major is large. For this flexibility to work to one's advantage, each student should have a conceptual focus, developed in consultation with his or her major advisor. This might be a question about a certain cultural phenomenon or an aesthetic school, style, or problem: for example, "What is the relationship between art and politics?" or "How is art education handled in different cultures, and to what effect?" Alternatively, you might also focus on an interaction or common development in two or more cultures, or on a particular genre or form. A student's conceptual focus should eventually lead to a senior thesis or project, such as a scholarly study, a translation, a film, a photo exhibit, or a creative writing project.

Courses

The major consists of twelve courses, not counting those taken for language preparation. At least one of the twelve courses should be either a seminar, an intensive course requiring a substantial integrative project, or independent study leading to a senior project or thesis. The particular distribution of courses is determined by the disciplinary track selected by the student. Courses that might serve two categories of the requirements cannot be double-counted within the major. Any departures from the proportions or content of these categories must be approved by petition to a committee of core faculty. Here is the distribution of required courses for each of the three possible tracks.

LITERATURE EMPHASIS

A. National and ethnic literatures (six courses). The student must take six literature courses—four in the primary cultural area and two in secondary area—preferably in the foreign language being studied.

B. Visual arts and/or film (two courses). The student must take two courses in film or the visual arts (normally, one in each cultural area, chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

C. Cross-cultural and/or gender-oriented literary or visual studies (two courses). The student must take two courses of a cross-cultural or gender-oriented nature in a literary or visual art or from film and visual arts courses (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

D. Literary and cultural theory (two courses). The student must also complete one semester of literary theory and one semester of cultural theory (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

FILM EMPHASIS

A. National and ethnic literatures (three courses). The student must take three literature courses, two in the primary culture area and one in the secondary area.

B. Film (five courses). The student must take five courses in film, normally including one in the primary cultural area and another in the secondary area. The student may substitute, for one of the five

courses, a course in visual arts or a studio course in some domain of filmmaking (screenwriting, directing, acting, etc.) (chosen from the course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

C. Cross-cultural and/or gender-oriented literary or visual studies (two courses). The student must take two courses of a cross-cultural or gender-oriented nature in a literary or visual art, or from film and visual arts courses (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

D. Film theory and cultural theory (two courses). The student must take one course in film theory plus one course in cultural theory (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

VISUAL STUDIES EMPHASIS

A. National and ethnic literatures (three courses). The student must take three literature courses, two in the primary cultural area and one in the secondary area.

B. Visual arts (five courses). The student must take five courses in visual arts, normally including one in the primary cultural area and one in the secondary area. The student may substitute, for one of the five courses, a course in film or two studio courses in a visual art (drawing, painting, sculpture, filmmaking, etc.) (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

C. Cross-cultural and/or gender-oriented literary or visual studies (two courses). The student must take two courses of a cross-cultural or gender-oriented nature in a literary or visual art or from film and visual arts courses (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

D. Visual and cultural theory (two courses). The student must take one course in visual theory and one course in cultural theory (chosen from course lists on <http://ase.tufts.edu/ilvs/requirements/courses.htm>).

For more detailed information, please visit the website <http://ase.tufts.edu/ILVS>.

International Relations

DIRECTOR:

Associate Professor Drusilla Brown, *Economics*

CORE FACULTY:

Professor Ina Baghdiantz-McCabe, *History*
Professor Gregory Carleton, *Russian*
Professor Ujjayant Chakravorty, *Economics*
Professor Gregory Crane, *Classics*
Professor Robert Devigne, *Political Science*
Professor Leila T. Fawaz, *History*
Professor Gerard Gasarian, *French*
Professor David M. Guss, *Anthropology*
Professor Brian Hatcher, *Religion*
Professor Hosea Hirata, *Japanese*
Professor Bruce Hitchner, *Classics*
Professor Charles Shiro Inouye, *Japanese*
Professor Yannis Ioannides, *Economics*
Professor Ayesha Jalal, *History*
Professor Vida Johnson, *Russian*
Professor Paul Joseph, *Peace and Justice Studies/Sociology*
Professor Beatrice Manz, *History*
Professor Jose Antonio Mazzotti, *Spanish*
Professor Malik Mufti, *Political Science*
Professor Isabelle Naginski, *French*
Professor Susan Napier, *Japanese*
Professor Peter Probst, *Art and Art History*
Professor Daniel J. Richards, *Economics*
Professor Tony Smith, *Political Science*
Professor Enrico Spolaore, *Economics*
Professor Vickie Sullivan, *Political Science*
Professor Reed Ueda, *History*
Professor Peter Winn, *History*
Professor Christiane Zehl Romero, *German*
Professor Xueping Zhong, *Chinese*
Associate Professor David Art, *Political Science*
Associate Professor Gloria Ascher, *German/Judaic Studies*
Associate Professor Paula Aymer, *Sociology*
Associate Professor Stephen Bailey, *Anthropology*
Associate Professor Cristelle Baskins, *Art and Art History*
Associate Professor Nancy Bauer, *Philosophy*
Associate Professor Marcelo Bianconi, *Economics*
Associate Professor Drusilla Brown, *Economics*
Associate Professor Consuelo Cruz, *Political Science*
Associate Professor Heather Curtis, *Religion*
Associate Professor David Dapice, *Economics*
Associate Professor Richard C. Eichenberg, *Political Science*

Associate Professor Ioannis Evrigenis, *Political Science*
Associate Professor Kenneth Garden, *Religion*
Associate Professor Nina Gerassi-Navarro, *Spanish*
Associate Professor Kelly Greenhill, *Political Science*
Adjunct Associate Professor David Gute, *Civil and Environmental Engineering*
Adjunct Associate Professor Raymond Hyatt, *Public Health and Community Medicine*
Associate Professor Richard Jankowsky, *Music*
Associate Professor Ikumi Kaminishi, *Art and Art History*
Associate Professor Erin Kelly, *Philosophy*
Associate Professor David Locke, *Music*
Associate Professor Kris Manjapra, *History*
Associate Professor Christina Maranci, *Art and Art History*
Associate Professor Margaret McMillan, *Economics*
Associate Professor Lionel McPherson, *Philosophy*
Associate Professor Jayanthi J. Mistry, *Child Development*
Associate Professor Jeanne M. Penvenne, *History*
Associate Professor Sarah Pinto, *Anthropology*
Associate Professor Kamran Rastegar, *Arabic*
Associate Professor Elizabeth Remick, *Political Science*
Associate Professor Hugh Roberts, *History*
Associate Professor Pearl T. Robinson, *Political Science*
Associate Professor Modhumita Roy, *English*
Associate Professor Rosalind H. Shaw, *Anthropology*
Associate Professor Oxana Shevel, *Political Science*
Associate Professor Jeffrey Taliaferro, *Political Science*
Associate Professor Rosemary Taylor, *Community Health/Sociology*
Associate Professor Joseph Walser, *Religion*
Associate Professor Markus Wilczek, *German*
Assistant Professor Michael Beckley, *Political Science*
Assistant Professor Amahl Bishara, *Anthropology*
Assistant Professor Arthur Chiang, *Economics*
Assistant Professor David Ekbladh, *History*
Assistant Professor Elizabeth Foster, *History*
Assistant Professor Eva Hoffman, *Art and Art History*
Assistant Professor Kelsey Jack, *Economics*
Assistant Professor Karen C. Kosinski, *Public Health and Community Medicine*
Assistant Professor Ning Ma, *Chinese*
Assistant Professor Nimah Mazaheri, *Political Science*
Assistant Professor Alisha Rankin, *History*
Assistant Professor Dennis Rasmussen, *Political Science*
Assistant Professor Ichiro Takayoshi, *English*
Assistant Professor Man Xu, *History*
Senior Lecturer Anna Hardman, *Economics*
Adjunct Senior Lecturer Mark A. Woodin, *Civil and Environmental Engineering*

Lecturer Rana Abdul-Aziz, *Arabic*

Lecturer Nancy W. Gleason, *Political Science*

Lecturer Ekaterina Gnedenko, *Economics*

Lecturer David J. Proctor, *History*

The program offers a rigorous plan of study for undergraduate students with a primary interest in international relations. The field of international relations includes the study of international and regional systems; the foreign relations of states, including their political, military, economic, and environmental policies; the sources of international conflict and cooperation; the domestic and transnational interests and actors that influence states; and the historical, political, social, cultural, ethical, and humanistic traditions that impinge on the international relations of particular states or regions.

The program is governed by an executive committee representing the departments and programs that serve the major. All majors select an academic advisor who is a member of the international relations core faculty.

First-year students who anticipate majoring in international relations should read the concentration requirements below. Generally, prospective majors in the first year should select a program of study that includes a foreign language and perhaps the first course in international relations (Political Science 61) and in economics (Economics 5). The major is usually declared during the sophomore year, although first-year students are encouraged to consult with the program in planning their course of study, especially if they plan to spend all or part of their junior year abroad.

The program awards four prize scholarships and academic awards: the John S. Gibson Prize, the Distinguished Achievement Award in International Relations, the International Relations Research Scholars Award, and the Anne E. Borghesani Memorial Prize. The International Relations Research Scholars Award is designed to enable promising IR majors to conduct high-level, original research under the supervision of IR core faculty members in the summer before their senior year. The Borghesani award, open to sophomores and juniors from any concentration, is intended to help defray the costs of study, research, or community service abroad that adds an international dimension to the student's program of study. Each year the IR program also selects students to represent Tufts at several national student conferences.

Majors in international relations may take advantage of study abroad opportunities and participate in the Tufts-in-Talioires summer session, where international relations courses are generally offered. Students who study abroad with Tufts and/or non-Tufts programs may credit qualified courses toward the major, provided that they have obtained approval from the IR program office, have completed the appropriate transfer credit preapproval process, and have submitted appropriate documentation to the IR program office in Cabot 605. Students should consult with their advisor and the IR program to make sure course work fulfills requirements. Students who study abroad in either Tufts programs or non-Tufts programs should carefully review all program policies regarding requirements and the number of courses that can be taken beyond the Medford campus (see more information below).

International relations majors may wish to note the combined-degrees program offered by the College of Liberal Arts and the Fletcher School of Law and Diplomacy. Qualified juniors may apply to the Fletcher School after they have completed and received grades in twenty courses. Details of this highly competitive dual-degree program are described in this bulletin under Combined-Degrees Programs; an interview with the Fletcher admissions office is required.

UNDERGRADUATE MAJOR REQUIREMENTS

The international relations major requires twelve courses comprised of five core courses and seven courses from one of six thematic concentrations chosen by students. One research methods class is required effective for the Class of 2018 and beyond. IR majors A grade of C- or better is required for a course to count for the IR major. No more than three courses taken abroad (including on Tufts Programs Abroad) may be applied toward the twelve-course major (only one of which may be applied toward the IR core requirements). The IR capstone requirement (upper-level seminar, directed research or senior thesis) must be completed on the Tufts Medford campus. Additionally, the IR program requires proficiency in a language other than English. Details regarding the requirements are as follows.

Language Requirement

The IR major requires oral and written proficiency in a language other than English. Proficiency is defined as successful completion of eight semesters (or the equivalent) of university-level language instruction. All students wishing to major in international relations are required to comply with this requirement. Courses used to fulfill this requirement may not overlap with the core or thematic concentration requirements.

Core Requirements (five courses)

The core requirements constitute the foundation of knowledge that is needed by all majors in International Relations, regardless of thematic concentration. They are composed of broad introductory courses that cover the major themes and debates within each discipline on the study of international affairs. Core courses constitute a major element in establishing a coherent sense of IR identity and community. The IR program strongly encourages students to take all core courses at Tufts.

Political Science 61 International Relations

Economics 5 Principles of Economics

One course in international economics*

One course in theories of society and culture*

One course in the historical dimension*

*See IR website for more details.

Thematic Concentration Requirement (seven courses)

Thematic concentrations are designed to provide students with substantial, in-depth and focused study of an aspect of international affairs. All majors must choose one of the following six thematic concentrations and complete seven courses within that concentration. These must include social science, history, and culture courses. At least one of the seven courses must also address the role of the United States in the relevant regional or issue area. One of the seven thematic concentration courses must also include a research methods course (such as INTR 91, INTR 92 or several other options). Moreover, the normal expectation is that no more than three of the seven courses in each concentration may be an introductory-level course, and that one must be a capstone research course (seminar, honors thesis, or directed research).

1. REGIONAL AND COMPARATIVE ANALYSIS

Choose one of the following:

Africa

East and Southeast Asia

Europe and the former Soviet Union

Latin America

Middle East and South Asia

2. INTERNATIONAL ECONOMICS

Choose one of the following:

International economics and trade

International economics and finance

International economics and environment

International economics and development

3. GLOBAL HEALTH, NUTRITION, AND THE ENVIRONMENT

4. INTERNATIONAL SECURITY

5. THE UNITED STATES IN WORLD AFFAIRS

6. IDEAS AND IDENTITY

Choose one of the following:

Ideologies

Empires/Colonialism/Globalization

Descriptions of the thematic concentrations, detailed program requirements and policies, and a complete list of courses that satisfy the IR major are contained in the International Relations Program Handbook, available in Cabot 605, and on the IR website.

For more detailed information, please visit the website <http://ase.tufts.edu/ir>.

Italian Studies

(FOR DEGREE REQUIREMENTS, SEE ROMANCE LANGUAGES.)

Japanese

(FOR DEGREE REQUIREMENTS, SEE GERMAN, RUSSIAN, AND ASIAN LANGUAGES AND LITERATURES.)

Judaic Studies

(FOR DEGREE REQUIREMENTS, SEE GERMAN, RUSSIAN, AND ASIAN LANGUAGES AND LITERATURES.)

Latin American Studies

DIRECTOR:

Associate Professor Nina Gerassi-Navarro, *Romance Languages*

Latin America is increasingly important in the world and for the United States in particular. The study of our hemispheric neighbors, the area of origin of our country's largest minority group according to the 2010 census, is important in itself, and also relevant for the understanding of larger international issues. Latin American Studies is an interdisciplinary program that encourages students to integrate the varying disciplinary perspectives of the arts, literature, social sciences, and history, along with the study of the languages of the area, into a coherent view of Latin America.

MAJOR IN LATIN AMERICAN STUDIES

The major in Latin American Studies offers students the opportunity to combine the approaches of several academic disciplines in a focused study of the region. In recent decades, Latin America has become a field of rapid development in the arts, humanities and social sciences. The major's interdisciplinary approach integrates historical, social, political, economic and cultural perspectives at both national and regional levels. The program of study culminates in an independent interdisciplinary capstone project on a Latin American subject or in a senior thesis or senior seminar.

Requirements for completing the Latin American Studies major are 11 courses and a five-semester language study. Required courses include courses in history, social sciences, literature and the arts, plus foundational courses, as well as a research seminar or thesis or independent project. At least one of the courses should focus on indigenous peoples, and at least one course must focus on pre-20th-century Latin America. A Latino Studies course may count as one of the elective courses. A grade of C- or better is required for a course to count for the major.

MINOR IN LATIN AMERICAN STUDIES

There are three requirements for completing an interdisciplinary minor in Latin American studies.

- 1) Students should study one of the region's languages for three years (e.g., Spanish 22) or the equivalent. Normally, this language will be Spanish or Portuguese, but others (e.g., Quechua) may be substituted with the approval of the director.
- 2) Students must complete at least five credits in Latin American Studies, which should include at least one course from each of the three disciplinary areas: arts and literature, social sciences, and history. Students may count as many as two courses transferred from other institutions or used to satisfy another concentration requirement toward the minor. This limit does not apply to courses taken at Tufts Programs Abroad. A grade of C- or better is required for a course to count for the minor.
- 3) Students must complete a capstone project that integrates at least two of the three disciplinary areas of the minor (arts and literature, social sciences, and history). This project may be a written work, a performance, or some other creative work for which the student will receive one course credit. Normally, the project will emerge out of one of the courses that the student takes for the minor and will be advised by the instructor of that course. The student must also form a committee of at least two faculty members to evaluate the project, which would include the project's faculty advisor and a faculty member from the other disciplinary area involved in the project. The format is flexible, but the content must conform to these guidelines. Normally, a student will complete the project in the final semester at Tufts. (See Interdisciplinary Minor Program for details.)

APPROVED COURSES

Each semester an updated list of current Latin American studies courses is available from the director. Seminars and other courses on the region may be offered from time to time and credited toward the minor or major. Students may also petition the director to credit courses not included in the list.

For more detailed information, please visit the website <http://ase.tufts.edu/latinamericanstudies>.

Latino Studies

DIRECTOR:

Associate Professor Adriana Zavala, *Art and Art History*

The interdisciplinary minor in Latino Studies is one of the five programs within Tufts' Consortium of Studies in Race, Colonialism, and Diaspora (RCD). The minor requires six credits. The minor provides the opportunity to study Latinas/os within the U.S. sociopolitical and cultural context, as well as a framework for understanding this population's historical connections to Latin America. Courses explore the impact of U.S.-Latin American relations in shaping migration flows, as well as the impact of colonialism and war, racism, inequality, and cultural, social, and political marginalization on U.S. Latino experiences. Our curriculum also underscores the vibrant contributions of Latinas/os in U.S. history and social life, in music, theater, film, the visual arts, literature, and popular culture.

The following courses are required:

- One introductory survey course focused on U.S. Latinos from the list online.
- One Latin American survey course from the list online or an approved equivalent.
- One survey course in comparative race relations in the U.S. context from the list online or an approved equivalent.
- One core course with at least 50 percent Latino content. With approval of Latino Studies director, this requirement can be met by taking a Latino Studies course from one of Tufts' consortium partners.
- One elective course relevant to Latino Studies with substantial and/or relevant Latino content, in which student must do a substantial project or paper on a Latino topic. An independent study course with a Latino Studies faculty on a Latino Studies topic may also count.
- The capstone experience (LST198): All students must participate in a capstone experience, developed in consultation with the program director, that may involve independent research or work in one of Boston's Latino communities. The capstone project must culminate in a written paper, performance, or oral presentation, which integrates

the knowledge and methodologies of the disciplines involved. The capstone may also be based, in part, on a documented internship and will then require a paper based on the internship experience to be evaluated by the program director or an associated program faculty member.

NOTE: Students should check the Latino Studies website for a list of courses that meet these requirements and/or meet with the director of the minor. All courses taken for the Latino Studies minor program must be taken for a letter grade. A maximum of two credits from the minor may be counted toward a major or majors; up to two credits may be used for distribution requirements. Also, one language course above the intermediate level, Spanish for Heritage Speakers (Spanish 23), or Portuguese 1 or 2 can count as an elective course.

Students interested in pursuing a Latino Studies Minor should register with Associate Professor Adriana Zavala, Art and Art History, 617-627-2423, adriana.zavala@tufts.edu; or with Cynthia Sanders, Program Administrator, 110 Eaton Hall, 617-627-2311, Cynthia.Sanders@tufts.edu

For more detailed information, please visit the website <http://ase.tufts.edu/latinostudies>.

Leadership Studies

DIRECTOR:

Mindy Nierenberg, *Tisch College of Citizenship and Public Service*

Leadership Studies is an interdisciplinary field that offers students the opportunity to study leadership theory from a multi-disciplinary perspective. The field of Leadership Studies connects with any major at Tufts, and provides students ways to integrate academic, personal, and experiential growth as leaders. Students are encouraged to explore various leadership models while developing their own leadership style, building skills and knowledge that will benefit them while at Tufts and in their lives after graduation. Scholarship in Leadership Studies analyzes the influence of historical, political, economic, psychological, and technological forces on effective leadership and leadership models. Leadership Studies at Tufts places particular

emphasis on leadership that bridges cultural divides and furthers understanding of diverse models of leadership. Leadership is examined not only on an individual level, but also regarding the role of organizations, nonprofit, for-profit, governmental, and educational, in complex societies.

Leadership Studies at Tufts develops creative, analytical and practical skills and attitudes. Skill development is further encouraged through courses emphasizing public speaking, cross-disciplinary and cross-cultural communication and team building, negotiation, mediation, and creative problem solving. The Leadership Studies minor also requires students to analyze issues relating to ethics, values and decision making, organizational behavior, power and power relations, and policymaking. In these realms, the minor also allows for a focus on civic leadership, and the importance of the development of the knowledge, skills and values crucial to effective positive change on local, domestic, and global communities.

INTERDISCIPLINARY MINOR

Students pursuing the interdisciplinary minor in Leadership Studies take a total of six courses at 5.5 credits. Two of these must be Tier 1 core courses and two must be drawn from the list of Tier 2 courses. The fifth course may be selected from Tier 1 or Tier 2. The director of the Minor in Leadership Studies advises on course selection to fit each student's interests and to establish the basis for the Tier 3 capstone senior project. All courses must be taken for a letter grade. As a capstone, students must complete a Tier 3 senior project. Here, students put theory into practice and take a seminar course in which they reflect on their experience in the context of their leadership courses and readings throughout the capstone. Students in the leadership minor consider how the courses they propose to take and their leadership experience constitute a coherent whole.

LEADERSHIP STUDIES CURRICULUM

The Leadership Studies curriculum consists of many courses drawn from across the range of departments and disciplines at Tufts that either directly or indirectly addresses the issues of leadership. The director is charged with maintaining an

appropriate selection of courses in Tier 1 and 2 (including evaluating student petitions to include additional courses for credit toward the minor).

Tier 1 Courses

The courses in Tier 1 develop the intellectual underpinnings of the Minor in Leadership Studies. These courses introduce the basic principles of leadership and introduce theories of leadership that have been developed in a number of different disciplines. Students are highly encouraged to take "Introduction to Leadership Studies", offered through the Political Science department, as one of their Tier 1 courses.

Tier 2 Courses

Courses in Tier 2 allow students to round out their study of leadership. These courses widen the disciplinary foundations of the study of leadership.

Tier 3 Course

To complete the minor, students must engage in a practical leadership capstone experience. Students must meet with the director of the program to develop a prospectus describing the goals, challenges, and objectives of their leadership experience. Students participating in programs such as the Tisch Scholars Program for Citizenship and Public Service, the IGL Synaptic Scholars Program, and Resident Assistants may apply to have that experience count as the capstone, and other campus leadership experiences may constitute the basis of their applications as well. Examples of capstone experiences for the Leadership Studies Minor have included service as a Reserve Officers Training Corps member, captain of an athletic team, or executive board member of a student organization. Structured reflection is a key element of the capstone experience. Students will be required to meet with other students pursuing the capstone in a half-credit pass-fail seminar. For the seminar, they will write a paper linking their experience to the theories and issues covered in their coursework.

As an alternative, and with permission of the director of the program, students can complete Tier 3 by undertaking a senior thesis on leadership.

Management of Community Organizations

FACULTY ADVISOR:

Barbara Parmenter, *Urban and Environmental Policy and Planning*

Are you one of those who, because of your deep commitment to an important public issue, started in community organizing or perhaps as a direct service provider—and who find yourself today as an “accidental manager” of a community organization? Without the benefit of formal training or theoretical grounding, you may find yourself in uncharted territory running a growing, increasingly complex organization.

The certificate in Management of Community Organizations (MCO) may be for you. It’s a graduate-level program that provides management training within the framework of social, economic and political values that shape the nonprofit sector. The program’s goal is to train people in effective management who are committed to social policy and wish to work at the community level. The certificate is offered by the graduate Department of Urban and Environmental Policy and Planning.

The certificate requires the completion of four courses—one core and three electives—that address such issues as financial analysis, program evaluation, urban and social policy, fundraising, and conflict resolution.

The program is open to individuals with a bachelor’s degree and is especially appropriate for new managers of community organizations, those with experience in the field who seek additional management training, midcareer professionals interested in pursuing community work, and individuals who wish to start a new agency or program.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://ase.tufts.edu/uep/Degrees/Certificate.aspx>.

Manufacturing Engineering Certificate Program

FACULTY ADVISOR:

Professor Anil Saigal, *Mechanical Engineering*

As the United States continues to compete in global markets, the need for manufacturing engineers who can design, build, operate, and manage competitive production systems has never been greater. Excellence in design and production, especially knowledge of CAD, CAM, CNC machining, and robotics, is essential as industries strive to reduce labor costs, increase productivity and profitability, tighten performance standards, and improve quality.

The Department of Mechanical Engineering offers a four-course graduate-level certificate in manufacturing engineering. The program is offered on a part-time, non-degree basis for students seeking professional training in manufacturing engineering. In most cases, courses taken as a certificate student can be transferred to a degree program. Graduate students may also pursue the certificate as a concentration within their degree. The program is open to students with a bachelor’s degree and a background in engineering, science, or mathematics.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

Mathematics

Professor Misha Kilmer, *Chair; Numerical linear algebra*

Professor George McNinch, *Associate Chair, Algebraic groups*

Professor Bruce Boghosian, *Fluid dynamics*

Professor Christoph Börgers, *Mathematical biology*

Professor Fulton Gonzalez, *Harmonic analysis*

Professor Mauricio Gutierrez, *Group theory*

Professor Marjorie Hahn, *Probability*

Professor Boris Hasselblatt, *Dynamical systems*

Professor Zbigniew H. Nitecki, *Dynamical systems*

Professor Eric Todd Quinto, *Robinson Professor of Mathematics; Tomography and functional analysis*

Professor Kim Ruane, *Geometric group theory*

Professor Montserrat Teixidor i Bigas, *Algebraic geometry*

Professor Loring Tu, *Algebraic geometry and algebraic topology*

Professor Richard Weiss, *William Walker Professor of Mathematics; Group theory*

Associate Professor Moon Duchin, *Geometry, topology, groups, dynamics*

Associate Professor Genevieve Walsh, *Geometry and topology*

Assistant Professor James Adler, *Computational partial differential equations, scientific computing*

Assistant Professor Xiaozhe Hu, *Scientific computing*

Norbert Wiener Assistant Professor Patricia Garmirian, *Probability theory and stochastic processes*

Norbert Wiener Assistant Professor Hao Liang, *Group theory and generalizations*

Norbert Wiener Assistant Professor Yusuf Mustopa, *Algebraic geometry*

Senior Lecturer Mary Glaser, *Combinatorics*

Lecturer Zachary Faubion

Lecturer Gail Kaufmann

Lecturer Kye Taylor

SECONDARY APPOINTMENTS:

Adjunct Professor Lenore J. Cowen, *Computer Science; Computational biology, theory of computation, algorithm design and analysis*

Adjunct Professor Elena Naumova, *Department of Civil and Environmental Engineering; Methodology development for modeling of transient processes*

Adjunct Professor Diane Souvaine, *Computer Science; Design and analysis of algorithms, computational geometry*

Our experience up to date justifies us in feeling sure that in Nature is actualized the ideal of mathematical simplicity.

— Albert Einstein

Spencer Lecture, Oxford, 1933

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Option I: Major in Mathematics

To major in Mathematics, a student must take ten courses beyond Calculus II (Mathematics 32, 36, or 39). These courses must include Mathematics 42 or 44, Mathematics 70 or 72, Mathematics 135, Mathematics 145, Mathematics 136 or 146, two more 100-level mathematics courses, and three electives. The electives may include mathematics courses numbered 50 or above and up to two approved courses in related fields. Majors are

advised to complete Mathematics 42 or 44 and Mathematics 70 or 72 by the end of their second year.

Students in the School of Engineering may, with certain exceptions, choose mathematics as a second area of concentration. To do so, a student must notify the dean of engineering through the Department of Mathematics at least one semester before graduation. The student must complete a program that simultaneously satisfies the conditions for a degree from the School of Engineering and the concentration requirements of the Department of Mathematics.

Option II: Major in Applied Mathematics

To major in Applied Mathematics, a student must take 13 courses beyond Calculus II (Mathematics 34, 36, or 39). These courses must include Mathematics 42 or 44; Mathematics 51; Mathematics 70 or 72; Mathematics 87, 158, 135, and 136; one of Mathematics 145, Comp/Math 61, Comp 15, or Comp/Math 163; one of the following three sequences: Mathematics 126/128, 151/152, or 161/162; one of Mathematics 126, 128, 151, 152, 161, or 162 (excluding the sequence referred to in the last requirement); and two electives. Mathematics courses numbered 61 or above are acceptable electives. With the approval of the Mathematics Department, students may also choose as electives courses with strong mathematical content that are not listed as Mathematics courses. Majors are advised to complete Mathematics 42 or 44, Mathematics 70 or 72, and Mathematics 87 by the end of their sophomore year.

UNDERGRADUATE MINOR PROGRAM

To minor in mathematics, a student must take six courses in the department beyond the level of Calculus II (Mathematics 34, 36, or 39). These must include Mathematics 42 (or 44) and 72 (or 70), as well as Mathematics 135 or 145 (or both).

UNDERGRADUATE COURSES

Please note: Students who wish to begin calculus should register for either Mathematics 30, 32, or 39. Those interested in computer science, engineering, mathematics, or the physical sciences should begin the three-course sequence Mathematics 32, 34, 42 or the two-course accelerated honors sequence Mathematics 39, 44. Other combinations

of these courses may not be granted full credit (see the separate course descriptions). Mathematics 4, 10, 14, 15, 16, 19, and 30 do not count toward a degree in the School of Engineering.

Students will receive half credit (with grade) for passing Mathematics 32 after receiving credit for Mathematics 30. Mathematics 32 must be taken at Tufts and for a grade in order to obtain this extra half credit. The extra half credit will not count toward the mathematical sciences distribution requirement. Mathematics 30 may not be taken for credit after receiving credit for Mathematics 32.

Course recommendations

Students who take Mathematics 70 instead of 72 are advised to also take another course above 51 to prepare for the proofs required in Mathematics 135 and 145.

Mathematics majors interested in graduate school in applied mathematics are advised to major in applied mathematics. The requirements of that major reflect the appropriate preparation for graduate study in this field.

Mathematics for majors interested in graduate school in pure mathematics: For mathematical depth, we recommend Mathematics 136, 146, and 158. We recommend students take as many 100-level and higher courses as possible.

We also recommend that students interested in graduate school in pure or applied mathematics do research in mathematics, such as through an NSF Research Experience for Undergraduates (REU) Program or with a professor at Tufts.

Mathematics for majors interested in actuarial science: We recommend Mathematics 51, 161, 162, and 136; economics courses such as EC 105, 107, 108, 150, and 152; and ES 152 and programming.

Mathematics for majors interested in computer science: We strongly recommend Mathematics 61, 63, 126, and 128, and we recommend 146, 161, 162, as well as Computer Science 160 and 170 plus programming.

Mathematics for majors interested in economics: We recommend Mathematics 51, 161, 162, and 136, as well as EC 107–8. We also recommend students take Comp 11.

Mathematics for majors interested in careers in industry: We recommend Mathematics 51, 87, 151, 161–162, 135–136, 126–128, and Comp 11 or above.

Mathematics for majors interested in careers in science: We recommend that students consult professors in the specific science department as well as our department.

Mathematics for majors interested in teaching high school: We recommend Mathematics 61, 63, 112, 146, and 161, and education courses. We encourage students to take Mathematics 136 or 158, or computer science, if possible.

GRADUATE PROGRAM

The Department of Mathematics offers programs leading to the degrees of master of science and doctor of philosophy. Applicants are expected to have mathematical preparation at least equivalent to that of an undergraduate major in mathematics, including courses in analysis and algebra. Many students fulfill the master's degree requirements and obtain a master's degree in the course of their doctoral studies.

Master's Degree

To qualify for the master's degree, a student completes an approved program of at least nine courses in total, with at least three courses numbered above 200, with the following guidelines to insure breadth:

- a. Three courses: one each in three of the distinct individual areas 1–5 given below, two of which are at the 200 level—a full pass on the corresponding Ph.D. qualifying examination would count as the course requirement here.
- b. Four courses: Any from areas 1–6
- c. Two courses: Elective courses which can be any course numbered above 112

Areas:

1. Analysis: 211, 212, 213, 136
2. Algebra: 215, 216, 146
3. Geometry/topology: 217, 218, 167, 168
4. Numerical analysis: 226, 228, 128
5. Partial differential equations: 251, 252, 152
6. Other: 158, 162, 163, 170, any course above 200

Any part of this requirement may be fulfilled by equivalent courses with prior approval by the Mathematics Department Graduate Committee. Master's students must complete at least two courses (not counting thesis) each semester until five courses counting towards the degree are satisfactorily completed, unless this requirement is waived by the graduate committee.

In addition, students are required to participate in one of our active research seminars for two terms as well as the colloquium on a regular basis.

Master's Thesis Option

A student may write an expository paper on a specific topic in mathematics under the direction of a member of the department and upon completion present it before a committee of two or more faculty members. The writing of the thesis can be counted as the two elective courses from the nine courses for the course requirement via numbers 295 and 296.

Doctor of Philosophy

A doctoral student must pass oral qualifying examinations in three out of the five fields of analysis, algebra, geometry/topology, partial differential equations and numerical analysis by the end of the second year.

The choice of three fields must be approved in writing by the graduate director based upon a discussion with the student by the end of his or her first semester at Tufts. This choice can be modified in consultation with the Graduate Committee.

Within one year after completion of the oral examinations, the student must pass a candidacy examination on material studied in preparation for work on a dissertation.

The major task of a doctoral student is to write a dissertation under the direction of a department member. This must be a substantial original contribution to the field of the student's specialty and must meet standards of quality as exemplified by current mathematical research journals.

At least one semester's teaching experience at Tufts is required.

For more detailed information, please visit the website <http://math.tufts.edu>.

Mechanical Engineering

Professor Chris Rogers, *Department Chair; Robotics, musical instrument design, fluid mechanics, and engineering education*

Professor Mark Kachanov, *Fracture mechanics, micro-mechanics of materials*

Professor William Messner, *John R. Beaver Professor; Automatic control systems with an emphasis on applications to data storage systems, robotics, microfluidics, and biological systems and instrumentation*

Professor Anil Saigal, *Materials engineering, manufacturing processes, quality control*

Professor Igor Sokolov, *Condensed matter, soft condensed matter and biomedical research, energy-related materials and sustainability, surface science and engineering*

Associate Professor Behrouz Abedian, *Fluid mechanics, electrokinetics and thermal-fluid systems*

Associate Professor Luisa Chiesa, *Sustainable energy, superconducting materials*

Associate Professor Marc Hodes, *Sustainable energy, thermoelectricity and heat transfer*

Associate Professor Thomas James, *Dynamics, mechanics and materials engineering*

Associate Professor Douglas M. Matson, *Solidification processes, thermal manufacturing, machine design*

Associate Professor Jason Rife, *Robotics, dynamics and controls*

Associate Professor Robert White, *Microsystems, dynamics, acoustics and sensors*

Assistant Professor Jeffrey Guasto, *Microscale transport, bio-fluid dynamics*

Assistant Professor Erica Kemmerling, *Medical engineering, fluid mechanics*

Assistant Professor Iryna Zenyuk, *Electrochemistry, thermodynamics, fluid mechanics, renewable energy*

Senior Lecturer and Research Assistant Professor Gary G. Leisk, *Machine design, non-destructive testing*

Professor of the Practice Robert Hannemann, *Thermal sciences, heat transfer*

Professor of the Practice Daniel Hannon, *Human factors in product design*

Professor of the Practice Pratap Misra, *GPS, emerging satellite navigation systems*

Professor of the Practice Michael Wiklund, *Human factors in product research and design*

Professor of the Practice Michael A. Zimmerman, *Material science, thermal manufacturing*

SECONDARY APPOINTMENTS:

Adjunct Professor Vincent Manno, *Provost and Dean of the Faculty, Professor of Engineering, Franklin W. Olin College of Engineering, Computational thermal-fluid dynamics, power generation, electronics thermal energy management, and manufacturing processes*

Adjunct Professor Holly Taylor, *Professor and Director of Graduate Program, Psychology, Tufts University Human Factors, situation models, spatial cognition and comprehension*

Adjunct Associate Professor Thomas Vandervele, *Associate Professor, Electrical and Computer Engineering, Tufts University, Interaction of light with matter, physics of nanostructures (semiconductor photonics and electronics) and interfaces, energy materials*

Mechanical engineering is a rich and versatile profession that encompasses invention, design, analysis, and manufacture of mechanical components and systems. Broadly speaking, mechanical engineering is the branch of engineering that encompasses the generation and application of heat and mechanical power. In other words, mechanical engineering is all about the analysis, design and manufacturing of systems in motion. It spans both mature, well-established industries such as automotive, aerospace, shipping, power, heating and cooling, and machinery and new and emerging technologies such as robotics, medical devices, and micro and nano devices. Some of the most exciting areas in mechanical engineering occur where it interfaces with other disciplines.

In addition to the traditional disciplines of heat transfer, fluid dynamics, dynamics and controls, materials processing, manufacturing, mechanics, and mechanical design, the Department of Mechanical Engineering is focused in three integrated areas of specialization.

1. Mechatronics, which is the interface between mechanical engineering and electronics. This specialty encompasses robotics, dynamics and controls, micro electro-mechanical systems (MEMS), manufacturing, and advanced materials.
2. Biomechanical systems, which is the interface between mechanical engineering and biology. This specialty includes human factors engineering, tissue scaffolds, soft-bodied robots, micro fluidic systems, biofluidics, biomechanics, and biological materials.

3. Sustainable energy, which is focused on systems for the generation or consumption of power in a sustainable system. This specialty includes power generation and propulsion system efficiency and innovation, electronics thermal management, sustainable data center technology, superconducting energy transmission and storage, wind energy, advanced thermodynamic cycles, heat transfer and fluid mechanics.

The mission of the Department of Mechanical Engineering is to provide educational experiences that give students a sound basis for professional practice and a career of lifelong learning. Each program has specific objectives, but the common goal is to learn fundamental principles of mechanical engineering and to master engineering methods to solve challenging technical problems and to communicate these solutions to the technical and nontechnical community. The department strives to offer programs that are recognized as distinctive in their combination of technical quality, diverse areas of technology, and attention to the individual.

UNDERGRADUATE PROGRAM

The undergraduate curriculum is based on a strong foundation in the physical, mathematical, and engineering sciences and enriched with courses in the humanities and social sciences. This skill set is augmented with hands-on laboratory and practical design experiences. Students select upper-level elective courses to offer exposure to a wide range of advanced and applied courses in thermal-fluid sciences, design methodology, materials and materials processing, manufacturing, applied mechanics, and system automation and control. This provides students with a broad intellectual foundation upon which to build future careers in advanced engineering education and research; engineering practice; or non-engineering professional training in business, education, law, and medicine.

The Department of Mechanical Engineering offers two undergraduate degree programs leading to the undergraduate degrees of Bachelor of Science in mechanical engineering (B.S.M.E.) and Bachelor of Science (B.S.). The B.S.M.E. program is accredited by the Engineering Accreditation Commission of ABET (www.abet.org). Of the thirty-eight course credits required for the professional degrees accredited by the Engineering

Accreditation Commission of ABET, a minimum of 9.5 course credits must be completed in college level math and basic science subjects appropriate to the discipline and a minimum of 14.5 course credits must be completed in Engineering topics, consistent with ABET general and program criteria. The B.S.M.E. program qualifies graduates for the Fundamentals of Engineering (FE) examination, which is the first step toward registration as a licensed professional engineer.

Bachelor of Science in Mechanical Engineering

Consistent with the requirements for ABET accreditation, the objectives of the B.S.M.E. program are presented here. We expect that graduates of the B.S.M.E. program will:

- 1) Integrate fundamental engineering, mathematics, and science principles to solve engineering or other professional challenges in an interdisciplinary environment.
- 2) Develop successful engineering or professional careers, either directly after an undergraduate degree or after pursuing graduate studies.
- 3) Communicate both technical and non-technical principles to a wide range of audiences.
- 4) Demonstrate leadership both through their individual efforts and through the roles attained within their respective organizations.

With the assistance of a faculty advisor, students should individually plan a program and, if desirable, modify that program each term as their experience and plans develop. In consultation with their advisors, students select a course of study that not only satisfies program requirements but also reflects their unique educational objectives.

CORE PROGRAM:

Freshman Year

FALL TERM

Engineering Science 93 Intro Engineering Elective

Mathematics 32 Calculus I

Physics 11 General Physics I

English 1 Expository Writing

SPRING TERM

Engineering Science 2 Introduction to Computing in Engineering

Mathematics 36 Applied Calculus II

Chemistry 1 Chemical Fundamentals

Humanities/Arts or Social Science elective

Sophomore Year

FALL TERM

Engineering Science 3 Introduction to Electrical Systems

Engineering Science 5 Introduction to Mechanics—Statics and Dynamics

Mathematics 42 Calculus III

Physics 12 or **Chemistry 2** General Physics II or Chemical Principles

Humanities/Arts or Social Science elective

SPRING TERM

Engineering Science 7 Thermodynamics

Engineering Science 9 Applied Mechanics—Strength of Materials

Mechanical Engineering 1 Mechanical Design and Fabrication

Mathematics 51 Differential Equations

Foundation elective

Junior Year

FALL TERM

Engineering Science 8 Fluid Mechanics

Mechanical Engineering 25 Engineering Materials

Mechanical Engineering 37 Dynamics and Vibrations

Mechanical Engineering 42 Machine Design II

Natural Science elective

SPRING TERM

Mechanical Engineering 16 Heat Transfer

Mechanical Engineering 18 Instruments and Experiments

Mechanical Engineering 80 System Dynamics and Controls

Probability, Statistics, or Numerical Methods

Humanities/Arts or Social Science elective

Senior Year

FALL TERM

Mechanical Engineering 43 Senior Design Projects

Mechanical Engineering concentration elective

Foundation elective

Humanities/Arts or Social Science elective

Free elective

SPRING TERM

Mechanical Engineering concentration elective

Mechanical Engineering concentration elective

Mechanical Engineering concentration elective

Humanities/Arts or Social Science elective

Free elective

The above courses, in conjunction with the courses taken in the first year, satisfy the following distribution requirement:

- a. A total of ten credits in introductory engineering sciences: four courses in biology, chemistry, Earth and ocean sciences, or physics, including Physics 11, Chemistry 1 or 16, and either Physics 12 or a second course in chemistry; four courses in mathematics, comprising Mathematics 32, 36, 42, and 51; and two credits in introductory engineering, to include Engineering Science 2 and 93. Many students opt to include biology in their electives, reflecting the increasing importance of biomedical engineering applications in Mechanical Engineering.
- b. A total of six courses in humanities, arts and social sciences (HASS), including English 1 or 3. At least one humanities and one social sciences course must be included. Acceptable HASS electives are available from Student Services online. Courses selected must include a minimum of one credit in each area of Humanities (H) and Social Sciences (SS).
- c. Eight department foundation courses: five required courses related to engineering science, one elective course in probability, statistics, or numerical methods, and two foundation electives that are either natural sciences, mathematics, engineering, or Engineering Management. Note that Engineering Science 101, Mechanical Engineering 108, and Mechanical Engineering 150 can be counted either as a mathematics/science elective or as B.S.M.E. concentration electives, while Engineering Science 55 (Numerical Methods for Engineers) and Engineering Science 56 (Probability and Statistics) can only count as mathematics/natural science foundation electives.
- d. Twelve department concentration courses: three required mechanical engineering science courses (Mechanical Engineering 16, 37, and 80), introduction to research instrumentation (Mechanical Engineering 18), two mechanical engineering design courses (Mechanical Engineering 1 and 42), a senior design project elective (Mechanical Engineering 43), and five mechanical engineering concentration electives. Refer to the ME degree sheet for details on department concentration courses.
- e. Two free elective courses without restriction.

Bachelor of Science—Engineering Psychology

This program is available for students planning a career or further graduate study in the field of human factors and ergonomics. Students generally should plan to elect the program at the end of the first year and will graduate with a B.S. degree in engineering psychology. Program requirements are detailed in this bulletin under Engineering Psychology.

Students may also pursue an M.S. degree in Human Factors.

CERTIFICATE PROGRAM IN MANUFACTURING ENGINEERING

FACULTY ADVISOR:

Professor Anil Saigal, *Mechanical Engineering*

This certificate is offered on a part-time, non-degree basis for post baccalaureate students seeking professional training in manufacturing engineering with emphasis on manufacturing processes, robotics, designs, quality control, or cost-effective production systems. Courses taken in the certificate program may be transferred to the degree program. Professor Anil Saigal is the faculty advisor of this program. The certificate requires four courses.

Two core courses are required:

Mechanical Engineering 125 Manufacturing Processes and Materials Technology

Mechanical Engineering 180 Digital Control of Dynamic Systems

Two elective courses are required from the following:

Mechanical Engineering 108 Modern Quality Control

Mechanical Engineering 126 Computer-Integrated Engineering

Mechanical Engineering 129 Finite Element Methods in Engineering Systems

Mechanical Engineering 182 Automation

Mechanical Engineering 184 Robotics

Civil and Environmental Engineering 188 Engineering Design with CAD

Further information can be found under Manufacturing Engineering Certificate Program in this bulletin.

CERTIFICATE PROGRAM IN
HUMAN-COMPUTER INTERACTION

FACULTY ADVISOR:

Professor of the Practice Daniel Hannon, Mechanical Engineering

This certificate is offered on a part-time, non-degree basis for post baccalaureate students and is especially useful for computer programmers, Web designers, software engineers, human factors professionals, user interface designers, and others who wish to develop or enhance their user interface design and implementation skills. Courses taken in the certificate program may be transferred to the degree program. Professor Daniel Hannon is the faculty advisor of this program. The certificate requires four courses.

Two foundation courses are required:

Computer Science 171 Human-Computer Interaction

Psychology 53/Engineering Psychology 61 Engineering Psychology

One additional course from the following:

Computer Science 86 Object Oriented Programming for GUIs

Engineering Psychology 161 Human Factors in Product Design

Engineering Psychology 162 Man-Machine System Design

Engineering Psychology 166 Applied Design Software User Interfaces

Psychology 130 Advanced Engineering Psychology

Electives:

Computer Science 20 Web Programming

Computer Science 175 Computer Graphics

Electrical Engineering 120 Computer Animation for Technical Communications

Occupational Therapy 105 Assistive Technology

Engineering Psychology 215 Interface Design in Complex Systems

More detailed information can be found under Human-Computer Interaction in this bulletin.

GRADUATE PROGRAM

Master of Science in Mechanical Engineering

The goal of the Master of Science (M.S.) degree program is to provide students with an opportunity to strengthen their technical backgrounds for

pursuing successful professional careers in engineering research, development and management.

Applicants are admitted to this program on the basis of their educational qualifications. A key admission requirement is a strong academic background in mechanical engineering or a related technical discipline. The department also requires all applicants to submit their recent Graduate Record Examination (GRE) scores. More detailed descriptions of all application requirements are provided in the Graduate School Handbook.

The M.S. program requires successful completion of ten (10) graduate-level (100-level or above) course credits, traditionally consisting of seven (7) course credits and a thesis worth three (3) credits; a thesis prospectus; seminar attendance; and successful thesis defense in an open forum. All students are required to choose two core areas from the three offered in the department (Thermal Fluids, Materials and Solids, and Dynamic Systems and Controls). They are then required to take a two-course sequence in each of these two areas in the first two semesters of their M.S. program.

The two-course sequence is referred to as core A and core B. All core A courses will have a math component that is relevant to the subject area, a project/design component, and a software component.

The three core area course sequences are Thermal Fluids (ME 111 and ME 112), Materials and Solids (ME 122 and 125), and Dynamic Systems and Controls (ME 180 and 181).

Students are also required to take an advanced mathematics course (ME 150, Math 151, or ES 101) in semester 2 or 3. The advanced math course has the prerequisites of the two core A courses. The student and thesis advisor determine the remaining elective credits in the M.S. program.

A thesis is required in partial fulfillment of the degree. Ordinarily, the thesis is three of the ten required course credits. The exact number of course credits to be considered for the thesis research (two or three) is determined by the thesis committee at the time of the thesis prospectus submission. After selecting a thesis topic and advisor, a student must register for thesis credit and submit a thesis prospectus signed by the student and advisor describing the proposed research. The thesis prospectus must be submitted by the end of the first semester of thesis credit registration. The thesis defense is the final step in obtaining approval for the thesis.

Master of Science in Human Factors

Human Factors Engineering is also referred to as Engineering Psychology or Ergonomics. The field is rapidly growing with wide engineering and non-engineering applications. The program offers specialized courses, training and research opportunities in the human-centered aspects of engineering activities such as medical devices and systems design, transportation systems research, product design, computer-interface design, ergonomics and workplace safety.

Although this program has its own entrance and course requirements separate from Mechanical Engineering, it is expected that applicants to the Human Factors program will have an acceptable B.S. in engineering or science. Relevant course work and research experience may be considered for non-engineering students. It is strongly recommended that the prospective student identify and contact the potential thesis advisor before applying to the program.

The M.S. (HF) program requires successful completion of ten (10) credits consisting of seven (7) course credits and a research-based thesis worth at least three (3) credits; an official proposal defense; seminar attendance; and successful thesis defense in an open forum. M.S. candidates are also expected to present their research at scientific conferences (e.g., ASME, HFES, IEA, IEEE SMC) and submit at least one paper to a peer-reviewed scientific journal.

All students are required to complete a two-course sequence in each of the following two core areas: Human-Machine Systems and Advanced Probability and Statistics. The courses must be taken in the first two semesters of the M.S. program. The two-course sequence is referred to as core A and core B, with core A being a prerequisite for core B.

The two core area course sequences are Human-Machine Systems (ENP 162 and ENP 163) and Advanced Probability and Statistics (PSY 107 and 108). Students are also required to take an advanced design course (ME 102 or ENP 161) in semester 2. The student and thesis advisor determine the remaining elective credits in the M.S. program.

A thesis is required in partial fulfillment of the degree. Ordinarily, the thesis is three of the ten required course credits. The exact number of course credits to be considered for the thesis research (two or three) is determined by the thesis committee at

the time of the thesis proposal defense. After selecting a thesis topic and advisor, a student must register for thesis credit and submit a thesis proposal signed by the student and advisor describing the proposed research. The thesis proposal defense must be completed by the end of the first semester of thesis credit registration. The thesis defense is the final step in obtaining approval for the thesis.

Master of Engineering

The Master of Engineering (M.Eng.) program is offered by the Department of Mechanical Engineering to provide qualified post-baccalaureate students the opportunity to grow as engineering professionals through advanced engineering education. Applicants are admitted to the Master of Engineering (M.Eng.) program based on a strong academic background in mechanical engineering or a related technical discipline. The department also requires all applicants to submit their recent Graduate Record Examination (GRE) scores.

The M.Eng. emphasizes technical course work, culminating in an engineering project, and can be contrasted with the departmental M.S. program, which is focused on research and development and includes a research thesis. Candidates are required to complete the equivalent of ten graduate-level (100-level or above) courses. All students must take at least three courses from the six available core topic classes. Students should honor prerequisites when selecting courses.

Students are required to take at least one math course selected from ME 150, ES 101, and ME 108. Students are also required to take ME 102 (Inventive Design).

The remaining five courses in the M.Eng. program are four elective courses and a one-credit project (Mechanical Engineering 299). The project is conducted under the guidance of a faculty advisor and must address a substantive engineering analysis or design problem. Students are required to submit a written report and make an oral presentation of their project work.

Doctor of Philosophy

Applicants to the Ph.D. program are expected to have an outstanding academic record in mechanical engineering or a related discipline. All applicants to the Ph.D. program should outline in writing their reasons for applying to the doctoral program, and

their tentative plan of study. For general information and admission requirements for the Ph.D. degree, see the graduate school section of this bulletin.

For admission to doctoral candidacy, the individual must pass a qualifying examination by the end of their fourth academic semester if entering the program with an M.S., or by the end of their sixth academic semester if entering the program with a B.S. The student must select four out of the eight exam areas (Physical Ergonomics, Cognitive Human Factors, Dynamics, Controls, Fluid Dynamics, Heat Transfer, Solid Mechanics, and Materials Processing) for the written qualifying examination, and pass an oral examination.

A Ph.D. candidate is required to complete at least five course credits beyond the seven M.S. degree in-classroom courses at the 100 level or higher. Doctoral candidates are expected to pursue either course work in direct support of their research or course work that addresses the recommendations made during the qualification period. In the interest of broadening the educational experience, students are also expected to take at least one advanced course 200 level or higher, either within or outside of the department.

After the successful qualifying exam, Ph.D. candidates are required to present a thesis prospectus to a committee composed of the thesis advisor, other mechanical engineering faculty, and possibly outside experts. This presentation includes questioning by the committee and other faculty to assess whether the candidate has sufficient background to study the research area. The purpose of the prospectus is to inform the department in a concise statement of the candidate's research program.

Ph.D. candidates must defend their dissertation in an oral examination, open to the community. The candidate is examined by a committee of at least three members, one of whom is an expert from outside the mechanical engineering department, and another from outside Tufts University. Recent doctoral dissertation topics include haptic feedback in minimally invasive surgery, novel materials processing approaches with application to ceramics, metal casting, and biomaterials development, modeling and experimental characterization of semiconductor manufacturing processes, development of optical techniques for microscale measurements, modeling, design, and fabrication of

microscale sensor arrays for aeroacoustic applications, computational and experimental cochlear mechanics, development of method for polymer synthesis using microfluidic enzymatic cascade, and electrowetting phenomenon for microscaled fluidic devices.

For more detailed information, please visit the Mechanical Engineering website:

<http://engineering.tufts.edu/me/graduate/phd.htm>.

Medieval Studies

FACULTY COORDINATOR:

Professor Steven Marrone, *History*

The interdisciplinary minor in medieval studies presents a multidisciplinary focus on the world of the Middle Ages. The medieval world introduces us to the cultural roots of Europe and Islam in a preindustrial society and to the beginnings of Western and Middle Eastern languages and literatures.

Five credits with at least one course from each of the three categories (as stated online) are required for the minor. In addition to the five credits, a student is required to complete an appropriate project, such as a thesis, an oral presentation, or a performance, which integrates the knowledge and methodologies of the disciplines involved. (See Interdisciplinary Minor Program for details.)

Microwave and Wireless Engineering

FACULTY ADVISOR:

Professor Mohammed Nurul Afsar, *Electrical and Computer Engineering*

In today's changing economy, the microwave and wireless engineering industry is moving away from developing traditional military applications and toward exploration of commercial opportunities. With the new availability of relatively inexpensive microwave components and improved digital communications, these opportunities have few limits. Radar, satellite, wireless radio and optical communications, cellular phone, cruise control and collision avoidance radar are just a few areas which utilize microwave technology.

In addition, computer hardware researchers and designers are finding that microwave engineering concepts are necessary to develop gigahertz and faster computer circuits. As engineers explore low microwave frequencies and even lower radio frequencies, this technology is now applied to cable, broadband, television, medical, and other commercial uses.

In collaboration, the Department of Electrical and Computer Engineering offers a five-course, graduate-level certificate in microwave and wireless engineering. The certificate program educates professionals in the exciting new uses of microwave and wireless technology through extensive laboratory and project work. The program can be pursued on a part-time, non-degree basis by professionals seeking advanced development and training or as an intermediate step to a master's degree. In most cases, courses taken as part of a certificate program can be transferred into a graduate-degree program in electrical engineering. The program is open to students with a bachelor's degree in electrical engineering or physics or with equivalent preparation, including a background in general physics and intermediate circuit theory.

The certificate requires five courses.

Two required courses:

EE 107 Communications Systems

EE 117 Introduction to Microwave Devices

One or both of the following:

EE 118 Microwave Semiconductor Devices and Circuits

EE 160 Computer-Aided Design of Microwave Circuits

Two graduate-level elective courses in microwave engineering or related fields:

EE119 Microwave System Engineering

EE 136 Antennas for Radar, Avionics, and Communications

EE 137 Radar Engineering

EE 148 Silicon Radio Frequency IC Design

EE 161 Microwave Integrated Circuits

(Students may substitute other Tufts graduate courses, subject to the approval of the certificate faculty advisor.)

For more information, contact the program administrator, Angela Foss, angela.foss@tufts.edu, 617-627-2320, or the faculty advisor, Mohammed Nurul Afsar, mafsar@ece.tufts.edu, 617-627-3217, or visit <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

Middle Eastern Studies

DIRECTOR:

Hugh Roberts, *Edward Keller Professor of North African and Middle Eastern History*

FACULTY:

Professor Ina Baghdiantz-McCabe, *History*

Professor Leila Fawaz, *History*

Professor Bruce Hitchner, *Classics*

Professor Ayesha Jalal, *History*

Professor Beatrice Manz, *History*

Professor Malik Mufti, *Political Science*

Professor Enrico Spolaore, *Economics*

Associate Professor Gloria Ascher, *Judaic Studies*

Associate Professor Steven Hirsch, *Classics*

Associate Professor Richard Jankowsky, *Music*

Associate Professor Christina Maranci, *Art and Art History*

Associate Professor Hugh Roberts, *History*

Associate Professor Joel Rosenberg, *Judaic Studies*

Assistant Professor Amahl Bishara, *Anthropology*

Assistant Professor Elizabeth Foster, *History*

Assistant Professor Kenneth Garden, *Religion*

Assistant Professor Eva Hoffman, *Art and Art History*

Assistant Professor Nimah Mazaheri, *Political Science*

Assistant Professor Kamran Rastegar, *Arabic Language and Literature*

Lecturer Rana E. Abdul-Aziz, *Arabic Language and Literature*

Lecturer Thomas Abowd, *Anthropology*

Lecturer Rabab El Nady, *Arabic Language*

Lecturer Hedda Harari-Spenser, *Hebrew Language and Literature*

Lecturer Fadi Jajji, *Arabic Language*

Lecturer Haci Osman Gunduz, *Arabic Language*

Lecturer Souhad Zendah, *Arabic Language*

Middle Eastern Studies is an interdisciplinary program that encourages breadth and significant immersion in one or more Middle Eastern cultures. The program gives students an opportunity to study the history and culture of the Middle East and of areas of the world whose territories were part of

Middle Eastern empires or were under the influence of Middle Eastern civilizations in pre-modern and modern times. Study abroad is highly recommended.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Middle Eastern Studies

The Middle Eastern Studies major has recently been modified in respect of the course requirements, with particular reference to the language requirement, which has been relaxed. Students who matriculate in fall 2014 will have to conform to the new revised requirements.

Revised Requirements of the Major

The Middle Eastern Studies major comprises twelve courses:

- i. Four courses of a Middle Eastern language (level 3–4 or equivalent). Students who have demonstrated language competence through level 3–4 by a placement test must take two advanced language courses and either two semesters of a second Middle Eastern language or two other courses from the list referred to in section ii.
- ii. Six courses in Middle Eastern studies—chosen in consultation with an advisor—from an approved list updated by the Middle Eastern Studies program annually. Three courses must be chosen from each of the following two groups:
 - A. art history, religion, literature, Judaic studies, music, and
 - B. anthropology, history, political science.

These courses must include at least one course in pre-modern and one course in modern Middle Eastern studies. They must also include one course in each of two Middle Eastern cultures. Two of these courses may be more advanced language courses (21–22 and beyond).

- iii. One course that relates the Middle East to other regions of the world.
- iv. One advanced research course, such as thesis honors, a seminar, or advanced directed study.

For more detailed information, please contact Professor Roberts at hugh.roberts@tufts.edu.

Multimedia Arts

CO-DIRECTORS:

Professor Karen Panetta, *Electrical and Computer Engineering*

Howard Woolf, *Experimental College*

CORE FACULTY:

Professor Karen Panetta, *Electrical and Computer Engineering*

Associate Professor Alva Couch, *Computer Science*

Assistant Professor Eva Hoffman, *Art and Art History*

Associate Director Howard Woolf, *Experimental College*

Senior Lecturer Neal Hirsig, *Drama and Dance*

Lecturer Paul Lehrman, *Music*

OUR MISSION

The Multimedia Arts (MMA) program actively seeks to break down the old divide between the arts and technology. We believe that students in engineering and the sciences who are exposed to the arts and humanities expand their horizons and that students across the liberal arts deeply enrich their education by becoming technologically literate.

OUR PARTNERS

Linking the School of Engineering with the School of Arts and Sciences, the MMA program is supported by the Electrical and Computer Engineering Department and the Computer Science Department in concert with the Experimental College, Art and Art History Department, Drama and Dance Department, and Music Department.

INTERDISCIPLINARY MINOR IN MULTIMEDIA ARTS

The multimedia arts program provides a framework for the analysis of and practical training in emerging digital media. The minor includes—and often mixes—work in animation, filmmaking, photography, music, text, drawing, collage, graphic design, software development, website construction, user interface strategies, and human factors theory. Through course work and collaboration on the part of students in liberal arts and students in technical disciplines, the minor aims to foster the development of a body of shared knowledge and ideas and, in so doing, to break down barriers that have traditionally hindered such cross-fertilization.

Requirements for the Minor

The specific requirements for the MMA minor incorporate four elements: work in multimedia practice, taking an appropriate set of electives, enrolling in the FMS Senior Colloquium, and completing a Senior Project.

Multimedia Practice. Each student enrolled in the minor must take at least two full-credit, letter-graded courses from an approved list of classes that introduce students to the tools, methods, and theories current in the field.

Electives. In addition, each student must take three full-credit, letter-graded courses selected from classes offered by the supporting departments (Electrical Engineering, Computer Science, Art and Art History, Drama and Dance, and Music) or from appropriate classes across the curriculum.

Senior Colloquium (half-credit, pass/fail). This is a mandatory course for students enrolled in any of the three FMS minors who are doing Senior Projects. It is to be taken in the fall of a student's senior year and is designed to aid in the planning and successful completion of your Senior Project.

Senior Project (full-credit, letter-graded). The Senior Project is an original work that reflects an understanding of and facility with one or more of the expressive and/or conceptual disciplines associated with multimedia. Collaborative projects are strongly encouraged.

Notes Regarding the Minor

Courses taken for major credit cannot be counted as MMA electives.

Only one course in a field related to your major may count as an MMA elective. For example, if a Music major takes one course in Art and Art History, then all other electives must fall outside the arts. Conversely, if a Computer Science major takes one course in Electrical and Computer Engineering, then all other electives must fall outside engineering.

Where appropriate, a third multimedia practice course may count as an elective.

All elective choices must be made in consultation with your MMA adviser.

For more information about the policies governing requirements and electives, visit <http://ase.tufts.edu/cms/mma.html>.

Museum Studies

Lecturer Cynthia Robinson, *Director and Faculty Advisor; Education*

Professor Andrew McClellan, *Faculty Advisor; Art and Art History*

As the stature and number of museums grow, so has the need for appropriate professional training. More than ever before, today's museum professionals need to be problem-solvers, educators, administrators, and logistical experts who understand not only the information that their collections hold, but how to tell their stories. Offered in collaboration with the Tufts Departments of Art and Art History, Classics, Education, and History, and the Office of Graduate Studies, the program equips students with the theories and practices needed for the 21st-century museum.

Students may pursue the certificate program, consisting of four courses and an internship, or a master's degree program in art history, history, or education. Together, certificate and masters students take museum studies courses that cover museum history, administration, education, collections management, preservation, material culture, fund-raising, evaluation, new media, and exhibition planning. The internship enables students to apply what they have learned in the classroom and to expand their networks.

The program is open to individuals with a bachelor's degree interested in pursuing a museum-based career, museum professionals who wish to improve their credentials for career advancement, and professionals in other fields who wish to shift career direction.

For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://museumstudies.tufts.edu>.

Music

Professor Joseph Auner, *Chair; music history, musicology*

Professor Jane A. Bernstein, *Austin Fletcher Professor of Music; music history, musicology*

Professor David Locke, *Ethnomusicology, music culture, performance*

Professor John McDonald, *Composition, music theory, performance, orchestration*

Associate Professor Alessandra Campana, *Music history, musicology, music and film*

Associate Professor Richard Jankowsky, *Director of Graduate Studies; ethnomusicology*

Assistant Professor Stephan Pennington, *Music history, musicology, African American music, cultural theory, queer pop music*

Assistant Professor Frank Lehman, *Music theory, music and film*

Lecturer Paul Ahlstrand, *Small Jazz Ensemble*

Lecturer Nina Barwell, *Flute Ensemble*

Lecturer Donald Berman, *New Music Ensemble*

Lecturer David Coleman, *Gospel Choir*

Lecturer Barry Drummond, *Javanese Music Ensemble*

Lecturer Jane Hershey, *Early Music Ensemble*

Lecturer Jamie Kirsch, *Director of Choral Activities; music theory*

Lecturer Paul Lehrman, *Director of Music Engineering; Electronic Music Ensemble; Music technology*

Lecturer Carol Mastrodomenico, *Opera Ensemble*

Lecturer John McCann, *Wind Ensemble; music theory*

Lecturer Michael McLaughlin, *Klezmer Ensemble; music theory, performance*

Lecturer John Page, *Director of Orchestral Activities; Conductor, Tufts Symphony Orchestra; music theory*

Lecturer Attah Emmanuel Poku, *African Music and Dance Ensemble*

Lecturer Kareem Roustom, *Arabic Music Ensemble; composition for multimedia, orchestration*

Lecturer Joel Larue Smith, *Director of Jazz Activities; jazz composition, theory, and performance*

Lecturer Michael Ullman, *Music history: blues and jazz*

Research Professor/Rabbi Jeffrey Summit, *Ethnomusicology*

Music plays an essential role in a liberal arts college education. Musical studies integrate mind, body, and spirit. Students who study music in college prepare themselves for a lifelong appreciation of the musical arts. The faculty of the Music Department guides students along a rigorous yet joyful pursuit

of knowledge in the following fields: instrumental/ensemble performance, theory of music, history of music, social/cultural musical context, and music composition. Music studies are interdisciplinary, drawing on other disciplines in the arts, humanities, social sciences, mathematics, sciences, and engineering. Studies in music teach transferable skills of value for careers in the professions and business.

The Music Department offers courses in the disciplines of composition, ethnomusicology, musicology, performance, and music theory. Our curriculum is inclusive and diverse, with emphasis on the traditions of Western classical music, American music (especially African American music and jazz), and world music (especially African and Middle Eastern music). Individual study of instrumental and vocal performance and participation in performing ensembles is enthusiastically endorsed; students may earn academic credit for these musical activities.

The Music Department's flexible program serves (a) those students who would choose music as a major or minor, and (b) all students seeking to develop their musical knowledge and/or performance skills. Students may major in music, double major in music and another field, or minor in music. Music courses fulfill many requirements (arts distribution, world civilizations, international relations, American studies, and several interdisciplinary minors). The courses, programs, and facilities of the Music Department are open to all members of the Tufts community.

PERFORMANCE OPPORTUNITIES

The Music Department provides students the opportunity for private study of instrumental and vocal performance with the outstanding faculty in our performance music program. Lessons may be taken for half credit (0.5) or not for credit (NC). A fee of \$700 (2015–2016) is required; beginning in the junior year, students majoring or minoring in music are eligible for a ninety-percent tuition waiver for two semesters. Majors and minors must apply for the major/minor scholarship money. Majors and minors must study for two semesters at the 153-01 and 02 levels in order to receive the tuition waiver. For detailed information, contact Edith Auner, Coordinator of Performance, at 617-627-5616.

Faculty in the Music Department teach a diverse variety of courses in ensemble performance, including African Music Ensemble (Kiniwe), Arabic Music Ensemble, chamber ensembles, Chamber Singers, Tufts Concert Choir, Early Music Ensemble, Flute Ensemble, Gospel Choir, Javanese Gamelan Ensemble, Tufts Jazz Orchestra, Jazz Improvisation Ensembles, New Music Ensemble, Opera Ensemble, Pep Band, Tufts Symphony Orchestra, Tufts Chamber Orchestra, and University Wind Ensemble. Enrollment in performing groups requires audition; contact the department office for audition information, 617-627-3564. Musical excellence is highly valued, but membership is more inclusive than in music conservatories.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The curriculum required of music majors provides a rigorous, balanced exposure to the essential fields in liberal arts music studies, including composition, ethnomusicology, musicology, performance, and theory. Normally, students declare the major in music and choose a member of the full-time faculty as major advisor during the spring semester of the sophomore year. Students obtain the necessary signatures for declaration of major forms and change of advisor forms at the department office. Undergraduate students who major in music are required to take eleven courses in the department. Students considering graduate studies in music or careers in music are advised to take additional courses beyond the eleven required for the major; please see your advisor for a list of specific recommendations. No course may be used to fulfill more than one requirement in the major, though some performance and composition courses may be repeated for credit.

The eleven courses required for the undergraduate major in music are:

- a. History of Western Music (two one-credit courses): Music 142, 143.
- b. Principles of Tonal Theory I and II (two one-credit courses): Music 101, 102.
- c. Advanced Theory (one-credit course): Music 103–110.
- d. Ethnomusicology; World, Ethnic, Folk, and Traditional: Music 186, and one course chosen from 106–110, 171–185, OR one course chosen from e.
- e. Western Popular Music, Jazz, Global Musics, Cultural Theory (one-credit course): 187–196.
- f. Performance—instrumental/vocal study (two half-credit courses): Music 153 (01 and/or 02).
- g. Electives—Theory, Composition, Ethnomusicology, Musicology, Performance (two one-credit courses): Music 111–141, 145–199.

In addition to courses listed above for the music major, students must enroll in a performing ensemble course (Music 69–96) for four semesters. Ensembles may be taken for credit or non-credit; however, credit for ensembles does not count toward the eleven courses required for the major.

Students who entered Tufts prior to Fall 2011 may elect to complete the requirements for the major described above or fulfill the earlier requirements of the major. Please consult with your advisor about these details.

UNDERGRADUATE MINOR PROGRAMS

Minor in Music

Students who intend to make music studies a significant part of their course work at Tufts may choose the disciplinary minor in music. Students may take a broad range of courses or may choose a cluster of courses in such areas as musicology, ethnomusicology, music theory, composition, jazz studies, and music technology. The undergraduate minor in music requires five courses; at least two courses must be at the 100 level; the other courses may be chosen from 100-level courses or from Music 21–67. Note: the prerequisite for all 100-level courses for the minor is Music 10, Introduction to Music Theory and Musicianship, or exemption from that course through the Music Theory Placement Test, given at the start of each semester. Two semesters in instrumental and/or vocal study (Music 153 01 and/or 02, or 195) are required; no more than one credit of private lessons may count towards the minor. Students minoring in music must enroll in a performing ensemble course (Music 69–96) for two semesters, but these credits cannot count toward the minor. After consultation with a member of the full-time music faculty for advice on a suggested program of study, students should complete a minor declaration form (available from the department office).

Minor in Multimedia Arts

This interdisciplinary minor is offered through the Communications and Media Studies program. For specific information about the policies governing requirements and electives, visit <http://ase.tufts.edu/cms/mma.html>.

COURSES AT NEW ENGLAND CONSERVATORY OF MUSIC

A reciprocal arrangement between Tufts University and New England Conservatory of Music allows students at both institutions to select a limited number of courses at either school that may be applied toward their respective degrees. Students may not take a course at the conservatory if it is offered at Tufts. This agreement does not apply to summer school. Students must first receive permission from their primary dean, then from the dean of the second institution.

COMBINED-DEGREES PROGRAM WITH NEW ENGLAND CONSERVATORY OF MUSIC

Music studies at Tufts are enhanced by the five-year Dual Degree program leading to a Bachelor of Arts or Bachelor of Science degree from Tufts and a Bachelor of Music degree from New England Conservatory of Music. (Please consult the academic catalogue of New England Conservatory of Music for information about its programs.)

Students interested in this program first must be admitted to both institutions; acceptance into the Dual Degree program is highly selective, based on both academic and musical competence. Transfer students are not normally accepted into this program; students currently enrolled at either school may apply for admission to the other institution and contend for a place in the program. Students may discontinue the program and continue toward completion of the preferred degree at the chosen institution. The cost of the program is based on Tufts undergraduate tuition rates. For information about the program, please contact the NEC Liaison Dean at Tufts University, or the Dean of Enrollment Services, Office of Admission, New England Conservatory of Music, 290 Huntington Avenue, Boston, Massachusetts 02115.

GRADUATE PROGRAM

Master of Arts

The Music Department offers the degree of Master of Arts in the areas of music theory, composition, musicology, or ethnomusicology. Applicants for the master's degree must demonstrate a distinctive background in music studies, must submit a writing sample or composition portfolio as part of their application, and are urged to take the Graduate Record Examination (GRE). The two-year program of study consists of ten semester courses numbered 100 and above (excluding Music 101, 102, 142, 143, 153, and 195), including a capstone project that includes a substantial written component. The capstone project may take the form of a master's thesis, composition, exhibit, lecture-recital, or other rigorous academic work determined in consultation with the student's advisor. A reading proficiency in one foreign language is required, and students are expected to take music courses inside and outside their area of concentration. The department encourages students to gain practical experience in performance courses and up to one credit from performance ensemble courses may be applied toward the Master of Arts degree.

For more detailed information, please visit the website <http://as.tufts.edu/music>.

Music Engineering

ADMINISTRATOR:

Lecturer Paul Lehrman, *Music*

ADVISOR:

Professor Chris Rogers, *Mechanical engineering*

UNDERGRADUATE MINOR

The minor in Music Engineering provides students with experiences at the intersection of music and technology. Students learn the technologies behind music-making, both traditional and modern, and how new technologies can be applied to musical goals. The minor is available to students both in the School of Engineering and the School of Arts and Sciences. The minor replaces the minor in Musical Instrument Engineering.

The minor consists of five courses and a final project (six units in total). The minor has three possible emphases: (1) sound recording and production, (2) electronic instrument design, and

(3) acoustic instrument design. Students can follow any one of these emphases, which will influence the choice of final project. Course requirements for the minor include:

1. One music course from Music 10 (Introduction to Music Theory and Musicianship), 101/102/103 (Principles of Tonal Theory I/II/III), 104 (Jazz Theory), or 118 (Composition Seminar).
2. A two-course concentration in one of:
 - a. Sound recording and production:
 - Physics 10 (Physics of Music and Color) or an equivalent course approved by a participating minor advisor
 - Electrical Engineering 65 (Music Recording and Production).
 - b. Electronic instrument design:
 - EE 12 (Analog Electronics) or EE 125 (Digital Signal Processing).
 - Engineering Science 95/Music 66 (Electronic Musical Instrument Design).
 - c. Acoustic instrument design:
 - Mechanical Engineering 139 (Acoustics) or 181 (Advanced Dynamics and Vibrations).
 - Engineering Science 73 (Musical Instrument Design and Manufacture) or an approved course in Musical Instrument Making from the School of the Museum of Fine Arts.
3. Music 64 (Computer Tools for Musicians), Electrical Engineering 65 (Music Recording and Production), Music 65 (Music Recording and Production), Music 85 (Electronic Music Ensemble), or Computer Science 150-ISW (Music Apps on the iPad).
4. One credit from the following options: Music 64, Music 65, Electrical Engineering 65, Engineering Science 73 (Musical Instrument Design and Manufacture), Engineering Science 95/Music 66, or an Engineering Internship (EE 99 or ME 99) or Independent Study course (EE 93 or 94, ME 93, or Music 97) on an approved topic supervised by a participating minor advisor, or a course on acoustic instrument design, sound, sculpture, or performance from the School of the Museum of Fine Arts.
5. A one-credit final project (EE 95 or 96, or both EE 97 and 98; ME 43 or 94; or Music 98) on an approved topic, supervised by a participating minor advisor.

Each student taking the minor must have a minor faculty advisor who approves course selections and mentors the final project. Each minor must include at least two courses with Engineering course designations. A list of approved courses available at the School of the Museum of Fine Arts is available from the program directors. For more information, visit <http://go.tufts.edu/musicengineering>.

Nutrition

The Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts University was established in 1981, bringing together experts from the areas of clinical nutrition, social and public policy, and biomedicine. Faculty at the school focus on a variety of issues across disciplines with the common thread of nutrition and its role in fostering the growth and development of human populations.

The school offers Master of Science and Doctor of Philosophy degrees, and in cooperation with the Frances Stern Nutrition Center of the Tufts Medical Center, a combined Master of Science with Dietetic Internship program. Dual-degree programs are offered with the School of Medicine (M.S./M.P.H.), with The Fletcher School of Law and Diplomacy (M.S./M.A.L.D.), with the Graduate School of Arts and Sciences Department of Urban and Environmental Planning (M.S./M.A.), and with Boston College's Carroll School of Management (M.S./M.B.A.). In addition, a one-year Master of Arts in Humanitarian Assistance (M.A.H.A.) is offered in conjunction with The Fletcher School.

Friedman has expanded its reach online with both degree and non-degree programs. The Master of Nutrition Science and Policy degree program (M.N.S.P.) is offered through a blend of online learning with short residencies on the Health Sciences campus located in downtown Boston. The Friedman School has also created 5 Online Graduate Certificate Programs: Nutrition Science for Health Professionals, Nutrition Science for Communications Professionals, Developing Healthy Communities: Nutrition, Behavior, and Physical Activity, Delivery Science for International Nutrition, Sustainable Agriculture and Food Systems.

The school's faculty lead a wide variety of educational, research and engagement programs in Boston and elsewhere. The faculty includes agronomists, biomedical scientists, economists, geographers, physicians, veterinarians, psychologists and others, all dedicated to teaching and research to improve the nutritional well-being of people worldwide. Some faculty members have their primary appointment and maintain laboratories at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA). Shared appointments can also be found with the School of Medicine, Sackler School of Graduate Biomedical Sciences, and Tufts Medical Center.

The Friedman School is located at 150 Harrison Avenue, Boston, Massachusetts 02111; phone 617-636-3777, fax 617-636-3600. For more information about the school, its degree programs and its research, visit the website www.nutrition.tufts.edu.

For current course listings, visit www.nutrition.tufts.edu. Although no undergraduate degree programs are offered, a variety of courses are available to undergraduates. Consent must be obtained from the instructor for courses numbered 200 and above.

Occupational Therapy

Associate Professor Gary Bedell, *Chair; Outcomes measurement, research methods, clinical reasoning, social participation of children and youth*

Professor Sharan L. Schwartzberg, *Group theory and practice, psychosocial rehabilitation, interprofessional healthcare teams*

Professor Linda Tickle-Degnen, *Healthy and active aging, nonverbal and verbal behavior in health quality of life, clinical reasoning, evidence-based practice, research methods*

Assistant Professor Keren Ladin, *Health care disparities, policy and ethics, research methods*

Senior Lecturer Janet Curran Brooks, *Occupational therapy practice in physical medicine, hand and upper extremity rehabilitation*

Senior Lecturer Scott Trudeau, *Occupational therapy practice in psychiatry, gerontology*

Lecturer Jennifer Buxton, *Assistive technology*

Lecturer Jessica Harney, *Clinical reasoning, kinesiology, health and community systems; health conditions management*

Lecturer Paul C. Leavis, *Physiology*

Lecturer Jean Lyons Martens, *Adult and pediatrics*

Lecturer Margaret Morris, *Pediatrics, clinical practice, school-based service*

Lecturer Monica Pessina, *Anatomy and neuroanatomy*

Lecturer Stephen N. Sarikas, *Anatomy*

Lecturer Sarah Everhart Skeels, *Health promotion/disease prevention and disability*

Lecturer Elizabeth Ratcliff Whitney, *Anatomy and neuroanatomy*

The Boston School of Occupational Therapy, the first of its kind in the country, was founded in 1918 at the request of the surgeon general of the United States Army to meet the need for personnel in military hospitals. It was later reorganized on a civilian basis and in 1921 was incorporated as a nonprofit educational institution under the laws of the Commonwealth of Massachusetts.

In 1945 the Boston School of Occupational Therapy became affiliated with Tufts University through the College of Special Studies. As a result of a merger between Tufts University and the Boston School of Occupational Therapy in January 1960, the legal name was changed to Tufts University-Boston School of Occupational Therapy. It became a department within Arts and Sciences and is currently housed on the Medford/Somerville campus at 26 Winthrop Street.

The goal of occupational therapy is to develop an individual's ability to manage life tasks and engage in meaningful activities in a way that enhances the quality of life. Occupational therapy focuses on both preventive and rehabilitative services.

GRADUATE PROGRAM

The department offers both master's and doctoral degree programs which prepare graduates for work as practitioners, administrators, researchers, and educators. The program interfaces the social and the health sciences, recognizing the importance of the profession's theoretical base in both the liberal arts and the sciences.

Clinical reasoning is the central organizing framework of the curriculum. It provides a foundation for clinical decision making and interaction that considers theoretical and procedural compo-

nents of therapeutic interventions. Human behavior results from dynamic interaction between the individual's innate potentials and characteristics, and experiences with people, objects, and events in the environment. In ongoing clinical reasoning seminars, the faculty and students examine these interactions in the contexts of clinical and community-based practice.

MASTER'S DEGREE PROGRAM

The master's degree program prepares students for entry-level positions in occupational therapy or provides post-professional graduate studies for therapists with a bachelor's degree in occupational therapy.

Program options are described below.

Entry-Level Program (for Non-OTRs) (Options I and II)

Eligibility: A bachelor's degree in a field other than occupational therapy. Candidates enter the program at the professional level and proceed to eventual certification as registered occupational therapists. Program can be completed with 2 ½ years and must be completed on a full-time basis.

Prerequisites: (Total of six courses.) All prerequisites must be passed with a grade of B- or better and taken at an accredited college: one course in social sciences (i.e., anthropology, psychology, sociology); one course in Developmental Psychology or Human Development; one course in Abnormal Psychology; two courses in biology, including content in cell biology (anatomy and physiology may be substituted for the biology prerequisite; one Bio course must have a lab component); one course in introductory statistics. Certificate of Hepatitis B vaccination upon enrollment is required.

Option I (No thesis)

Master of Science in Occupational Therapy

REQUIRED COURSES

- OTS 101** Human Physiology (one course credit)
- OTS 102** Gross Anatomy (one course credit)
- OTS 103** Neuroanatomy (one course credit)
- OTS 104** Kinesiology (one course credit)
- OTS 106** Occupation and Adaptation in the Child and Adolescent (one course credit)

OTS 107 Occupation and Adaptation in the Adult Years (one course credit)

OTS 137 Fieldwork Seminar (no credit)

OTS 138 Fieldwork Seminar (no credit)

OTS 205 Clinical Reasoning Seminar I: Observation and Interpretation (one-half course credit)

OTS 206 Clinical Reasoning Seminar II: Interactive Reasoning in the Practice of Occupational Therapy (one-half course credit)

OTS 207 Clinical Reasoning Seminar III: Procedural Reasoning in the Practice of Occupational Therapy (one-half course credit)

OTS 209 Clinical Research (one course credit)

OTS 219 Group Theory and Community-Based Practice (one course credit)

OTS 224 Occupational Therapy Practice in Physical Dysfunction (one course credit)

OTS 226 Occupational Therapy Practice with Pediatric Population (one course credit)

OTS 227 Occupational Therapy Practice in Psychosocial Dysfunction (one course credit)

OTS 229 Occupational Therapy Practice with Older Adults (one course credit)

OTS 232 Health and Community Systems (one-half course credit)

OTS 233 Occupational Therapy Management and Administration (one-half course credit)

OTS 237 Fieldwork Experience (no credit)

OTS 238 Fieldwork Experience (no credit)

OTS 242 Health Conditions: Pathology and Prevention I (one-half course credit)

OTS 243 Health Conditions: Pathology and Prevention II (one-half course credit)

OTS 244 Health Conditions: Pathology and Prevention III (one-half course credit)

The total number of minimum course credits for the degree is sixteen. If they desire, non-thesis students may take two graduate level elective classroom credits in the department or wider university in addition to the sixteen required credits.

To maintain full-time status, a student must be registered for a minimum of three course credits. Several course sequences are utilized by the department. Some of these include fieldwork during the summer, part-time fieldwork, and fieldwork during the academic year with course work in the summer. Please consult the department for further information.

**Option II (Thesis)
Master of Science**

Required Courses: All of the option I requirements, but no electives. Similar 16-credit course sequence as Option I.

Thesis: Two course credits of thesis supervision (OTS 295, 296) and completion of thesis. Total number of credits required for the degree is eighteen (sixteen course credits and two thesis credits).

**Post-Professional-Level Programs for OTRs
(Options III and IV)**

These programs are for post-professional students interested in developing their knowledge base in areas such as administration and management, aging, education, mental health, childhood and adolescence, and upper extremity function and rehabilitation. Students may also choose the self-directed concentration focused on their individual interests.

Eligibility: Registered occupational therapists or candidates eligible for registration.

Prerequisite: One course in introductory statistics. The prerequisite course must be passed with a grade of B- or better and taken at an accredited college.

**Option III (No thesis—practice option)
Master of Science in Occupational Therapy**

Required Courses: OTS 209 (Clinical Research, one course credit); OTS 208 (Clinical Reasoning Seminar IV, one course credit). These required courses may be taken in any sequence or combination depending on student interest, schedule, and courses offered.

Concentration: Three courses in an area of concentration; one practicum (OTS 234 or OTS 235).

Electives: Two course credits.

Practica: OTS 235 (Spring): One credit.

Total number of course credits for the degree is eight.

**Option IV (Thesis—research option)
Master of Arts or Master of Science**

Required Courses: OTS 209 (Clinical Research, one course credit); OTS 208 (Clinical Reasoning Seminar IV, one course credit).

Thesis: Two course credits of thesis supervision (OTS 295, 296) and completion of thesis.

Concentration: Three courses in concentration (three course credits).

Electives: One course credit.

Total number of course credits for the degree is eight.

DOCTORAL DEGREE PROGRAM (OTD)

The Occupational Therapy Doctoral degree program prepares occupational therapists to fulfill leadership roles upon completion of the degree. These roles are expected to make an impact on individuals and groups in society and the world in such areas as education, health, societal participation, wellness, and quality of life. As leaders, the graduates will be prepared to implement and evaluate leadership projects and disseminate results. A masters degree is required for admission. Required credentials are found at ase.tufts.edu/bsot.

REQUIRED COURSES

OTS 208 Clinical Reasoning Seminar IV: Evidence-Based Practice (one course credit)

OTS 286 Leadership Project Planning (one-half course credit)

OTS 287 Leadership Project Implementation (one and one-half course credits)

OTS 288 Outcomes Measurement and Monitoring: Using Data to Inform Practice (one course credit)

OTS 289 Integrative Paper (one course credit)

OTS 297, 298 Proseminar (one-half course credit each)
Two graduate level courses in specialty area (equivalent to two course credits)

Total number of course credits for the degree is eight.

CERTIFICATE PROGRAM

The certificate program is offered on a non-degree, part-time basis to occupational therapists seeking advanced professional education in occupational therapy or preparing to enter a graduate degree program. Upon department approval, these courses can be used for the Occupational Therapy post-professional M.S. degree, if students are interested and accepted into that program.

The certificate program gives students the option of focusing on an area of specialization, such as hand and upper extremity rehabilitation, occupational therapy in the schools, or working with a faculty advisor to design their own program of study. For more information, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

Certificate of Hand and Upper Extremity Rehabilitation

The hand and upper extremity rehabilitation specialization is intended for practicing occupational therapists who would like to gain knowledge in the specialty area of hand and upper extremity therapy. Tufts Department of Occupational Therapy students who are interested in this content and practice area are also invited to apply. Therapists and students who complete this four-course series are well positioned to apply for positions in outpatient and hand therapy departments.

The certificate requires four course credits as follows:

OTS 274 Topics in Hand and Upper Extremity Rehabilitation I: Fall

OTS 275 Topics in Hand and Upper Extremity Rehabilitation II: Spring

OTS 276 Topics in Hand and Upper Extremity Rehabilitation III: Summer

One research course (select one):

OTS 208 Clinical Reasoning IV: Evidence-Based Practice

OTS 209 Clinical Research

OTS 288 Outcomes Measurement and Monitoring

Certificate of School-Based Practice

This certificate in school-based practice is intended for licensed occupational therapists interested in expanding their knowledge base to become specialized practitioners in the provision of academically

relevant occupational therapy services in public schools. Tufts Department of Occupational Therapy students who are interested in this content and practice area are also invited to apply. Therapists who complete this four-course series will learn how to influence services within their schools consistent with special education law and the American Occupational Therapy Association standards.

This certificate requires the following:

Two core courses:

OTS 284 School-Based Practice: Programmatic Issues

OTS 285 School-Based Practice: Assessment to Intervention

One research course (select one):

OTS 208 Clinical Reasoning IV: Evidence-Based Practice

OTS 209 Clinical Research

OTS 288 Outcomes Measurement and Monitoring

One content course in the area of services to children (to be approved by advisor)

Certificate of Advanced Professional Studies

Occupational therapists are confronted with administrative and supervisory responsibilities and the need for increased specialization. Areas of practice such as health and wellness consulting, technology and assistive device development, and community-based health services are emerging practice areas. To help occupational therapists meet these demands, Tufts Department of Occupational Therapy, in conjunction with the Office of Graduate Studies, offers a part-time program, the Certificate of Advanced Professional Study.

The certificate requires four course credits as follows:

OTS 209 Clinical Research (or equivalent with advisor consent)

Specialty courses: Three specialty courses with an integrated focus are required. These courses and other electives are offered on the basis of interest, enrollment, and availability. Elective graduate-level courses at Tufts may be substituted based on a student's needs. An individual course of study is arranged with the program adviser.

Certificate of Advanced Study in Pain Topics for Occupational Therapists

The Certificate of Advanced Study in Pain Topics in Occupational Therapy is designed for occupational therapists looking to fill a gap in knowledge on pain management. The certificate mirrors the Tufts University School of Medicine (TUSM) graduate program in Pain Research, Education and Policy. Both programs are built on the premise that pain is a biopsychosocial phenomenon and as such, its management ought to be influenced by a variety of factors ranging from neuroanatomy to social and economic issues. Students are exposed to a dynamic and richly rewarding educational experience. All OT-PREP students complete a total of five credit hours to earn the TUSM certificate. Licensed occupational therapists and students enrolled in the Tufts University Graduate Degree Program in Occupational Therapy are invited to enroll in the Tufts TUSM Certificate of Advanced Study in Pain Topics (www.tufts.edu/med/prep). A baccalaureate degree is required for admission.

The certificate requires five courses as follows:

OTS 293 (fall) or **294** (spring): Special Topics (1 credit)

OTS 234 (fall) or **235** (spring): Practicum Course (1 credit)

PREP 230: Neuroanatomy, Neurochemistry and Pharmacology of Pain (1 credit)

PREP 232: Ethical and Sociocultural Aspects of Pain (1 credit) OR PREP Elective/s with OT advisor consent (1 credit)

PREP 234: Introduction to Clinical Pain Problems (1 credit)

For further information and an application, contact TUSM, Public Health and Professional Degree Programs, Certificate of Advanced Study in Pain Topics, at 617-636-0935 or med-phpd@tufts.edu.

ADMISSION

All applications for admission with requests for university-based financial aid, including scholarships and assistantships, must be submitted in a complete form by January 15 for fall entry. For complete information on the application process, visit <http://ase.tufts.edu/bsot>.

ACCREDITATION AND CERTIFICATION

The Entry Level Occupational Therapy Program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association

(AOTA), located at 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824-1220, Web:

www.AOTA.org.

Graduates of the entry-level master's program will be able to sit for the national certification examination for occupational therapists administered by the National Board for Certification in Occupational Therapy (NBCOT). For information about the national certification examination, please contact NBCOT, 12 South Summit Avenue, Suite 100, Gaithersburg, MD 20877-4150, phone 301-990-7979, fax 301-869-8492, or visit www.nbcot.org.

After successful completion of this examination, the individual will be certified as an Occupational Therapist, Registered (OTR). In addition, most states require licensure in order to practice. For specific information on individual state licensure procedures, see www.AOTA.org.

POLICIES AND PROCEDURES

Exemption from Courses

A student may be exempt from a required occupational therapy course on satisfactory completion of an equivalent course in terms of content knowledge and experiential learning. The student must demonstrate proficiency in the area to the course instructor. Satisfactory completion of proficiency will be determined by the individual instructor. A petition for variance from department requirements must be completed. Upon approval, the student can substitute an elective for the required degree credit.

Leaves of Absence

To be granted a leave of absence, students must petition, in writing (<http://gradstudy.tufts.edu/student-services/forms.htm>), their advisor and departmental chair. The request must be accompanied by a letter of support from the student's academic advisor. Each request is treated on its individual merit. The departmental policy states that no more than a one-year leave of absence may be granted from the academic portion of the program; it also states that each entry-level masters student must complete the six months of Level II fieldwork required for the degree no later than twenty-four months following completion of academic preparation.

Acceptable Grades

Graduate students are expected to achieve a grade of B- or better in all courses. Courses completed with less than a B- may be retaken only once. The original grade earned remains on the student's academic record. If a student obtains two grades of less than B-, the student's performance will be reviewed by the department. This will usually result in a recommendation to the dean that the student be administratively withdrawn from the program. Only the dean of the Graduate School of Arts and Sciences may administratively withdraw an enrolled student.

Grades of Incomplete

Students may not enter an occupational therapy course with an incomplete or an unsatisfactory grade in a prerequisite to that course. Grades of incomplete are not automatically given. The student who desires an extended time period in which to complete the semester's work in a particular course must negotiate an incomplete with the instructor. This negotiation must be completed by the final class meeting of the course. Normally course work must be completed six weeks into the following semester. It is the responsibility of the student to ensure that course work is completed and that the process to update the transcript is followed through to completion.

Students who, due to extenuating circumstances, are not able to comply with any of the above grade policies may petition the Department of Occupational Therapy Academic Standards Committee for a variance.

Withdrawals

A student is allowed no more than one withdrawal from any required or elective class after the add-drop period. Graduate students are not allowed to repeat the same course more than once; the student's performance will be reviewed by the department. Withdrawal in any semester from two or more required courses after the add-drop period will usually result in a recommendation to the dean that the student be administratively withdrawn from the program. Only the dean of the Graduate School of Arts and Sciences may administratively withdraw an enrolled student.

Required Occupational Therapy Courses

Students will take professional courses in accordance with the Accreditation Council for Occupational Therapy Education (ACOTE) Standards of an Accredited Educational Program.

Fieldwork

The Accreditation Council for Occupational Therapy Education (ACOTE) and the National Board for Certification in Occupational Therapy (NBOCT) require the equivalent of six months of supervised Level II fieldwork in a hospital, school, or health care agency as a prerequisite to taking the certification examination. Tufts requires that a minimum of 960 hours of Level II fieldwork placements be successfully completed within 24 months following completion of academic preparation as entry-level occupational therapy program degree requirements. Two Level II fieldwork placements are arranged with students by the department's academic fieldwork coordinator. In addition to these placements, students participate in approximately 80 hours of course-related Level I fieldwork concurrent with specific courses arranged by the fieldwork coordinators. Placements for Level I and II fieldwork are subject to availability at locations that have contracts with Tufts-BSOT. The availability of a placement and the locations that have contracts with Tufts-BSOT vary from semester to semester.

For more detailed information, please visit the website <http://ase.tufts.edu/bsot>.

Occupational Therapy Certificate Program

FACULTY ADVISOR:

Professor Sharan L. Schwartzberg, *Occupational Therapy*

Occupational therapists are confronted with administrative and supervisory responsibilities and the need for increased specialization. Areas of practice such as hand and upper extremity rehabilitation, school-based practice, home care for the elderly, mental health, and community services expect extraordinary growth. To help occupational therapists meet these demands, Tufts Department of Occupational Therapy offers part-time certificate

programs in hand and upper extremity rehabilitation, school-based practice, and a general certificate tailored to individual student learning needs.

The certificate program is open to those with a bachelor's, master's, or doctoral degree in occupational therapy. The program is especially designed for occupational therapists who are interested in expanding their careers, fieldwork educators, administrators, clinical specialists, and supervisors as well as seasoned professionals eager to strengthen their expertise.

For more information, contact the program administrator, Angela Foss, at 617-627-2320, or visit <http://gradstudy.tufts.edu/programs/certificates/index.htm>.

CERTIFICATE OF ADVANCED STUDY IN PAIN TOPICS FOR OCCUPATIONAL THERAPISTS

The Certificate of Advanced Study in Pain Topics in Occupational Therapy is designed for occupational therapists looking to fill a gap in knowledge on pain management. The certificate mirrors the Tufts University School of Medicine (TUSM) graduate program in Pain Research, Education and Policy. Both programs are built on the premise that pain is a biopsychosocial phenomenon and as such, its management ought to be influenced by a variety of factors ranging from neuroanatomy to social and economic issues. Students are exposed to a dynamic and richly rewarding educational experience. All OT-PREP students complete a total of five credit hours to earn the TUSM certificate.

Licensed occupational therapists and students enrolled in the Tufts University Graduate Degree Program in Occupational Therapy are invited to enroll in the TUSM Certificate of Advanced Study in Pain Topics (www.tufts.edu/med/prep). A baccalaureate degree is required for admission.

The certificate requires five courses as follows:

OTS 293 or **294**: Special Topics (1 credit)

OTS 234, 235: Practicum Course (1 credit)

PREP 230: Neuroanatomy, Neurochemistry and Pharmacology of Pain (1 credit)

PREP 232: Ethical and Sociocultural Aspects of Pain (1 credit) OR PREP Elective/s with OT advisor consent (1 credit)

PREP 234: Introduction to Clinical Pain Problems (1 credit)

For further information and an application, contact TUSM, Public Health and Professional Degree Programs, Certificate of Advanced Study in Pain Topics, at 617-636-0935 or med-phpd@tufts.edu.

Peace and Justice Studies

DIRECTOR:

Professor R. Bruce Hitchner, *Classics*

ASSISTANT DIRECTOR:

Dale Bryan, *Peace and Justice Studies*

EXECUTIVE BOARD AND TEACHING FACULTY:

Professor Elizabeth Ammons, *English*

Professor Paul Joseph, *Sociology*

Professor Peniel Joseph, *History*

Associate Professor Kathleen A. Camara, *Child Development*

Associate Professor Gregory Carleton, *Russian Literature*

Associate Professor Consuelo Cruz, *Political Science*

Associate Professor Kelly Greenhill, *Political Science*

Associate Professor Erin Kelly, *Philosophy*

Associate Professor Lionel McPherson, *Philosophy*

Associate Professor Pearl T. Robinson, *Political Science*

Associate Professor Rosalind Shaw, *Anthropology*

Adjunct Assistant Professor David Arond, *Public Health and Family Medicine*

Assistant Professor Amahl Bishara, *Anthropology*

Assistant Professor Cora Roelofs, *Community Health*

Assistant Professor Ichiro Takayoshi, *English*

Senior Lecturer Steve Cohen, *Education*

Lecturer Deborah Donahue-Keegan, *Education*

Lecturer Laura K. Graham, *Peace and Justice Studies*

The planet faces a set of interrelated challenges related to violence and war, peacemaking and peacebuilding, justice and human rights and, increasingly, environmental degradation and climate change. The Peace and Justice Studies Program (PJS) provides students with an interdisciplinary course structure which examines the obstacles, conditions, and paths to addressing these challenges. It also explores the ways that governmental and nongovernmental organizations, social movements, and individuals have confronted such problems and worked to resolve them. This structure is also designed to develop students' critical and analytical skills as well as competencies in fields that contribute towards peace and social transformation.

Five overlapping areas of study are emphasized:

1. The causes of war, the techniques of war prevention, and the conditions and structures of a just peace.
2. The meaning of justice, the means to achieve justice, and the relationship between justice and peace.
3. The theory and practice of conflict resolution operating along a continuum from individual disputes to international diplomacy.
4. The relationship between violence and peace in culture, with particular emphasis on investigating the traditions of nonviolence and on understanding ethical social behavior.
5. The origins, strategies, and visions of social movements and their relationship to other means of social change agency, such as community organizing, Internet activism, civic engagement, corporate social responsibility, social entrepreneurship, and institutionalized processes such as elections and lobbying.

PJS nurtures an active sense of social responsibility for the human condition, and encourages students to participate actively in developing their education by combining their talents and imagination through formal study and experiential education. The program presents a broad range of educational events and co-curricular activities which promote an engaged intellectual and civic climate on campus. In this sense, PJS fulfills the university's mission and the liberal arts tradition by encouraging the student's awareness, responsibility, and active engagement in the affairs of the world.

PJS offers both a major and a certificate. To fulfill requirements for the major, a student must complete eleven courses: the introductory course (PJS 1), one intermediate course in each of five core areas, an internship (PJS 99), the integrative seminar (PJS 190), and three elective courses on a particular theme to be chosen in consultation with the student's PJS advisor. Students with a qualifying academic record are also encouraged to enroll in a senior honors thesis in Peace and Justice Studies (PJS 198).

To complete the certificate, a student must complete eight courses: the introductory course (PJS 1), an internship (PJS 99), the integrative seminar (PJS 190), one of two possible intermediate courses (PJS 120 or PJS 135), and four elective

courses on a particular theme to be chosen in consultation with the student's PJS advisor. Completion of the Peace and Justice Studies Certificate will be noted on the student's transcript. Courses fulfilling the certificate requirements may also be used, where applicable, to meet major concentration or distribution requirements.

Philosophy

Associate Professor Erin Kelly, *Chair; Ethics, political philosophy, philosophy of law*

Professor Jody Azzouni, *Philosophy of language, philosophy of logic, philosophy of mathematics, philosophy of science, metaphysics*

Professor Nancy Bauer, *Dean of Academic Affairs for Arts and Sciences; Feminism, modern European philosophy, philosophy and film*

Professor Daniel C. Dennett, *University Professor; Austin B. Fletcher Professor of Philosophy; Co-Director, Center for Cognitive Studies; Philosophy of mind, philosophy of psychology*

Professor Ray Jackendoff, *Seth Merrin Professor of Philosophy; Co-Director, Center for Cognitive Studies; Linguistics, cognitive science*

Professor George E. Smith, *Philosophy of science, logic*

Professor Stephen L. White, *Philosophy of mind, epistemology, meta-ethics, aesthetics*

Associate Professor Avner Baz, *Ethics, aesthetics, epistemology, Kant, Wittgenstein, ordinary language*

Associate Professor Patrick Forber, *Philosophy of biology, philosophy of science, philosophy of probability*

Associate Professor Lionel McPherson, *Ethics, political and social philosophy*

Associate Professor Sigrún Svavarsdóttir, *Moral philosophy, practical rationality*

Assistant Professor Brian Epstein, *Metaphysics, philosophy of language, philosophy of social science*

Assistant Professor Dilip Ninan, *Philosophy of language, metaphysics, philosophy of mind*

Assistant Professor Christiana Olfert, *Ancient philosophy, early modern philosophy, ethics*

Research Professor Peter Levine, *Public policy, civic engagement*

Visiting Professor Mario De Caro, *Naturalism, ethics, free will, philosophy of mind*

Visiting Professor Amelie Rorty, *(history of ethics and moral psychology; ancient philosophy; political theory; literary and art criticism)*

Senior Lecturer David Denby, *Metaphysics, philosophy of language, ethics*

Senior Lecturer Susan Russinoff, *Philosophy of language, logic, philosophy of logic, history of logic, critical thinking pedagogy*

Philosophy courses are for students majoring in any field who wish to enrich their education with a deeper understanding of themselves, the world they experience, and the reality underlying this experience, by a study of speculative and critical traditions in Western thought. The philosophy major provides a means of integrating broad education in the liberal arts via systematic and historical study of problems that arise in metaphysics, ethics, and epistemology, as well as in the foundations of other fields of inquiry. It is an appropriate major for those who enjoy thinking carefully and logically about basic issues and for those who seek breadth of educational experience prior to entering professional programs, such as law or medicine, or undertaking graduate study in some other areas. Non-majors may engage in a philosophical study of problems and concepts from their own fields by taking related courses in philosophy, such as feminist philosophy, philosophy of science, philosophy of language, and philosophy of mind; or they can acquire an elementary knowledge of the field by taking a philosophy course numbered below the 100 level.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major: ten courses, including:

- **Phil 1**
- At least one course in logic: **Phil 33** or **Phil 103** or another 100-level Logic course
- At least one course numbered 100 or above in each of the following areas:
 1. History (ancient through early 20th-century, including phenomenology and early analytic philosophy)
 2. Value Theory (including moral philosophy, social and political philosophy, and aesthetics)
 3. Metaphysics and Epistemology (including philosophy of language, philosophy of mind, and philosophy of science)

See the Philosophy Department website for approved courses for each area.

- One 100-level seminar (which can also count for any of the above requirements and which must be drawn from among Phil 187, 188, 191, 192, 197, or, under appropriate circumstances, 195, 291, or 292). Students planning to undertake graduate work in philosophy are urged also to (1) write a senior honors thesis in Philosophy and/or (2) petition to take Phil 297, Graduate Writing Seminar.
- Four elective courses.

Students may count no more than five courses numbered below 100 for the major. At least seven courses constituting a Philosophy major must be offered or cross-listed by the Tufts Philosophy Department.

CERTIFICATE PROGRAM IN ETHICS, LAW, AND SOCIETY

The goal of the Certificate Program in Ethics, Law, and Society is to use philosophy to prepare students to be active citizens in leadership positions in government, non-governmental organizations, and the private sector. Students will learn about how moral and political philosophy relate to questions of public importance. The program focuses on how to use philosophy to think, argue, and write clearly and insightfully about these ethical questions.

Requirements for the certificate include six courses and an individual research project. The certificate program is in addition to a student's concentration (or major), and no more than half of the courses used to fulfill the certificate requirements may be used to fulfill concentration requirements.

The six courses required for the certificate are as follows:

1. An introductory course (below 100-level) in philosophy
2. One or two upper-division courses (100-level or above) in ethical theory
3. One or two upper-division courses (100-level or above) in political philosophy or the philosophy of law
4. One or two courses in applied ethics (includes Phil 24, 43, 48, 124, 125)
5. Seminar: Ethics, Law, and Society, Phil 197.

The individual research project is initiated during the Ethics, Law and Society seminar and extends six weeks into the spring semester.

UNDERGRADUATE MINOR PROGRAMS

For more detailed information on minor programs administered by the Philosophy Department, please visit the Department website: <http://as.tufts.edu/philosophy/undergraduate/minor>.

Minor in Philosophy

The minor in Philosophy requires the completion of six courses, including:

1. One of Phil 1, 3, 6, 24, 33, 39, 43, or 48
2. Two Philosophy courses at the 100 level
3. Three other Philosophy courses

Minor in Cognitive and Brain Sciences (administered through the Center for Cognitive Studies)

The minor in Cognitive and Brain Sciences requires seven courses. At least five of these must be in departments different from the student's major. The selection of courses must be approved by the student's advisor.

1. PSY 9, Introduction to Cognitive and Brain Sciences
2. PHIL 15, Introduction to Linguistics, and/or COMP 15, Data Structures
3. PSY 195, Senior Seminar in Cognitive and Brain Sciences (full year, one course credit.
4. The remainder of the seven courses are to be selected from at least two of the following groups:

a. Psychology courses

- PSY 11** Developmental Psychology
- PSY 25** Physiological Psychology
- PSY 26** Animal Learning and Cognition
- PSY 27** Perception
- PSY 28** Cognitive Psychology
- CD 51** Intellectual Development of Young Children
- PSY 80** Psychology of Music
- PSY 103** Brain and Behavior
- PSY 118** Topics in Infancy
- PSY 122** Cognitive Aging
- PSY 126** Origins of Cognition
- PSY 129** Cognitive Neuroscience
- PSY 140** Mathematical Psychology
- PSY 142** Seminar in Affective Neuroscience
- PSY 144** Memory and Retention
- PSY 145** Mental Representation
- PSY 180** Music, Language, and the Brain

b. Philosophy, Linguistics and Psycholinguistics courses

- PHIL 3** Language and Mind
- PHIL 33** or **103** Logic
- PHIL 38** Rational Choice
- PHIL 110/PSY 153** Biological Foundations of Language
- PHIL 111/PSY 150** Semantics
- PHIL 112/PSY 151** Syntactic Theory
- PHIL 113/PSY 132** Cognition of Society and Culture
- PHIL 114** Topics in Logic
- PHIL 117** Philosophy of Mind
- PHIL 126** Theories of Human Nature
- PHIL 133** Philosophy of Language
- PHIL 134** Philosophy of Social Science
- PHIL 170** Computation Theory
- PHIL 191** Foundations of Cognitive Science
- PSY 149** Psychology of Language
- PSY 152** Psychology of Bilingualism
- PSY 155** Phonological Theory
- CD 152** Development of Thought and Language
- CD 155** The Young Child's Development of Language
- CD 177** Bilingual Studies
- CD 195** Developmental Disorders in Language and Reading
- CD 243** Reading, Dyslexia, and the Brain
- ED/ML/GER 114** Linguistic Approaches to Second Language Acquisition

c. Computer Science courses

- COMP 131** Artificial Intelligence
- COMP 135** Machine Learning and Data Mining
- COMP 150 BBR** Behavior-Based Robotics
- COMP 150 MOD** Computational Models in Cognitive Science
- COMP 170** Computation Theory
- COMP 171** Human Computer Interaction

Other courses may be admitted for the minor with the approval of the student's advisor and advisor notification of the DARS coordinator at Student Services.

Minor in Linguistics**(administered through the Center for Cognitive Studies)**

The minor in Linguistics has three components. First, it offers students a grounding in contemporary linguistic theory and its constituent domains of phonology (sound structure), morphology (word structure), syntax (grammatical structure), and semantics (the structure of meaning), with attention

to a great variety found among languages of the world. Second, the minor addresses the interaction of the study of language with fields as diverse as philosophy, literature, child development, neuroscience, and evolutionary theory. Third, as part of the appreciation of linguistic diversity, the minor requires students to develop proficiency in one or more foreign languages.

Language Requirement: Students may not use the Culture Option to fulfill Part 2 of the Arts and Sciences Foreign Language Requirement; they must either complete six semesters (or equivalent) of one foreign language, or three semesters each (or equivalent) of two foreign languages.

The selection of courses must be approved by the student's linguistics advisor. Students may petition their advisor to include other courses in category 3.

In addition to the language requirement, the minor in Linguistics requires six courses, of which no more than two may also be used toward the student's major.

AFFILIATED FACULTY INCLUDE:

Maryanne Wolf, *Child Development*

Chip Gidney, *Child Development*

Gregory Crane, *Classics*

Anne Mahoney, *Classics*

John Fyler, *English*

Hosea Hirata, *GRALL*

Saskia Stoessel, *GRALL*

John Julian, *Romance Languages*

Ray Jackendoff, *Co-Director; Philosophy*

Daniel Dennett, *Philosophy*

Ariel Goldberg, *Co-Director; Psychology*

Philip Holcomb, *Psychology*

Gina Kuperberg, *Psychology*

The minor in Linguistics requires six courses, including:

1. **LING 15/PHIL 15/PSY 64** Introduction to Linguistics
2. Two of the following:
 - LING 112/PHIL 112/PSY 151** Syntactic Theory
 - LING 113/PHIL 111/PSY 150** Semantics
 - LING 155/PSY 155** Phonological Theory
3. Three of the following:
 - A third course from category 2
 - LING/PHIL 3** Language and Mind
 - LING/PHIL 33** or **103** Logic
 - LING 92/ML 96** Romance Linguistics

LING 101/ENG 101 Old English

LING 114/ED/ML/GER 114 Linguistic Approaches to Second Language Acquisition

LING/PHIL 133 Philosophy of Language

LING 137/ANTH 137 Language and Culture

LING/PSY 149 Psychology of Language

LING/PSY 152 Psychology of Bilingualism

LING 153/PHIL 110/PSY 153 Biological Foundations of Language

LING 155/ CD 155 The Young Child's Development of Language

LING 71/CLS 71 Historical Linguistics

LING/CLS 170 Indo-European Linguistics

LING 177/CD 177 Bilingual Studies

LING/CD 195 Developmental Disorders of Language and Reading

LING/CD 243 Reading, Dyslexia and the Brain

LING 80 Psychology of Music

LING 91/191 Special Topics in Linguistics/Advanced Topics in Linguistics

LING 93 Independent Research in Linguistics

GRADUATE PROGRAM

The program leading to the Master of Arts degree in Philosophy is intended primarily for the student who is considering advanced work in philosophy but who did not concentrate in the subject as an undergraduate. Typically, students admitted to the program plan to pursue a doctorate in philosophy (Tufts itself does not offer a doctorate in the field), though some students have other career plans.

The department's offerings range across the major areas of interest in contemporary philosophy. Each year at least four seminars are offered, typically on instructors' current research interests. The department has particular strengths in the following areas: contemporary ethical theory, social and political philosophy, metaphysics and epistemology, philosophy of language and philosophical logic, philosophy of mind, and philosophy of science.

Master's candidates receive individual attention from members of the department in their specialized fields and have an opportunity to participate in the philosophical life of the department. The department has a lecture series, which brings six to eight eminent speakers to Tufts each year, and it sponsors other departmental events. Students also have access to the very active philosophical community in the Boston area.

The program leading to the degree of Master of Arts in philosophy is designed to be completed over four terms. Requirements are as follows:

Program Requirements

SUMMARY

The Master's in Philosophy requires completing eleven courses (worth eleven credits). Coursework must satisfy a breadth requirement. Students must also pass an Area of Strength Exam. See below for a more detailed description of these requirements.

COURSEWORK

The coursework consists of eleven (11) upper-level philosophy courses (courses numbered 100 or above). Thus, students must earn eleven (11) credits. We do not accept transfer courses.

The eleven (11) courses must include:

- **Phil 103** Logic
Students with proven strength in logic may be able to be exempt from the logic requirement.
- **Phil 297** Graduate Writing Seminar
This course is designed to help students prepare a writing sample in order to apply to doctoral programs.

Coursework must satisfy a breadth requirement. Two courses are required in each of these three (3) areas:

1. Normative philosophy
2. History of philosophy
3. Metaphysics and epistemology

All upper-level philosophy courses, except the graduate writing seminar, fall into at least one of three distribution areas. See the Course Distribution list found on the Department of Philosophy website (<http://as.tufts.edu/philosophy/sites/all/themes/asbase/assets/documents/gradMAcourseDistributionList.pdf>) for allocation.

Students are not required to concentrate their coursework in a particular area. Nonetheless, students may well focus more on some areas but not others in the courses they take. While deciding which courses to take, students should be aware that some are offered regularly and some are not.

Area of Strength Exam

In addition to coursework, students must also pass one of three “area of strength” exams. The exams are:

1. Ethics
2. Epistemology
3. Metaphysics

Before the start of each academic year, a list of topics and/or core texts for each of the exams will be made available. This content will vary from year to year.

Students should take the exam in their second or third semester. Before taking the exam of their choice, they must have completed a course in that area. Students must register for the “area of strength exam” course during the semester in which they plan to take the exam. The “area of strength” course has no designated course content and is, in effect, a transcript record of when the exam was taken. It is not worth any credits.

Physical Education/ Athletics

John Morris, *Director of Athletics*

Branwen Smith-King, *Assistant Athletic Director; Physical Education Coordinator*

John Casey, *Assistant Athletic Director; Baseball*

Brian Gordon, *Business Manager*

Paul Sweeney, *Sports Information Coordinator*

Matt Malone, *Facilities, Fields and Events Manager*

Dan Kopcso, *Fitness Center Coordinator*

Marten Vanderveelde, *TP3 Fitness Program Manager*

COACH/LECTURERS:

Ethan Barron, *Men's track and field*

Kate Bayard, *Women's tennis*

Carla Berube, *Women's basketball*

Nancy Bigelow, *Women's swimming*

Gary Caldwell, *Crew*

John Casey, *Baseball*

Michael Daly, *Men's lacrosse, assistant football*

Lauren Ebstein, *Softball Coach*

Courtney Farrell, *Women's lacrosse*

Adam Hoyt, *Men's swimming*

Karl Gregory, *Men's tennis*

Ken Legler, *Sailing*

Christina McDavitt, *Field hockey*

Joe McManus, *Men's and women's squash*

Cheryl Milligan-Pinzino, *Assistant Softball*

Kristen Morwick, *Women's track and field*

Brian Murphy, *Hockey*

Ariana Klinkov, *Women's fencing*

Jay Civetti, *Football*

Joshua Shapiro, *Men's soccer*

Robert Sheldon, *Men's basketball, golf*

Cora Thompson, *Women's volleyball*

Joe McManus, *Women's squash*

Martha Whiting, *Women's soccer*

TRAINER/LECTURERS:

Jenna Cherenzia, *Sports medicine*

Patricia Cordeiro, *Sports medicine*

Mark Doughtie, *Sports medicine*

Nicholas Mitropoulos, *Sports medicine*

Andy Roth, *Sports medicine*

Fiona Donegan, *Sports medicine*

Within the liberal arts framework at Tufts University, the physical education program offers students instruction in individual, dual, and group activities that promote lifelong fitness and enjoyment.

Courses in aquatics, racquet sports, fencing, aerobics, physical fitness, and outdoor education are some examples of the diverse offerings of the department. Approximately 50 courses are scheduled each academic year, and most courses are offered fall and spring semesters. Every effort is made to maintain limited enrollment in all courses, to provide each student with maximum personal attention from the instructors.

One-half academic credit is granted for courses that are skill-oriented, and a total of two such credits may be applied toward the total for the degree. Introductory level courses are offered on a pass-fail basis. Theory classes of one course credit are applicable toward the degree. No advanced placement or retroactive credit will be given for any physical education courses.

Athletics has been an important part of life at Tufts throughout its history. The athletic program provides students the opportunity to compete in both intercollegiate and intramural sports, and also to engage in general recreation. Tufts fields seventeen varsity teams for men and women, supports eight club sports organizations, and offers several intramural sports programs.

For more detailed information, please visit the Physical Education website <http://ase.tufts.edu/physed/>.

For more detailed information about athletics programs, please visit the Athletics website <http://gotuftsjump.com/>.

Physics and Astronomy

Professor Roger G. Tobin, *Chair; Experimental condensed matter physics, physics education*

Professor Peggy Cebe, *Experimental condensed matter polymer physics*

Professor Lawrence H. Ford, *Cosmology, general relativity, astrophysics*

Professor Gary R. Goldstein, *Theoretical high-energy physics*

Professor Kenneth R. Lang, *Astronomy*

Professor W. Anthony Mann, *Experimental high-energy physics*

Professor Austin Napier, *Experimental high-energy physics*

Professor William Oliver, *Experimental high-energy physics*

Professor Krzysztof Sliwa, *Experimental high-energy physics*

Professor Alexander Vilenkin, *L. and J. Bernstein Chair in Evolutionary Science; Cosmology; General relativity, astrophysics*

Associate Professor Hugh Gallagher, *Experimental high-energy physics*

Associate Professor Peter Love, *Quantum computing*

Associate Professor Danilo Marchesini, *Astronomy/astrophysics*

Associate Professor Cristian Staii, *Experimental condensed matter physics, biological physics*

Assistant Professor Timothy Atherton, *Theoretical condensed matter physics*

Assistant Professor Pierre-Hugues Beauchemin, *Experimental high-energy physics*

Assistant Professor Mark Hertzberg, *Cosmology, general relativity*

Assistant Professor Anna Sajina, *Astronomy/astrophysics*

Research Professor Kenneth Olum, *General relativity and cosmology, quantum field theory*

SECONDARY APPOINTMENTS:

Professor Bruce Boghosian, *Mathematics; quantum computing, fluid dynamics*

Professor David Hammer, *Education; science education*

Adjunct Professor Fiorenzo Omenetto, *Biomedical engineering; optical physics*

Adjunct Professor Igor Sokolov, *Mechanical engineering, nanomechanics, nanophotonics*

Adjunct Associate Professor Thomas Vandervelde, *Electrical and computer engineering, semiconductors, optoelectronics*

Adjunct Senior Lecturer Robert F. Willson, *Tufts University School of Medicine; Astronomy*

The laws of physics are few in number yet appear to govern all known material phenomena: physical, chemical, and biological. The science of physics involves the observation of natural processes and the formulation from these observations of general principles that may be tested further or exploited for useful ends. Majoring in physics can be a valuable part of a broad education. Students who combine mastery of the basic laws of physics with the outlook and flexibility of a liberal education will be well prepared to take on a variety of specialized roles. Men and women who majored in physics in the recent past have successfully entered careers in physics, as well as in business administration, the computer industry, law, medicine, dentistry, meteorology, public health, and teaching.

UNDERGRADUATE CONCENTRATION REQUIREMENTS—COLLEGE OF LIBERAL ARTS

Minimum Grade Policy

A minimum GPA of 2.0 in the courses applied to a major, and no more than one course with a grade less than C-. This policy applies to all majors offered by the department for students entering September 2013 or later.

Major in Physics

Eight courses in physics more advanced than Physics 2 or 12 and including Physics 13 and 64; two courses in mathematics more advanced than Mathematics 42 and 44 (previously 13 and 18). With the exception of Physics 13 and 64, two of the physics courses and one mathematics course may be replaced by approved advanced courses in related fields (such as astronomy, biology, chemistry, computer science, engineering, or mathematics). The ten courses required for the major must include two courses in advanced laboratory training. One of these courses must be Physics 64; the other may be Physics 31 or 41.

Major in Applied Physics

Five courses in physics more advanced than Physics 2 or 12, including Physics 13 and 64; two courses in mathematics more advanced than Mathematics 42 and 44 (previously 13 and 18); three courses from the concentration requirements of one of the engineering departments. With the exception of

Physics 13 and 64, one of the five physics courses may be replaced by an approved course in a related field.

Major in Chemical Physics

Foundation: Chemistry 1, 11, or 16; Chemistry 2 or 12; Physics 1 or 11; Physics 2 or 12. Concentration: Ten credits of more advanced, one-credit courses: four credits in Chemistry (with a prerequisite of Chem 2 or 12), four credits in Physics (with a prerequisite of Phys 2 or 12), and two credits in mathematics (Math 70 or courses with a prerequisite of Math 42, 44, or 70—previously 13, 18, or 46, respectively). The courses must include the following: Physics 13; one credit in advanced laboratory training, either Physics 64 (counts as one advanced physics course) or both Chemistry 33 and 34 (counts as one advanced chemistry course); either Chemistry 31 or Physics 52; either Chemistry 32 or Physics 61; and either Chemistry 51 or Chemistry 61.

Major in Astrophysics

Four courses in physics more advanced than Physics 2 or 12, including Physics 13 and either Physics 31 or 64; two courses in mathematics more advanced than Mathematics 42 and 44 (previously 13 and 18); four courses in astronomy more advanced than Astronomy 9 and 10. One mathematics course, and either one physics course or one astronomy course, may be replaced by an approved advanced course in a related field. Research experience is strongly recommended.

Note to Premedical, Predental, and Preveterinary Students

Students interested in entering medical, dental, or veterinary school after graduation may take advantage of the following replacement option to complete the corresponding entrance requirements as part of the physics major. With the exception of Physics 13 and 64, two of the physics courses and one mathematics course may be replaced by Chemistry 51 and 53 and 52 and 54, and one other advanced elective. Chemistry 53 and 54 will also fulfill one term of the advanced laboratory training requirement for the physics major.

UNDERGRADUATE CONCENTRATION REQUIREMENTS—SCHOOL OF ENGINEERING

Bachelor of Science in Engineering Physics

A minimum of 38 credits is required: introductory (10 credits), humanities/arts/social science (6 credits), free elective (2 credits), foundation (8 credits), and a physics/engineering concentration requirement (12 credits). The introductory requirement includes Physics 11 and 12.

The foundation requirement comprises Physics 13, Physics 32, Physics 52, Physics 41 (or ES 3 and ES 4); two courses from Engineering Science 3, 4, 5, 8, or 9; plus two other courses satisfying the foundation requirements of the School of Engineering.

The concentration requirement comprises four courses in physics and astronomy at the intermediate or advanced levels, which must include Physics 64; four courses from the concentration requirements of one of the engineering departments; and four approved elective courses in computer science, engineering, mathematics, or science.

UNDERGRADUATE MINOR PROGRAM

The program requires the completion of five courses, with a minimum grade of C-. Prematriculation credits may not be applied towards the requirements for the minor. Minimum grade policy applies to students entering September 2013 or later.

Physics Minor

Five courses in physics, which must include Physics 13. The other courses may be selected from among Physics 11, 12 (or 1, 2), and courses in physics numbered 15 or higher.

Astrophysics Minor

Five courses, at least three of which must be courses in astronomy numbered 15 or higher. The remaining courses may be selected from among Physics 11, 12 (or 1, 2), 13, and courses in physics or astronomy numbered 15 or higher.

GRADUATE PROGRAM

The Department of Physics and Astronomy grants two degrees: the Doctor of Philosophy and the Master of Science. The department has established qualifications to ensure that degree candidates have a broad background in experimental and theoretical

physics. A faculty advisory committee is appointed for each student to supervise the program of study leading to the degree.

Master of Science

The Master of Science degree requires eight graduate-level courses in physics or related fields, the latter to be subject to approval by the advisory committee. These courses must include Physics 131, 145, 146, 163, and 164, and must be completed with a grade of B- or better. The student has the option of writing and defending a Master's thesis, which may count as the equivalent of up to three courses.

Master of Science, Astrophysics Track

The curriculum requirements consist of seven core courses and one elective course. A minimum of eight courses are required. Any exceptions or substitutions must be approved by the student's advisory committee.

The core program consists of seven Physics and Astronomy courses: Physics 131, 145, 163, and 153; Astronomy 121 and 122; and Physics 146 or 164 or a course in radiative processes in astrophysics which could be taken at another institution. The additional graduate-level elective must be approved by the student's advisory committee.

Master of Science, Physics Education Track

A minimum of ten courses are required. Any exceptions or substitutions must be approved by the student's advisory committee.

The core program consists of eight courses, four in Physics and Astronomy (Physics 131, 145, 153, and 163) and four in education (Education 111, Education 130, one foundations course, and one credit (two semesters) of proseminar). Additionally, two elective courses from Physics & Astronomy must be selected in consultation with the student's advisory committee.

Successful completion of the course requirements shall satisfy the requirements for a Master of Science degree.

Doctor of Philosophy

The doctoral candidate must demonstrate proficiency in four core fields: classical mechanics, classical electromagnetism, statistical mechanics, and quantum mechanics, either by achieving

satisfactory grades in the relevant courses (A- or better in Physics 131 and 153; A- or better average in the sequences Physics 145/146 and Physics 163/164) or through special examinations in those fields. However, a student whose average grade in classical mechanics (131) and classical electromagnetism (145, 146) is at least A- (3.67) will be exempt from the examinations in both subjects. Similarly, a student whose average grade in statistical mechanics (153) and quantum mechanics (163 and 164) is at least A- (3.67) will be exempt from the examinations in both of those subjects. Graduate courses taken at other institutions may in some cases be used to fulfill part of this requirement.

The doctoral candidate must also complete courses in any two of five specialized fields: astronomy/astrophysics (121 or 122), condensed matter physics (173 or 174), particle physics (183 or 184), general relativity and cosmology (167 or 268), and advanced quantum mechanics (263).

By the end of the second year, the candidate must choose a field of specialization and obtain a research advisor. The current research areas in the department are astronomy and astrophysics, biophysics, condensed matter physics, cosmology, general relativity, particle physics, and physics education.

By the end of the third year, the candidate must have completed the basic proficiency requirement and taken an oral examination in the chosen specialized field. Satisfactory performance on the oral examination qualifies the candidate to undertake a program of independent research under the guidance of the research advisor, culminating in the preparation and defense of a doctoral dissertation.

Doctor of Philosophy, Astrophysics Track

Students who wish to pursue the doctorate must complete the course requirements for the Master of Science in the Astrophysics track and fulfill additional requirements.

The doctoral candidate must demonstrate proficiency in five core fields: classical mechanics, classical electromagnetism, statistical mechanics, quantum mechanics, and astronomy, either by achieving satisfactory grades in the relevant courses (A- or better in Physics 131, 153, 145, 163; A- or better average in the sequence Astronomy 121/122) or through special examinations in those fields. However, a student whose average grade in classical

mechanics (131) and classical electromagnetism (145) is at least A- (3.67) will be exempt from the examinations in both subjects. Similarly, a student whose average grade in statistical mechanics (153) and quantum mechanics (163) is at least A- (3.67) will be exempt from the examinations in both those subjects. Graduate courses taken at other institutions may in some cases be used to fulfill part of this requirement.

By the end of the third year, the candidate must have completed the basic proficiency requirement and taken an oral examination in astrophysics. Satisfactory performance on the oral examination qualifies the candidate to undertake a program of independent research under the guidance of the research advisor, culminating in the preparation and defense of a doctoral dissertation.

Doctor of Philosophy, Chemical Physics Track

The curriculum requirements for the Chemical Physics track meld those of Chemistry with those of Physics. The curriculum has more emphasis on chemical synthesis than the core program in Physics and more electricity and magnetism than the core program in Chemistry. These greater core requirements are balanced with a greater flexibility in the elective courses.

The core program consists of seven graduate-level classroom courses, at least three of which must be Chemistry courses (Chem 133, 136, or 131 and at least one of 150, 151, 152, 161 and 162) and three must be Physics courses (163, 164, or 153). These are to be completed by the fourth semester in residence. Additionally, two elective courses must be chosen from Chemistry 132, 151, or 162 or Physics 131, 146, 173 or 174. Other appropriate courses may be substituted with the approval of the student's advisory committee.

Two oral presentations are required: a public seminar by the end of the fourth semester and a presentation to the student's research committee in the fifth semester. The seminar is based on current literature, can be presented in either department, and is evaluated by the research committee. The topic for the presentation to the committee is chosen by the student in consultation with the research committee. This presentation may be waived for students having at least a 3.3 average in the core courses. In addition, the student must prepare a written, original research proposal by the

end of the eighth semester. This proposal shall be somewhat distinct from the thesis work and defended orally before the advisory committee.

Doctor of Philosophy, Physics Education Track

The curriculum requirements for the Physics Education track meld those of Education with those of Physics and Astronomy. The student's faculty advisory committee will consist of at least one member from the Education department and one from the Physics and Astronomy department in addition to the research advisor.

Students who wish to pursue the doctorate must complete the course requirements for the Master of Science in the Physics Education track and fulfill additional requirements.

The doctoral candidate must demonstrate proficiency in four core fields of physics: classical mechanics, classical electromagnetism, statistical mechanics, and quantum mechanics, either by achieving grades of A- or better in the core physics courses or through special examinations in those fields. However a student whose average grade in classical mechanics (131) and classical electromagnetism (145) is at least A- (3.67) will be exempt from the examinations in both subjects. Similarly a student whose average grade in statistical mechanics (153) and quantum mechanics (163) is at least A- (3.67) will be exempt from the examinations in both of those subjects.

Following completion of the core courses, the doctoral student shall complete:

- An oral qualifying examination in physics, similar to that required of other physics doctoral students. This should ordinarily be completed in the third year.
- A written dissertation proposal, also presented orally to the advisory committee. This should ordinarily be completed in the fourth year.

For more detailed information, please visit the website <http://ase.tufts.edu/physics>.

Political Science

Professor Deborah J. Schildkraut, *Chair; American politics, political psychology, political behavior, racial and ethnic politics*

Professor Jeffrey M. Berry, *John Richard Skuse, Class of 1941, Professor of Political Science; American politics, political behavior*

Professor Robert Devigne, *Political theory*

Professor Ioannis Evrigenis, *Political theory*

Professor James M. Glaser, *Dean of Academic Affairs for the Arts and Sciences; American politics, political behavior*

Professor Malik Mufti, *International relations, comparative politics, Middle East*

Professor Tony Smith, *Cornelia M. Jackson Professor of Political Science; International relations, comparative politics*

Professor Vickie Sullivan, *Political theory*

Associate Professor David Art, *Comparative politics, political economy, Europe*

Associate Professor Consuelo Cruz, *Comparative politics, Latin America*

Associate Professor Richard C. Eichenberg, *International relations, foreign policy, political behavior*

Associate Professor Kelly M. Greenhill, *International relations, security studies*

Associate Professor Natalie Masuoka, *American politics, political behavior*

Associate Professor Elizabeth Remick, *Comparative politics, East Asia*

Associate Professor Pearl T. Robinson, *Comparative politics, Africa, African-American politics*

Associate Professor Oxana Shevel, *Comparative politics, post-Communist region*

Associate Professor Jeffrey W. Taliaferro, *International relations, security studies*

Assistant Professor Michael Beckley, *International relations*

Assistant Professor Nimah Mazaheri, *Comparative politics and political economy*

The Department of Political Science is concerned with the functions and theory of the structure and operation of government, and the nature and development of local, national, and international politics. The goals of the department are both intellectual and practical. Courses are designed to develop an understanding of the political process, and an ability to critically analyze political systems, relationships, and problems. Courses are also

intended to provide a basis for intelligent citizenship, increase capacity for community service, and orient the student toward possible employment in governmental agencies on the local, state, national, or international level. The undergraduate curriculum is structured to recognize that majors in political science will have a diversity of post-college goals. The department's offerings may be regarded as a foundation for graduate study preparatory to college teaching, professional government service, the law, and city and environmental planning, as well as for careers in such fields as public and business administration, journalism, secondary school teaching, nonprofit work, and social action.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The major requires ten courses overall: two political science foundation courses and eight additional political science courses. Students are required to take at least one course in each of four subfields: American politics and government (or American public policy), comparative politics and government, international relations, and political theory and philosophy. Internships and directed research courses will not fulfill a subfield requirement.

All majors must also take at least one course designated as methodologically focused. These courses incorporate material that helps students to understand the logic of social science inquiry. Because these courses will improve students' comprehension of how social science research is conducted, they are advised to fulfill this requirement early in their course of study, preferably in the sophomore year.

Courses that have met this requirement in the past are:

- PS 14** Sophomore Seminar: Political Behavior of Young People
- PS 15** Sophomore Seminar: Politics in the City
- PS 23** Sophomore Seminar: Political Economy of Latin America
- PS 103** Political Science Research Methods
- PS 104** Seminar: New Media, New Politics
- PS 107** Political Participation and Mass Behavior
- PS 108** Public Opinion and U.S. Democracy
- PS 111** Political Psychology
- PS 117** Politics in the American South
- PS 124** Seminar: Comparative Political Economy of

Advanced Industrial Democracies

- PS 130** Seminar: African Political Economy
- PS 135** Comparative Revolutions
- PS 159-01** Seminar in Political Thought: Political Theory Methods
- PS 160** Force, Strategy and Arms Control
- PS 166** Seminar: The Causes of Modern War
- PS 174** The Rise and Fall of Great Powers
- PS 181** Public Opinion and Foreign Policy
- PS 195** Seminar: Politics of Sustainable Communities
- PS 198, 199** Senior Thesis

Each year, other courses may be designated as methodologically focused, and these additional options will also fulfill the requirement.

Please consult the course listings published by the department prior to preregistration for a complete listing of all methodologically focused courses.

Majors are also required to take one upper-level seminar in political science at Tufts' Medford/Somerville campus. Sophomore seminars do not fulfill this requirement. Majors are required to take eight of the ten political science courses in the Tufts University Department of Political Science. All of the other requirements of the major—the two foundation courses, the course in each of the four major subfields, the methodologically focused course, and the advanced seminar—must also be fulfilled in the Tufts University Department of Political Science.

Majors are expected to complete their basic courses and declare their major by the end of the sophomore year. A grade of C- or better is required for a course to count toward the major. The department publishes requirements, programs, and additional information about the major on the department's website at <http://ase.tufts.edu/polsci>. New majors should familiarize themselves with this material.

UNDERGRADUATE MINOR PROGRAM

Students interested in completing a minor concentration in political science may choose from seven different options: Law and Society, Political Economy, Political Science (general), Comparative Politics, American Politics, Foreign Policy Analysis, and Political Thought. Interested students may contact the front desk at the Department of Political Science: 617-627-3465.

All of these minors require five courses in political science. Each of them, however, has separate requirements and a different list of courses. No student may take two minors. A detailed listing of these requirements is found on the website at <http://ase.tufts.edu/polsci>.

TUFTS-IN-WASHINGTON PROGRAM

The Tufts-in-Washington program offers students an opportunity for intensive firsthand study of government and politics during a semester's residence in Washington, D.C. Undergraduates who are accepted to the program may elect either American national government or foreign policy as their field of concentration. Students are registered at Tufts and are billed all the costs of the program through their Tufts eBill. This includes Tufts tuition, room, board, fees and medical insurance, if not waived by the student. Students are housed at American University in Washington, D.C., but all costs are billed by and payable to Tufts by the billing due date.

The Tufts-in-Washington program is administered by the Department of Political Science, but it is open to all Tufts undergraduates. A prerequisite for admission is a background in political science and other social science courses relevant to the student's plan of study in Washington.

Central to the curriculum during the Washington semester is a series of seminars with various Washington political elites and policy activists. Students also do individual research projects and participate as interns in the government or in the private sector. The Tufts-in-Washington seminars do not fulfill the upper-level seminar requirement for the political science major, which must be taken at Tufts' Medford/Somerville campus. Interested students may contact Dennis Rasmussen at 617-627-4804.

For more detailed information, please visit the website: <http://ase.tufts.edu/polsci>.

Program Evaluation

FACULTY ADVISOR:

To be decided

In the government and nonprofit sectors, significant resources are devoted to programs that address compelling social needs. Evaluation of these programs can help them to grow and improve their operations. Yet agencies often resist evaluation because it is seen as politically risky or technically intimidating.

Private funders and public agencies are increasingly demanding evaluation as a provision for funding. Individuals with evaluation training are needed to assist programs, sponsoring agencies, and funders in planning and carrying out evaluations to address their needs for information and analysis.

The certificate in program evaluation is designed for midcareer professionals who wish to learn about the design and implementation of effective evaluation strategies. Students learn practical skills that can be put to use in the evaluation of a wide range of social service, public health, community development, and environmental programs.

Four courses are required for the certificate. The certificate is offered in collaboration with the graduate Departments of Child Study and Human Development and Urban and Environmental Policy and Planning in the School of Arts, Sciences, and Engineering, as well as the Friedman School of Nutrition Science and Policy, and the School of Medicine.

The program is open to individuals with a bachelor's degree and three to five years of professional experience in a particular field. The program is particularly appropriate for agency directors and administrators, program managers and staff, foundation project officers, policy analysts, community organizers and advocates, human resources professionals, and educators.

For more information and/or an application, contact the program administrator, Angela Foss, at 617-627-2320 or visit the website: <http://ase.tufts.edu/uep/Degrees/Certificate.aspx>.

Psychology

Professor Lisa M. Shin, *Chair; Clinical neuroscience*

Professor Richard A. Chechile, *Mathematical psychology, memory*

Professor Robert G. Cook, *Dean of Graduate School of Arts and Sciences; Animal cognition and learning*

Professor Joseph F. DeBold, *Endocrinology and behavior*

Professor David W. Harder, *Clinical psychology, personality assessment*

Professor Phillip J. Holcomb, *Cognitive neuroscience, language*

Professor Robin A. Kanarek, *John Wade Professor; Physiological psychology and nutrition*

Professor Gina R. Kuperberg, *Cognitive neuroscience, language (semantics), neuropsychiatry*

Professor Klaus A. Miczek, *Moses Hunt Professor of Psychology; Psychopharmacology*

Professor Aniruddh Patel, *Music cognition*

Professor Holly A. Taylor, *Director of Graduate Program; Spatial cognition, language, memory*

Associate Professor Keith B. Maddox, *Social cognition*

Associate Professor Samuel R. Sommers, *Director of Undergraduate Program; Social perception and judgment*

Associate Professor Ayanna K. Thomas, *Memory and aging*

Associate Professor Heather L. Urry, *Affective neuroscience*

Assistant Professor Ariel M. Goldberg, *Linguistics and psychology of language*

Assistant Professor Paul Muentener, *Cognitive development*

Assistant Professor Elizabeth Race, *Cognitive neuroscience*

Assistant Professor Jessica D. Remedios, *Social cognition*

Lecturer Alexander H. Queen, *Clinical psychology*

Research Professor Ray Nickerson, *Cognition and human factors*

Visiting Associate Professor Tad Brunye, *Applied cognition*

Visiting Scholar Katherine Midgley, *Psychology of bilingualism*

SECONDARY APPOINTMENTS:

Professor Ray Jackendoff, *Philosophy; Linguistics and psychology of language*

Professor Linda Tickle-Degnen, *Occupational Therapy; Social functioning and wellness*

Professor Matthias Scheutz, *Computer Science; Artificial intelligence, robotics, cognitive science*

Psychology concerns processes and principles of behavior. Increased understanding of oneself and others through the study of psychology is useful in almost any endeavor. The Psychology curriculum is diverse in order to reflect the breadth of the field, from the biological bases to the social determinants of behavior. Students gain general familiarity with psychology, and have the option to emphasize specific areas in the field. Courses are geared toward the development of evaluative and analytic skills, which are indispensable to advanced study in experimental, clinical, and applied psychology. These skills, together with knowledge of the factors influencing individual and group behavior, are highly valuable for careers in such fields as public health, engineering, medicine, business, administration, law, and education.

PSYCHOLOGY COURSES AS DISTRIBUTION REQUIREMENTS

Because Psychology courses span all five distribution areas, students are urged to check SIS and the department's website listing of current course offerings for the most up-to-date information by distribution area. Most departmental courses count toward either the social sciences or natural sciences distributions.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

The Psychology Department offers undergraduate majors in Psychology, Biopsychology, Clinical Psychology, Cognitive and Brain Science, and Engineering Psychology. Psychology, Biopsychology, Clinical Psychology, Cognitive and Brain Science, and Engineering Psychology majors may not double major in any of the other majors offered by the Psychology Department.

Major in Psychology

This major is intended for students interested in exploring a variety of topics in psychology. Eleven courses distributed as follows: Psychology 1; one course from among Psychology 11, 12, 13, 14, 15, and 17; one course from among Psychology 22, 25, 26, 27, 28, and 29; Psychology 31; Psychology 32; one advanced lab course from among Psychology 36, 37, 38, 40, 41, 42, 46, 48, and 49; two Psychology courses numbered above 100; one other departmental course (i.e., an elective); and two approved advanced courses in related fields.

Courses taken to fulfill the psychology major (including related-field requirements) normally may not be taken pass-fail. No more than two independent study courses (Psychology 91, 92, 97, 99, 191, 192, 197, 198, 199) may be counted toward the concentration requirements. Successful completion of a Senior Honors Thesis chaired by a member of the department (PSY 199) may substitute for the advanced lab requirement. No more than one course taken to fulfill the 100-level requirement may be an independent study course.

Students with a score of 4 or 5 on the AP in psychology place out of Psychology 1. An AP score of 5 completely substitutes for Psychology 1 within the major, meaning that a student needs only 10 additional courses to complete the major. An AP score of 4 places a student into two-digit psychology courses, but the student needs to take an additional psychology course for the major in lieu of Psychology 1. Successful completion of Child Development 1 is treated in the same manner as an AP score of 4: students may substitute CD 1 for PSY 1 for prerequisite purposes, but they must take an additional psychology course in order to reach the 11 courses required for the major.

Psychology 32 and the advanced lab must be completed at Tufts. Double majors in Psychology and Mathematics can use Math 162 as a substitute for Psychology 31. Students who are double majoring in Psychology and Economics can use Econ 13 as a substitute for Psychology 31.

In recommending students for honors, in addition to the general college requirements, the department does not normally recommend students for highest honors unless they have done empirical research. Students graduating with a major in Psychology may choose either a B.A. or B.S.

Major in Clinical Psychology

This major is intended for students interested in entering graduate or professional schools in mental health or human services and/or working with psychiatric patients. Required courses are Psychology 1, 12, 31, 38, 71, 106, 181, and 182; two electives in psychology, one of which must be at the 100 level; and two approved advanced courses in related fields. Students graduating with a major in Clinical Psychology earn a B.A., unless they take Psychology 32, in which case they may choose either a B.A. or B.S.

Major in Biopsychology

This interdepartmental major, for students particularly interested in neurobiology and behavior, requires five courses in biology and five in psychology. These include the following: Cells and Organisms (Biology 13), General Genetics (Biology 41), Animal Behavior (Biology 130), one course in animal physiology (chosen from among Biology 75, 110, 115, 116, and 134) and an elective in biology; Statistics (Psychology 31 or Biology 132), Experimental Psychology (Psychology 32), Brain and Behavior (Psychology 103), plus two electives from among Psychology 22, 26, 27, 29, 40, 41, 42, 45, 46, 48, 49, 104, 112, 117, 123, 124, 127, 128, 129, 142, 143, 146, 148, 154, and 159. Additional courses may be added to this list at the discretion of the chair.

Biopsychology majors may not also double major in psychology or biology. Majors are encouraged to elect an advanced laboratory course in either department, and independent research is strongly encouraged, but is not required. Students majoring in Biopsychology can select a major advisor from either the Psychology or Biology department. Students graduating with a major in Biopsychology earn a B.S.

Major in Cognitive and Brain Sciences

This interdisciplinary major draws on psychology, neuroscience, linguistics, philosophy of the mind, computer science, and biology. Students are required to take a core of courses in psychology, a basic range of courses in the other constituent disciplines, and a series of upper-level courses in which they can specialize in one or more fields. Advanced students may choose to continue to be broadly interdisciplinary, or they may choose primarily to “track” within a single discipline such as psychology, philosophy, linguistics or computer science. The program is completed with a required research experience accompanied by a senior seminar.

Beginning with the Class of 2019, this major consists of 14 courses, including the following 7 requirements: Intro to Psychology (PSY 1), Intro to Cognitive and Brain Sciences (PSY 9), Statistics (PSY 31 or CD 140), Experimental Psychology (PSY 32), Intro to Linguistics (Philosophy 16/ Psychology 64), Intro to Computer Science (Computer Science 11), and Data Structures (Computer Science 15).

Three intermediate courses are required, one from each of the following groups: Group A: Psychology 11, 25, 26, 27, 28, 29, 103, Child Development 51; Group B: Computer Science 131, 150BBR, 150CMCS (formerly 150MOD), 171; Group C: Philosophy 3, 33 or 103, 191-02, Psychology 150, 151, 155.

Three advanced courses are required, drawn from at least two of the following groups (only 1 of which may be independent study/directed research): Group 1: Psychology 80, 91, 92, 103, 112, 117, 118, 122, 123, 124, 126, 127, 129, 131, 139, 140, 142, 144, 145, 146, 148, 154, 191, 192, 199; Group 2: Psychology 149, 150, 151, 152, 153, 155, 180, Child Development 145, 152, 155, 156, 177, 195, 243, Education 114; Group 3: Computer Science 86, 105, 131, 135, 150BRR, 150CMCS (formerly 150MOD), 170, 171, 193, 194; Group 4: Philosophy 38, 114, 117, 126, 132, 133, 134, 170, 191-02 (note that for all four groups, courses may only be used if not counted as intermediate courses as described above).

Students in the Classes of 2018, 2017, or 2016 may follow the revised concentration requirements above. Or they may complete the older requirements, which do not include PSY 1 and instead call for four advanced courses drawn from at least two of the groups listed above.

Cognitive and Brain Science majors are encouraged to complete a senior research project which entails either (a) completing an honors thesis in Psychology, Child Development, Computer Science, or Philosophy; (b) completing a year-long research experience with a faculty member in one of these departments or with a faculty member in the Neuroscience Department of the Medical School; or (c) completing a faculty-supervised review paper of the literature on a particular issue within one of these areas. Planning for such projects should begin by the end of junior year.

In addition, students are encouraged, after consultation with their advisor, to augment the Cognitive and Brain Science major by taking electives from Psychology (especially 37, 40, 41, 46, 48, 49, 107, 108), Anthropology (150), Biology (13, 14, 116, 134), and Math (11, 12, 13, 150). Students graduating with a major in Cognitive and Brain Sciences earn a B.S.

Major in Engineering Psychology

This interdisciplinary program, commonly called human factors engineering, is offered jointly by the departments of mechanical engineering and psychology. (See Engineering Psychology for program description and course listings.)

GRADUATE PROGRAM

The Department of Psychology offers both a master's degree and a doctor of philosophy degree in general experimental psychology. To be considered for graduate work in psychology, a student must have a bachelor of arts or bachelor of science degree from an accredited college or university. Most students will have majored in psychology, but this is not a requirement. The student must, however, have had at least a one-semester course in statistics and at least six semester hours of experimental psychology or comparable research experience. Students having a master's degree in psychology may apply for the doctoral program directly if their master's degree included an empirical thesis.

Graduate students are expected to develop overall breadth in psychology, as well as an emphasis in a specialty area. Emphasis areas within the department include cognitive psychology; experimental psychopathology; physiological psychology and psychopharmacology; social psychology; cognitive, social, and affective neuroscience; and cognitive development. Considerable emphasis is placed on the student's ability to undertake research. These skills are demonstrated in connection with course work, independent research, and the thesis and/or dissertation. All graduate students are expected to participate in supervised research each semester, as well as periodic teaching activities.

General Program Requirements

The program is based around five major annual milestones:

- Year 1: A first-year project
- Year 2: Completion of the master's thesis
- Year 3: Publication/grant submission
- Year 4: Conceptual presentation at department conference and mini-review
- Year 5: Completion of dissertation

There is no formal language requirement for either the master of science degree or the doctor of philosophy degree.

Master of Science

The requirements for the master of science degree include ten credits (eight course credits and two research credits) distributed as follows: completion of the graduate sequence in statistics (Psychology 107 and 108), one area core course, two upper-level psychology courses or seminars (100 level or higher), one additional 200-level core or seminar course, one independent reading/research course or other course credit, one professional preparation course, and successful completion of the first-year project (one credit) and the master's thesis (one credit).

No more than two graduate-level courses, which have not been used to count toward another graduate degree, may be transferred from another institution toward the Tufts program.

The master's thesis must be an empirical research study in psychology, which will be presented in written form and on which the candidate must take an oral comprehensive examination.

Students holding Tufts' teaching and research assistantships are advised to register for five courses per year and should plan to spend more than one year in completing the degree. Only under exceptional circumstances should it require more than two years for completion. The department does not encourage part-time participation in the program.

Doctor of Philosophy

The doctor of philosophy degree requires thirteen credits (eight course credits, two research credits, and three dissertation credits) beyond those required for the master's degree.

These must include one additional core course, two 200-level seminars, one additional professional preparation course, four elective courses or independent reading/research courses, a credit associated with completion of the third-year publication/grant submission, and a credit associated with the fourth-year conceptual presentation and mini-review. Additionally, when writing the dissertation, students must sign up for two 1.5 dissertation credits.

The doctoral candidate must submit a dissertation on his or her original empirical research and must take an oral examination in support of the dissertation.

In general, the student's program of study is worked out with a faculty advisor, taking into account the student's interests and background.

For more detailed information, please visit the website <http://ase.tufts.edu/psychology>.

Quantitative Economics

(FOR DEGREE REQUIREMENTS, SEE ECONOMICS.)

Religion

Professor Brian Hatcher, *Chair; Hinduism and religion in modern South Asia*

Associate Professor Heather Curtis, *History of Christianity and American religions*

Associate Professor Joseph Walser, *Buddhism and religion in ancient South Asia*

Associate Professor Kenneth Garden, *Islam and Sufism*

Assistant Professor Jennifer Eyl, *Early Christianity and religions of the ancient Mediterranean*

SECONDARY APPOINTMENTS:

Professor Gary Leupp, *History; Japanese history and Japanese Buddhist studies*

Associate Professor Kevin Dunn, *English; Bible as literature*

Assistant Professor Marie-Claire Beaulieu, *Classics; Greek religion, epigraphy, medieval Latin*

The Department of Religion is dedicated to the exploration and critical analysis of religion as a central aspect of human history and culture. Courses seek to promote reflection on the diversity of religious experience; empathetic engagement with a range of beliefs, texts and practices; mastery of a range of methods for studying religion; and reflection on the role religion plays in shaping human customs, values, beliefs, and institutions.

A graduate degree in religion is not offered. However, some 100-level courses may be taken in conjunction with other programs.

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Religion

Ten courses are required for the major in religion. These courses are to be distributed as follows:

- a. Religion 99 (Theory and Method in Study of Religion).

- b. Diversity requirement (four courses): Students should have exposure to at least four different religious traditions. This may be accomplished through classes in which four different traditions are taught, or through four courses, each focused on a different religious tradition, or through some combination thereof. Students are to take four classes within the department to achieve the diversity requirement. The advisor and the chair of the Department of Religion must approve the courses taken to fulfill this requirement.
- c. Depth requirement (three courses): Students must choose a subfield in religious studies. This may be one religious tradition, the traditions of a geographical region, or a religious textual tradition. Students must demonstrate that they have taken at least three classes in that specialty. One of the three courses must be in the doctrinal (theological and philosophical) aspects of religion. In their chosen areas of specialization, students must take two above-100 level courses. These may include an independent study or a senior thesis. The departmental advisor and the chair must approve the student's area of specialization. No course may count for both the diversity and depth requirements.
- d. In addition to the above eight courses, two additional courses listed or cross-listed in religion, regardless of subject area, are required.

UNDERGRADUATE MINOR PROGRAM Minor in Religion

Five courses, distributed as follows, are required.

- a. Religion 99 (Theory and Method in Study of Religion).
- b. Students should have exposure to at least three different religious traditions. This may be accomplished through classes in which three different traditions are taught, or through three courses, each focused on a different religious tradition, or through some combination thereof. The advisor and the chair of the Department of Religion must approve the courses taken to fulfill this requirement.
- c. One other course numbered above 100. This course may not be counted as one of the three courses of the above requirement.

For more detailed information, please visit the website <http://ase.tufts.edu/religion/>.

Romance Languages

Professor Gérard Gasarian, *Nineteenth- and twentieth-century French poetry*

Professor José Antonio Mazzotti, *Latin American literature, colonial period, modern poetry, film studies*

Professor H. Adlai Murdoch, *Francophone literature*

Professor Isabelle H. Naginski, *Nineteenth-century French prose, Franco-Russian literary relations, women writers*

Associate Professor Nina Gerassi-Navarro, *Latin American literature, nineteenth century, travel literature, film studies*

Associate Professor Zeina Hakim, *Seventeenth- and eighteenth-century French literature and culture*

Associate Professor Pedro Ángel Palou, *Latin American studies*

Associate Professor Vincent J. Pollina, *Medieval and Renaissance French and Italian literature*

Assistant Professor Pablo Ruiz, *Latin American literature, twentieth century*

Senior Lecturer Laura Baffoni Licata, *Coordinator of Italian Studies/Italian literature and culture*

Senior Lecturer Marta Rosso-O'Laughlin, *Spanish Language Coordinator*

Lecturer Juliana Berte, *Spanish language*

Lecturer María-Concepción Lagunas Davis, *Spanish Language Course Administrator*

Lecturer Anne de Laire Mulgrew, *Spanish language*

Lecturer Charles Dietrick, *Spanish Language Course Administrator*

Lecturer Brenna Heitzman, *French language*

Lecturer Nancy Levy-Konesky, *Spanish language*

Lecturer Carmen Merolla, *Italian language*

Lecturer Amy Millay, *Spanish language*

Lecturer Cristina Pausini, *Italian Language Coordinator*

Lecturer Tracy Pearce, *French language*

Lecturer Kathleen Pollakowski, *Spanish language and literature*

Lecturer Anne Poncet-Montange, *French Language Coordinator*

Lecturer Anne-Christine Rice, *French language*

Lecturer Ester Rincon, *Spanish language*

Lecturer Claire Schub, *Nineteenth- and twentieth-century French literature*

Lecturer Cristiane Soares, *Portuguese Language Coordinator*

Lecturer Anne Taieb, *French Language Course Administrator*

Susan Sánchez-Casal, *Director, Tufts-in-Madrid program*

Jeanne Fourneyron, *Director, Tufts-in-Paris program*

Loreto Palomar, *Director, Tufts-in-Chile program*

The Romance languages all derive from the Latin spoken in different parts of the Roman Empire. Courses in French, Italian, Portuguese, and Spanish lead students to an understanding of the language when spoken or written, and allow them to read and appreciate each nation's literature. At all stages of instruction, students may deepen their linguistic sensibilities and expand their horizons by studying, through a Romance language, a civilization different from but connected to their own. Students may major in French, in Italian, or in Spanish Studies, and may minor in Italian. A special minor for engineering students allows them to minor in French, Spanish, or Italian. Portuguese is only offered at the language level. The Department of Romance Languages also participates in the programs of the Experimental College.

LANGUAGE HOUSES

The Department of Romance Languages sponsors the French House and the Spanish House. The houses are open to all students interested in these languages and cultures and are not limited to majors. They offer small-group living and an opportunity to enjoy an intensive language experience, often with native speakers, and to participate in many social and cultural events.

JUNIOR YEAR ABROAD

Through the Tufts-in-Madrid, the Tufts-in-Paris, and the Tufts-in-Chile programs, the Department of Romance Languages offers undergraduate majors an unusual opportunity for study in Spain, France, and Chile during the academic year. For more information, contact the Department of Romance Languages or the Office of Tufts Programs Abroad.

Tufts-in-Paris Program

Preparation equivalent to completion of French 21 and 22 is prerequisite to the program; completion of French 31 and 32 is highly recommended. Students are registered in the University of Paris I (Panthéon-Sorbonne), the University of Paris III (Sorbonne Nouvelle), Sciences Po (Paris), and the private Institut Catholique and take most of their courses at these institutions. Courses are also offered within the Tufts-in-Paris program.

Internships are available to full-year students.

Tufts-in-Madrid Program

(See Tufts Programs Abroad for description.) Preparation equivalent to completion of Spanish 21 and 22 is prerequisite to the program; completion of Spanish 31 or 34 and 32 or 35 is highly recommended. Students live in Madrid or Alcalá de Henares, and take classes within the Tufts-in-Madrid program, and at the Autonomous University of Madrid or the University of Alcalá. Internships available. For more information concerning the Tufts-in-Madrid Program, write to the Department of Romance Languages, the Office of Tufts Programs Abroad, or see the program website at www.tufts-skidmore.es.

Tufts-in-Chile Program

(See Tufts Programs Abroad for description.) Preparation equivalent to completion of Spanish 21 and 22 is prerequisite to the program; completion of Spanish 31 or 34 and 32 or 35 is highly recommended. Students are registered in both universities; University of Chile and Catholic University. Fall registration takes place at University of Chile. Spring registration takes place at both universities.

For more information concerning the Tufts-in-Chile Program, write to the Department of Romance Languages or to the Office of Tufts Programs Abroad.

Tufts University European Center

The Tufts University European Center sponsors a six-week summer study program in Talloires, on the Lac d'Annecy, in the heart of the French Alps. Students enroll for credit in two courses chosen from an array of offerings including French language, literature, and civilization. The courses, taught by members of the Tufts faculty, draw on the rich cultural and physical resources of this beautiful region of France. Classes are held in Le Prieuré (the Priory), which was formerly part of an eleventh-century Benedictine monastery. Each student lives and shares meals with a local French family; the residential component of the program adds an important dimension to the students' experience of French daily life and culture. For more information, contact the Office of the Tufts University European Center.

PLACEMENT OF ENTERING UNDERGRADUATES

All entering students who elect courses in French, Spanish, or Italian and who have previously studied the language will be placed in the appropriate course level by their scores on the SAT Subject Tests, Advanced Placement Test, or Tufts placement examination. The Tufts placement examination, which is for diagnostic purposes only, is given each September and January during the orientation period.

Students who place above French, Spanish, or Italian 3 may complete the language requirement by choosing any one of the three available options (see College of Liberal Arts Information, Foundation Requirements). One course credit equivalent to French/Spanish/Italian 21 or 22 is granted under certain conditions (see College of Liberal Arts Information, Advanced Placement and Acceleration Credit).

For further information, see the appropriate coordinator of language instruction.

UNDERGRADUATE CONCENTRATION REQUIREMENTS IN FRENCH AND SPANISH

Prospective majors in French or Spanish are advised to consult the guidelines for selecting a related field, which appear on the Romance Languages website. The department highly recommends that seniors returning from overseas programs enroll in two 100-level French or Spanish courses on the Tufts campus during their final year of study. At least one of the four 100-level literature courses must be taken during the senior year on the Tufts campus itself.

Major in French

The French major requires ten courses as follows: French 22, or equivalent; French 31 and 32, or equivalent; four 100-level courses in literature; two 100-level course to be selected from among the various course offerings in advanced language and culture, including French 121, 122, 124, 125, and all 100-level French courses unless specified otherwise, or their equivalents, or up to two additional 100-level courses in French literature; one course taught in any language in a related field, or one additional 100-level course in French language and

culture or literature. (Students participating in programs abroad may count toward the satisfaction of the latter two requirements a wide range of courses in language, literature, art history, geography, history, civilization, and other areas.) No more than one credit in Independent Study may be counted toward the major. No more than two credits combining an Independent Study and an honors thesis may be counted toward the major. All courses taken for credit in the major must be completed with a grade of C- or better.

Major in Spanish

The Spanish major requires ten courses as follows: Spanish 22, or equivalent; Spanish 30 or 31, and 32 or 33, or equivalent; three 100-level courses in literature; four 100-level courses to be selected from among the various course offerings in advanced language and culture, including Spanish 121 or 122, 124 or 125, 126, 130, 140, 148, 150, or their equivalents. One course may be in English. (Students participating in programs abroad may count toward the satisfaction of this requirement a wide range of courses in language, literature, art history, geography, history, civilization, and other areas, taught in the language of the major.) No more than one credit in Independent Study (SP 193 or 194) may be counted toward the major. No Independent Study can be taken during the senior year if the student is writing an honors thesis (SPN 199, two credits). All courses taken for credit in the major must be completed with a grade of C- or better.

UNDERGRADUATE CONCENTRATION REQUIREMENTS IN ITALIAN STUDIES

Prospective majors in Italian studies are advised to consult the list of courses exclusively devoted to Italian culture, taught in departments other than Romance Languages, which count toward the Italian Studies major. The list appears on the Romance Languages website. It is highly recommended that seniors returning from overseas programs enroll in an appropriate Italian course in the Department of Romance Languages during their final year of study. Interested students should consult the designated advisor for the major.

Major in Italian Studies

The Italian Studies major requires ten courses distributed as follows among Sections I, II, III, IV, and IV:

Section I: Two courses in Composition and Conversation, taught in Italian, in the Department of Romance Languages: Italian 21 and 22, or equivalent;

Section II: Two survey courses of literature, taught in Italian: Italian 31, and 32, or equivalent;

Section III: One 100-level course of advanced Italian language, taught in Italian: Italian 121;

Section IV: Two literature or culture courses at the 100-level, taught in Italian;

Section V: Three elective courses in Italian literature, culture, or related fields, taught in Italian or English (see Guidelines, attached to the Checklist for the Major, for acceptable courses).

Courses taken in departments other than Romance Languages must be devoted exclusively to Italian culture (as attested by course description and syllabus), and must be approved by the Department of Romance Languages for credit in the major. No more than one credit in Independent Study may be counted toward the major. No more than two credits combining an Independent Study and an honors thesis may be counted toward the major. All courses taken for credit in the major must be completed with a grade of C- or better.

UNDERGRADUATE MINOR PROGRAMS

Minor in Italian

The minor in Italian requires five courses as follows: Four courses in Italian language, literature, and/or culture above the intermediate level (Italian 3-4), one of which must be in literature. These courses must be taught in Italian. One course chosen from among the following: a) one further course in Italian language, literature, and/or culture, taught in Italian on the Medford/Somerville campus; b) a course in Italian literature or civilization taught in English translation (e.g., Italian 51, 52, 55, 75); c) one of the Italian culture courses listed in the Guidelines for acceptable courses; (d) an upper-level course, completed in Italy, in one of a variety of disciplines. No more than one credit in Independent Study may be counted toward the minor.

It is highly recommended that seniors returning from overseas programs enroll in an appropriate Italian course in the Department of Romance Languages during their final year of study.

Interested students should consult the designated advisor for the minor.

Special Minors for Engineering Students

The humanities and/or arts and social sciences requirements for students in the School of Engineering may be satisfied by a special minor in French, Spanish, or Italian language and culture comprising a total of six credits. Please note the following stipulations:

- 1) Of the five credits taken in the Department of Romance Languages, no more than one credit may be taken in English.
- 2) Students must determine their level of proficiency in the language by examination (placement test at Tufts, Advanced Placement Test score, or SAT Subject Test score).
- 3) Students cannot receive credit toward the minor for courses taken below this initial placement.
- 4) Students must consult with the designated advisor for the special minor in the Department of Romance Languages.
- 5) Independent Studies will not be available.
- 6) All courses used in fulfillment of the minor must be taken for a grade.

FRENCH OR SPANISH

The minor requires five credits above French 3 or Spanish 3.

The sixth credit must be taken in the social sciences or the humanities, concentrating on the area in which the target language is spoken. It may be taken in English or Spanish/French.

ITALIAN

The minor requires five credits above Italian 2.

The sixth credit must be taken in the social sciences or the humanities, concentrating on the area in which the target language is spoken.

DEPARTMENTAL HONORS

The departmental honors program provides the opportunity for majors in French, in Spanish, or in Italian Studies—in close cooperation with a faculty advisor—to write a senior honors thesis for one or two course credits. Each such credit may count toward the major as a 100-level literature course. No more than two credits combining an Independent Study and an honors thesis may be counted toward the major. Near the end of the spring term, the thesis is defended before a committee of three readers, who determine whether the degree with highest honors in thesis, with high honors in thesis, or with honors in thesis is to be awarded at commencement.

The applicant's name must have appeared on the Dean's List prior to the first term of the senior year. Interested students should consult with the potential advisor and with the chair of the department toward the end of the junior year.

GRADUATE PROGRAM

Master's Degree

A master of arts degree is offered in French language and literature. Preference is given to students who have a strong undergraduate major in French.

To qualify for the master's degree, a student completes an approved program of at least ten courses, including a general examination. A student is expected to show evidence of scholarly attainment both in course work and in the general examination.

For more detailed information, please visit the website <http://ase.tufts.edu/romlang>.

Russian

(FOR DEGREE REQUIREMENTS, SEE GERMAN, RUSSIAN, AND ASIAN LANGUAGES AND LITERATURES.)

School Psychology

(FOR DEGREE REQUIREMENTS, SEE EDUCATION.)

Sociology

Professor Pawan Dhingra, *Chair; Immigrant adaptation, Asian Americans, cultural identities, social/cultural inequalities, race and ethnic relations*

Professor Paul Joseph, *Sociology of war and peace, political sociology, globalization*

Associate Professor Paula Aymer, *Race and ethnic relations, family, religion, immigration*

Associate Professor Sarah Sobieraj, *Mass media, political sociology, civil society and the public sphere, sociology of culture, social movements*

Associate Professor Rosemary CR Taylor, *Comparative historical study of health and disease; public policy; science, technology, and risk; qualitative methodology*

Assistant Professor Orly Clerge, *Race and ethnicity, urban sociology, immigration and migration, family, education, methods*

Assistant Professor Helen Marrow, *Immigration, race and ethnic relations, social inequalities and social policies, health, qualitative research methods*

Assistant Professor Freeden Oeur, *Gender and masculinity; education; feminist theory; children and youth; culture*

Sociology is the systematic study of social institutions, social inequalities, and social and cultural identities. Sociology studies how social structures shape human behaviors, social categories, and social meanings. Sociology also studies how behavior (agency) constructs social structure. Institutions include family, religion, media and culture, health and medicine, education, the military, organizations, the environment, urban environments, policy and the arts. Areas of study include social inequalities such as race, immigration, class, gender, and globalization. Sociology students learn how to critically examine and analyze social structure and culture; how social and cultural constructs such as gender, race, and class influence people's lives; and how people change society by forming social movements and using the media.

SOCIOLOGY >

SPANISH >

URBAN AND ENVIRONMENTAL POLICY AND PLANNING >

UNDERGRADUATE CONCENTRATION REQUIREMENTS

Major in Sociology

All Sociology majors, including those who elect to do one of the three clusters (see below), must complete ten Sociology courses. None of the ten courses may be taken pass-fail, and at least six of the courses must be listed or cross-listed by the Tufts University Department of Sociology. Four courses must be the following core courses, at least two of which must be taken in the Tufts University Department of Sociology:

- 01: Introduction to Sociology
- 101: Quantitative Research Methods
- 102: Qualitative Research Methods
- 103: Survey of Social Theory

Of the ten required Sociology courses, one must be numbered 180 or above. Sociology 193, 194, 197, 198 and 199 do not count for this requirement. Five of the ten required courses are unrestricted electives, except for students who choose to complete a cluster. Six of the ten required courses must be taken at the Somerville/Medford Campus.

Majoring in Sociology Using a Cluster Option

Students who major in Sociology may choose electives that complete one of the following cluster options:

1. Media, Culture, and Society
2. Social Inequalities and Social Change
3. Globalization, Transnationalism, and Immigration.

Minor in Sociology

The minor requires the completion of six courses, none of which may be taken pass-fail: one required introductory course numbered 1 through 70; one required methods course: Sociology 101 or 102; one theory course: Sociology 103; and three elective courses. Details are available from the department. Students should declare their minor by junior year

For more detailed information, please visit the website <http://ase.tufts.edu/sociology>.

Spanish

(FOR DEGREE REQUIREMENTS, SEE ROMANCE LANGUAGES.)

Urban and Environmental Policy and Planning

Professor Weiping Wu, *Chair; International planning and development, urban economic policy, China*

Professor Julian Agyeman, *Sustainability policy and planning, environmental and food justice, intercultural cities*

Professor Robert M. Hollister, *International university civic engagement*

Professor Sheldon Krinsky, *Lenore Stern Professor in the Humanities and Social Sciences; Environmental policy and ethics*

Associate Professor Mary E. Davis, *Environmental health, economic analysis*

Associate Professor Justin Hollander, *Land use planning, urban redevelopment, shrinking cities*

Associate Professor Francine Jacobs, *Child and family policy, program evaluation*

Assistant Professor Shomon Shamsuddin, *Social policy, community development*

Lecturer Laurie Goldman, *Social welfare and housing policy, policy implementation, and public and nonprofit management*

Lecturer Penn S. Loh, *Director of the Masters of Public Policy Program and Community Practice; Environmental justice*

Lecturer Barbara Parmenter, *Student Affairs Coordinator; Geographic information systems*

Lecturer Ann Rappaport, *Environmental management and policy*

Lecturer Sumeeta Srinivasan, *Spatial models and geographic information systems*

Lecturer Jonathan Witten, *Land use planning, local government law, natural resources policy*

The Department of Urban and Environmental Policy and Planning offers two graduate public policy and planning programs culminating in either a master of arts (M.A.) degree or a master of public policy (M.P.P.) degree. Our goal is the education of a new generation of leaders, “practical visionaries,” who will contribute to the development of more just and sustainable communities. A key step toward this is making our institutions more responsive to

child, adult, and ultimately community well-being by helping them understand, empathize with, and respond to the social, economic, and environmental needs of individuals and communities.

AFFILIATED CENTERS AND INSTITUTES

Center for Interdisciplinary Studies—Environmental Studies Program

The Department of Urban and Environmental Policy and Planning (UEP) is one of three Tufts departments that oversee the undergraduate environmental studies program. The Sustainability, Policy, and Equity track, for which UEP serves as the host department, examines the sociopolitical, humanistic, economic, and cultural aspects of managing environmental problems.

Global Development and Environment Institute (GDAE)

The Global Development and Environment Institute (GDAE) was established to gain a new understanding of how nations and societies at differing stages of economic development can pursue development in an environmentally and socially sustainable manner, and to assist the public and private sectors in applying this knowledge through appropriate policies that promote sustainability. Through research, curriculum development, a visiting scholars' program, conferences, and faculty seminars, the institute offers opportunities for shared activities between the Fletcher School and Graduate and Professional Studies. It also provides employment opportunities for graduate students.

Tufts Institute of the Environment (TIE)

The Tufts Institute of the Environment (TIE) is an interdisciplinary university-wide institute that initiates, facilitates, and promotes environmental education, research, and outreach toward a sustainable future. It meets this goal by assisting faculty to create new environmental courses; developing interdisciplinary research initiatives; coordinating efforts among existing departmental programs; supporting speakers and visitors; involving alumni; producing newsletters, supporting student events, developing social media, and other outreach activities; and supporting and recognizing outstanding Tufts students.

TIE is located on the Medford Campus in Miller Hall, and its physical space is used by many students to study, work, and meet with other

students and faculty members. TIE coordinates and supports events for the environmental community throughout the year. TIE supports student research through fellowships, travel grants, and a limited number of internships and research assistantships. Within its offices, TIE also supports the Water: Systems, Science, and Society (WSSS) program, an interdisciplinary graduate research and education program.

Tufts Office of Sustainability (OOS)

Tufts Office of Sustainability (OOS) serves as a resource, advocate, and catalyst for environmental sustainability at Tufts. Originally started in 1999 as the Tufts Climate Initiative, it acts as the bridge between resource conservation ideas and their practical implementation and eventual integration into the day-to-day rhythm on campus. The Office plays an active role in helping Tufts meet its sustainability goals in emissions, resource conservation and sustainability education. Its website and blog are frequently updated with information, opportunities, and promotions related to environmental sustainability at Tufts, and its weekly newsletter keeps the community informed about job openings and upcoming events in the area.

The OOS collaborates with academic departments as well as students and staff to provide support and encourage innovation. In addition, it runs two educational programs for Tufts community members: the Eco-Ambassador program for staff and faculty wishing to help their department or office become greener, and the Eco-Representative program for students living in university-owned residences. Both these programs empower individuals to become change agents right here at Tufts.

Jonathan M. Tisch College of Citizenship and Public Service (Tisch College)

Tufts University is explicitly committed to fostering an attitude of "giving back," including promoting an understanding that active citizen participation is essential to freedom and democracy. The mission of the Jonathan M. Tisch College of Citizenship and Public Service (Tisch College) is to prepare Tufts undergraduate and graduate students for lifetimes of active citizenship, and to make public service an important dimension of their lives and work. Program activities designed to fulfill this mission include faculty and curriculum development,

student leadership development, an information and resource clearinghouse, and seed grants for faculty and student initiatives. The Lincoln Filene Center, a component of Tisch College, increases knowledge about citizen action and community building, enhances public-service education and research at Tufts, and informs public decision making. The center acts as a catalyst to connect people and resources in new ways, and to develop new approaches to public problems.

UNDEGRADUATE PROGRAMS

Undergraduate Minor in Urban Studies

The Minor in Urban Studies provides students with an opportunity to pursue their love of cities and communities and to study urban issues in depth. Students can select from a variety of courses that examine the interplay among the different groups occupying the urban space, the problems they confront, their struggle for recognition and power, and the forces shaping the physical terrain they inhabit. The minor offers a good foundation for students contemplating graduate work in urban planning, environmental policy, public administration, public policy, law, or social work. It also can be an intellectually exciting focus for interdisciplinary exploration, because understanding urban phenomena requires synthesizing knowledge from a broad range of the social sciences and humanities. The completion of five courses from at least three different departments is required. In addition, a student is required to complete an appropriate capstone project, such as a research paper, an oral presentation, a video, a photographic exhibit, a fictional narrative, or other forms of study, which integrates the knowledge and methodologies of the disciplines involved. Interested students should consult the faculty coordinator, Weiping Wu (weiping.wu@tufts.edu), about specific courses that can be counted toward the minor. For more detailed information, please visit <http://ase.tufts.edu/uep/Degrees/UrbanStudiesMinor.aspx>.

GRADUATE PROGRAMS

UEP students focus on public problems in the broad areas of urban and social policy and planning, or environmental policy and planning, as well as on issues linking these various concerns. UEP's goal is the education of a new generation of leaders,

“practical visionaries” who will contribute to the development of more just and sustainable communities.

A key step toward this is making our institutions more responsive to child, adult and ultimately community well-being by helping them understand, empathize with and respond to the social, economic and environmental needs of individuals and communities.

We offer two graduate programs in public policy and planning: a master of arts (M.A.) degree in urban and environmental policy and planning that is accredited by the Planning Accreditation Board and a master of public policy (M.P.P.) degree. Both degrees equip public-spirited individuals for rewarding careers in government, nonprofit organizations, citizen advocacy groups, and the private sector.

UEP has a flexible M.A. and M.P.P. curriculum built around a set of six core values:

1. An appreciation of the inextricable linkages between social, economic and environmental issues and the ability to make policy and planning recommendations accordingly.
2. An appreciation of the role of values in policy formation and planning and the ethical/social responsibility of policy and planning professionals to act accordingly.
3. An appreciation of the deeply embedded nature of gender, age, race, class, disability, culture and sexual orientation in all aspects of public policy and planning.
4. An appreciation of the centrality of spatial, social and environmental justice to all aspects of public policy and planning.
5. An appreciation of the need to understand the role of individual and community rights and responsibilities in public policy and planning.
6. An appreciation of the need to move society toward the development of sustainable communities where there is a high quality of human life, delivered in a just and equitable manner while respecting the limits of supporting ecosystems.

The M.A. also requires a set of competencies based on three areas:

Knowledge—Upon completion of the MA program, students should have basic familiarity with:

- The history, structure and function of urban and metropolitan settlements.
- Economic influences on policy and planning (e.g., “market” and “polis” relations).
- Environmental, social and cultural influences on policy and planning.
- The different roles of government, governance and citizenship in policy and planning.
- The history, theory and processes of both policy making and planning together with implementation procedures and practices.
- Evaluation of policy and planning.
- The administrative, legal and political aspects of policy and plan-making.
- Areas of specific policy or planning content-based knowledge related to their professional interest(s) and an in-depth knowledge of one policy or planning domain through the thesis or other terminal project.

Skills—Upon completion of the M.A. program, students should have basic skills in the following:

- Critical thinking skills
 - ♦ Individual problem identification and documentation of the extent of the problem as well as the political, social, environmental and spatial context
 - ♦ Identifying possible analysis strategies and their implications
 - ♦ Identifying criteria for proposing and selecting solutions
 - ♦ Evaluating the development and results of policies and plans
- Research skills
 - ♦ Research design
 - ♦ Literature collection and analysis
 - ♦ Identifying and assessing data sources and limitations
 - ♦ Development of data collection instruments and tools
- Data analysis skills
 - ♦ Interpreting and synthesizing data
 - ♦ Drawing inferences from specific observations to make more generalizable findings
 - ♦ Comparative and longitudinal analysis

- ♦ Recognizing and accounting for limitations to findings
- Qualitative skills
 - ♦ Direct observation and analysis of primary and secondary qualitative data
- Quantitative skills
 - ♦ Descriptive and inferential statistics
 - ♦ Basic forecasting
 - ♦ Use of spreadsheets and statistical software
- Spatial analysis skills
 - ♦ Ability to identify spatial problems and frame spatial questions for analysis and research
 - ♦ Use of Geographic Information Systems for basic spatial analysis and mapping
- Communication skills
 - ♦ Written, oral and graphic communication
 - ♦ Presentation strategies and methods

Policy and Planning in Practice—The M.A. program will provide the following professional opportunities and training:

- At least 150 hours, supervised, in an organization relevant to the student’s interests
- Demonstration through the Internship Agreement and Learning Assessment that the internship gave the opportunity for significant learning in a field relevant to the student’s interests and meets at least one of his or her career goals
- Reflections on the role of ethics in professional policy and planning processes, practices and behavior
- Synthesis and application of policy and planning content-based knowledge from theory into practice
- Collaborative group management, problem solving, negotiation and mediation
- Organizational management, including decision making and strategic problem solving, human resource development, and financial management and resource development
- Political and economic power mapping

Master of Arts

The Master of Arts (M.A.) requires completion of twelve or thirteen courses plus a thesis or capstone exam for a total of fourteen credits. Each semester-long course at Tufts receives one credit. The program normally takes the equivalent of two years of full-time study, although it is possible to be enrolled in the program on a part-time basis.

Degree Requirements

The requirements for the M.A. degree are as follows:

- Five required core courses covering theoretical foundations of policy and planning, and the development of relevant professional skills;
- Seven or eight elective courses approved by student's advisor;
- An internship in public policy or planning; and
- A master's thesis or capstone exam.

Students select courses from the department's offerings, other Tufts departments and schools, and Boston-area consortium universities. To receive credit for a course, graduate students must attain a grade of B- or better.

Core courses

A required core curriculum exposes students to methods of policy analysis and planning and helps them develop the competencies listed above, for effective professional practice.

The five required core courses are:

1. Foundations of Public Policy and Planning
2. Economics for Planning and Policy Analysis
3. Quantitative Reasoning for Policy and Planning (introductory or intermediate)
4. Field Projects: Planning and Practice
5. Cities in Space, Place and Time

Electives

In addition to the core curriculum, students choose courses that meet their particular objectives and provide a strong grounding in basic methods and approaches to public policy and planning. UEP recognizes the need for the policy and planning specialist, the person who wants to plan for landscape, ecological or watershed management, or develop child and/or family or other social welfare policies. However, UEP also recognizes the inextricable interconnections between and across different policy and planning areas, whether a student's interest is primarily environmental or social, urban or rural, local or global. Accordingly, a student's choice of classes can be narrower (on the public policy and planning challenges in one policy or planning area) or broader (on sustainable

development, which looks at these issues and their interrelationships as a whole), depending ultimately on the student's goals.

At UEP, faculty and student interests and course offerings center on the following:

- Sustainable communities
- Environmental and food justice
- Community development and housing
- Race, class, and social welfare policy
- Child and family policy
- Land use planning
- Natural resource policy and planning
- Science/technology, ethics, and environmental policy
- Environmental health and risk
- Corporate management of environmental Issues
- Climate change
- International urban and environmental policy
- Program evaluation
- Applied research methods
- Planning tools, techniques, and strategies
- Citizen roles in policy and planning
- Policy and planning for intercultural cities

Internship

An internship (minimum 150 hours) is usually completed between the two academic years. Most internships are based in a public or nonprofit agency, and are usually paid. Alternatively, students may elect a research internship, working on a university-based or research institution-based project. Although faculty provide assistance and advice, students are expected to secure their own internship placements.

Thesis

The thesis requirement provides students the opportunity to become proficient in framing a research question and carrying out an independent investigation on a topic of the student's choosing. Building on competencies developed through course work, students present a well-reasoned analysis of a significant policy or planning problem. Theses may be technical studies, policy analyses, theoretical papers, research studies, or planning reports.

Capstone exam

The capstone exam requirement represents a topic-based assessment of an individual student's interests in the fields of policy and planning. The student chooses major and minor topics in collaboration with a faculty advisor and reader(s) in a fashion similar to the selection of a thesis topic. There are three separate components to the capstone exam: (1) a detailed literature review; (2) a take-home exam; and (3) an oral exam.

Master of Public Policy

The Master of Public Policy (M.P.P.) is for individuals with at least seven years of significant, relevant professional experience, who are interested in expanding their knowledge of public policy within urban, social, and environmental domains—or across these domains, such as programs and policies related to sustainable communities.

This degree program offers students the opportunity to strengthen their critical thinking, policy analysis, and communication skills; improve their professional practice in areas such as mediation, land use planning, or financial management; and establish close professional relationships and networks among faculty, affiliated agencies, and other students. Full-time students may complete this nine-credit degree in one year; part-time enrollment options are also available. The requirements for the M.P.P. are as follows:

Degree Requirements

- Four required core courses that enable students to reflect on their professional practice, examine dominant theories and themes in the public policy literature, and further refine and consolidate their perspectives on their career paths.
- Four elective courses in a public policy area.
- Two additional elective courses in policy and planning fields or professional skills.

The four core courses are:

1. Economics for Planning and Policy Analysis
2. Quantitative Reasoning for Policy and Planning (introductory or intermediate)
3. Reflections on Public Policy Practice (one-half credit, fall, in the first semester of student's program)
4. Integrative Seminar (one-half credit, spring, in the last semester of the student's program)

An M.P.P. seminar is composed of the two half-credit courses. It helps students examine their own professional experiences in the context of prevailing theories about policy and program development, implementation, and evaluation. The M.P.P. seminar is for M.P.P. degree students only. All other courses are taken with students in the M.A. in urban and environmental policy and planning program. Up to two courses may be selected from course offerings in other Tufts departments and schools, as long as they relate to public policy and are approved by the student's advisor. In addition, with the advisor's approval, one class at a consortium school may be taken in the second semester. Transfer credits will not be accepted. Students with significant background in economics or statistics may, with faculty approval, waive the relevant required courses and substitute electives of their choosing.

Public Policy Areas

Each student, working closely with his or her academic advisor, identifies an area of public policy interest(s). The student then selects four policy courses that deepen his/her theoretical and practical understanding of policy within this area(s) of interest.

All our courses focus on urban, social and/or environmental policy issues. A student can choose from one or more of these areas, or can choose to focus on the intersection(s) between these areas, namely the arena of sustainable development.

Examples of Public Policy Courses

- U.S. Social Welfare Policy
- Social Policy for Children and Families
- Community Development, Planning and Politics
- Community Economic Development
- Climate Change Policy, Planning and Action
- Environmental Law
- Water Resources Policy and Planning and Watershed Management
- Corporate Management of Environmental Issues
- Developing Sustainable Communities
- Environmental Justice, Security and Sustainability
- International Planning and Urban Policy

Professional Practice Electives

Students also have opportunities to enroll in courses that enhance their professional practice skills, such as:

- Leadership and Organizational Development
- Financial Analysis and Management
- Philanthropy and Fundraising
- Negotiation, Mediation, and Conflict Resolution
- Program Evaluation
- Local Government Finance

Inquiries and requests for application materials for either the M.A. or M.P.P. degree program should be addressed to the Department of Urban and Environmental Policy and Planning, 97 Talbot Avenue, Tufts University, Medford, Massachusetts 02155, or call 617-627-3394. The application deadline for the M.A. program is January 15; the application deadline for international applicants is December 31; the deadline for the M.P.P. program is April 30. Late applications may be considered.

Interdisciplinary Doctorate

The department participates in Tufts' interdisciplinary doctoral program, which accepts a limited number of Ph.D. candidates (applicants must have completed a master's degree) who design an individualized program of study. (See Interdisciplinary Doctorate in this bulletin for program description.)

Combined and Collaborative Degree Programs

The Department of Urban and Environmental Policy and Planning offers joint master's degree programs with the Departments of Biology, Child Study and Human Development, Civil and Environmental Engineering, and Economics. Students complete core requirements in UEP and one of the affiliated departments to receive a single master's degree (M.A. or M.S.). It is possible to complete joint degree requirements in two years. UEP also offers dual degree programs with the Fletcher School, the Department of Civil and Environmental Engineering in the School of Engineering, the Friedman School of Nutrition Science and Policy, the Department of Public Health and Community Medicine in the School of Medicine, Boston College Law School, and the Boston College Carroll School of Management.

For the dual degree programs, each department/school reviews candidates based on its own requirements and criteria. The candidate's admission to UEP is not affected by that of the other department/school, and vice versa. Students are required to meet with academic advisors from both UEP and the other department/school to plan a course of study that balances each student's background and interests with the requirements of the specific program.

Please note: these programs are not available to students in the M.P.P. program.

UEP and Biology

The joint master's degree in urban and environmental policy and planning/biology responds to the need for biological literacy by professionals working in policy areas. The program is designed for individuals who are interested in understanding the technical side of policy and planning, including the implementation of policy (e.g., regulations) and the formulation of policy (e.g., legislation), and accounting for biological aspects of land-use issues (e.g., working with governmental and nongovernmental conservation and planning organizations). Students have the choice of receiving the M.A. or M.S. degree.

UEP and Child Study and Human Development

UEP and the Eliot-Pearson Department of Child Study and Human Development offer a joint master's degree program in child and family policy. The degree is designed for individuals interested in child and family program development, program evaluation, public and private agency administration and planning, policy-oriented research, child advocacy, and community organizing around child and family issues.

UEP and Civil and Environmental Engineering

UEP students may pursue either a joint or dual degree program with the Department of Civil and Environmental Engineering in the School of Engineering. Both programs respond to the need for environmental professionals who are skilled in both a technical and policy perspective in the analysis, planning, and implementation of environmental management and health activities. The programs combine policy study skills with more

technical training in civil and environmental engineering. The joint degree program results in an M.S. degree, while the dual degree program results in both the M.A. and M.S. degrees. The former requires twelve course credits, plus a thesis, while the latter requires seventeen course credits, plus a thesis, and can be completed in five semesters.

UEP and Economics

Economics and public policy and planning are inextricably intertwined. Public policy issues have motivated some of the classic studies in economics, and the tools of economic analysis can be applied to a wide variety of policy and planning questions. The joint-degree program between UEP and the Department of Economics provides students with an opportunity to explore these long-standing linkages and to develop skills in policy analysis and planning based in economics. A student who completes the program is awarded a joint M.S. degree.

UEP and the Fletcher School

The Fletcher School offers a broad program of professional education in international affairs. Its curriculum addresses international law and organization, diplomatic history and international political relations, international economic relations, and international political institutions and systems. UEP and the Fletcher School offer a dual degree program focusing on international environmental policy. This program provides an opportunity for a limited number of highly qualified students to earn both the M.A. degree in urban and environmental policy and planning and the master of arts in law and diplomacy (M.A.L.D.) at the Fletcher School. By combining the two programs, the dual degree can be completed in three instead of four years.

The dual degree program responds to growing student and professional demand for graduate education in international environmental policy. It is designed to prepare students for careers in economic and development institutions, government agencies, and nonprofit organizations concerned with international problems affecting the physical environment, such as acid rain, offshore oil drilling, soil erosion, deforestation, biodiversity, waterways pollution, and chemical contamination.

UEP and the Friedman School of Nutrition Science and Policy

The dual degree programs with the Agriculture, Food, and Environment program and the Food Policy and Applied Nutrition program of the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy are meant for students interested in the connection between environmental effects of food production and supply, and who want to become active participants in policy and planning debates. Students pursuing these programs are interested in deepening their knowledge of policy analysis and planning, and understanding how food policy fits into larger public policy and planning issues—including environmental problem solving and community development. By combining two programs, the dual degree can be completed in three instead of four years. Students receive both an M.A. degree in urban and environmental policy and planning and an M.S. degree in agriculture, food, and environment or a master of science in food policy and applied nutrition.

UEP and Public Health and Community Medicine

Increasingly, public health, community planning and environmental policy have become integrated in the field. A student completing this dual degree program earns an M.P.H. (master of public health) degree from the School of Medicine and an M.A. degree in urban and environmental policy and planning. The program generally requires six semesters of full-time study. Students enroll in three semesters at UEP and three semesters (including summers) at the M.P.H. program. The preferred sequence of enrollment is for students to enroll in UEP for their first and second semesters. The student then enrolls in the M.P.H. program in their third and fourth semesters, and splits their final year between UEP and M.P.H. enrollment. Students are encouraged to integrate their knowledge in both programs from the start, as those enrolled in either program may take courses to fulfill degree requirements via cross registration.

UEP and the Boston College Law School

This program is for students interested in exploring the connections between the law and urban and environmental policy and planning. Students receive two degrees—an M.A. and a Juris Doctor (M.A./J.D.). The dual degree program recognizes

that the fields of law and planning are inexorably linked. Planning (including policy analysis) is a process of guiding future developmental patterns; the law frames the mechanisms and limits of governments' control over this process. Planning and law immerse students in broad debates and critical thinking about the environment, human settlements, social and environmental justice, corporate responsibility, and land use. All of these issues are guided by constitutional, equitable, and pragmatic principles.

The M.A./J.D. is offered through collaboration between UEP and the Boston College Law School. There is currently no graduate program in New England which offers the combined strengths of this dual degree program.

During their first year, students choose to take courses either through UEP or the law school exclusively. Students split their courses between the department and the law school in the years that follow. Students may transfer credits toward each degree, allowing them to concentrate their studies and complete the program in four years (as opposed to five, which would be typical if a student were pursuing each degree separately). For detailed information on the requirements for the J.D., please contact the Boston College Law School, Newton, MA 02459, or visit www.bc.edu/schools/law/home.html.

UEP and the Boston College Carroll School of Management

This program is designed for students who want to develop leadership and management skills to implement policy and planning initiatives, and those interested in social entrepreneurship, corporate social responsibility and sustainability. Students receive two degrees—a master of arts and a master of business administration (M.A./M.B.A.). The dual degree recognizes that the fields of planning, policy and management have always been linked, but the value of the nexus increases with a complex global economy and growing world population. Planning, policy and management disciplines have embedded in them broad debates and critical thinking about the environment, human settlements, social and environmental justice, corporate responsibility, sustainable communities, and land use, each guided by core values, account-

ability and professional practice. The values-driven nature of both programs means that in scholarship and practice, faculty and students in the dual program actively negotiate the evolving relationship between business and civil society.

The M.A./M.B.A. program, offered through collaboration between UEP and Boston College's Carroll School of Management (CSOM), is unique, offering students the opportunity to capitalize on the strengths of two nationally recognized schools. During their first year, students choose to take courses either through UEP or CSOM exclusively. Students split their coursework between UEP and CSOM in the years that follow, ultimately spending three semesters registered at CSOM and three semesters registered at UEP. For detailed information on requirements for the M.B.A., please see www.bc.edu/content/bc/schools/csom/graduate.html.

CERTIFICATE PROGRAMS

In addition to the master's programs, the Department of Urban and Environmental Policy and Planning offers two certificate programs in community sustainability. The certificates in management of community organizations and community environmental studies emphasize participatory strategies for community self-determination and sustainability. These flexible programs enable working adults to gain the vital management and environmental skills necessary to enhance current careers or to move into new professional work. A third certificate in program evaluation is offered in collaboration with the Department of Child Study and Human Development, the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, and the School of Medicine.

To earn a certificate, students successfully complete four courses for credit. The certificate in program evaluation also requires completion of an applied practicum. Courses for the certificate programs are drawn from the curriculum of the M.A. program. It is possible to complete a certificate program in as little as one year or to extend it over several years. The certificate programs are open to students with a bachelor's degree. For more information, visit <http://gradstudy.tufts.edu>.

Certificate Program in Community Environmental Studies

The certificate in community environmental studies (CES) provides professional training for careers in today's rapidly growing and changing environmental field. The program offers a rich and varied selection of environmental courses in planning, policy, economics, engineering, and science complemented by courses in negotiation, law, and nonprofit management. This program is designed for citizen advocates seeking to promote environmentally sustainable communities, environmental specialists in companies who interact with community leaders, and public agency personnel. (See Community Environmental Studies in this bulletin for description.)

This certificate requires four courses.

CES Core Courses

Select at least one core course from the following:

- UEP 200** Land Use Planning I: Nonregulatory Tools and Techniques (Fall)
- UEP 201** Land Use Planning II (Spring)
- UEP 221** Climate Change Policy and Planning (Spring)
- UEP 223** Fundamentals of U.S. Agriculture (Fall)
- UEP 279** Water Resources Policy, Planning, and Watershed Management (Fall)

CES Electives

Select up to three skills and environmental policy electives from the following:

- UEP 161B** Writing and Public Communication
- UEP 173** Transportation Planning
- UEP 205** Urban Planning and Design
- UEP 206** Planning for Low Impact Development
- UEP 222** Biotechnology: Social and Environmental Issues
- UEP 230** Negotiation, Mediation, and Conflict Resolution
- UEP 232** Introduction to Geographic Information Systems
- UEP 233** Regional Planning: Tools and Techniques
- UEP 234** Qualitative Analysis for Planning and Public Policy
- UEP 242** International Planning and Urban Policy
- UEP 264** Green Urban Design
- UEP 265** Corporate Management of Environmental Issues
- UEP 278** Environmental Justice, Security, and Sustainability
- UEP 284** Developing Sustainable Communities
- UEP 286** Environmental Ethics
- UEP 294-16** Special Topics: Public Health and the Built Environment

(Students may substitute other Tufts graduate courses, subject to the approval of the certificate advisor.)

Certificate Program in Management of Community Organizations

The certificate in management of community organizations (MCO) offers professional management training within the framework of the social, economic, and political values that shape the nonprofit sector. The program's goal is to train people in effective management who are committed to social policy and wish to work at the community level. Participants share a commitment to working to improve the housing, employment, environment, health, and overall quality of life for low-income groups and communities. (See Management of Community Organizations in this bulletin for description.)

This certificate requires four courses.

MCO Core Courses

Select at least one core course from the following:

- UEP 253** Financial Analysis and Management (Spring)
- UEP 256** Program Evaluation (Fall and Spring)
- UEP 261** Community Development, Planning, and Politics (Spring)
- UEP 276** Leadership and Organizational Development (Fall)

Course descriptions for these core courses can be found on the UEP website.

MCO Electives

Select up to three skills and urban and social policy electives from the following:

- UEP 161A** Writing and Public Communication
- UEP 191B** Philanthropy and Fundraising
- UEP 205** Urban Planning and Design
- UEP 213** Housing Policy
- UEP 230** Negotiation, Mediation, and Conflict Resolution
- UEP 240** U.S. Social Welfare Policy
- UEP 251** Economics for Planning and Policy Analysis
- UEP 271** Community Economic Development
- UEP 275** Policy Implementation and Innovation
- UEP 282** Social Policy for Children and Families
- UEP 284** Developing Sustainable Communities
- UEP 294** Local Government Finance

(Students may substitute other Tufts graduate courses, subject to the approval of the certificate advisor.)

Certificate Program in Program Evaluation

Private funders and public agencies are increasingly demanding evaluation as a provision for funding. Individuals with evaluation training are needed to assist programs, sponsoring agencies, and funders in planning and carrying out evaluations to address their needs for information and analysis. The certificate in program evaluation is designed for midcareer professionals who wish to learn about the design and implementation of effective evaluation strategies. Students learn practical skills that can be put to use in the evaluation of a wide range of social service, public health, community development, and environmental programs. In addition to a bachelor's degree, applicants are expected to have three to five years of professional experience in a particular field. (See Program Evaluation in this bulletin for description.)

This certificate requires four courses (format code: UEP = Urban and Environmental Policy and Planning; CD = Child Study and Human Development; PSY = Psychology; NUTR = Nutrition; SOC = Sociology; OTS = Occupational Therapy; ED = Education; MPH = Public Health).

Courses in statistics, data analysis, and research methods are offered by several departments. Course substitutions can be made with the approval of the certificate faculty advisor.

1. Foundation course:

UEP 256 (also **CD 247**) Program Evaluation

2. One course in applied statistics and data analysis, for example:

CD 140 Problems of Research: Statistics

MPH 205 Principles of Biostatistics

NUTR 209 Statistical Methods for Nutrition Research

NUTR 211 Nutrition Data Analysis

PSY 107/108 Advanced Statistics

SOC 101 Quantitative Research Methods

UEP 254 Quantitative Reasoning for Policy and Planning

3. One course in research methods, for example:

CD 142 Problems of Research: Methods and Design

ED 271 Methods of Educational Research

MPH 201 Principles of Epidemiology

NUTR 210 Survey Research in Nutrition

OTS 210 Research Methods

SOC 105 Field Research

4. One elective in your area of interest or expertise: education, child development, nonprofit management, social or environmental policy, nutrition, or public health.

For more detailed information, please visit the UEP website <http://ase.tufts.edu/uep>.

Urban Studies

FACULTY COORDINATOR:

Professor Weiping Wu, *Urban and Environmental Policy and Planning*

The Minor in Urban Studies provides students with an opportunity to pursue their love of cities and communities and to study urban issues in depth. Students can select from a variety of courses that examine the interplay among the different groups occupying the urban space, the problems they confront, their struggle for recognition and power, and the forces shaping the physical terrain they inhabit. The minor offers a good foundation for students contemplating graduate work in urban planning, environmental policy, public administration, public policy, law, or social work. It also can be an intellectually exciting focus for interdisciplinary exploration, because understanding urban phenomena requires synthesizing knowledge from a broad range of the social sciences and humanities. The completion of five courses from at least three different departments is required. In addition, a student is required to complete an appropriate capstone project, such as a research paper, an oral presentation, a video, a photographic exhibit, a fictional narrative, or other forms of study, which integrates the knowledge and methodologies of the disciplines involved. Interested students should consult the faculty coordinator, Weiping Wu (weiping.wu@tufts.edu), about specific courses that can be counted toward the Minor. For more detailed information, please visit: <http://ase.tufts.edu/uep/Degrees/UrbanStudiesMinor.aspx>.

Water: Systems, Science & Society

John L. Durant, *Department of Civil and Environmental Engineering*

Timothy Griffin, *Friedman School of Nutrition Science and Policy*

PROGRAM DESCRIPTION

The goal of the graduate certificate program in Water: Systems, Science & Society (WSSS) is to train a new kind of professional who understands the causes and dynamics of water-related problems from multiple points of view, yet has the skills and knowledge to be an expert in a particular discipline. To ensure sufficient depth and expertise in that discipline, students in the WSSS program must be accepted by and obtain their graduate degrees from an existing school or department. Tufts schools participating in WSSS include Arts and Sciences, Engineering, Medicine, Veterinary Medicine, the Friedman School of Nutrition Science and Policy, and the Fletcher School of Law and Diplomacy.

To earn the certificate students in the program must:

1. Complete the Research Track:
 - a. Take three WSSS-approved courses,
 - b. Attend regular WSSS meetings,
 - c. Complete a thesis or capstone project on a water-related topic,
 - d. Present water-related research at a public forum, and
 - e. Submit a transcript of water-related research writing to a peer-reviewed journal.
2. Or, complete the Practicum Track:
 - a. Take two WSSS-approved courses,
 - b. Attend regular WSSS meetings,
 - c. Participate in one of the WSSS practicum projects during the spring semester,
 - d. Participate in the planning and execution of the annual WSSS symposium, and
 - e. Complete an Interdisciplinary Professional Experience internship of 150 hours or more in a water-focused capacity.

WSSS Practicum: The WSSS Practicum allows WSSS students to work in small groups on the integrated assessment of water resources case studies. The goal of the practicum is to expose students to the techniques and thought processes of integrated assessment in order to train them as researchers and professionals. The practicum is headed by Rusty Russell of the Urban and Environmental Policy and Planning Department, with input from other participating WSSS faculty.

Internship: To foster individual student development, a problem-focused, domestic or international field experience with a public- or private-sector organization—the Interdisciplinary Professional Experience (IPE)—is required of WSSS students choosing Track P. The goal is for students to work in an area related to their WSSS research topics and thereby to further integrate training, practice, and research. Students and their faculty mentors, however, may select other IPE placements tailored to the student's interests. Through the IPE—which often takes the form of an internship—students gain professional-level experience and may develop opportunities for future research and subsequent employment. Students may secure their own IPE or seek the advice of WSSS faculty with similar interests. Indeed, WSSS faculty offer an impressive array of potential opportunities in a wide range of international and domestic organizations.

WSSS students conduct interdisciplinary research in areas where Tufts has well-established research programs:

1. Water, Climate and Environmental Change
2. Water and Public Health
3. Water Pollution and Remediation Science
4. Watershed Management
5. Water, Food and Livelihood Security
6. Water Diplomacy

The WSSS graduate certificate requirements are completed in addition to the student's degree requirements, but through the use of electives and co-listed courses, the WSSS program usually will not add time to a graduate degree program. Upon completion of these activities, students receive a certificate and transcript notation for Water: Systems, Science & Society, as well as their graduate degree.

Note: Occasionally modifications may be made to these requirements; therefore, please confirm with school coordinators or program co-chairs at time of application.

For more information, please contact John Durant, john.durant@tufts.edu, 617-627-5489.

For more detailed information, including a list of approved WSSS courses, the WSSS handbook, meeting agendas, student and alumni information and many other resources, please visit the WSSS website: www.tufts.edu/water

Women's, Gender, and Sexuality Studies

DIRECTOR:

Associate Professor Sarah Pinto, *Anthropology/WGSS*

PROGRAM ADMINISTRATOR:

Andrea Carlino

AFFILIATED FACULTY:

More than fifty faculty members across Arts and Sciences are affiliated with WGSS as teaching faculty and/or mentors for senior projects. For an updated list and information about affiliated faculty please see the program website:

<http://ase.tufts.edu/wgss>.

Women's, Gender, and Sexuality Studies is an interdisciplinary program that focuses on research and teaching in three overlapping fields of inquiry. Scholarship in Women's, Gender, and Sexuality Studies integrates knowledge and methodologies from many disciplines to analyze the various historical and political circumstances, social and economic forces, and cultural representations that shape gendered lives. It emphasizes the fundamental intersection of gender and sexuality with other crucial categories of human identity and experience, including race, ethnicity, and class. It explores the connections between the individual and institutional systems of power in local, national, and transnational contexts. It draws on the insights of feminist theory and practice and develops new modes of critical thought and new models for activism. The program offers a number of interdisciplinary courses, including introductory courses and special topics courses open to all undergradu-

ates; in addition, it brings together a wide range of courses taught in different departments and programs, each contributing a unique approach to specific topics and materials within the broad and diverse study of women, gender, and sexuality. Additionally the WGSS program organizes lectures, faculty research colloquia, and other academic events, including annual public forums in which students present their research and capstone projects.

UNDERGRADUATE MAJOR REQUIREMENTS

The major in Women's, Gender, and Sexuality Studies gives students the opportunity to pursue their own intellectual interests within the multifaceted study of women, gender, and/or sexuality. All majors take two interdisciplinary courses offered by the Program (WGSS 72: Intro to WGSS and WGSS 190: Doing Feminist Research); two core courses that explore the broad, foundational questions and arguments within specific disciplines or interdisciplinary fields of study; and five electives chosen from at least three different departments or programs that engage particular subjects, issues, and materials in the study of women, gender, and/or sexuality. Among the five electives, students take at least three within a concentration area chosen from those suggested on the program website or designed individually in consultation with the program director based on a student's focus of interest. In addition, all majors do a capstone project in the senior year that develops from the concentration area, either as a mentored independent project (WGSS 193) or, if eligible, an honors thesis (WGSS 198/199). The director of WGSS serves as academic advisor to the major and oversees the progress of all students in the program. Two faculty mentors from different disciplines appropriate to the topic advise on the capstone project or thesis in the senior year. With the director's approval, one internship for credit, one Experimental College course, and one independent research course may count as electives. All courses must be taken for a letter grade and receive a grade of C- or higher. With approval from the director, up to four credits can be transferred from another institution towards the major.

UNDERGRADUATE MINOR REQUIREMENTS

The WGSS interdisciplinary minor complements and may also integrate with a student's major. Students pursuing the minor in Women's, Gender, and Sexuality Studies take a total of six credits, including two interdisciplinary courses offered by the program (WGSS 72: Intro to WGSS and WGSS 190: Doing Feminist Research) and three electives from at least two different departments or programs that engage particular subjects, issues, and materials in the study of women, gender, and/or sexuality. It is recommended that one core course be included among the electives. In addition, all minors do a capstone project in the senior year, either as a mentored independent project (WGSS 193) or, with approval from the program director, by doing a substantial research paper/project in a fourth WGSS elective course. The director advises on course selection to fit each student's interests and to identify a framework for the capstone project. Two faculty mentors from different disciplines appropriate to the topic advise on the capstone project in the senior year. If completed by doing a substantial research paper/project in a fourth WGSS elective, the instructor of the course acts as mentor and grades the paper, a copy of which must be delivered to the WGSS office to fulfill the capstone requirement. All courses must be taken for a letter grade and receive a grade of C- or higher. With approval from the director, two credits can be transferred from another institution towards the minor.

GRADUATE COURSES

Tufts is one of the nine institutional members of the Graduate Consortium in Women's Studies (GCWS), which offers a changing curriculum of interdisciplinary, team-taught graduate level courses for credit toward a Tufts graduate degree (with departmental advisor approval). Undergraduates doing research in a relevant topic can apply to be admitted to a GCWS course. The courses have a Tufts registration number. For more information about specific courses, the application process, and other Consortium programs for graduate students, including conferences, a dissertation writing workshop, and the annual Mother Board writing prize, contact the Consortium at 617-642-3485 or visit <http://mit.edu/gcws>.

WGSS CURRICULUM

Women's, Gender, and Sexuality Studies lists at least twenty courses each semester in a wide range of subjects and materials offered by departments and programs, including those taught regularly and as special topics within the WGSS Program. See the Program website at <http://ase.tufts.edu/wgss> for specific semester listings, course descriptions, and other information about the Women's, Gender, and Sexuality Studies requirements and curriculum.

World Literature

Tufts makes available a wide range of courses on foreign literatures in English translation, Anglophone literatures abroad, diaspora literatures and other cross-cultural literary surveys, as well as introductory survey courses of foreign literatures in the original languages. For a full list of such courses, see the information about International Literary and Visual Studies (ILVS) at the following site: <http://ase.tufts.edu/ILVS>, and the course offerings of the various foreign language and literature departments: Classics (which comprises Greek and Latin); Drama; German, Russian, and Asian Languages and Literatures (which comprises Arabic, Chinese, German, Hebrew, Japanese, Judaic Studies, and Russian); and Romance Languages (which comprises French, Italian, Portuguese, and Spanish). The nearest equivalent to a major in World Literature is the major in ILVS. Please see the description of that major at the site referred to above. The Department of English and the Department of Drama and Dance also offer majors with a broadly international and cross-cultural orientation. See those departmental websites for details.

Research and Educational Centers

Advanced Technology Laboratory (ATL)

Stacie Simon, *Lab Coordinator*

The laboratory is located at 200 Boston Avenue. For more information, visit <http://ase.tufts.edu/atl/> or call 617-627-0900.

Center for Cognitive Studies

Daniel Dennett, *Co-director*

Ray Jackendoff, *Co-director*

The center is located in 115 Miner Hall. For more information, visit <http://ase.tufts.edu/cogstud> or call 617-627-3297.

Center for Engineering Education and Outreach (CEEEO)

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The center is located in the lower level of Curtis Hall. For more information, visit <http://www.ceeo.tufts.edu>, call 617-627-5888, or email ceeo@tufts.edu.

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Donna Qualters, *Director*

The center is located at 108 Bromfield Road. For more information, visit <http://celt.tufts.edu/>, call 617-627-4000, or e-mail celt@tufts.edu.

Center for the Humanities at Tufts (CHAT)

Jonathan Wilson, *Director*

The center is located at 48 Professors Row. For more information, visit <http://ase.tufts.edu/chat/>, call 617-627-3342, or e-mail humanities@tufts.edu.

Center for Information & Research on Civic Learning and Engagement (CIRCLE)

Kei Kawashima-Ginsberg, *Director*

The center is located in Lincoln-Filene Hall. For more information, visit <http://www.civicyouth.org/> or call 617-627-4710.

Center for Interdisciplinary Studies (CIS)

Julie Dobrow, *Director*

The center is located in Eaton Hall. For more information, visit <http://cis.tufts.edu/> or call 617-627-2955.

Center for Reading and Language Research

Maryanne Wolf, *Director*

The center is located in Miller Hall. For more information, visit <http://ase.tufts.edu/crlr/> or call 617-627-3815.

Center for Science and Mathematics Teaching

Ronald Thornton, *Director*

The center is located at 4 Colby Street in the Science and Technology Center. For more information, visit <http://ase.tufts.edu/csmt/>, call 617-627-2825, or e-mail csmt@tufts.edu.

Center for Science, Technology, Engineering and Mathematics (STEM) Diversity

Darryl Williams, *Director*

The center is located in Anderson Hall. For more information, visit <http://stemdiversity.tufts.edu/>, call 617-627-4169, or e-mail stemdiversity@tufts.edu.

Center for Scientific Visualization

Lionel Zupan, *Associate Director for Research Technology*

The center is located in Anderson Hall. For more information, visit <http://sciviz.tufts.edu/> or call 617-627-4933.

Center for South Asian and Indian Ocean Studies

Ayesha Jalal, *Director*

The center is located in East Hall. For more information, visit <http://ase.tufts.edu/southasian/> or call 617-627-2133.

Center for the Study of Race and Democracy

Peniel Joseph, *Director*

The center is located at 23 Bellevue St. For more information, visit <http://as.tufts.edu/csrd/> or call 781.874.9178.

Fares Center for Eastern Mediterranean Studies

Nadim Shehadi, *Director*

The center is located at 160 Packard Avenue. For more information, visit <http://farescenter.tufts.edu>, call 617-627-6560, or e-mail fares-center@tufts.edu.

Feinstein International Center**Karen Jacobsen**, *Acting Director*

The center is located at 114 Curtis Street on the Medford campus. For more information, visit <http://fic.tufts.edu/>, call 617-627-3423, or e-mail fic@tufts.edu.

Geographic Information Systems (GIS) Center

The center is located in Tisch Library. For more information, visit <http://sites.tufts.edu/gis/>.

Global Development and Environment Institute (GDAE)**Neva Goodwin**, *Co-director***William Moomaw**, *Co-director*

GDAE is located at 44 Teele Avenue. For more information, visit <http://ase.tufts.edu/gdae>, call 617-627-3530, or e-mail gdae@tufts.edu.

Human Robot Interaction Laboratory**Matthias Scheutz**, *Director*

The laboratory is located at 200 Boston Avenue. For more information, visit <http://hrilab.cs.tufts.edu/> or call 617-627-6416.

Institute for Applied Research in Youth Development (IARYD)**Richard Lerner**, *Director*

The institute is located in the Lincoln-Filene Center. For more information, visit <http://ase.tufts.edu/iaryd/>, call 617-627-5558, or e-mail iaryd@tufts.edu.

Institute for Global Leadership (IGL)**Michael Peznola**, *Executive Director***Sherman Teichman**, *Founding Director*

The institute is located at 96 Packard Avenue. For more information, visit <http://www.tuftsgloballeadership.org>, call 617-627-3314, or e-mail tuftsigl@gmail.com.

Institute of Cosmology**Alexander Vilenkin**, *Director*

The institute is located in Robinson Hall. For more information, visit <http://cosmos2.phy.tufts.edu/xbook.html> or call 617-627-5363.

Interdisciplinary Laboratory for Computation

The laboratory is located at 196 Boston Avenue.

For more information, call the 617-627-2225 or e-mail csadmin@cs.tufts.edu.

Talloires Network**Rob Hollister**, *Executive Director*

The network secretariat is located at 23 Bellevue Street.

For more information, visit <http://talloiresnetwork.tufts.edu/> or call 781-874-9731 or email talloiresnetwork@tufts.edu.

Tissue Engineering Resource Center (TERC)**David Kaplan**, *Director***Gordana Vunjak-Novakovic**, *Associate Director*

The center is located at 4 Colby Street. For more information, visit <http://ase.tufts.edu/terc> or call 617-627-0824.

Tufts Clinical and Translational Science Institute (CTSI)**Harry Selker**, *Dean*

The institute is located at Tufts Medical Center, 35 Kneeland Street. For more information, visit <http://tuftsctsi.org/> or call 617-636-2874.

Tufts Community Research Center**Doug Brugge**, *Director*

The center is located at 136 Harrison Avenue. For more information, visit <http://activecitizen.tufts.edu/research/tcrc/> or call 617-6236-0326.

Tufts Gordon Institute**Mark Ranalli**, *Executive Director and Associate Dean*

Tufts Gordon Institute is located at 200 Boston Avenue, Suite 2400. For more information, visit <http://gordon.tufts.edu/> or call 617-627-3110.

Tufts Institute of the Environment (TIE)**Antje Danielson**, *Administrative Director*

TIE is located in Miller Hall, 210 Packard Avenue. For more information, visit <http://environment.tufts.edu/> or call 617-627-3645.

Tufts University European Center**Gabriella Goldstein**, *Director*

The center is located in Talloires, France and can also be contacted at 108 Packard Avenue. For more information, visit <http://ase.tufts.edu/europeancenter/>, call 617-627-3290, or email france@tufts.edu.

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CLASS YEAR ABBREVIATIONS

A	College of Liberal Arts
D	Dental School
E	Engineering School
F	Fletcher School
G	Graduate School
H	Honorary Degree
J	Jackson College
M	Medical School
N	Friedman School of Nutrition Science and Policy
P	Parent of Student
V	Cummings School of Veterinary Medicine

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Paul Stanton, B.A., M.Ed., Interim Dean of Student Services
Carol Baffi-Dugan, B.A., M.A., Associate Dean of Undergraduate Education, Program Director for Health Professions Advising and Post-Bac Premedical Program

Sheila P. Bayne, B.A., M.A., D.Phil., Associate Dean of Undergraduate Education, Director of Programs Abroad

Robyn S. Gittleman, B.A., M.Ed., Associate Dean of the Colleges, Director of the Experimental College

Jean L. Herbert, B.A., M.A., Ph.D., Associate Dean of Undergraduate Education, Director of Resumed Education for Adult Learners (R.E.A.L.) Program

Jason Rife, B.S., M.S., Ph.D., Associate Dean for Undergraduate Education, School of Engineering

Robert D. Mack, B.A., M.Ed., Ed.D., Associate Dean of Undergraduate Education, Director of Bridge to Liberal Arts Success at Tufts (BLAST) Program

Katrina Moore, B.A., M.Ed., Director of the Africana Center

Marisel Perez, B.S., M.Ed., Associate Dean of Student Affairs

Karen Panetta, B.S., M.S., Ph.D., Associate Dean for Graduate Education, School of Engineering

Fiorenzo Omenetto, B.A., M.S., Ph.D., Associate Dean for Research, School of Engineering

Darryl N. Williams, B.S., M.S., Ph.D., Associate Dean for Recruitment, Retention, and Community Engagement

Faculty

In the following list, names of all professors, associate professors, assistant professors, instructors, and lecturers in the Faculty of Arts, Sciences, and Engineering are arranged alphabetically with degrees, degree date, college attended, and rank as of September 2015.

FULL-TIME FACULTY

Rana Abdul-Aziz, B.A., M.A. (2006), Tufts University, Lecturer in Arabic

Behrouz Abedian, B.S., M.S., Ph.D. (1979), Massachusetts Institute of Technology, Associate Professor of Mechanical Engineering

Thomas Abowd, B.G.S., M.A., Ph.D. (2003), Columbia University, Lecturer in Arabic

Daniel M. Abramson, A.B., M.A., Ph.D. (1993), Harvard University, Associate Professor of Art History

Linda M. Abriola, B.S., M.S., M.A., Ph.D. (1983), Princeton University, University Professor and Professor of Civil and Environmental Engineering

Dany Adams, B.A., Ph.D. (1994), University of Washington, Research Associate Professor of Biology

James Haley Adler, Ph.D. (2009), University of Colorado at Boulder, Assistant Professor of Mathematics

Shuchin Aeron, B.S., M.S., Ph.D. (2009), Boston University, Assistant Professor of Electrical and Computer Engineering

Mohammed Nurul Afsar, B.S., M.S., Ph.D. (1978), University of London (UK), Professor of Electrical and Computer Engineering

Julian Agyeman, B.Sc., M.A., Ph.D. (1996), University of London, Professor of Urban and Environmental Policy and Planning

Jennifer Allen, B.S., M.S., M.P.H., Ph.D. (1997), Harvard University, Associate Professor of Community Health

Astier Almedom, B.A., M.A., D.Phil. (2007), Oxford University, Professor of Practice in International Humanitarian Policy and Public Health, The Fletcher School, and Inaugural Fellow, Institute for Global Leadership

Greg Aloupis, B.Sc., M.Sc., Ph.D. (2005), McGill University, Visiting Assistant Professor of Computer Science

Elizabeth Ammons, B.A., M.A., Ph.D. (1974), University of Illinois, Harriet H. Fay Professor of Literature, Professor of English

David Art, B.A., Ph.D. (2004), Massachusetts Institute of Technology, Associate Professor of Political Science

Ayse Asatekin, B.S., Ph.D. (2009), Massachusetts Institute of Technology, Assistant Professor of Chemical and Biological Engineering

- Gloria Joyce Ascher**, B.A., M.A., Ph.D. (1966), Yale University, Associate Professor of German
- Timothy Atherton**, M.Phys., Ph.D. (2007), University of Exeter, Assistant Professor of Physics
- Joseph H. Auner**, B.A., M.A., Ph.D. (1991), University of Chicago, Professor of Music
- Paula Aymer**, B.Sc., M.A., Ph.D. (1990), Northeastern University, Associate Professor of Sociology
- Jody Azzouni**, B.A., M.A., M.S., Ph.D. (1986), City University of New York, Professor of Philosophy
- Laura M. Baffoni-Licata**, Dottorato, Ph.D. (1984), University of Connecticut, Senior Lecturer in Italian
- Ina Baghdiantz McCabe**, B.A., M. Phil., Ph.D. (1993), Columbia University, Hagop and Miriam Darakjian and Boghos and Nazley Jafarian and Son Haig Chair in Armenian History, Professor of History
- Stephen M. Bailey**, B.A., M.A., Ph.D. (1978), University of Michigan, Associate Professor of Anthropology
- Laurie G. Baise**, B.S.E., M.S., Ph.D. (2000), University of California at Berkeley, Professor of Civil and Environmental Engineering
- Natalya Baldyga**, Ph.D. (2006), University of Minnesota, Assistant Professor of Drama
- Cynthia Ballenger**, B.A., M.Ed., Ph.D. (1994), Boston University, Lecturer in Child Study and Human Development
- Linda Bamber**, B.A., M.A., Ph.D. (1974), Tufts University, Professor of English
- Susan Barahal**, B.S., M.Ed., Boston University, Lecturer in Art Education
- Cristelle Baskins**, B.A., Ph.D. (1988), University of California at Berkeley, Associate Professor of Art History
- Nancy Bauer**, A.B., M.T.S., Ph.D. (1997), Harvard University, Professor of Philosophy
- Avner Baz**, M.A., Ph.D. (2000), University of Illinois, Associate Professor of Philosophy
- Linda Beardsley**, B.A., M.A., M.Ed. (1982), Tufts University, Senior Lecturer in Education
- Pierre-Hugues Beauchemin**, B.S., M.S., Ph.D. (2005), McGill University, Assistant Professor of Physics
- Marie-Claire Beaulieu**, Ph.D. (2008), University of Texas at Austin, Assistant Professor of Classics
- Michael Beckley**, B.A., M.A., Ph.D. (2012), Columbia University, Assistant Professor of Political Science
- Gary Bedell**, B.S., M.A., Ph.D., OT (1998), New York University, Associate Professor of Occupational Therapy
- Jacob S. Benner**, B.A., M.S. (2000), University of Utah, Senior Lecturer in Earth and Ocean Sciences
- Clay Bennett**, B.S., Ph.D. (2005), University of Pennsylvania, Assistant Professor of Chemistry
- Harry Bernheim**, B.S., M.S., Ph.D. (1976), University of Michigan, Associate Professor of Biology
- Jane Bernstein**, B.A., M.Mus., Ph.D. (1974), University of California at Berkeley, Fletcher Professor of Music
- Jeffrey Berry**, A.B., M.A., Ph.D. (1974), Johns Hopkins University, John Richard Skuse Class of 1941 Professor of Political Science
- Marina Umaschi Bers**, B.A., M.Ed., M.S., Ph.D. (2001), Massachusetts Institute of Technology, Professor of Child Study and Human Development
- Maria Juliana Berte**, B.A., M.A. (2001), University of Minnesota, Lecturer in Spanish
- Marcelo Bianconi**, B.A., M.A., Ph.D. (1988), University of Illinois, Professor of Economics
- Amahl Bishara**, A.B., M.A., Ph.D. (2006), New York University, Associate Professor of Anthropology
- Lauren D. Black III**, B.S., M.S., Ph.D. (2006), Boston University, Assistant Professor of Biomedical Engineering
- Alexander Blanchette**, B.A., M.A., Ph.D. (2012), University of Chicago, Assistant Professor of Anthropology and Environmental Studies
- Anselm C. Blumer**, B.A., M.Sc., Ph.D. (1982), University of Illinois, Associate Professor of Computer Science
- Bruce Boghosian**, B.S., M.S., Ph.D. (1987), University of California at Davis, Professor of Mathematics
- Christoph Börgers**, Ph.D. (1985), Courant Institute of Mathematical Sciences, Professor of Mathematics
- Pamela Bower-Basso**, B.A., M.A. (1978), Rhode Island School of Design, Lecturer in Art Education
- Bárbara M. Brizuela**, M.A., Ed.D. (2001), Harvard University, Dean of Academic Affairs for Arts and Sciences and Professor of Education
- Daniel Brown**, A.B., M.A., Ph.D. (1977), Brown University, Associate Professor of German
- Drusilla Brown**, B.A., M.A., Ph.D. (1984), University of Michigan, Associate Professor of Economics
- Kristina Schmid Callina**, B.A., M.S., Ph.D., Assistant Research Professor in Child Study and Human Development
- Kathleen Camara**, B.A., M.A., Ph.D. (1979), Stanford University, Associate Professor of Child Study and Human Development
- Alessandra Campana**, M.A., Ph.D. (2004), Cornell University, Associate Professor of Music
- Alfred Jay Cantor**, B.A., Ph.D. (1977), University of California at Santa Cruz, Professor of English
- Natalie L. Cápiro**, B.S., M.S., Ph.D. (2007), Rice University, Research Assistant Professor of Civil and Environmental Engineering
- Gregory Carleton**, B.A., M.A., Ph.D. (1992), University of Michigan, Professor of Russian

FACULTY >

Peggy Cebe, B.S.Ed., M.S., Ph.D. (1984), Cornell University, Professor of Physics

Renata Celichowska, B.A., M.A. (1992), New York University, Lecturer and Director of Dance Program

Ujjayant Chakravorty, B.S., Ph.D. (1989), University of Hawai'i at Mānoa, Professor of Economics

C. Hwa Chang, B.S., M.S., Ph.D. (1987), Drexel University, Associate Professor of Electrical and Computer Engineering

Remco Chang, B.A., M.Sc., Ph.D. (2009), University of North Carolina at Charlotte, Assistant Professor of Computer Science

Steven C. Chapra, B.E., M.E., Ph.D. (1982), University of Michigan, Louis Berger Professor of Civil and Environmental Engineering

Jana H. Chaudhuri, B.A., M.A., Ph.D., Assistant Research Professor in Child Study and Human Development

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Frances Sze-Ling Chew, A.B., Ph.D. (1974), Yale University, Professor of Biology

Luisa Chiesa, B.S., M.S., Ph.D. (2008), Massachusetts Institute of Technology, Associate Professor of Mechanical Engineering

Ming Y. Chow, B.S., M.S. (2004), Tufts University, Lecturer in Computer Science

Wayne A. Chudyk, B.S., M.S., Ph.D. (1980), University of Illinois, Associate Professor of Civil and Environmental Engineering

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Steven David Cohen, B.A., M.A., Ph.D. (1980), Brandeis University, Senior Lecturer in Education

Robert Cook, B.S., M.A., Ph.D. (1983), University of California at Berkeley, Professor of Psychology

Alva Couch, S.B., M.S., Ph.D. (1988), Tufts University, Associate Professor of Computer Science

Lenore J. Cowen, B.A., Ph.D. (1993), Massachusetts Institute of Technology, Professor of Computer Science

Gregory Crane, B.A., Ph.D. (1985), Harvard University, Winnick Family Chair in Technology and Entrepreneurship, Professor of Classics

Elizabeth Crone, B.S., Ph.D. (1995), Duke University, Associate Professor of Biology

Mark Cronin-Golomb, B.Sc., Ph.D. (1983), California Institute of Technology, Professor of Biomedical Engineering

Consuelo Cruz, B.S.F.S., M.A., Ph.D. (1994), Massachusetts Institute of Technology, Associate Professor of Political Science

Janet Curran-Brooks, B.S., M.Ed., O.T.R. (1991), Harvard University, Senior Lecturer in Occupational Therapy

Heather Curtis, B.A., M.A., Th.D. (2003), Harvard University, Associate Professor of Religion

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David Denby, B.A., B.Phil., Ph.D. (1997), University of Massachusetts at Amherst, Senior Lecturer in Philosophy

Daniel C. Dennett, B.A., D.Phil. (1965), Oxford University, University Professor, Austin B. Fletcher Professor of Philosophy

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Moon Duchin, A.B., M.S., Ph.D. (2005), University of Chicago, Assistant Professor of Mathematics

Kevin Dunn, B.A., M.A., Ph.D. (1988), Yale University, Vice Provost and Associate Professor of English

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George Ellmore, B.A., M.A., Ph.D. (1980), University of California at Berkeley, Draupner Ring Scholar, Associate Professor of Biology

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Brian Epstein, A.B., M.S., Ph.D. (2004), Stanford University, Assistant Professor of Philosophy

Susan G. Ernst, B.A., Ph.D. (1975), University of Massachusetts at Amherst, Professor of Biology

Ioannis Evrigenis, B.A., M.Sc., A.M., Ph.D. (2005), Harvard University, Professor of Political Science

Jennifer Eyl, B.A., M.A., Ph.D. (2012), Brown University, Assistant Professor of Religion

Sergio Fantini, B.S., Ph.D. (1992), University of Florence (Italy), Professor of Biomedical Engineering

Zachary Faubion, B.A., M.S., Ph.D. (2012), University of California at Irvine, Lecturer in Mathematics

Leila Fawaz, B.A., M.A., Ph.D. (1979), Harvard University, Issam M. Fares Chair in Lebanese and Eastern Mediterranean Studies, Professor of History

David Henry Feldman, A.B., Ed.M., Ph.D. (1969), Stanford University, Professor of Child Study and Human Development

Jianping Feng, B.A., M.A., Ph.D. (2004), State University of New York at Albany, Lecturer in Chinese

Kendra Field, B.A., M.P.P., Ph.D. (2010), New York University, Assistant Professor of History

Kathleen Fisher, B.Sc., Ph.D. (1996), Stanford University, Professor of Computer Science

Sasha Fleary, B.A., M.S., Ph.D. (2012), Texas A&M University, Assistant Professor of Child Study and Human Development

Maria Flytzani-Stephanopoulos, B.S., M.S., Ph.D. (1978), University of Minnesota, Robert and Marcy Haber Professor of Chemical and Biological Engineering and Distinguished Professor

Patrick E. Forber, B.A., B.S., M.S., Ph.D. (2006), Stanford University, Associate Professor of Philosophy

Lawrence H. Ford, B.S., M.A., Ph.D. (1974), Princeton University, Professor of Physics

Elizabeth Ann Foster, B.A., M.A., Ph.D. (2006), Princeton University, Assistant Professor of History

Catherine H. Freudenreich, B.A., Ph.D. (1994), Duke University, Professor of Biology

Stephen Michael Fuchs, B.A., Ph.D. (2006), University of Wisconsin, Assistant Professor of Biology

Juliet Fuhrman, A.B., Ph.D. (1982), Johns Hopkins University, Associate Professor of Biology

John Morgan Fyler, B.A., M.A., Ph.D. (1972), University of California at Berkeley, Professor of English

Hugh Gallagher, B.S., Ph.D. (1996), University of Minnesota, Associate Professor of Physics

Kenneth J. Garden, B.A., Ph.D. (2005), University of Chicago, Associate Professor of Religion

Anne Gardulski, B.S., M.S., Ph.D. (1987), Syracuse University, Associate Professor of Earth and Ocean Sciences

David Garman, B.S., M.A., Ph.D. (1984), University of Michigan, Associate Professor of Economics

Patricia Garmirian, B.S., M.S., Ph.D. (2013), Lehigh University, Norbert Wiener Assistant Professor of Mathematics

Grant Garven, B.S., M.S., Ph.D. (1982), University of British Columbia, Professor of Earth and Ocean Sciences

G erard Gasarian, L.  s L., M.  s L., Ph.D. (1982), University of California at Berkeley, Professor of French

Michelle Gaudette, B.A., Ph.D. (1988), Johns Hopkins University, Lecturer in Biology

Laura Gee, B.A., Ph.D. (2013), University of California, San Diego, Assistant Professor of Economics

Christos Georgakis, B.S., M.S., Ph.D. (1975), University of Minnesota, Professor of Chemical and Biological Engineering

Irene Georgakoudi, B.A., M.S., Ph.D. (1998), University of Rochester, Associate Professor of Biomedical Engineering

Nina Gerassi-Navarro, B.A., M.A., Ph.D. (1993), Columbia University, Associate Professor of Spanish

John Germaine, B.S., S.M., Sc.D. (1982), Massachusetts Institute of Technology, Research Professor, Department of Civil and Environmental Engineering

Partha Ghosh, B.S., M.B.A., M.S. (1977), Massachusetts Institute of Technology, Professor of the Practice, Tufts Gordon Institute

Calvin Gidney III, B.A., M.S., Ph.D. (1995), Georgetown University, Associate Professor of Child Study and Human Development

FACULTY >

Linda Ross Girard, B.A., M.F.A. (1996), Brandeis University, Lecturer in Drama

Sol Gittleman, B.A., M.A., Ph.D. (1961), University of Michigan, Nathan and Alice Gantcher University Professor of Judaic Studies, Professor of German

James M. Glaser, B.A., M.A., Ph.D. (1991), University of California at Berkeley, Professor of Political Science and Dean for Arts and Sciences

Mary E. Glaser, B.A., M.A., M.S., Ph.D. (1982), Dartmouth College, Senior Lecturer in Mathematics

Ariel Goldberg, B.A., M.A., Ph.D. (2010), Johns Hopkins University, Assistant Professor of Psychology

Jessica Goldberg, B.A., M.A., Ph.D., Assistant Research Professor in Child Study and Human Development

Gary Richard Goldstein, S.B., S.M., Ph.D. (1968), University of Chicago, Professor of Physics

Fulton B. Gonzalez, B.S., Ph.D. (1984), Massachusetts Institute of Technology, Professor of Mathematics

Julia Svoboda Gouvea, B.A., M.A., Ph.D. (2010), University of California at Davis, Assistant Professor of Education

Brian E. Gravel, Ph.D. (2011), Tufts University, Lecturer and Director of the STEM Elementary Education Program

Kelly Greenhill, B.A., S.M., C.S.S., Ph.D. (2004), Massachusetts Institute of Technology, Associate Professor of Political Science

Chris Gregg, B.S., M.S., Ph.D. (2012), University of Virginia, Lecturer in Computer Science

Barbara Wallace Grossman, A.B., M.A., M.F.A., Ph.D. (1984), Tufts University, Professor of Drama

Jeffrey Guasto, B.S., B.S., Sc.M., Ph.D. (2008), Brown University, Assistant Professor of Mechanical Engineering

Haci Osman Gündüz, B.A., M.A. (2008), Old Dominion University, Lecturer in Arabic

David M. Guss, B.A., M.A., Ph.D. (1982), University of California at Los Angeles, Professor of Anthropology

David M. Gute, B.A., M.P.H., Ph.D. (1981), Yale University, Associate Professor of Civil and Environmental Engineering

Mauricio Gutierrez, B.A., M.A., Ph.D. (1971), Brandeis University, Professor of Mathematics

Samuel Z. Guyer, B.A., M.S., Ph.D. (2003), University of Texas, Associate Professor of Computer Science

Terry Evans Haas, B.S., Ph.D. (1963), Massachusetts Institute of Technology, Professor of Chemistry

Judith Haber, B.A., Ph.D. (1988), University of California at Berkeley, Professor of English

Marjorie Hahn, B.S., Ph.D. (1975), Massachusetts Institute of Technology, Professor of Mathematics

Zeina N. Hakim, Licence ès Lettres, D.E.A., Doctorat ès Lettres, Ph.D. (2005), Columbia University, Associate Professor of French

David Hammer, Ph.D. (1991), University of California at Berkeley, Professor of Education and Co-Director of the Center for Engineering Education Outreach

Daniel Hannon, B.A., M.S., M.Sc., Ph.D. (1991), Brown University, Professor of the Practice in Mechanical Engineering

Hedda Harari-Spencer, B.A., M.A. (2006), University of Virginia, Lecturer in Hebrew

David Wayne Harder, B.A., M.A., Ph.D. (1975), University of Michigan, Professor of Psychology

Anna Hardman, B.A., M.C.P., Ph.D. (1988), Massachusetts Institute of Technology, Senior Lecturer in Economics

Jessica Harney, DPT, PT, OT (2006), MGH Institute of Health Professions, Lecturer in Occupational Therapy

J. Matthew Harrington, B.A., M.A., Ph.D. (2009), University of Michigan, Lecturer in Classics

David Harris, B.S., Ph.D. (1997), Northwestern University, Provost and Professor of Sociology

Boris Hasselblatt, B.S., M.A., Ph.D. (1989), California Institute of Technology, Associate Provost and Professor of Mathematics

Soha Hassoun, B.S., M.S., Ph.D. (1998), University of Washington, Professor and Chair of Computer Science

Brian A. Hatcher, B.A., M.Div., M.A., Ph.D. (1992), Harvard University, Packard Professor of Theology, Professor of Religion

Brenna K. Heitzman, B.A., M.A., Ph.D. (2013), Duke University, Lecturer in French

Mark Hempstead, B.S., S.M., Ph.D. (2009), Harvard University, Associate Professor of Electrical and Computer Engineering

Benjamin Hescott, B.A., Ph.D. (2007), Boston University, Assistant Professor of Computer Science

Lacey J. Hilliard, B.A., B.S., M.S., Ph.D., Assistant Research Professor in Child Study and Human Development

Hosea Hirata, B.A., M.F.A., Ph.D. (1987), University of British Columbia, Professor of Japanese

Steven Hirsch, B.A., Ph.D. (1980), Stanford University, Associate Professor of Classics

Amy K. Hirschfeld, B.A., M.A. (1997), Harvard University, Senior Lecturer, Tufts Gordon Institute

R. Bruce Hitchner, B.A., A.M., Ph.D. (1982), University of Michigan, Professor of Classics

Marc Hodes, B.S., M.S., Ph.D. (1998), Massachusetts Institute of Technology, Associate Professor of Mechanical Engineering

Eva Hoffman, B.A., M.A., Ph.D. (1982), Harvard University, Assistant Professor of Art History

Sonia Hofkosh, B.A., Ph.D. (1988), University of California at Berkeley, Associate Professor of English

- Phillip J. Holcomb**, B.A., Ph.D. (1984), New Mexico State University, Professor of Psychology
- Justin B. Hollander**, B.A., M.R.P., Ph.D. (2007), Rutgers University, Associate Professor of Urban and Environmental Policy and Planning
- Robert Hollister**, B.A., M.C.P., Ph.D. (1980), Massachusetts Institute of Technology, Professor of Urban and Environmental Policy and Planning
- Jeffrey A. Hopwood**, B.S., M.S., Ph.D. (1990), Michigan State University, Professor of Electrical and Computer Engineering
- Alan Hoskinson**, B.S., M.S., Ph.D. (2009), University of Wisconsin at Madison, Research Assistant Professor of Electrical and Computer Engineering
- Xiaozhe Hu**, B.S., Ph.D. (2009), Zhejiang University (China), Assistant Professor of Mathematics
- Charles Shiro Inouye**, A.B., M.A., Ph.D. (1988), Harvard University, Professor of Japanese
- Yannis Ioannides**, M.S., Ph.D. (1974), Stanford University, Max and Herta Neubauer Chair in Economics, Professor of Economics
- Shafiqul Islam**, B.S., M.S., Sc.D. (1991), Massachusetts Institute of Technology, Professor of Civil and Environmental Engineering
- B. Kelsey Jack**, A.B., Ph.D. (2010), Harvard University, Assistant Professor of Economics
- Ray Jackendoff**, B.A., Ph.D. (1969), Massachusetts Institute of Technology, Seth Merrin Professor of Philosophy
- Robert J. K. Jacob**, B.A., M.S.E., Ph.D. (1976), Johns Hopkins University, Professor of Computer Science
- Francine Jacobs**, B.A., M.Ed., Ed.D. (1979), Harvard University, Associate Professor of Child Study and Human Development and Urban and Environmental Policy and Planning
- Fadi Jajji**, M.A. (2004), University of Baghdad, College of Languages, Lecturer in Arabic
- Ayesha Jalal**, B.A., Ph.D. (1983), Trinity College, University of Cambridge, Mary Richardson Professor of History
- Richard C. Jankowsky**, B.A., Ph.D. (2004), University of Chicago, Associate Professor of Music
- Xiaocheng Jiang**, B.S., Ph.D. (2011), Harvard University, Assistant Professor of Biomedical Engineering
- Bruce Johnson**, B.A., M.A., Ph.D. (1999), Harvard Graduate School of Education, Lecturer in Child Study and Human Development
- Sara K. Johnson**, B.S., M.A., Ph.D., Assistant Research Professor in Child Study and Human Development
- Vida Johnson**, B.A., M.A., Ph.D. (1977), Harvard University, Professor of Russian
- Khary Jones**, B.A., M.A., M.F.A. (2010), Columbia University, Lecturer in Drama and Dance
- Paul Joseph**, B.A., M.A., Ph.D. (1975), University of California at Berkeley, Professor of Sociology
- Peniel Joseph**, Ph.D. (2000), Temple University, Professor of History
- Mark L. Kachanov**, B.S., M.S., Ph.D. (1980), Brown University, Professor of Mechanical Engineering
- Kiyomi Kagawa**, B.A., M.A. (1991), University of Illinois at Champaign-Urbana, Senior Lecturer in Japanese
- Ikumi Kaminishi**, B.A., M.A. (1988), University of Chicago, Associate Professor of Art History
- Robin Kanarek**, B.A., M.S., Ph.D. (1974), Rutgers University, John Wade Professor of Psychology
- David L. Kaplan**, B.S., Ph.D. (1978), State University of New York at Stony Brook, Stern Family Professor and Chair of Biomedical Engineering and Distinguished Professor
- Gail Kaufmann**, M.A. (1993), Tufts University, Lecturer in Mathematics
- Jess Keiser**, B.A., M.A., Ph.D. (2013), Cornell University, Assistant Professor of English
- Erin Kelly**, B.A., M.A., Ph.D. (1995), Harvard University, Associate Professor of Philosophy
- Erica Kemmerling**, B.S., M.S., Ph.D. (2013), Stanford University, Assistant Professor of Mechanical Engineering
- Andrew Kemp**, B.Sc., Ph.D. (2009), University of Pennsylvania, Assistant Professor of Geology
- Jonathan E. Kenny**, B.S., M.S., Ph.D. (1979), University of Chicago, Professor of Chemistry
- Usman Khan**, B.S., M.S., Ph.D. (2009), Carnegie Mellon University, Assistant Professor of Electrical and Computer Engineering
- Roni Khardon**, B.Sc., M.Sc., Ph.D. (2000), Harvard University, Professor of Computer Science
- Misha Kilmer**, B.S., M.A., Ph.D. (1997), University of Maryland, Professor of Mathematics
- Jamie A. Kirsch**, B.A., M.A., D.M.A. (2008), Indiana University at Bloomington, Lecturer in Music
- Susan Koegel**, B.A., Ph.D. (2007), University of California at San Francisco, Senior Lecturer in Biology
- Shiori Koizumi**, B.A., M.A. (1992), Longy School of Music, Lecturer in Japanese
- Valencia J. Koomson**, B.S., M.E., Ph.D. (2003), University of Cambridge (UK), Associate Professor of Electrical and Computer Engineering
- Karen Kosinski**, B.S., M.S.P.H., Ph.D. (2011), Tufts University, Assistant Professor of Public Health and Community Medicine
- Samuel Kounaves**, A.A., B.S., M.S., Ph.D. (1985), University of Geneva, Professor of Chemistry

FACULTY >

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Daniel Mulholland, Ph.D., Professor of History Emeritus (1968–2014)

George Saltonstall Mumford, Ph.D., Professor of Astronomy Emeritus (1955–1997)

Joseph Noonan, Ph.D., Professor of Electrical and Computer Engineering Emeritus (1985–2012)

FACULTY >

Susan Ostrander, Ph.D., Professor of Sociology Emerita (1980–2015)

Alice Lucille Palubinskas, Ph.D., Professor of Psychology Emerita (1952–1990)

Aubrey Parkman, Ph.D., Professor of History Emeritus (1953–1983)

A. Benjamin Perlman, Ph.D., Professor of Mechanical Engineering Emeritus (1967–2007)

John Oliver Perry, Ph.D., Goldthwaite Professor of Rhetoric Emeritus (1964–1989)

Arthur Lord Pike, S.M.E.E., Professor of Electrical Engineering Emeritus (1954–1990)

John Duncan Powell, Ph.D., Associate Professor of Political Science Emeritus (1968–1991)

Georgette Vabre Pradal, D. ès L., Professor of Romance Languages Emerita (1962–1986)

Peter L. D. Reid, Ph.D., Professor of Classics Emeritus (1974–2010)

Robert L. Reuss, Ph.D., Associate Professor of Earth and Ocean Sciences Emeritus (1969–2009)

William Francis Reynolds, Ph.D., William Walker Professor of Mathematics Emeritus (1957–1998)

Winifred Rothenberg, Ph.D., Associate Professor of Economics Emerita (1986–2012)

Ronald Salter, Ph.D., Professor of German Emeritus (1968–2006)

Philip Bowen Sampson, Ph.D., Moses Hunt Professor of Psychology Emeritus (1955–1992)

James William Schlesinger, Ph.D., Associate Professor of Mathematics Emeritus (1964–2000)

Analúcia Dias Schliemann, Ph.D., Professor of Education Emerita (1994–2010)

Janet Schmalfeldt, Ph.D., Professor of Music Emerita (1995–2013)

Jacob Schneps, Ph.D., Vannevar Bush Professor of Physics Emeritus (1956–2011)

Lynda Norene Shaffer, Ph.D., Professor of History Emerita (1972–2002)

Yaacov Shapira, Ph.D., Professor of Physics Emeritus (1987–2007)

Martin J. Sherwin, Ph.D., Walter S. Kickson Professor of English and American History Emeritus (1980–2007)

Eli Charles Siegel, Ph.D., Professor of Biology Emeritus (1968–2010)

Saul Abraham Slapikoff, Ph.D., Associate Professor of Biology and American Studies Emeritus (1966–1998)

David A. Sloane, Ph.D., Associate Professor of Russian Emeritus (1979–2011)

Helen D. Smith, Associate Professor in Occupational Therapy Emerita (1967–1998)

Howard Mitchell Solomon, Ph.D., Professor of History Emeritus (1971–2003)

Emese Soos, Ph.D., Lecturer in French Emerita (1982–2015)

Rudolf Francis Storch, Ph.D., Associate Professor of English Emeritus (1965–1988)

Mary Ann Sturtevant, M.Ed., Professor of Physical Education Emerita (1962–1994)

Nakho Sung, Ph.D., Professor of Chemical and Biological Engineering Emeritus (1972–2013)

Leila Aline Sussman, Ph.D., Professor of Sociology Emerita (1966–1992)

Samuel Sutcliffe, Ph.D., Associate Professor of Civil and Environmental Engineering Emeritus (1964–1994)

Walter C. Swap, Ph.D., Professor of Psychology Emeritus (1971–2004)

Sarah Meiklejohn Terry, Ph.D., Associate Professor of Political Science Emerita (1978–2002)

Alice E. Trexler, Ph.D., Associate Professor of Dance Emerita (1978–2012)

Elizabeth Ahn Toupin, M.A., Associate Dean of Undergraduate Education Emerita (1968–1994)

Martha Trudeau Tucker, Ph.D., Senior Lecturer of Education Emerita (1985–2012)

Arthur Uhler, Jr., Ph.D., Professor of Electrical Engineering Emeritus (1948–1994)

Albert Ullman, Ph.D., Professor of Sociology Emeritus (1946–1983)

Vo Van Toi, Ph.D., Associate Professor of Biomedical Engineering Emeritus (1984–2009)

Kenneth Augustus Van Wormer, Jr., Sc.D., Professor of Chemical Engineering Emeritus (1954–2007)

Judith Wechsler, Ph.D., Professor of Art History Emerita (1989–2010)

Anna Wegel-Hajj, M.A., Lecturer in Spanish Emerita (1977–2014)

Kathleen Weiler, Ph.D., Professor of Education Emerita (1988–2012)

Raquel Weitzman, M.A., Lecturer in Spanish Emerita (1995–2014)

John C. Wells, Ph.D., Professor of German Emeritus (1947–1983)

Donald Wertlieb, Ph.D., Professor of Child Study and Human Development Emeritus (1978–2011)

Barbara Ehrlich White, Ph.D., Adjunct Professor of Art History Emerita (1965–2002)

Stephen S. Winter, Ph.D., Professor of Education Emeritus (1971–1991)

Martin L. Zelin, Ph.D., Professor of Psychology Emeritus (1966–2004)

School of the Museum of Fine Arts, Boston

ADMINISTRATION

Christopher Bratton, B.F.A., M.F.A., Doctor Honoris Causa, President of the School of the Museum of Fine Arts

Sarah McKinnon, B.A., M.A., Ph.D., Senior Vice President for Academic Affairs, Dean of the School

Susan Lush, B.A., M.Ed., Associate Dean of Academic Affairs, Undergraduate Programs

Lisa Bynoe, M.F.A., M.F.A., M.Ed., Associate Dean of Graduate Programs

Patrick Carter, B.F.A., M.F.A., SMFA Faculty, Tufts Studio Courses Coordinator

Taylor Horner, B.M., M.M., Registrar

Arts, Sciences, and Engineering Librarians

Christopher Barbour, Associate Librarian, Humanities Collections Librarian, Coordinator of Special Collections William Bloom IV, Associate Librarian, Head of Access Services

Megan Bresnahan, Associate Librarian, Science Collections Librarian, Scholarly Communication Coordinator

Chao Chen, Associate Librarian, Humanities Research and Instruction Librarian

Lydia Herring-Harrington, Affiliate Librarian, Electronic Resources and Metadata Services Librarian

Martha Kelehan, Associate Librarian, Head of Collections, Social Sciences Collections Librarian

Alex May, Assistant Librarian, Cataloging and Metadata Services Librarian

Alicia Morris, Librarian, Head of Technical Services

Marsha S. Paiste, Associate Librarian, Catalog Librarian Josh Quan, Affiliate Librarian, Social Science Data Specialist

Constance Reik, Librarian, Social Sciences Research and Instruction Librarian, Government Information Coordinator

Michael Rogan, Librarian, Music Librarian

Erica Schattle, Associate Librarian, First Year Education Librarian

Evan Simpson, Associate Librarian, Head of Research and Instruction

Christopher Strauber, Associate Librarian, Humanities Research and Instruction Librarian, Instructional Design Coordinator

Karen Vagts, Assistant Librarian, Engineering/Business/Math Research and Instruction Librarian, Citation Tools Coordinator

Laura R. Walters, Associate Librarian, Associate Director for Collections and User Services

Laura Wood, Librarian, Director, Tisch Library

College of Liberal Arts and Jackson College

The College of Liberal Arts and Jackson College have a coordinate relationship and together offer courses of study leading to the degrees of bachelor of arts and bachelor of science. From the student's point of view the two colleges are coeducational and indistinguishable. All references to the College of Liberal Arts in this bulletin are to these two combined colleges.

School of Engineering

The School of Engineering offers undergraduate and graduate degrees in several areas of engineering and computer science. The school offers courses leading to degrees of bachelor of science, master of science, master of engineering, master of science in engineering management, and doctor of philosophy. There is also a combined program with the School of Arts and Sciences.

Graduate School of Arts and Sciences

The Graduate School of Arts and Sciences offers programs of study leading to the degrees of master of arts, master of science, master of fine arts, master of arts in teaching, master of public policy, educational specialist, doctor of philosophy, and doctor of occupational therapy.

College of Special Studies

The College of Special Studies, in conjunction with the School of the Museum of Fine Arts, Boston, offers courses of study leading to the degree of bachelor of fine arts. The college also offers continuing education programs in liberal arts and engineering fields through the Office of Graduate Studies.

Accreditation of Tufts University

Tufts University is a privately endowed institution founded in 1852 and has been accredited by the New England Association of Schools and Colleges (NEASC) and Commission on Institutions of Higher Education (CIHE) since 1929, and its accreditation by NEASC encompasses the entire institution. Tufts underwent a comprehensive evaluation in March 2013 and was accredited by the Commission in September 2013. The University will submit a fifth year interim report in Spring 2018. NEASC establishes and maintains high standards of educational excellence through self-evaluation and peer review. Institutions demonstrating that they meet these standards are accredited and thus members of NEASC. The CIHE, recognized by the U.S. Department of Education, is one of seven accrediting commissions that provide accreditation regionally.

Some programs and degrees at Tufts have been accredited by additional specialist agencies:

- B.S. in Chemical Engineering, accredited by Accreditation Board for Engineering and Technology (ABET) since 1952, last reviewed fall 2011, next review academic year (AY) 2017–2018
- B.S. in Civil Engineering, accredited by ABET since 1936, last reviewed fall 2011, next review AY 2017–2018
- B.S. in Computer Engineering, accredited by ABET since 1982, last reviewed fall 2011, next review AY 2017–2018
- B.S. in Electrical Engineering, accredited by ABET since 1936, last reviewed fall 2011, next review AY 2017–2018
- B.S. in Environmental Engineering, accredited by ABET since 1995, last reviewed fall 2011, next review anticipated AY 2017–2018
- B.S. in Mechanical Engineering, accredited by ABET since 1936, last reviewed fall 2011, next review AY 2017–2018
- B.S. in Computer Science/Engineering, accredited by ABET's Computing Accreditation Commission since 2004, last reviewed fall 2011, next review AY 2017–2018
- M.A. and Ed.S. in School Psychology, accredited by the National Association of School Psychologists (NASP) and the Massachusetts (MA) Department of Elementary and Secondary Education since 1992, last reviewed fall 2010, next review fall 2017
- B.S. in Early Childhood Licensure, accredited by the MA Department of Elementary and Secondary Education since 1994 (when the MA Department of Education initiated a program review process and approval for Teacher Education programs, which had previously been "registered" by the Commonwealth), last reviewed spring 2003, next review anticipated AY 2016–2017
- M.A.T. in Art Education (grades PreK–8 and 5–12), accredited by the MA Department of Elementary and Secondary Education since 1994, last reviewed spring 2003, next review anticipated AY 2016–2017
- M.A. in German with Teacher Licensure, accredited by the MA Department of Elementary and Secondary Education since 1994, last reviewed spring 2003, next review anticipated AY 2016–2017
- M.A.T. in Early Childhood Education, accredited by the MA Department of Elementary and Secondary Education since 1994, last reviewed spring 2003, next review anticipated AY 2016–2017
- M.A.T. in Elementary STEM, accredited by the MA Department of Elementary and Secondary Education since 2003, next review anticipated AY 2016–2017
- M.A.T. in Middle and High School, accredited by the MA Department of Elementary and Secondary Education since 1994, last reviewed spring 2003, next review anticipated AY 2016–2017
- BFA, MFA (offered with the School of the Museum of Fine Arts, Boston), accredited by the National Association of Schools of Art and Design's (NASAD) Commission on Accreditation since 2004, next review anticipated AY 2014–2015
- Professional Entry Level Master's Degree in Occupational Therapy, Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA) since 1938, last reviewed 2014, next review 2021
- M.A. in Urban and Environmental Policy and Planning, accredited by the Planning and Accreditation Board (PAB) since 2004, last reviewed 2011, next review 2018
- Dental Education, accredited by the Commission on Dental Accreditation of the American Dental Association (CODA) since 2004, last reviewed 2015, next review 2022

- Medical Education, accredited by the Liaison Committee on Medical Education (LCME) of the American Medical Association (AMA) and the Association of American Medical Colleges (AAMC) since 1942, last reviewed 2014, next review 2022
- Master of Public Health, accredited by the Council on Education for Public Health (CEPH) since 1992, last reviewed 2009, next review 2016
- Physician Assistant Program (Master of Medical Science), accredited by the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA) since 2012, next review anticipated 2015
- Doctor of Veterinary Medicine, accredited by American Veterinary Medical Association (AVMA) since 1983, last reviewed 2012, next review AY 2018–2019

The Tufts University Police Department has been accredited by the Massachusetts Police Accreditation Commission since 2005, last reviewed in June 2014, next review anticipated in 2017.

Scholarship Funds

University scholarship funds available to students in the College of Liberal Arts, Jackson College, and the School of Engineering are listed in this section. The endowment of the university's scholarship funds has been invested and the income is used to provide financial aid to students as described in the financial aid section. Scholarship funds intended solely for Jackson College are preceded by an asterisk.

All of these funds are awarded based on financial need and the recipients are chosen by the financial aid office. No separate application is necessary.

The Jonathan Abarbanel Scholarship was established in 2014 by Jonathan B. Abarbanel, A'68 to provide financial aid for undergraduates in the Tufts University School of Arts and Sciences, with a preference for third and fourth year students majoring in the Department of Drama and Dance.

The Alireza Family International Scholarship, established in 2000 to provide scholarships for highly qualified Muslim students who need financial assistance to be able to enroll at Tufts.

The Alice Harrison Allen Endowed Scholarship, established in 2008, in support of financial aid for Tufts undergraduate students in the School of Arts and Sciences.

The Lizzie P. Allen Scholarship, founded in 1900 by Lizzie P. Allen, of Derby Line, Vermont.

The Alpha Sigma Phi Fraternity Fund, founded in 1981. Preference is given to descendants of alumni who were members of Alpha Sigma Phi at Tufts.

The Altman Family Endowed Scholarship, established in 2013 to support scholarships within the School of Engineering to benefit undergraduate students with an interest in developing engineering skills to solve critical medical, environmental or public health problems and who are active in extracurricular activities on campus.

The Alfred E. Anderson Scholarship, established in 2002 to provide scholarship awards to United States citizens.

The Anderson Scholarship, founded in 1890 by John M. Anderson, of Salem, in the name of John M. and Rebecca Anderson.

The Arthur J. Anderson Scholarship, established in 1954 by Arthur J. Anderson of the Class of 1912.

The Gilbert A. and Robena J. Andrew Scholarship Fund, established in 1985 by the estate of Dr. Norman W. Andrew in honor of his parents to aid students in the field of premedical studies.

The Norman W. Andrew Scholarship Fund, established in 1985 by the estate of Norman W. Andrew to aid students in the field of biology.

The Eileen Fox Aptman, J'90 and Lowell Aptman Endowed Scholarship, established in 2011 in the School of Arts and Sciences, to help strengthen and support Tufts University's progress to become a need-blind institution.

The Jesse Moses Aronson Scholarship, established in 1951 by Jesse Moses Aronson of the Class of 1918, to be awarded each year to an outstanding applicant for admission to the School of Engineering who needs financial help to attend college.

The Ashley Family Endowed Scholarship Fund was established by Jonathan Ashley, A'88 and Susan Ashley to provide financial aid for Tufts University undergraduate students.

***The Association of Tufts Alumnae, Inc. Scholarship**, established in 1957 for an annual scholarship to be awarded to a Jackson student who has completed one year successfully and is selected by a university committee, with the approval of the dean of Jackson College.

The Jack and Myrtle Atlas Scholarship, established in 1987 to provide financial aid to needy undergraduates, with preference to students from California.

The Eugene Averell and Elizabeth Harlow Averell Scholarship, established in 1952 by provision in the will of Eugene Averell of the Class of 1895, the income to be paid annually to a meritorious student.

The Cyrus V. Bacon and Ada B. W. Bacon Scholarship, founded in 1915 by Mrs. Ada B. W. Bacon, of Hingham, Massachusetts.

The Bacow/Gordon Endowed Scholarship Fund, established in 2011 by Michael S. Gordon, A'87 and Christina Gordon, in honor of Lawrence S. Bacow and Adele Fleet Bacow. This scholarship recognizes the visionary leadership President Bacow provided Tufts between 2001 and 2011 and supports his goal of removing economic obstacles to talented students seeking a college education.

The Mitchell and Ruth Bacow Endowed Scholarship Fund, established in 2003 as part of the Pritzker Challenge to benefit outstanding undergraduate students and to increase the diversity of the student body.

The Crosby F. Baker Memorial Scholarship, established in 1955 by colleagues, friends, former students, and family in memory of Crosby F. Baker of the Class of 1910, member of the faculty from 1900 to 1954.

The Balfour Scholarship Fund, established in 1989 by a generous grant from the L. G. Balfour Foundation to aid talented minority students in need of financial assistance.

The George Stevens Ballard Scholarship, founded in 1910 by Caroline D. M. Ballard, of Augusta, Maine.

The Almon Ballou, Carolyn Clark Scholarship, established in 1954 by Carolyn Clark Bigelow of the Class of 1900 in memory of her grandfather, Almon Ballou.

The Hosea Ballou II Memorial Scholarship, founded in 1891 by Mrs. Mary T. Goddard, of Newton, Massachusetts.

The Latimer W. Ballou Scholarship, founded in 1898 by Latimer W. Ballou, of Woonsocket, Rhode Island.

The John and Staci Barber Endowed Scholarship, established in 2008 to support scholarships within the University and to increase the diversity of the Tufts undergraduate student body.

The Barnard Scholarships, founded in 1897 by Mrs. Caroline M. Barnard, of Everett, Massachusetts.

The Esther and Philip Barnet Endowed Scholarship Fund, established in 2011 by Dr. Sylvan Barnet, former Tufts professor, in honor of his parents. The scholarship benefits undergraduates in the School of Arts and Sciences.

The John K. and Margaret G. Baronian Scholarship, established in 1977 by John K. Baronian, A'50, in memory of his immigrant parents, survivors of the Armenian Genocide of 1915, who provided the inspiration for his pursuit of education. It was with the desire to help others to pursue their educational goals that this memorial scholarship was given.

The Henry F. Barrows Scholarship, founded in 1891 by Henry F. Barrows, of North Attleboro, Massachusetts.

The Nancy Bartlett Scholarship, founded in 1897 by Mrs. Nancy Bartlett, of Milford, Massachusetts.

The Baxt Family Scholarship, established in 2013 to support scholarships within the School of Arts and Sciences.

The Bay Bank Middlesex Scholarship, founded in 1980 by Bay Bank Middlesex of Burlington, Massachusetts.

The Walter P. Beckwith Scholarship Fund, established in 1947 under the will of Hira R. Beckwith, of Claremont, New Hampshire, the income to be used to assist worthy young men in acquiring a college education.

The Beelzebub Golden Anniversary Scholarship Fund, established in 1988 by the Beelzebub Alumni Association to provide scholarship to needy undergraduates who are members of the Beelzebubs.

The Rose Bendetson Memorial Scholarship Fund, established by Mr. and Mrs. Norris Bendetson as a memorial to the mother of Norris Bendetson, A'41. The gift is to be used for needy and deserving students, with preference given to those who are residents of Haverhill, Massachusetts.

The Bendheim Family Scholarship, founded in 1985 by the family of Thomas L. Bendheim, A'85, of Scarsdale, New York, to enrich the diversity of the student body in the College of Liberal Arts and Jackson by supporting a student of high scholastic standing and limited means, with preference to students from the five boroughs of New York City.

The Bendheim Family Study Abroad Scholarship, established in 1999 to provide financial support to Tufts students studying abroad.

The Dr. Karl T. Benedict Sr. and Daisy Benedict Scholarship Fund, established in 2004 to provide financial aid to students in the Tufts College of Liberal Arts.

The Carol and John Bennett Family Scholarship Fund, established in 2012 by Dr. and Mrs. John M. and Carol R. Bennett, J'82P, A'86P. Preference is for undergraduate students enrolled in the School of Arts and Sciences who wish to pursue careers in medicine.

The Andrea Caponigro Berthel Scholarship, established in 1990 by friends and family of Andrea Caponigro Berthel, a former member of the Tufts University trustees' office. This is the first scholarship in Tufts' history to be named in honor of a staff member. The income from this fund will be awarded annually to two deserving students who are graduates of Medford and Malden high schools. The scholarship is to be based on merit as well as need.

The Newman Peter and Genevieve Blane Birk Scholarship, for worthy, deserving, and able students in the College of Liberal Arts and Jackson. Founded in 1984 in memory of two Braker Fellows who became distinguished professors of English at Tufts.

Ronald Louis Blackburn, Jr., A'85 Scholarship Fund, established in 1986 in memory of Ronald Blackburn to provide financial assistance to African-American students. Selection of the recipients will be based on record of achievement, potential for leadership, and demonstrated financial need.

The John Twiss Blake Fund, established in 1990 by the estate of John Twiss Blake to assist students in the School of Engineering.

The Sophie and Arthur Blecker University Scholarship Fund, established in 1989 by Susan Blecker Cohen, J'66; George Cohen; Marcia Zaroff Blecker, J'69; and Robert Blecker, T'69; awarded to a student entering the College of Liberal Arts and Jackson who has financial need, and who holds the promise of superior achievement as an undergraduate.

The Barry L. and Lilia C. Bloom Family Scholarship, established in 2007 to provide financial aid to achieve the educational benefits of diversity in the School of Arts and Sciences.

The Kenneth and Debra Bloom Scholarship, established in 2008 to support scholarships within the School of Engineering and the School of Arts and Sciences.

The Joseph A. Boccino Boston Post Society of Military Engineers Scholarship, established in 2007 to assist in funding the education of a student residing in Massachusetts, Northeastern Connecticut, Northern Rhode Island or Southern New Hampshire, enrolled in the civil or environmental engineering program.

The Elizabeth Warren Bond Scholarship Fund, founded in 1933 for deserving Jackson students.

The Margaret Helen Bond Scholarship, founded in 1933 for deserving Jackson students.

The Charles and Fannie A. Miner Booth Scholarship, founded in 1900 by Charles Booth, of Springfield, Vermont.

The Kennison T. Bosquet Scholarship Fund, established in 1977 by the bequest of the late Mr. Bosquet, whose wife Elizabeth was a member of the Jackson College Class of 1931. The income is to be awarded for scholarships at the discretion of the university.

The Boston Tufts Alliance Scholarship, created through the generosity of members of the Boston Tufts Alliance group to support financial aid for undergraduate students at Tufts, with a preference for students from the Boston area.

The Laurie Bove Scholarship, established in 1996 in memory of Laurie Bove of the Class of 1984 by her family and friends, to provide financial aid to female residents of Medford who come to Tufts with an interest in occupational therapy.

The William L. Bradley and Clara M. Pizzarello Scholarship, established in 2011 in memory of Dean Grant Curtis to benefit undergraduates in the School of Arts and Sciences.

The Ellen F. Bragg Scholarship Fund, founded in 1928 to provide scholarships for students in the College of Letters showing the greatest intellectual and moral excellence.

The Henry W. Bragg Fund Scholarships, founded in 1936 by Henry W. Bragg.

The Brandes Family Endowed Scholarship, established in 2008 to give deserving students an opportunity to attend Tufts University.

The Dr. and Mrs. William F. Brennan and Family Scholarship, established in 2002 to provide aid to worthy and promising undergraduate students who are determined to be in need of scholarship funds.

The Ron Brinn Scholarship Fund, established in 1999 in honor of Ron Brinn, A'58, Tufts Director of Alumni Relations for sixteen years, to provide financial aid to needy students of the College of Liberal Arts and Jackson and the School of Engineering.

The Nathan and Shirley Brodsky Scholarship, established in 2013 to support scholarships within the School of Arts and Sciences for first-generation students who are naturalized United States citizens.

The Nathan and Shirley Brodsky Scholarship for Tufts in Talloires, established in 2013 to support scholarships within the School of Arts and Sciences. The scholarships will be awarded to first-generation students who are interested in the Tufts in Talloires Program and have never lived in Europe.

The Budd Family Scholarship, established in 1996 by Edward H. Budd, A'55, and his family, to aid juniors and seniors with a GPA of 3.0 or better who have demonstrated involvement in and dedication to enriching campus life at Tufts.

The David W. Burke Fund was established in honor of David W. Burke, A'57, H'09, mentor and friend to many Tufts University students. The fund supports undergraduate scholarships, with a preference for students in communications and media studies.

The Wellington Burnham Fund Scholarships, created by a bequest from Wellington Burnham of the Class of 1931.

The Edith Linwood Bush Scholarship, established during the Second Century Fund campaign by classmates, former students, and friends in honor of Edith Linwood Bush of the Class of 1903, member of the faculty from 1920 to 1952, and dean of Jackson College from 1925 to 1952.

The Richard Perry Bush Scholarships, founded in 1910 by Mrs. Caroline M. Barnard, of Everett, Massachusetts.

The Francis Buttrick Fund for Scholarships, preferably for men from Waltham, Massachusetts.

The Daniel V. Byrne, E'76 Endowed Scholarship in Mechanical Engineering, established in 2012 to support students within the Department of Mechanical Engineering. As a student in Mechanical Engineering, Dan Byrne was inspired by Dr. Fred Nelson, Dr. John Sununu, and other faculty members who introduced him to thermodynamics and Stirling engines. Dan went on to succeed as an engineer and shortly after, an entrepreneur. Dan has been a true example of the Tufts model of active citizenship—changing the world through his career as well as through his personal commitment to the environment, and the charities and businesses he supports with his time, talent and resources. Dan's passion for Mechanical Engineering inspired him to make this gift to support undergraduate scholarship.

The Godfrey Lowell Cabot Scholarship, established in 1951 by the Cabot Carbon Company in honor of Godfrey Lowell Cabot, the income to be used as a yearly scholarship to a deserving student of the School of Engineering.

The Cabot Corporation Scholarship Fund, established in 1955 by Godfrey L. Cabot, Inc., of Boston, the income to be used for scholarship aid for deserving students in any school or department of the university. In making the awards, preference is to be given to an otherwise qualified son or daughter of an employee of Godfrey L. Cabot, Inc., and its subsidiary companies.

The Calder Challenge Scholarship Fund was established in 1996 by the Louis Calder Foundation to provide financial aid for academically promising students from the five boroughs of New York City.

The Calef Permanent Fund, given by Ira C. Calef in 1917 to provide scholarships for young men or women.

The Callahan-Lee Scholarship Fund, established in 1993 to provide scholarships to undergraduate students in need of financial aid with preference given to students from Swampscott and Gardner, Massachusetts, and Windham, New Hampshire.

The Callahan-Lee-Long Endowed Scholarship Fund, established with a gift from the estate of Mr. John T. Lee, Jr., A'50.

The Jeanne A. Carpenter Memorial Scholarship, established in 2007 in memory of Jeanne A. Carpenter, J'74, to further the University's efforts to create an intentional, intellectual and broadly diverse community of scholars.

The John A. Cataldo Scholarship, established in 1989 by Mr. Cataldo, E'46, to provide a full-tuition scholarship to be awarded annually to one or two meritorious students in the Department of Civil and Environmental Engineering.

The Centennial Class of 1952 Endowed Scholarship, established in 2004, to be awarded to an undergraduate student, man or woman, from the School of Arts and Sciences or the School of Engineering. Recipients should meet the following criteria: commitment to community service, high academic standing, and demonstrated financial need. It is the hope of the Centennial Class of 1952 that recipients will always be loyal to their alma mater and will respond to the needs of the university by giving back in time and substance.

The Lucille Cesari, J'52, Endowed Scholarship, established in 2000 to provide scholarships to Tufts undergraduate students with financial need.

The Annie, Leon, and Madeline Chalfen Fund, endowed in 1963 for undergraduate scholarships.

The Christina and John Chandris Endowed Scholarship Fund, established in 2011 to provide full tuition scholarships to selected students who have demonstrated both outstanding academic ability and the most extensive need for financial assistance in order to enroll at Tufts.

The Chang for Change Scholarship Fund was established in 2014 by Nicole G. Chang, J'01 and David A. Chang, A'01 to provide financial aid for Tufts University undergraduates, specifically independent students and those who are committed to positively changing their lives.

The Edwin H. Chapin Memorial Scholarship, founded in 1891 by friends of Edwin Hubbell Chapin, D.D., of New York City.

The Ralph Stillman Charles, Jr., Scholarship, established in 1960 by Ralph S. Charles of the Class of 1923 and Mary Grant Charles, Jackson Class of 1920, in memory of their eldest son (1924–1934), for the benefit of any deserving students in any of the three colleges—Liberal Arts, Engineering, or Jackson—at the discretion of the college authorities.

The Kathryn Cassell Chenault 2010 Scholarship Fund, established in 2010, to support undergraduate scholarships that will help achieve the educational benefits of diversity at Tufts. Chenault Scholarships will replace the loan component of the recipients' financial aid package.

The Kathryn Cassell Chenault J'77 Scholarship, established in 2002 to help attract, retain, and prepare a diverse student body who will make important leadership contributions to Tufts and to our global community. The Chenault Scholarship is part of the Jay Pritzker family of scholarships.

The Joseph R. Churchill and Anna Quincy Churchill Scholarship Funds, established in 1971 under the will of Mary C. Churchill to honor her husband and her daughter, Dr. Anna Quincy Churchill, M'17, Assistant Professor of Anatomy Emerita, to provide scholarships to students of biology (preferably botany).

The Charles P. Ciaffone and Lloyd W. Pote Scholarship, established in 1982 by Charles Ciaffone of the Class of 1941 and Lloyd Pote of the Class of 1937, the owners, and other employees of CPC Engineering of Sturbridge, Massachusetts. The income from this fund is to be awarded yearly to a deserving engineering student as determined by the faculty of the School of Engineering.

The Charles L. Clapp Scholarship, established in 2006, to provide financial aid to a student in the junior class who demonstrates superior academic achievement in the field of government or politics.

The Andrew J. Clark Memorial Scholarship, founded in 1891 by Mrs. Abbie B. Clark, of Orange, Massachusetts.

The Class of 1904 Scholarships, founded in 1930 and substantially increased during the Second Century Fund campaign by the men and women of the Class of 1904.

The Class of 1911 Scholarships, awarded from the Class of 1911 Fund.

***The Class of 1913 Women's Memorial Scholarship Fund**, established in 1925 by the women of the Class of 1913 to be used for Jackson undergraduates who need financial assistance at a time of emergency and need.

The Class of 1919 Scholarship, established at the fiftieth reunion of the Class of 1919 in honor of Dean George S. Miller, A'06. The income from this fund is to be awarded annually to an undergraduate in the College of Liberal Arts and Jackson or the School of Engineering in accordance with Tufts's student aid policies.

The Class of 1920 Scholarship Fund, established by the members of the Class of 1920, Liberal Arts, Engineering, and Jackson College, on the occasion of the fiftieth anniversary of their graduation from Tufts. The fund aids deserving undergraduates with demonstrated financial need, as determined by the university's financial aid office. The terms of the Class of 1920 Scholarship Fund stipulate that a woman undergraduate must be among the recipients of the fund's benefaction not less than once every three years.

The Class of 1923 Scholarship Fund, to be awarded as directed by officers of the class.

The Class of 1926 Scholarship, founded in 1951 by the men and women of the Class of 1926, as their twenty-fifth reunion gift to the college, to be awarded in rotation to students in the College of Liberal Arts one year, Jackson College the next year, and the School of Engineering the third year.

The Class of 1928 Scholarship, founded in 1955 by the men and women of the Class of 1928, the income to be awarded to deserving students in Tufts College or Jackson College.

The Class of 1933 Scholarship Fund, established in 1990 by members of the Class of 1933 to provide scholarship funds for future students.

The Class of 1935 Scholarship, established in 1996 by members of the Class of 1935 to provide financial aid to deserving undergraduate students.

The Class of 1939 Memorial Scholarship, established in 1948 by the men and women of the class in memory of their classmates who gave their lives in World War II.

The Class of 1940 Memorial Scholarship, established in 1956 by the men and women of the Class of 1940, the income to be awarded on the joint bases of merit and need to undergraduate students, preference being given to descendants of the Class of 1940 who are otherwise qualified.

The Class of 1943 Scholarship, established in 1996 by members of the Class of 1943 to provide scholarship aid for future Tufts students.

The Class of 1944 Scholarship, established in 2000 by men and women of the Class of 1944 to be awarded annually to an undergraduate in the College of Liberal Arts, Jackson College, or the School of Engineering on the basis of need and merit as shown by outstanding scholarship and qualities of leadership in student and community activities. Preference is given to descendants of the Class of 1944 or other legacies whenever possible.

The Class of 1947 Victor Prather Scholarship Fund, established by the Class of 1947 on the occasion of their twenty-fifth reunion to memorialize a respected friend and classmate. Victor A. Prather, Jr., A'47, M'52, was a flight surgeon assigned to aviation and space medicine research when he lost his life at the end of a high-altitude flight in a strato-lab balloon designed for space equipment testing. He was a scholar devoted to the advancement of knowledge, and he was a leader uncompromising in his ideals. Financial assistance is awarded to students who meet the university's criteria for need and who demonstrate in their studies the same enthusiasm for learning that Victor Prather did in his lifetime.

The Class of 1952 Endowed Scholarship, established in 2004, to be awarded to an undergraduate student, man or woman, from the School of Arts and Sciences or the School of Engineering. Recipients should meet the following criteria: commitment to community service, high academic standing, and demonstrated financial need. It is the hope of the Centennial Class of 1952 that recipients will always be loyal to their alma mater and will respond to the needs of the university by giving back in time and substance.

The Class of 1957 Scholarship, established in 2002, to be awarded to a Tufts undergraduate with good moral character, community service experience, high academic standing, and demonstrated financial need.

The Class of 1958 Scholarship Fund, established in 2003 for the benefit of Tufts students of the Faculty of Arts and Sciences.

The Class of 1959 Scholarship, established in 1984 for the benefit of future generations of Tufts students. This special endowment fund represented one of the major gifts made to Tufts by members of the Class of 1959 on the occasion of their twenty-fifth reunion, and it has been substantially increased by classmates on a continuing basis over the years thereafter. Income from this fund is to be awarded annually on a combined basis of merit and need to one or more deserving undergraduate students in accordance with Tufts financial aid policies, with preference to be given to descendants of the Class of 1959 who are otherwise deemed to be fully qualified.

The Class of 1960 Scholarship, established by members of the Tufts Class of 1960 to provide aid to a deserving student who is an undergraduate.

The Class of 1961 Scholarship, established in 2001 by members of the Tufts Class of 1961 to provide financial aid to worthy and promising students with financial need, with preference to students who have demonstrated service to the community.

The Class of 1962 Scholarship, established in 1962, to provide scholarships to undergraduate students in the Faculty of Arts and Sciences. First preference is given to students who are direct descendents of members of the Class of 1962.

The Class of 1963 Scholarship Fund, established in 2003 in honor of the Class of 1963 and in memory of those who are no longer with us, will be awarded to an undergraduate student who is of good character, with proven academic achievement, a commitment to active citizenship, and demonstrated financial need. The Class of 1963 is especially committed to helping individuals who have overcome significant obstacles in order to attend Tufts University. It is their hope that the recipients of this scholarship will form a lifelong connection with the university and through their service and support become role models for others.

The Class of 1989 Endowed Scholarship was established in 2014 by James Bartlett, A'89, Bradford Bernstein, A'89, Brian Gerson, A'89 and Fotis Hasiotis, A'89 in honor of their 25th Class Reunion, to support financial aid for Tufts University undergraduates.

The Class of 2000 Scholarship, established in 2000 by members of the Class of 2000 to provide scholarships to Tufts undergraduate students with financial need.

The Class of 2002 Scholarship, established in 2008 to provide scholarships to be awarded to one or more worthy and promising students who are determined to be in need of scholarship funds.

The Allan Clemow Scholarship, established in 2007 in honor of Allan Clemow E'65, the Director of Admissions at Tufts University, to support scholarships in the School of Engineering with preference towards students in the Entrepreneurial Leadership Program.

The Henry E. Cobb Scholarship, founded in 1891 by Henry E. Cobb, of Boston.

The Lloyd H. and Ruth M. Coffin Scholarship, established in 1952 by Mr. and Mrs. Lloyd H. Coffin, of Marblehead, Massachusetts.

The Fern and Hersh Cohen Endowed Scholarship fund, established in 2013 to support the School of Arts and Sciences.

The Lisa and Bruce Cohen Scholarship Fund was established in 2015 to support financial aid for Tufts University undergraduate students.

The Monte Cohen Scholarship Fund, established in 1972 in honor and memory of industrialist Monte Cohen, of West Newton, Massachusetts, by his son Leon H. Cohen of the Liberal Arts Class of 1948 and other members of the family. The income each year is distributed to an undergraduate student deemed worthy of such aid by the financial aid office.

The Ricky and Peter Cohen Family Scholarship Fund, established in 2003 as part of the Pritzker Challenge to be used to help Tufts attract, retain, and prepare talented African American, Hispanic American, and Native American students who will make important contributions to Tufts and to our global community.

The Sarah Rebecca and Myer Cohen Memorial Scholarship, established in 1951 in memory of Sarah Rebecca and Myer Cohen by Edward I. Cohen of the Class of 1919, his daughters Sandra and Jacquelyn Cohen, and James Cohen of the Class of 1921.

The Harold E. Collins Scholarship Fund, established by the will of Harold E. Collins, A'17, to assist needy and worthy students.

The Sherwood Collins Scholarship Fund, established in 1990 by an anonymous donor. Awarded to graduate students in drama.

The Conti-Dicken Family Scholarship Fund, established in 2004 to be awarded with preference to female students at Jackson College with limited means who possess high academic potential and a demonstrated commitment to achieving scholastic excellence in the study of arts and sciences.

The Katherine E. Coogan Scholarship, established in 1994 by Ruth E. Coogan in memory of her daughter, Katherine E. Coogan, Class of 1964, to be used for scholarships in economics for native-born Americans.

The Davis Cook Scholarship, founded in 1904 by Davis Cook, of Cumberland, Rhode Island.

The James M. and Emily Cook Scholarship, founded in 1903 by Henrietta J. States, of Boston.

The William Oscar Cornell Scholarship, founded in 1890 By William Oscar Cornell, of Providence, Rhode Island.

Cornfeld Scholars Program, established in 1989 by Dr. Robert M. Cornfeld, D'55, to provide financial assistance to undergraduate students who show exceptional promise to become future biomedical researchers.

The Sanda Countway Scholarship Fund, established by bequest of Sanda Countway, WA 1904. The income from this fund is to be used to provide financial assistance to

deserving undergraduate students in Jackson College, the College of Liberal Arts, and/or the School of Engineering of Tufts University.

The Lyn and Paul Courant Endowed Scholarship, established in 2013 to support scholarships within the School of Arts and Sciences.

The Cousens Scholarship, founded in 1891 by John E. Cousens, of Brookline, Massachusetts, in the name of John E. and Sara C. Cousens.

The Howard E. Cousins Scholarship, established as a bequest in 1966 by the late Howard E. Cousins, of Arlington, Massachusetts, member of the College of Engineering, Class of 1909. The income from the invested principal shall be used to provide financial aid to students enrolled in the School of Engineering and qualifying for such aid, with preference to be given to residents of Salem and Arlington, Massachusetts.

The Stephen and Bessie Cowey Scholarship, established in 1990 by Thelma Cowey Swain, J'31, to honor her parents and to provide lasting assistance for Tufts students from the state of Maine.

The Annie L. Cox Scholarship Fund, established in 1946.

The Dorothy M. and Charles JJ Cox Endowed Arts and Sciences Scholarship Fund was established in 2014 by Margo A. Cox, M.D. and Robert F. Gagel, M.D. to support financial aid for undergraduate students in the Tufts University School of Arts and Sciences.

The George Howland Cox Scholarship, established in 1949 for the benefit of students of high scholastic standing who are in need of financial aid.

The Reverend Austin Crowe Scholarship Fund, established in 1987 in memory of Austin Crowe (brother of Blanche Haslam and father of Austin Crowe, Jr., A'61) to provide funds to aid worthy and needy students.

The Margaret Smith Cullen, J'46 Endowed Scholarship, established in 2008, to be awarded to undergraduate students in any class at the University. The scholarship may be continued up to four years as long as the recipients remain in good standing.

The Waldo O. Cummings Memorial Scholarship Fund, which gives preference to residents of Tyngsborough, Massachusetts.

The William M. Currier Scholarship Fund, established under the will of William M. Currier, of Quincy, Massachusetts. Preference given to residents of Georgetown or Danvers, Massachusetts.

The James O. Curtis Scholarship, founded in 1915 by Betsy B. Curtis, of Medford, Massachusetts.

The Isabella C. Cutler Scholarship Fund, established in 1985, in memory of Isabella Cutler, J'14, of Lexington,

Massachusetts. Scholarships from the income of this fund are given to aid needy students, as requested by the donor.

The Florence D. Cwirko Scholarship, established in 1978 in memory of Florence D. Cwirko, J'47, by her mother Mrs. Julia Cwirko. Income is to be used to provide financial assistance to students in the undergraduate college.

The Elizabeth Slade Dalrymple Scholarship, established in 2008, by a bequest from Elizabeth Dalrymple.

The Boryana Damyanova International Students Scholarship Fund, established in 2006 to honor the memory of Boryana Damyanova, Class of 2006. The fund will provide scholarships for highly qualified international students who need financial assistance to be able to enroll at Tufts.

The Benjamin H. Davis Scholarship, founded in 1897 by the Reverend B. H. Davis, of Weymouth, Massachusetts, for the benefit of students of the College of Liberal Arts who are preparing to enter the Christian ministry.

The Moses Day Scholarship, founded in 1880 by Moses Day, of Roxbury, Massachusetts.

The Stephen G. Demirjian Scholarship, established in 2001 to provide aid to needy students of Armenian heritage first and secondarily to students of Greek heritage.

The Devejian Family Scholarship Fund, established in 2010 by a bequest from Mr. and Mrs. Robert Devejian, E'44, to provide scholarships for needy students in the Tufts School of Engineering.

The Dewar Scholarship, established in 1990 by the Dewar Foundation. Preference in awarding the scholarship is given to graduates of Oneonta Senior High School, Oneonta, New York.

***The Cora Polk Dewick Scholarship**, established during the Second Century Fund campaign by classmates and friends in honor of Cora Polk Dewick of the Class of 1896, Alumni Trustee 1920–1940.

The Jeannie Diefenderfer Scholarship, established in 2008 to support scholarships with the School of Engineering.

The Leonard A. DiLorenzo, E'66 and Annmarie P. Garceau Endowed Scholarship Fund, created in 2010 to provide financial aid for undergraduates in the School of Engineering, with the hope that this scholarship would encourage female students to pursue engineering studies at Tufts.

The Catherine P. and Arland A. Dirlam Scholarship, established in 1949 by Catherine Price Dirlam, Class of 1927, and Arland A. Dirlam, of the Class of 1926, the income to be awarded in alternate years to a student in Jackson College and to a student in the School of Engineering.

The Leon E. Dix Memorial Scholarship.

The Frank C. Doble Scholarship, established in 1997 in memory of Frank Currier Doble, founder of the Doble Engineering Company, and a recipient of two Tufts degrees: a bachelor of science in electrical engineering in 1911, and an honorary doctor of science in 1962. The income is awarded to worthy undergraduate students in the Department of Electrical and Computer Engineering.

The Doherty Family Scholarship, awarded to students of high leadership potential and a desire to give back to Tufts University in the future.

The Dolan Family Endowed Scholarship, created in 2005 to support undergraduate students in the School of Arts and Sciences and the School of Engineering. The scholarships will be awarded to promote the achievement of the educational benefits of diversity at Tufts.

The Abraham and Marianna Dranetz Endowed Scholarship, established in 2004 to provide scholarship to students in the Tufts School of Engineering who demonstrate financial need and high academic achievement. Preference is given to students enrolled in biomedical research programs in the engineering school.

The John Druker and Bertram A. Druker Scholarship Fund, the income to be used for scholarships or loans as determined by the director of the Office of Financial Aid.

The Priscilla N. Dunne Scholarship Fund, established in 1980 by Ms. Dunne, J'75, for students demonstrating need. Preference is given to those majoring in psychology.

The Elizabeth and Maxwell W. Dybiec Endowed Scholarship Fund, established in 1999 to be used for educational and scholarship purposes.

The William F. Eastwood A'65 Scholarship, established on the occasion of his retirement in 2002, in honor of Bill Eastwood, A'65, who worked in the Tufts Financial Aid Office for thirty-four years and who served as Director of Financial Aid for fifteen of those years. Preference shall be given to students with financial need from the North Shore of Massachusetts or the Upper Valley of Vermont and New Hampshire.

The George W. Eaton Fund, established in 1942 by bequest of George W. Eaton, of Peabody, Massachusetts, the income to be expended in aiding poor and worthy students to secure an education at Tufts College.

The Carlos P. Echeverria Scholarship, established in 1951 by Carlos P. Echeverria of the Class of 1912.

The Thomas R. B. Edmands and Abbie Whittmore Edmands Scholarship Fund, established in 1973 by Anne Edmands Hall in memory of her parents.

The Eliot-Pearson Scholarship, awarded to a student major in the Eliot-Pearson Department of Child Study and Human Development.

The Edward A. Ellis Scholarship, established in 2008 to support promising and deserving students. The scholarship will be awarded to undergraduates in any class and may be continued for up to four years as long as the recipients remain in good standing.

The Susan F. Emerson Scholarship, established by provision in the will of Susan F. Emerson, of Boston. To be awarded annually to a student in Tufts College who attains distinction in athletics as well as in scholarship.

The Frederick J. Emmett Scholarship, established in 1991 to benefit students in the Tufts School of Engineering.

The Environmental Engineering Scholarship, established in 1990 by Martha M. Wyckoff, E'77, to provide scholarships for undergraduate engineering students who are pursuing an interdisciplinary approach to the study of the environment.

The David R. and Betsy Banks Epstein Endowed Scholarship, established in 2005 to provide need-based financial aid to Tufts undergraduate students studying theatre.

The Steven B. and Deborah Epstein Endowed Scholarship, established in 2006 in support of the Pritzker Challenge and to increase diversity on the Tufts campus.

The Harry Esses Scholarship, established in 2008, to provide need-based undergraduate scholarships for African American, Hispanic American and Native American students in the School of Arts and Sciences and the School of Engineering.

The James H. Farrell, Jr., Scholarship, founded in 1986 by James H. Farrell, Jr., of the Engineering Class of 1959, for the benefit of deserving students in need of financial aid. Income from the fund is to be awarded annually to one or more undergraduates in the College of Liberal Arts, Jackson College, or the School of Engineering. Where feasible, the scholarship will be awarded with preference given to graduates of Boston College High School.

The Meade S. and Robert W. Fasciano, A'56 Endowed Scholarship Fund, established in 2009, to support undergraduate Tufts students who are qualified to receive financial aid. Preference is given to students who are active in extracurricular activities on campus and who are residents of Somerville, Massachusetts.

The Wesley J. Fastiff, A'54 and Bonnie B. Fastiff, '60 Endowed Scholarship Fund, established in 2011 in support of financial aid in the School of Arts and Sciences.

***The Wilton B. and Helen R. Fay Memorial Fund**, established in 1979 by Helen R. Fay, the income of which shall be used to assist deserving needy students of Jackson College in acquiring a college education; preference to be given to young women whose homes shall be in Middlesex County, Massachusetts.

The Matthew A. Feldman Family Scholarship Fund, established in 2011 by Matthew Feldman, A'85, to benefit students in the School of Arts and Sciences.

The Robert L. Feldman Scholarship, established in 1989 by Mr. Feldman, A'69, to aid worthy students in need of assistance in meeting their educational costs.

The Felton Family Endowed Scholarship Fund, established in 2011 by Gregg J. Felton, A'92, and Marla J. Felton, J'92, to benefit undergraduates in the School of Arts and Sciences.

The Ferrelli Family Endowed Scholarship Fund was established in 2014 by Richard Ferrelli, A'85. This scholarship supports financial aid for undergraduates in the Tufts University School of Arts and Sciences, with a preference for first-generation college students.

The Riccardo and Dora Ferrelli Memorial Endowed Scholarship Fund was established in 2014 by Richard Ferrelli, A'85 and Maria Ferrelli Giatrelis, E'89 to support financial aid for Tufts University undergraduates. Richard and Maria established this fund to memorialize their immigrant parents who inspired generational advancement through education and it is their interest to support students who are first-generation college students and are the children of immigrants naturalized as U.S. citizens and permanently residing in the United States.

The Edward W. Fickett Scholarship, established in 1963 by bequest of Bertha D. Chellis in memory of the late Edward W. Fickett of the Class of 1896, the income to be awarded to a deserving student.

The Fickett Scholarship, established in 1944 under the will of the late Edward W. Fickett, of Somerville, as "The Fickett Scholarship in memory of my sister, M. Grace Fickett of the Class of 1896, the income of this fund to be awarded annually to a deserving student, either male or female, who is majoring in the Department of Education."

The Benjamin and Alice Finn Memorial Scholarship Fund, established in memory of the parents of Philip H. Finn of the Class of 1942 and Alvan D. Finn of the Class of 1945. Income from this fund is to be awarded on the basis of merit and need to an undergraduate, and every fourth year to a Fletcher School of Law and Diplomacy student.

The Henry L. and Madeline E. Fischer Centennial Class Scholarship, established in 2014 to support scholarships for the School of Engineering, with first preference to electrical engineering majors.

The Fisher Veterans Scholarship, established in 2008 to provide financial aid for students who have served in the United States military.

***The Ella Bowker Flagg, Class of 1905 Scholarship Fund**, established in 1972 under the will of Ella Bowker Flagg of the Class of 1905 for the benefit of students in Jackson College.

The James B. Flaws Endowed Scholarship Fund, established in 2011 by James Flaws, E'71. The fund will leverage financial access for students majoring in the Civil and Environmental Engineering Department while furthering the school's goal of positioning engineering students as future problem solvers, project leaders, communicators and ethical citizens of a global community.

The Austin B. Fletcher Scholarship, founded in 1905 by Austin Barclay Fletcher, of New York City.

The Morris and Freda Fraidin Scholarship Fund, established in 1986 by Stephen Fraidin in honor of his parents, to aid worthy students in the arts and sciences.

The Frischkorn Family Scholarship Fund, established in 2003 to provide financial aid to worthy and promising undergraduates who are actively engaged in the study of German or Economics.

***The Volney Sewell Fulham Scholarships** for women of Jackson College.

The Parisis J. and Bessie Georgian Student Aid Fund, established in 1971 by gift of Parisis J. Georgian, to aid undergraduate students of Tufts University.

The Rob and Lisi Gheewalla Endowed Scholarship Fund, created in 2010 by Robert R. Gheewalla, A'89, and Ilisa C. Criss, J'88, to benefit undergraduates in the School of Arts and Sciences.

The Leona and John Ghublikian Educational Fund, established in 1989 by Leona and John R. Ghublikian, E'39, to provide scholarships to deserving students enrolled in the Department of Chemical and Biological Engineering.

The Luther Gilbert Scholarship, founded in 1902 by Mrs. Luther Gilbert, of Roxbury, Massachusetts.

***The Mary and Luther Gilbert Scholarships**, founded in 1902 and 1904 by Mrs. Mary C. Knight, of Roxbury, Massachusetts, for the benefit of women students.

The Gerald R. Gill Memorial Scholarship, established in 2008 in memory of Gerald Gill, Professor of History at Tufts University, to provide financial aid to increase the diversity of the Tufts campus.

The Calmon and Hortense Ginsberg Scholarship, founded in 1964 by Mr. and Mrs. Calmon Ginsberg, of New York City, for the benefit of worthy students in Tufts University.

The Nancy Glass Endowed Scholarship, established in 2008 for support of undergraduates in the Tufts School of Arts and Sciences.

The Gleason Family Endowed Scholarship, established in 2007, to further the University's highest priorities of providing financial aid to students in need.

The Herbert D. Goff Scholarship Fund, established in 1944 under the will of the late Herbert D. Goff, of Cranston, Rhode Island.

The Dr. James Laurence Golden and Helen Murphy Golden Scholarship Fund, established in 1982 by Maureen L. Golden of the Class of 1959, the income to be used to aid undergraduate students of proven academic promise and dedication in the arts and sciences, who have also displayed exceptional leadership and service within their hometowns or communities.

The Martha Goldthwaite Memorial Scholarship, founded in 1890 by Willard Goldthwaite, of Salem, Massachusetts.

The Philip J. Gomez and Lonnia Gomez Horn Endowed Scholarship Fund, established in 2013 by Lonnia Horn, J'67, and Charles Horn to provide financial aid for Tufts University undergraduates majoring in mathematics.

The Edward T. and Claire Gordon Endowed Scholarship Fund for Arts and Sciences, established by the Estate of Edward T. and Claire Gordon. This fund will provide financial aid for undergraduates in the Tufts University School of Arts and Sciences.

The Ellen R. Gordon Endowed Scholarship, established in 2008 in support of financial aid for Tufts undergraduate students in the School of Arts and Sciences majoring in the sciences.

The Gorra Family Scholarship, established in 2002 to provide a scholarship award to a deserving student each year.

The Alfred J. and Beverly Green Scholarship, founded in 1961 by Alfred J. and Beverly Green, of New York, the income to be awarded to an undergraduate or graduate student who needs financial aid.

The Mary Sheldon Green Scholarship, established in 2002 to provide financial aid to Tufts' undergraduate students.

The Harold Greisman Scholarship, established in 2008 to endow a fund at Tufts to support scholarships in the School of Arts and Sciences in perpetuity.

The Mortimer Griffith Scholarship Fund, established to provide financial aid to needy students in the School of Engineering.

The Willis Wentworth Griffiths Scholarship, established in 1951 by William H. Griffiths of the Class of 1928, in memory of his father, Willis Wentworth Griffiths of the Class of 1899, to be awarded on the basis of need to a senior who has demonstrated leadership in worthwhile extracurricular activities.

The Mary L. Groce Scholarship, founded in 1906 by Mary L. Groce, of Roxbury, Massachusetts.

The Morris H. and Ethel M. Gudwin Scholarship Fund, established in 1999 by the will of Morris H. Gudwin.

The Emily E. Guild Scholarship, funded by the donor, of Brattleboro, Vermont, in 1964.

Marcy and Robert Haber Scholarship Fund, established in 1997 by Marcy and Robert Haber, E'79, G'80, to provide scholarships to students in the School of Engineering with immigrant parents.

The David N. Hadad Memorial Scholarship, founded in 1985 by his family and friends from the Class of 1980. Preference is given to students in the School of Engineering who come from greater Lawrence, Massachusetts.

The Frank Oliver Hall Memorial Scholarship, established in 1954 by the people of the Universalist Church of the Divine Paternity in the city of New York, in memory of Reverend Frank Oliver Hall, D.D., of the Class of 1884, Minister of the Universalist Church of the Divine Paternity from 1902 to 1918 and from 1929 to 1938, Professor of Homiletics in Tufts School of Religion from 1918 to 1929. The income of this fund is to be awarded annually, preference being given to a graduate student who is a member of the Church of the Divine Paternity.

The William J. Halligan Scholarship, established in 1953 by William J. Halligan of the Class of 1923, to be awarded annually to worthy students in the School of Engineering.

The Sharon Halverson Scholarship, established in 2008 to provide scholarships to undergraduates in the School of Arts and Sciences.

The Ronald E. Halvorsen Scholarship Fund, established in 1988 to provide scholarships to deserving students in the School of Engineering.

The George H. Hammond Memorial Scholarship, established in 1999 by colleagues, friends, and former students of Professor G. H. Hammond, E'35, in honor of his loyal service to Tufts for over 40 years as an outstanding teacher and mentor. The income is awarded to worthy undergraduates in the Department of Electrical Engineering and Computer Science.

The Roland Hammond Scholarship Fund, established in 1978 by Dr. Roland Hammond, A'98, H'39, in memory of his father, Roland Hammond, Class of 1868. Income shall be used only toward the payment of tuition or other charges of such worthy student or students as the officers of the college may select.

The Edward W. and Patricia C. Hanley Scholarship Fund, founded in 1983 to aid an appreciative undergraduate student at Tufts University.

The Hervey A. Hanscom Scholarship, established in 1954 by Hervey A. Hanscom, of Medford, Massachusetts. The income is to be used each year to aid a deserving boy, preferably a country boy from the state of Maine and/or the children of employees of Hervey A. Hanscom.

The Harold and Ruth Haskell Scholarships, established in 1951 by Harold and Ruth Sibley Haskell, both of the Class of 1906. The income from the fund is to be given to deserving students from the states of Delaware, Maine, and Massachusetts, in this order if possible.

***The Marian Titus Hayford Scholarship Fund**, established in 1977 by the late Mrs. F. Leslie Hayford, a graduate of the Women of Arts, Class of 1902, the income to be used for scholarships to one or more undergraduate women.

The Monte R. and Jane Haymon Endowed Scholarship, established in 2006 by Monte R. Raymon, E'59, and Jane Kraft Haymon, J'60, to benefit students with financial need in both the School of Engineering and the School of Arts and Sciences.

The William Randolph Hearst Endowed Scholarship, established in 1994 to provide scholarships for participants in training programs at the Lincoln Filene Center.

The Herbert and Elaine N. Heller Student Scholarship Fund, established in 2003 to benefit underprivileged Jewish students at the School of Arts and Sciences and the School of Engineering.

***The Heptorean Club Scholarship**, founded in 1898 by the Heptorean Club of Somerville, and including the Gerta Colby Donnelly Fund. Awarded annually to a graduate of the Somerville High School who is already attending Tufts.

The Captain Charles C. Hersey Scholarship, established in 1989 under the will of Captain Hersey, A'30, to aid qualified students at Tufts College.

The Morris and Sid Heyman Memorial Fund, founded by Mrs. Sid L. Heyman in 1980 in memory of her late husband, Morris Heyman, Class of 1918. Awards are made to deserving students in the undergraduate electrical engineering program.

The Frederick Sherman Hickok Scholarship, established in 1963 under the will of Conde Wilson Hickok for the benefit of engineering students.

The Martin J. Higgins Memorial Scholarship Fund, established in 1987 by William Dougherty of the Class of 1960, in memory of Martin J. Higgins, student leader, outstanding athlete, enthusiastic alumnus, and respected colleague. The income from this fund is to be awarded annually to a deserving undergraduate student in the College of Liberal Arts or Jackson College.

The Clara Bell Hight Scholarship Fund, established under the provisions of the Clara Bell Hight Trust as a permanent scholarship fund. The income generated from the principal is to be used for financial assistance to needy and deserving students enrolled in Tufts University.

The Samuel Greeley Hilborn Scholarship, founded in 1940 under the will of Grace Hilborn Webster.

The Hill Faculty/Staff Scholarship Fund, established through payroll deductions from Tufts faculty and staff to provide financial aid to needy undergraduate students.

The Ralph and Rachel G. Hill Scholarship, established through the estate of Rachel G. Hill in memory of her parents, to provide financial aid to deserving students in the Faculty of Arts, Sciences, and Engineering with preference given to undergraduates studying in the fields of engineering or biology.

The Robert W. Hill Scholarship, established in 1955 by the late Judge Robert W. Hill of the Class of 1904, for many years a trustee of Tufts College.

The Israel Hoffman Endowed Scholarship Fund was established in 2015 by Lesley Spector Heller, J'88 and Michael Heller to provide financial aid for undergraduate students in the Tufts University School of Arts and Sciences.

The Warren Nesbit Holbrook Memorial Scholarship, founded in memory of his brother by Charles R. Holbrook of Framingham, Massachusetts, in 1971.

The Robert Hollister Scholarship Fund, established in 2011 in honor of Dean Hollister upon his retirement as the Dean of the Tisch College, to provide need-based aid to undergraduate students.

The Hopkins Family Scholarship, established in 2012 by Nancy H. McManus, J'52. The purpose of this fund is to support scholarships within the School of Arts and Sciences, with first preference being given to students who come from Vermont, or northern New England, or the greater San Francisco area.

The Clarence P. and Henry C. Houston Scholarship, established in 1953 by classmates, friends, and former students of Clarence P. Houston of the Class of 1914 and Henry C. Houston of the Class of 1910.

The Albert S. Hovannesian Scholarship, endowed in 1978 by Albert S. Hovannesian, a graduate of the College of Engineering, Class of 1946, to provide financial assistance to students in the undergraduate colleges. His own personal understanding of the special problems which under-financed students and their families experience is the reason why he chose to fund this scholarship. Preference is given to needy students who are industrious and who also work part-time to help defray their educational expenses.

The Hovannesian-Howorth Scholarship Fund, established in 1989 in honor of Mrs. Claire L. Howorth of Stoneham, Massachusetts, to provide aid to electrical/mechanical engineering students whose particular interests are in microwave technology degree work.

The William H. and Arlene E. Howard Scholarship, established in 2009 for support of students in the Music Department, Tufts University College of Liberal Arts and Jackson.

The Howland Scholarship, established in 1865 from the income of the bequest of Edwin Howland, of South Africa.

The Paul O. Huntington Scholarship (E'13), given to a student in the academic or engineering program in memory of the husband of Harriet S. Huntington.

***The Hunton Scholarship**, founded in 1921 by Mrs. Gertrude Hunton Sweet, of Attleboro, Massachusetts, for the benefit of women.

***The Lydia Glidden Hutchinson Scholarship Fund**, founded in 1985 by Lydia Glidden, Jackson '28, for deserving women attending Jackson College.

The Hye-Hovannesian Scholarship, endowed in 1981 by Albert S. Hovannesian of the Class of 1946. Preference is given to undergraduates of Armenian-American descent.

The Ingalls Family Endowed Scholarship, established in 2012 by Edmund F., A'78, A'09P and Margaret D. Ingalls, J'81, A'09P, to support scholarships within the School of Arts and Sciences.

The International Board of Advisors Endowed Scholarship, established in 2004 to help the university in its efforts to facilitate and sustain a socioeconomically diverse international student population at Tufts University.

The Ives Memorial Scholarship, founded in 1966 by Harriet Raillon Ives of Woodstock, New York, in memory of herfamily.

Haig Jafarian Memorial Scholarship Fund, established in 1992 by Ethel J. Duffett and Dana Paul Bowie in memory of their beloved brother and uncle, Haig Jafarian. The income is to provide scholarships to students in the College of Liberal Arts and Jackson, with preference to students of Armenian ancestry who have expressed interest in the course known as "A Survey of Armenian History."

The Paul and Alice Darakjian Jafarian Memorial Scholarship, established in 1990 by Ethel J. Duffett in memory of her parents, to provide scholarship assistance to students in the College of Liberal Arts and Jackson. Preference will be given to students of Armenian ancestry who have expressed an interest in Armenian studies.

The Jaffe Endowed Scholarship Fund, established in 2013 by Stephen B. Jaffe, E'64, A'97P, and Wilhelmina Jaffe, A'97P, to provide financial aid for undergraduates in the Tufts

University School of Engineering, with a preference for chemical and biological engineering majors.

The Christine Jankowski Graduate Fellowship for Romance Languages, established in memory of Christine Jankowski of the Class of 1970, awarded to a graduate student in the field of romance languages.

The Japha Family Scholarship, established in 2001 to provide scholarships to students with a record of above average academic performance and contributions of earnest service to and/or beyond the Tufts community.

The Jephson Educational Trust Endowment Fund, established in 1999 for aid to undergraduate students who show exceptional promise but whose families are particularly disadvantaged.

The Edgar N. and Faith A. Johnson A'54, J'54, Endowed Scholarship Fund, established in 2013 by Eric C. and Regina Johnson to provide need-based financial aid for Tufts University undergraduate students.

The Raymond L. Johnson Scholarship Fund, established in 1999 by the will of Raymond L. Johnson.

The Peter and Clare Kalustian Scholarship, established in 2008, to provide scholarships to mechanical and chemical engineering students, with a preference to be given to students of Armenian descent.

The Karol Family Endowed Scholarship, established in 2013 to support scholarships for undergraduate students in the Schools of Arts and Sciences and Engineering who have high integrity and an entrepreneurial character; creative original thinkers; constructive innovators; selfless contributors to the Tufts community.

The Arnold S. Katz Scholarship. A member of the class of 1963, Mr. Katz founded this scholarship in 1981 to aid students in the College of Liberal Arts and Jackson. Preference is given to students from York County, Maine.

The Andrew B. Kaufman Family Endowed Scholarship, established in 2013 by Dr. Andrew B. Kaufman, A'61, J'86P, J'92P to provide financial aid for undergraduates in the Tufts University School of Arts and Sciences.

The Kava Family – Goldman Sachs Endowed Scholarship Fund was established in 2014 to support financial aid for Tufts University undergraduates. This scholarship is a gift of Goldman Sachs Gives at the recommendation of Lisa D. Kava, J'89 and Alan S. Kava.

The Elsa Orent Keiles Scholarship Fund, established in 1996 by the will of Elsa Orent Keiles, J'25.

The Michael T. Kelleher Scholarship, established in 1951 in honor of Michael T. Kelleher, of Boston, the income to aid each year an outstanding young man who needs help in order to go to college.

The Andrew P. Kerr/Adam F. Kerr Scholarship, established in 1988 by Andrew P. Kerr, Class of 1960. This scholarship benefits students who are in need of financial aid and who are in good academic standing in the College of Liberal Arts and Jackson.

The KF Endowed Scholarship, established in 2013 by Patrice S. Karp, J'90, and David C. Karp to provide financial aid for Tufts University undergraduates. The scholarship is representative of the Karp's and the university's shared goal to increase access to education to stellar but financially challenged students from diverse backgrounds.

The Kier-Wain Family Scholarship, established in 2000 to provide financial aid to Tufts students with financial need. First preference in selection will be given to an undergraduate woman of Cuban-American heritage. If a Cuban-American woman is not available for the scholarship, preference will be given to a woman of other Hispanic heritage.

Killam Canadian Fund, established in 1997 in memory of Isaac Walton Killam of Nova Scotia by his Massachusetts sisters through their testamentary trusts, to help Canadian students with limited financial circumstances enroll at Tufts University.

The Elson T. Killam Memorial Scholarship Fund, established by a bequest made in trust in memory of the late Elson T. Killam, a 1922 graduate of the College of Engineering. The income from the principal is to be used for general scholarship needs of the university.

Kimball University Scholarship, established in 1994 by David N. Kimball, A'68, to provide financial aid to students of high achievement who show promise of future success.

The Kindler-Sullivan Scholarship, established in 2008, to support the university's efforts to create an intentional, intellectual, and broadly diverse community of scholars.

The Kline Family Scholarship, established in 2013 by Douglas and Susan Kline, E'84, A'13P, to support financial aid for students participating in the Bridge to Liberal Arts Success at Tufts (BLAST) program.

***The Dr. Barbara Knight-Meyers Scholarship**, established in 1963 by Dr. and Mrs. Edward R. Knight. This scholarship is to provide financial aid to a deserving student in Jackson College.

The George T. Knight Memorial Scholarship, established in 1951 by classmates, former students, friends, and family in memory of George Thompson Knight of the class of 1872, professor in the Crane Theological School from 1883 to 1910, member of the faculty 1875–1910.

The Mabel Hoyle Knipe Scholarship Fund, established in 1998 from the estate of Mabel Hoyle Knipe, J'28, with preference given to graduates of Fairhaven High School.

The Robert A. Kolankiewicz Scholarship Fund, established in loving memory by the family, classmates, and friends of the late Robert A. Kolankiewicz, Liberal Arts graduate of the Class of 1952 and husband of Cynthia (Reynolds) Kolankiewicz Foss, Jackson College, Class of 1953. The scholarship income is to benefit deserving students participating in a Tufts ROTC program in the Navy or Marine Corps in that order. If no ROTC student qualifies for the award in any given year, it will be given to deserving undergraduates in the College of Liberal Arts or Jackson College.

The Kovler Family Scholarship Fund, established in 1987 by the Blum-Kovler Foundation at the request of Jonathan and Peter Kovler, for the benefit of undergraduate students in need of financial assistance.

The Krakoff Family Endowed Scholarship Fund was established in 2014 by Reed D. Krakoff, A'86, A'17P to support financial aid for Tufts University undergraduates.

The Robert L. Krakoff Memorial Endowed Scholarship, established in 2008. The scholarship benefits students earning a minor degree in Entrepreneurial Leadership Studies and intending to pursue entrepreneurship in the future.

The Frieda Kress Scholarship, established in 2006 to provide need-based undergraduate financial aid to promote diversity at Tufts.

The Michael Kuhn Memorial Financial Aid Fund, established in 2001 to provide aid to Tufts students with financial need.

The Carolyn Guber Langelier Scholarship, established in 2008 to support scholarships within the School of Arts and Sciences, in order to increase the diversity of the Tufts student body.

The Landsberger Family Endowed Scholarship, established in 2007 to support scholarships to help achieve the educational benefits of diversity in the School of Arts and Sciences.

The Rosewell B. Lawrence Scholarship, founded in 1922 by Rosewell B. Lawrence, of Medford, for scholarships and loans for worthy students. Preference is given to graduates of Medford High School already attending Tufts.

The Dr. Howard L. and Mary McCarthy Leary Scholarship Fund, established in 1987 by Mrs. Leary for qualified premedical students in the College of Liberal Arts and Jackson.

The Lebovitz Family Endowed Scholarship, established in 2008, to support scholarships within the University and to increase the diversity of the Tufts undergraduate student body.

The Jack and Lorraine Lee University Scholarship, established in 2001 to provide financial aid to needy undergraduate students who are residents of New Hampshire, with preference to students who are in their second year of employment at a New Hampshire golf course.

The Leibowitz Family Endowed Scholarship Fund, created in 2010 by Dr. Steven R. Leibowitz, A'79, to benefit undergraduates in the School of Arts and Sciences.

The Maud Amelia Leighton Scholarship Gift, the income from a Trust Fund established by George A. Leighton, of Los Angeles, California, for the benefit of engineering students.

The Henry Leir International Scholarship, established in 1999 to provide financial aid for outstanding Tufts undergraduate students who wish to study abroad or who demonstrate commitment to the study of international affairs.

The Allen and Eleanor Lester Scholarship, established by a bequest in 2009 to benefit undergraduate students at Tufts University.

The Alvin Levin Scholarship, established in 1994 to provide scholarships to women of color enrolled in the Urban and Environmental Policy program.

The Louis Levin Scholarship Fund, a scholarship fund established in 1961 by William A. Levin of the Class of 1943 in memory of his father. Income from the fund provides financial aid for undergraduates, with preference given to students majoring in one of the sciences.

The Jon A. Levy Endowed Scholarship, established in 2012 by Jon A. Levy, E83 to support financial aid for Tufts undergraduate students in the School of Engineering.

The Blanche M. Lewis Scholarship, established by Gerald Lewis of the Class of 1954 in honor of his mother, awarded annually with preference for a young woman showing promise in literature or fine arts, who would be unable to attend Tufts without financial assistance.

The Frank T. Lewis Scholarship Fund, which benefits engineering students with preference to those majoring in mechanical engineering.

The Freda Lewis Scholarship, established in 2002 to provide scholarships for students attending Jackson College, preference being given to students who are members of or affiliated with a Universalist Church.

The Leo Rich Lewis Memorial Scholarship, established in 1950 by classmates, former students, family, and friends in memory of Leo Rich Lewis of the Class of 1887, Fletcher Professor of Music and member of the faculty from 1892 to 1945. Preference is given to students majoring in music.

The Jacob Lewiton Scholarship, established in 2000 by bequest of Jacob Lewiton, Trustee Emeritus. The scholarship fund is for needy students who commute to Tufts College. It is the hope of the family that further contributions will be made from time to time to this scholarship fund.

The Dr. Hersh W. Libo and Mrs. Libby Libo Scholarship Fund, established in 2013 by Dr. Hersh and Mrs. Libby Libo in honor of their parents Louis and Betty Libo and Meye and Yetta Barolsky.

The Edwin A. Locke Scholarship, established under the will of Edwin A. Locke of the Engineering Class of 1915, the income to be used to award scholarships to engineering students.

The William L. Locke Scholarship, established in 1961 by Mrs. William L. Locke in memory of her husband of the Class of 1900. The income from this gift is to provide financial aid to a junior or senior in the Department of Civil and Environmental Engineering.

The Jerome T. Loeb Scholarship, established in 1989 by Mr. Loeb, A'62, and awarded annually to an undergraduate, with preference for students from St. Louis, Missouri, and surrounding communities.

The Loomis Scholarship Fund, founded in 1985 in memory of Samuel Loomis, A'15, and his wife Bernice C. Loomis. Seventy-five percent of the annual income is to be used for scholarships, and the remainder is to be added to the principal of the fund annually.

The Loulakis Family Endowed Scholarship, established in 2007 by Michael Loulakis, E'76, to provide need-based financial aid for juniors and seniors in the School of Engineering who plan to pursue a career in law or public policy related to the E & C industry. Preference will be given to Civil Engineering students who have demonstrated high academic achievement and leadership.

The Lawrence Loventhal Endowed Scholarship, established in 2008 in support of financial aid for Tufts undergraduate students of the School of Arts and Sciences.

The Norman E. and Marjorie W. MacCuspie Scholarship, established in 1981 to provide financial aid to qualified men and women at Tufts College and Jackson College.

The Frances Booth MacGowan Endowed Scholarship Fund, established in 1999, with preference that awards from the fund be granted to female students in the College of Liberal Arts and Jackson.

The Elmore I. and Etta P. MacPhie Scholarship, established in 1956 by Etta Phillips MacPhie of the Class of 1913 in memory of her husband, Elmore I. MacPhie, of the Class of 1911, the income to be used for the benefit of deserving students in the College of Liberal Arts or Jackson College.

The Leslie and Bruce Male University Scholars Fund, established in 1990 by Leslie and Bruce Male, A'63, to provide financial aid to students of high achievement who show promise of future success.

The Manogue Family Endowed Scholarship Fund was established in 2014 by Joseph M. and Jeanne M. Manogue, A'15P, to provide financial aid for undergraduates in the Tufts University School of Arts and Sciences.

The Frank Marcucella Scholarship, established in 1953 by Frank Marcucella, of Medford, Massachusetts.

The Nathan Margolis, A'31, G'34 Memorial Scholarship, established in 2005 by Esther Margolis to promote excellence in teacher training. The Margolis Fund will be awarded annually to one or more students engaged in the study of Education, with a preference for students pursuing a Master of Arts in Teaching degree.

The Myron W. Marr Scholarship, established in 1956 by Dr. Myron W. Marr of the Class of 1904 and the Medical School Class of 1907.

The Laurence K. Marshall Scholarship, established in 1977. This scholarship exists to help others fulfill their educational objectives while encouraging them to explore and to excel. Awards are made annually to students in the School of Engineering who demonstrate academic excellence, who have financial need, and who have areas of interest and accomplishment outside of their major fields of study.

The Marvin Scholarship, established in 1952 by Reingold Kent Marvin, of Boston, Massachusetts. The income of this fund is to be used for the benefit of descendants of Thomas E. O. Marvin, or any student excelling in scholarship and athletics, in that order.

The Arthur E. Mason Memorial Scholarship, established in 1954 by Mrs. Arthur E. Mason, of Newton, Massachusetts, in memory of her husband, Arthur E. Mason, for many years treasurer and trustee of Tufts College. The income from this fund is to be awarded annually to a student residing in New England.

The David Lee Maulsby Memorial Scholarship, established in 1951 by classmates, former students, family, and friends in memory of David Lee Maulsby and the Class of 1887. Dr. Maulsby was professor of Oratory and English Literature from 1891 to 1910.

The Wallace Mayo Scholarship, founded in 1925 by Wallace Mayo, of Dayton, Ohio.

The Edward J. McCabe Scholarship, established in 1994 to provide scholarships for worthy students attending the School of Engineering.

The Brendan P. McCarthy Endowed Scholarship Fund was established in 2014 by Brendan P. McCarthy, A'85 to provide financial aid for undergraduate students in the Tufts University School of Arts and Sciences.

The Kathryn A. McCarthy, J'45 Endowed Scholarship, established in 2002 to provide scholarships to deserving and financially needy undergraduates who have good scholastic achievement as well as qualities of leadership and citizenship within the community.

The Kathryn A. McCarthy Special Endowed Scholarship, established in 2004 as part of the Pritzker Challenge. The scholarship will increase the diversity of the student body of current or prospective students within the Schools of Arts, Sciences and Engineering, with preference given to the students of the North Cambridge High School, Cambridge, MA.

***The Sarah Nelson McFarlane Scholarship**, established in 1959. To be awarded to a member of any class in Jackson College who, in the opinion of the dean or other qualified person, is worthy and in need of financial assistance.

The McMahan Memorial Fund, established by the friends and family of William A. McMahan, Esq., in his memory. The fund provides scholarships to undergraduate students in the School of Arts and Sciences.

The Jean Griswold Mead Scholarship, established in 1968 in memory of Mrs. Leonard C. Mead by her family and friends.

The Eva Mela Scholarship, established in 2012 by Thomas Mela, A'65, J'96P, and Elizabeth Mela, J'66, J'96P, in memory of Eva Mela, A'65P. The purpose of this fund is to support financial aid for Tufts undergraduate students accepted into the School of Arts and Sciences' Bridge to Liberal Arts Success at Tufts program (BLAST). This scholarship will help to provide the support, resources and opportunities necessary for BLAST scholars to achieve academic excellence, and to actively contribute to their communities inside and outside of the University's campus.

The Memorials Scholarship, established in 1956 to provide suitable recognition of contributions made in memory of beloved Tufts people. Income from this fund is used for scholarships for needy students.

The Alex Mendell Memorial Scholarship, awarded annually to a sophomore or junior who, through his or her leadership in a variety of campus activities, brings together students representing a broad spectrum of the community. Like the student in whose memory the award is made, the recipient should demonstrate a generosity of spirit and character that both contribute to the self esteem of others and to their love of Tufts.

The Richard Mergendahl Memorial Scholarship, established in 1951 by classmates, friends, and family in memory of Richard Mergendahl of the Class of 1944.

Guy Rindge and Alice Barbour Merrill Scholarship, established in 1997 to provide financial aid for undergraduate students.

The Merrin Family Scholarship, established in 1997 to provide financial aid to students from the five boroughs of the City of New York who demonstrate academic promise and financial need.

The Frank Merritt Scholarship. Preference will be given to direct descendants of Mr. Frank Merritt of the Class of 1879, founder of the scholarship. Next in preference shall be some worthy student of the engineering school. For each recipient the founder has this message: "Loyalty and patriotism are akin and are noble qualities. It is hoped that the persons receiving benefits from this scholarship will always be true and loyal to their Alma Mater, and if fortune should smile upon them at some future time they will respond to the needs of the college."

The Robert W. and Gladys S. Meserve Scholarship Fund, established in 1995 in memory of Robert W. and Gladys S. Meserve by family and friends to provide financial aid to students from Waltham High School and Medford High School. Robert W. Meserve was an Alumni Trustee (1955–59), a Life Trustee (1959–79), Chairman of the Board of Trustees (1964–69), and Trustee Emeritus (1979–95).

The Millenium Challenge Fund, established in 2009 to provide need-based financial aid to undergraduate students at Tufts, and to give others incentive to invest in financial aid at Tufts.

The Charles L. Miller Fund, established as a bequest in 1969 by the late Charles L. Miller, of Greenwich, Connecticut, as an endowed scholarship fund with the income only to be used for the purpose of providing financial aid to worthy and needy students of the university.

The George Stewart Miller Scholarship, established in 1951 by classmates, former students, and friends of George S. Miller of the Class of 1906, acting president 1937–1938, vice president 1939–1951, member of the faculty and administration 1916–1956, and president of the Tufts Alumni Association 1954–1960.

The Marion Stratton Miller Scholarship, established in 1976 in memory of Marion Stratton Miller, for many years an active and loyal member of the Tufts community. In awarding the income of this scholarship, preference is to be given to her direct descendants.

The Pamela A. Milligan and Richard A. Henige Endowed Scholarship Fund, established in 2010 to support scholarships within the School of Arts and Sciences.

The A. A. Miner Scholarships, founded in 1864 and 1890 by Alonzo Ames Miner, D.D., of Boston.

The Tanya Mitra Scholarship Fund, established in 2012 in memory of Tufts alumna Tanya Mitra, A10. To honor Tanya's memory and continue her legacy, her friends and family created this endowed scholarship fund to benefit pre-med students in the School of Arts and Sciences who wish to pursue a career in medicine and who, like Tanya, are driven to help others both domestically and abroad. Through this scholarship, Tanya's friends and family hope to share the gift of a Tufts education with generations of students, who, like Tanya, are eager to pursue a medical education built upon the solid liberal arts foundation provided by Tufts.

The Adelbert H. Morrison Fund, founded in 1958 under the will of Helen C. Morrison for the benefit of needy and worthy students majoring in engineering, preferably graduates of Boston Technical High School already attending Tufts.

The Gina George Morse Endowed Scholarship, established in 2009 by Gina George Morse, J'84, AG'87, in support of financial aid for undergraduate students in the School of Arts and Science, with preference to students studying child development.

The Joseph W. Morton Memorial Scholarship, established in 1956 by the men and women of the Class of 1931 as their twenty-fifth reunion gift, to be awarded annually to a student in one of the undergraduate schools of Tufts University, preference being given to descendants of members of the Class of 1931 who are otherwise qualified. Named in honor of Joseph W. Morton, A'11, H'56, alumni secretary, 1924–1956.

The Hannah S. Moulton Scholarships, founded in 1914 by Hannah S. Moulton, of Kensington, New Hampshire.

The John Martin Mugar Scholarship Fund, established in 2007 to provide need-based financial aid to create an intentional, intellectual, and broadly diverse community of scholars. Proceeds of this fund will be awarded to first-generation college-bound students.

The Frederick S. and Marie E. Mullen Scholarship, established in 1989 by Robert F. Mullen, Class of 1965, in honor of his parents.

The Louis Sutcliffe Murphy Fund, established in 1977 by Mrs. Louis S. Murphy, Alexandria, Virginia, in memory of her husband, Liberal Arts Class of 1901. The fund is also in memory of her son Louis S. Murphy, Jr., who attended Tufts. The income is available to undergraduate students who display need and academic qualification to the appropriate university officials.

The John and Gail Nackel Scholarship Fund was established in 2014 by John G. Nackel, A'73, A'03P and Gail H. Nackel, A03P. This scholarship supports financial aid for Tufts University undergraduates, with a preference for juniors or seniors with an interest in careers in the health professions or students from Medford, MA.

The Michael and Josephine Nackel Scholars Fund, established in 2000 to provide scholarships for undergraduate students of Arab-American heritage or students from the Medford community.

Rosamond Najjar Scholarship Fund, established in 1998 to offer scholarships with preference to graduates of Medford High School.

The Michael and Lisa Nash Scholarship, established in 2008, to support the university's efforts to create an intentional, intellectual, and broadly diverse community of scholars.

The Neary Family Scholarship Fund was established in 2014 by James Neary, A'87 and Rebecca Neary, J'87 to increase access to education for stellar but financially-challenged students from diverse backgrounds, particularly under-represented students who are pursuing an undergraduate minor in finance and/or are interested in a career in financial services after graduation.

The Neubauer Scholars Program, established in 2000 by Trustee Joseph Neubauer. The program attracts and enrolls intellectually talented students from across the country and around the world. Neubauer scholars are encouraged to take advantage of research, internship, and study abroad opportunities to broaden their experience and perspectives. The Neubauer Scholars Advisory Committee assists the scholars in the pursuit of scholarly activities.

The Newhouse Scholarship, established in 1997 to offer financial support to low-income students from New York City.

Murdock H. Newman Scholarship Fund, established in 1997 from the estate of Catherine H. Newman in memory of her husband Murdock H. Newman, A'31, to provide financial assistance to deserving students, with preference given to students from Grafton County, New Hampshire.

The New York City Scholarship, established by a private charitable foundation in 1996 to provide financial aid for needy undergraduate students from New York City high schools.

***The A. Florence Nichols Scholarship Fund**, founded in 1960 under the will of A. Florence Nichols of the Class of 1899, the income from which is to be given annually to some needy and deserving young woman who is working her way through college.

The Malcolm and Mabel Nickerson Scholarship, established by a bequest in 2009 to be invested in the general scholarship fund of Tufts University.

The Fred P. Nickless, Jr., Scholarship Fund, established by the Alumni Association in honor of Fred P. Nickless, Jr., A'48, G'49, for his long and loyal service to Tufts as alumni secretary for thirty years. The income is to be awarded annually to a deserving undergraduate or graduate student(s) in the Colleges of Arts and Sciences. Preference is to be given to Tufts alumni and their children.

The Eugene M. Niles Scholarship Fund, founded in 1927 for scholarships and other student aid.

The Norcross Scholarship, founded in 1890 by James A. and Mary E. Norcross, of Worcester.

The Ronald F. Noreen Scholarship, established in 2007 to benefit students in the School of Arts and Sciences and to increase the diversity, broadly defined, of the Tufts student body.

The North Shore Tufts Club Scholarship, founded in 1969 for the benefit of students of Tufts University. Preference is given to students whose homes are in the communities served by the club on the North Shore of Massachusetts.

The William J. O'Brien, A'42, Scholarship Fund, established in 2013 by the Estate of Freda F. O'Brien to support undergraduates in the School of Arts and Sciences who are studying economics and wish to pursue a career in business or finance. This fund will provide financial aid for Tufts University undergraduates.

The O'Connor-Birmingham Family Endowed Scholarship, established in 2006 to provide scholarship funds to increase the diversity of the Tufts student body. Preference will be given to students who have completed the "Step up to Excellence" program, or students who have graduated from public high schools in culturally diverse communities and who have demonstrated personal responsibility and community leadership.

The Offer Family Scholarship Fund, established in 1983 by Mr. Charles Offer, Sr., to aid worthy and appreciative students.

The William R. O'Reilly and Elizabeth Ross Endowed Scholarship Fund, created in 2006 for the benefit of undergraduates at the School of Arts and Sciences. The Fund supports need-based financial aid and promotes the educational benefits of diversity at Tufts University.

The Osher Reentry Scholarship, established in 2009, to be awarded to students who have experienced a gap in their education of at least five years and anticipate participation in the workforce for a significant period of time subsequent to graduation.

The Susan and Richard Pallan Scholarship, established in 1989 to benefit any full-time undergraduate student in need of financial aid.

The Charles A. Pappas Endowed Scholarship, established in 1990 by the Thomas Anthony Pappas Charitable Foundation, Inc., for needy students possessing high scholastic abilities at the College of Liberal Arts and Jackson College.

The Thomas L. Pappas Family Scholarship, established in 2012 by Thomas L. Pappas, A'83, A'12P. The purpose of this fund is to support scholarships within the School of Arts and Sciences, with first preference being given to students who are the first in their families to attend college and students double-majoring in mathematics or the sciences.

The Parets Family Scholarship, established in 2005 to provide financial aid to Tufts students, with preference to students of limited financial means who possess high academic potential and a demonstrated commitment to achieving scholastic excellence in the study of arts and sciences.

The Parks Family Endowed Scholarship Fund, established in 2014 by Eileen M. Parks, J'63, and Thomas W. Parks to support students within the School of Arts and Sciences.

The Theodore L. and Ruth B. Parrella Scholarship Fund, established in 2007 by Carol L. Parrella, E85, in memory of her parents, to support undergraduates in the School of Engineering with preference given to a female student majoring in Mechanical Engineering.

The Adoniram J. and Jane L. Patterson Scholarship, founded in 1920 by Adoniram J. Patterson, of Roxbury, Massachusetts.

The Ethel L. Peabody Scholarship Fund, established in 1975 by Miss Ethel L. Peabody of the Jackson College Class of 1915. Preference is given to former students of the Fitchburg, Massachusetts, High School already attending Tufts.

The Ellery E. Peck Memorial Scholarship, founded in 1891 by Henry Rollins, of Bangor, Maine.

The Pederson Memorial Scholarship, established in 2008, to benefit undergraduate students of the Faculty of Arts, Sciences, and Engineering who are pursuing academic majors in the humanities, including Classics, Comparative Religion, English, Foreign Languages, History, Philosophy, Visual and Critical Studies, or similar areas.

The Joseph and Rosaria Peduto Scholarship, established in 2008 to support a preference to provide financial aid to students of Italian descent.

The William L. Peduto Scholarship, established in 2008, to support the University's efforts to create an intentional community of diverse learners.

The Dorothy Penniman Latin Scholarship, established in 1979 through the generosity of Dorothy Penniman Hubbard of the Jackson Class of 1925. The donor studied Latin at Tufts, later taught Latin, and understands the lasting and multiple benefits of knowledge of the subject. She has established this fund in the hope that it will encourage other students to pursue the study of Latin. First preference at all times is given to students in need of financial aid enrolled in Latin courses in the Department of Classics.

The Penniman Scholarship, established in 1944 by Dorothy Penniman Hubbard and Ruth Penniman Ware in memory of their parents, Dr. and Mrs. George Wallace Penniman, the income from which is to be used annually to aid some deserving student with preference to students majoring in religion.

The Ralph Wentworth Penniman Memorial Scholarship, established in 1982 by Dorothy Penniman Hubbard of the Jackson Class of 1925 in memory of her brother, who was a graduate of the Tufts College Class of 1910. Income from the fund is restricted to students in the College of Liberal Arts, with preference to students majoring in history.

The Louis and Mary Perito Memorial Scholarship, established in 1982 by Paul L. Perito of the Class of 1959, in memory of his parents. The income from this fund is to be awarded annually to a deserving student in the College of Liberal Arts or Jackson College.

The John B. Perkins Scholarship, founded in 1866 by James D. Perkins, of New Rochelle, New York.

The John Perkins Scholarship, founded in 1896 by Ann Maria Perkins, of Medford, Massachusetts.

The Nancy Tabb Pfannenstiehl Memorial Scholarship Fund, established in 1993 by her family and friends, given with preference to undergraduate women majoring in romance languages.

The Joseph D. Pierce Memorial Scholarship, founded in 1898 by the children and other relatives of J. D. Pierce, D.D., of Attleboro, Massachusetts.

The Julius Pinkus Scholarships, founded in 1987 from the estate of Julius Pinkus in memory of Barney and Tobey Pinkus, Dr. Louis Pinkus, M'25, and Julius Pinkus. The income is divided equally among the School of Medicine, the College of Liberal Arts, and the Department of Music to be used as scholarship aid to worthy students.

The Percy J. Pitkin Scholarship, founded in 1983 by Percy J. Pitkin of the Class of 1923.

The Ernesto Poma Family Endowed Scholarship Fund was established in 2014 by Tufts parents, Ernesto and Cecelia Poma, A'13P to provide financial aid for Tufts University undergraduate students, with a preference for students who are from Latin America.

The Frank W. Pote Memorial Fund, established in 1982 in memory of Frank W. Pote, professor of physics at Tufts from 1912 to 1953, by his family and friends. The income from this fund is to be utilized to help deserving students who are majoring in physics.

The Marion S. Potter Scholarship Fund, founded in 1958 under the will of Marion S. Potter, to be used to provide scholarships for worthy students in the College of Liberal Arts of Tufts University.

The Melvin and Shirley Prague Scholarship, established in 2000, to be awarded to a member of the Tufts student body who has established and maintained a record of above average academic performance, has contributed earnest service to and/or beyond the Tufts community, and has demonstrated financial need.

The Theresa Winsor Pratt Endowed Scholarship, established in 2000 in memory of Theresa Pratt to provide financial aid for undergraduate students in the Resumed Education for Adult Learners (REAL) Program.

The Douglas and Susan Present Scholarship Fund, established in 2011 to benefit students in the School of Arts and Sciences, with preference given to academically qualified alumni of New Jersey SEEDS programs.

The David and Ethel Presson Scholarship, established in 1956 by David Presson, of Boston.

The John William Priesing and Carl William Priesing Scholarship, established in 1950 by Carl W. Priesing of the Class of 1921, in memory of his father. The name of Carl W. Priesing was added in 1976 in honor of Mr. Priesing's fifty-fifth reunion year by his son.

The Jay Pritzker Scholarship, established in 2002 as a matching challenge grant to support need-based financial aid that will be awarded to promote the achievement of the educational benefits of diversity at Tufts. Scholars are named for Jay Pritzker, Howard Hunter, or the names chosen by donors of qualifying gifts.

The Paul Pryor Scholarship Fund, established in 1988 by the estate of Paul I. Pryor, A'18, for the benefit of deserving male students in the College of Liberal Arts, with preference given to those active in extracurricular activities.

The Carolyn Fraser Pulling Scholarship Fund, established in 1980 to aid worthy students by bequest of Mrs. Arthur (Carolyn Fraser) Pulling, Women of Arts, Class of 1908.

The Gregory and Christine Randolph Scholarship, established in 2008 to provide scholarship support for students who have demonstrated financial need.

The Saul C. Ravitch Memorial Scholarship, established in 1952 by Mrs. Sylvia Ravitch in memory of her husband Saul C. Ravitch of the Class of 1922.

The Joel Reed Memorial Scholarship, established in 1988 to provide a scholarship fund for commuting students who exemplify Joel Reed's academic diligence and community service, thereby encouraging this effort and ensuring that Joel's name and spirit live on.

The Reed Family Endowed Scholarship Fund, established in 2010 by Bruce N. Reed, E'47, in honor of his family and in support of undergraduate scholarships at Tufts, with preference to students who are descendants of Tufts Naval V-12 and Naval ROTC participants during the years 1941 to 1948.

The Rennert Family Scholarship, established in 2008 to support scholarships within the School of Arts and Sciences.

The Resnek Family Scholarship Fund, established in 1988 by Frank, Barbara, and Paul Resnek, A'97, to provide tuition assistance for talented students attending Tufts University, with preference to citizens of the United States.

The Joel W. and Marion Newhall Reynolds Scholarship, established in 1951 by Joel W. Reynolds, Jr., of the Class of 1923, and Marion Newhall Reynolds, Jackson Class of 1924. The income from this fund is to be divided equally each year between a student of the School of Engineering and a student of Jackson College.

The Rhode Island Scholarship, founded in 1899 by several persons in Rhode Island.

The Mary A. Richardson Scholarship, founded in 1904 by Mrs. Mary A. Richardson, of Worcester, Massachusetts.

The William B. Richardson Scholarship, established in 1952 by William B. Richardson of the Class of 1915.

The Ringer-Breed Scholarship was established by the late Alison M. Breed, J'66, AG'72, a Tufts University trustee, to provide financial aid for Tufts University undergraduates who demonstrate financial need, leadership in campus activities or non-political community service and achievement in endeavors such as academics, the arts, athletics, entrepreneurship, or technology. The scholarship was created in honor of Wilfred H. Ringer, Class of 1907; Beth Ringer Moran, J'32; Wilfred H. Ringer, Jr., E'37, and Hayden N. Ringer, E'44.

The Rittenburg Family Scholarship Fund, established in 1989 by members of the Rittenburg family to provide scholarships to deserving students of the School of Engineering. Scholarships shall be awarded by the Dean and the Office of Financial Aid.

The Pilar Crespi Robert Scholarship Fund, established in 2003 as part of the Pritzker Challenge to benefit outstanding undergraduate students of African American, Hispanic American, and Native American heritage.

The Rebecca T. Robinson Scholarship, founded in 1890 by Charles Robinson, L.L.D., of Newton, Massachusetts.

The Emily Graham Rose Memorial Scholarship, established in 1965, for the benefit of deserving students in Jackson College and Tufts College.

The Tufts ROTC/Veterans Scholarship was established in 2014 to support financial aid for Tufts University undergraduates in the ROTC program or for returning United States veterans who are enrolled as undergraduate students.

The Professor Fred Rothbaum Scholarship Fund was established in 2013 in memory of Tufts University Professor Fred Rothbaum. The fund will honor Professor Rothbaum's life by supporting student scholars in the Eliot-Pearson Department of Child Study and Human Development.

The Jeffrey and Marieke Rothschild Endowed Scholarship was established in 2015 by Jeffrey and Marieke Rothschild, E'18P, to support financial aid for Tufts University undergraduate students.

The Gertrude Rubel Scholarship, established in 1998 to provide financial aid for undergraduate students from Medford and Somerville, Massachusetts.

The Elbridge Rust Scholarship Fund, founded in 1926 by Elbridge Rust, of Peabody, Massachusetts.

The Ankur and Mari Sahu Endowed Scholarship Fund, established in 2011 to support scholarships within the School of Arts and Sciences. Students must be eligible for financial aid and will demonstrate superior ability, achievement and potential for leadership, with preference to female students from South Asian countries.

David and Gertrude M. Saklad Fund, established in 1990 under the will of David Saklad, E'21, to provide scholarships to students in engineering science and computer science who have completed freshman year, have shown academic skill, and require financial assistance.

The Ruth Salaway Friedman Memorial Fund, established in 2013 through the Estate of Gertrude Elizabeth Salaway to provide financial aid for Tufts University undergraduates.

The Lori Winters Samuels and Ted Samuels Family Scholarship, established in 2006 to provide need-based undergraduate financial aid to promote diversity at Tufts.

The Herbert J. and Harriet S. Sandberg Family Scholarship, established in 2004 to provide scholarship to African American, Native American, and Hispanic American students with financial need. Preference is given to students meeting these criteria who have graduated from Medford High School in Medford, Massachusetts.

The Albert W. Sayles Scholarship, founded in 1899 by Albert W. Sayles, of Lowell, Massachusetts.

The Sarah E. Sayles Memorial Scholarship, founded in 1891 by Albert W. Sayles, of Lowell, Massachusetts.

The Scaramucci Family Endowed Scholarship, established in 2006 for the benefit of undergraduate students in the School of Arts and Sciences and to increase the diversity of the student body.

The Irving and Hannah Schwartz Scholarship, established in 1951 by Joseph and Irving Schwartz of the Class of 1937, in honor of their parents and in honor of Dr. Siegfried Thannhauser.

The William and Lillian Schwartz Student Scholarship, founded in 1984 for the benefit of needy and worthy students.

The Scott Fund, established in 1932 by the will of Augustus E. Scott, of Lexington, Massachusetts.

The Laura A. Scott Scholarship, founded in 1890 by Mrs. Laura A. Scott, of Ridgefield, Connecticut.

The Segalas Family Endowed Scholarship Fund, established in 2007 to increase the diversity of the undergraduate student body.

The Margaret and Donald Segur Scholarship, established in 2000 to provide support to students from Armenia at the Fletcher School of Law and Diplomacy or at the College of Liberal Arts and Jackson College, who are studying political science, economics, prelaw, or journalism. Second preference goes to students of Armenian descent at the Fletcher School, and third preference goes to undergraduate students of Armenian descent at the College of Liberal Arts and Jackson College, who are studying political science, economics, prelaw, or journalism.

The Usha and William Sellers Scholarship, established in 2009 to provide financial aid to international undergraduate students coming to study at Tufts from India, with particular preference to students who are Dalit and/or come from an impoverished background.

The William J. Sen Scholarship Fund, established in 1982 by William J. Sen, E'40. The income of this fund is to be used annually to aid students of the School of Engineering, with preference to undergraduates and minority students.

The Evelyn and Joseph Shapiro Endowed Scholarship, established in 2007 to provide annual scholarship funds to undergraduate students who are in good academic standing.

The Frank S. and Eva A. Shapiro Scholarship Fund, established in 1955 by Frank S. Shapiro of the Class of 1916, the income to assist worthy undergraduate students with preference being given to students interested in chemistry.

The Mildred and Sumner Shapiro Scholarship, established in 1997 to provide financial assistance to students in the Tufts College of Liberal Arts.

The Edwin A. Shaw Memorial Scholarship, established in 1952 by former students, family, and friends in memory of Edwin Adams Shaw of the Class of 1898 and professor of education, 1919–1950.

The Henry J. and Louise O. Shea Scholarship, established in 1987 to provide scholarships to needy and deserving students.

The William H. Sherman Scholarship, founded in 1903 by William H. Sherman, of Cambridge, Massachusetts.

The A. Shuman Scholarship, founded in 1923 by A. Shuman of Boston.

***The Hettie Lang Shuman Memorial Fund**, founded in 1905 by Mr. A. Shuman in memory of his wife. The interest of this fund is expended annually in aiding deserving women students.

The Frank and Virginia Siegel Scholarship, established in 2012 by Tufts parents Frank and Virginia Siegel, A'15P, to support financial aid for Tufts undergraduate students in the School of Arts and Sciences.

The Seymour and Marcia Simches Scholarship Fund, established in 1986 by friends and family members of Professor Seymour Simches. This fund will be awarded annually to an outstanding student in financial need who is majoring in one of the humanities.

The Simmons Scholarships, founded in 1895 by Robert F. Simmons, of Attleboro, in the name of Mary F. and Robert F. Simmons.

The Miriam Charef Simonds Scholarship Fund, established by her sister, Pauline Charef Simonds, Jackson '54, with assistance from family, friends, and colleagues. An ardent student of American political life, Mimi Simonds possessed, to an exceptional degree, an ability to respond creatively and effectively to the social and political issues of her time. She performed outstanding public service at the community, state, and national levels. In keeping with the compelling interests of her life, it is the family's wish that the annual income from this scholarship fund be awarded to a student in the Graduate Program in Public Policy and Citizen Participation who is deemed both financially and academically worthy of this recognition and who has completed one year of study. For Mimi Simonds, hope for the future was a premise that sustained her until her death. It is the intent of this scholarship to provide a living legacy of that hope and a memorial to the commitment which she brought to public service.

The Simons Family Scholarship, established in 1987 to provide a partial scholarship in the College of Liberal Arts.

The Simons Memorial Scholarship, founded in 1891 by Mrs. Mary A. Simons, of Manchester, New Hampshire, in memory of Hiram H. Augustus and Frank Simons.

***The Charles A. and Cornelia B. Skinner Scholarship**, founded in 1907 by the Reverend Charles A. Skinner, D.D., and Mrs. Cornelia B. Skinner, of Cambridge, Massachusetts.

The Capt. Benjamin Sklaver Endowed Scholarship Fund, established in 2010 in memory of Benjamin Sklaver, A99, F03. It should be awarded annually to one or more undergraduate student(s), in the college of Liberal Arts or Engineering, in need of financial assistance who have demonstrated a commitment to public service, international relations, and/or human rights.

The John Richard Skuse, Class of 1941, Memorial Scholarship, established in 1999 by the bequest of John Richard Skuse to provide financial aid to Tufts students based on ability, achievement, and need. First preference is given to students from the town of Exeter, New Hampshire.

The Abraham and Sonya Slifka Scholarship Fund, established in 1991 to provide financial aid for undergraduate students.

The Phyllis E. Sloan Endowed Scholarship, established in 2009 to support undergraduate scholarships within the University.

The Michael B. Slone, A'89 Endowed Scholarship for Talloires, established in 2010 in memory of Michael Bennett Slone, A'89, to benefit students with demonstrated financial need, whose plan of study includes the European Center in Talloires.

The Charles E. Smith Scholarship, established in 1952 by Charles Eugene Smith of the Class of 1922, the income to be awarded to a young man in the College of Liberal Arts.

The Dana Weiss Smith and Robert A. Smith Scholarship, established in 2013 to support financial aid for undergraduate students in the School of Arts and Sciences at Tufts University.

***The Rena Greenwood Smith Scholarship Fund**, established in 1986 by the Richard Ilsey Smith Trust to benefit a worthy student of Jackson College.

The Richard Ilsey Smith Scholarship Fund, established in 1986 to benefit a worthy student of the university.

The Simeon C. Smith and Emily A. Smith Scholarship Gift. The income from a trust fund established by Simeon C. Smith to be known as the Simeon C. Smith and Emily A. Smith Fund, allocated by the trustees for scholarship purposes.

The George A. Spencer Scholarship, established in 2000 to benefit deserving students from the School of Engineering at Tufts University.

The Virginia Nold Spencer Memorial Scholarship, established in 1996 to help ensure a Tufts engineering education to the most qualified students regardless of their financial capabilities.

The John Murray Sprague and Eliza Fletcher Sprague Scholarship, founded in 1908 by John Sprague, of Lowell, Massachusetts.

The Miriam Carleton Squires Scholarship, established in 1971 under the will of Miriam Carleton Squires, of Broken Bow, Nebraska, a member of the Class of 1908.

The Marjorie Cohen Stanzler Scholarship Fund, established in 2002 to provide financial aid to needy students who are citizens of the United States.

The Edwin Carter Starr Memorial Scholarship, established in 1980 by Mrs. Paul (Catherine S.) Phenix in memory of her father. The income is awarded annually to benefit students in the field of child development.

The State Scholarships, established in 1859 in accordance with a resolve of the Commonwealth of Massachusetts.

The Charles E. Stearns Scholarship Fund, established by students, colleagues, friends, and family to honor the exceptional fifty-year career of Charlie Stearns, A'39, as a gifted student, a caring and intellectually stimulating professor, and a loyal and insightful dean. It is intended to support one or more Geology students who have demonstrated attention to detail, thoughtful analysis, and insight to their geological studies. In the absence of students fitting the above criteria, the Stearns Scholarship Fund may be used to support gifted students in the School of Arts and Sciences.

The Bruce and Irene Steinberg Endowed Scholarship Fund was established in 2014 by Bruce and Irene Steinberg to provide financial aid for undergraduate students in the Tufts University School of Arts and Sciences, with a preference for students who are studying International Relations and have participated in Tufts 1+4.

The William and Mary-Jane Sterling Scholarship, founded in 1985 by William C. Sterling, Jr., of the Class of 1956 to aid worthy undergraduates in obtaining the benefits of education.

The Stern Family Endowed Scholarship, established in 2000 to benefit outstanding undergraduate students.

The Dale Stevens Scholarship, founded in memory of the late Dale Stevens, of North Andover. Awarded to a student majoring in the Eliot-Pearson Department of Child Study and Human Development. Preference is given to undergraduates at Tufts from North Andover, Massachusetts, or other communities in the Merrimack Valley.

The Stevens Family Endowed Scholarship Fund, established in 2014 by Beryl Stevens Harper, J'69, to support students within the School of Arts and Sciences.

The Frederick W. Storck Memorial Fund, established in 1989, the income to be used for undergraduate financial aid at the university.

The Stowe Scholarship, founded in 1890 by Mrs. Eugenia D. Stowe, of Meriden, Connecticut.

***The John and Lucy H. Stowe Fund**, founded in 1902 by bequest of Mrs. Stowe of Lawrence, Massachusetts, "for the benefit of the lady students department."

The Harry Louis Strecker Scholarship, established in 1969 as a bequest by the late Harry L. Strecker, Class of 1913, of Livingston, New Jersey. The income thereof is to be used to assist a worthy student in the electrical engineering department.

The Carl and Alice Stroehmann Scholarship, established in 1953 by Carl F. Stroehmann of the Class of 1919.

The Students Against All Odds Scholarship, established in 2002, to provide support to students who are distinguished not only by their academic progress and potential, but also especially by their success in overcoming normally insurmountable obstacles. Preference will be given to students who have demonstrated scholastic ability, service to community and/or family, and a work ethic by earning funds for college either in summer employment or during the school year.

The Ellen G. Sullivan Scholarship, established in 2002 to provide financial aid to needy undergraduate Black American students majoring in Child Development.

The Dorothy Sulloway Sweet Scholarship, founded in 1933 by Joseph L. Sweet and Florence M. Sweet.

The Judith P. Sulzberger Scholarship, established in 1997 to provide funds to particularly needy underrepresented-minority students from New York City.

The Carl Lars Svensen Scholarship, established in 1952 by Carl Lars Svensen of the Class of 1907, the income to be given to a student in the School of Engineering.

The Gerald L. Swartwood Endowed Scholarship Fund for Engineering, established in 2011 through the estate of Gladys Swartwood and in memory of her husband, Gerald Swartwood, E'46.

The Elbridge Sweet Scholarship, founded in 1933 by Joseph L. Sweet and Florence H. Sweet.

The Dr. Elliott H. Sweetser and Aileene B. Sweetser Scholarship Fund, which benefits undergraduate students in the School of Arts and Sciences at Tufts University.

The Talbot Scholarship, founded in 1890 by Newton Talbot, of Boston.

The Lloyd H. Taylor Scholarship, established in 1984 to aid qualified students in the School of Engineering.

The Paul E. Thissell Scholarship, in memory of Paul Thissell of the class of 1921 and Bernice Tilden Kidder. Preference is given to a Massachusetts-born student majoring in French.

The Louise F. Thistle Endowed Scholarship, established in 2009 in support of financial aid for Tufts undergraduate students in the School of Arts and Sciences.

The Albert Thomann, A'52, and Maria Thomann Scholarship, established in 2005, to be awarded to one or more worthy and promising students who are determined to be in need of financial aid. Scholarships may be awarded to students in any class and may be continued up to four years as long as the recipient remains in good standing.

The George C. Thomas Scholarship, founded in 1899 by George S. Thomas, of Philadelphia, Pennsylvania.

The Tiampo Family Endowed Scholarship Fund, established in 2012 by James Tiampo, E'83, A'83 and Kristy Tiampo, E'83, to support scholarships within the School of Engineering at Tufts University. Kristy and Jim met while studying Civil Engineering at Tufts and are both grateful for the education they received and committed to helping deserving students enjoy the excellent learning experience Tufts offers.

The Frederick W. Tibbets Memorial Fund, established in 1942 by bequest of M. Helen Tibbets, late of Gloucester, Massachusetts, as a memorial to her late brother Frederick W. Tibbets of the Class of 1879. Income is used to aid worthy and needy students.

The TOMS Scholars Endowed Fund, established in 2012 to provide need-based financial aid to students in the Tufts University School of Arts and Sciences, with a preference for international students.

The Walter V. Towle Scholarship Fund, established in 1963 by bequest of Grace H. Towle, the income to be used to assist students of the highest scholastic standing.

The Neil W. and Elizabeth S. Townsend Scholarship, established in 2014 by Elizabeth Townsend, J'90, and Neil Townsend, E'87, to support undergraduate students within the Schools of Arts and Sciences and Engineering.

The Travelli Scholarship, founded in 1890 by Mrs. Emma R. Travelli, of Newton.

The Hyman S. and Edith Rieva M. Trilling Scholarship, founded in 1984 to benefit students in the College of Liberal Arts and Jackson College.

The Tufts Kinsmen Scholarship, for aid to students with preference to Tufts family descendants. Awards from income are made on basis of need and achievement to those who have completed one year or more at Tufts.

***The Betsy Houses Twombly Scholarship**, established in 1993 to provide assistance toward tuition, room, and board for a worthy and needy female student in either Tufts or Jackson College.

The A. Raymond and Eileen Tye Scholarship, established in 1994 to provide financial aid and to assist with the tuition of qualified undergraduates who are pursuing their educational goals.

The Tyler Scholarship, founded in 1919 by Susan E. Tyler, of Lowell, Massachusetts.

The Irving Usen Scholarship, established in 1952 by Irving Usen in memory of W. A. Carroll. The income is to be available for a qualified, needy young man or young woman whose parents are fishermen residing in New England and preferably residents of Gloucester, Massachusetts, or Portland, Maine.

The Albert Whittier Vanderhoof Scholarship, established in 1959 in honor of Albert W. Vanderhoof of the Class of 1924.

The Verschleiser Family Endowed Scholarship Fund was established in 2014 by Amy Lederman Verschleiser, J'92 and Jeffrey Verschleiser to provide financial aid for undergraduate students in the Tufts University School of Arts and Sciences.

The Villamil-Davis Family Scholarship, established in 2004 for the benefit of undergraduate students and to increase the diversity of the student body.

The Teri Volpert '84 and Barry Volpert Endowed Scholarship, established in 2005, awarded to students with demonstrated financial need who have excelled in the classroom.

The Peter J. Wade Scholarship, established in 1999 to provide scholarships to students pursuing studies in studio art or graphic design. Preference is given to juniors or seniors who have shown excellence in some area of studio art or graphic design and who are enrolled in the five-year, dual-degree program with the Museum School of the Museum of Fine Arts, Boston.

The Albert and Renee Waldman Endowed Scholarship Fund, established in 2011 to provide scholarships to one or more students in the College of Liberal Arts and Jackson College.

The Joseph H. Walker Scholarship, founded in 1898 by Joseph H. Walker, of Worcester, Massachusetts.

The Walker Mathematical Scholarship, established in 1865 in honor of William J. Walker, M.D., of Newport, Rhode Island, and payable from the income of the Walker Fund.

The Julia Ward Scholarship, established in 2007 to further Tufts' efforts to create an intentional, intellectual and broadly diverse community of scholars, to include students from a wide variety of socio-economic, geographic, cultural, ethnic, and political backgrounds.

The Mary Ann Ward Scholarship, founded in 1892 by Sylvester L. Ward, of Boston.

The Warren Educational Fund Scholarship, the income for the benefit of a worthy student, preference being given to students from St. Paul's Universalist Church, Springfield, Massachusetts.

The Warren Scholarship, founded in 1905 by Dr. Ira Warren, of Boston.

***The Sarah A. Watson Scholarship Fund**, founded in 1958 under the will of Sarah A. Watson for the benefit of Jackson College, the income and interest to be expended for the aid of a deserving student who would not otherwise have the benefits of further education.

The Dorothy Altman Weber, J'64 and Stephen R. Weber Endowed Scholarship was established in 2014 to provide financial aid for Tufts University undergraduate students.

The Marcia D. Weber Endowed Scholarship Fund, established in 2011 by Marcia Weber, J'71 to support students of financial need who are majoring in Child Study and Human Development in the Eliot-Pearson Department.

The Alice Weeks–Jesse Dowse Endowment Fund, established in 1990 by the estate of Albert W. Weeks in memory of Alice M. Weeks and her mother, Jesse Dowse, both graduates in mathematics at Tufts, to provide financial aid to students attending Tufts College or the Graduate School of Arts and Sciences.

The Gerald and Ruth Weil Scholarship, established in 2008, to provide financial resources to needy students who are identified by the university as increasing diversity at Tufts.

The Mark Weisberg Scholarship Fund, founded in 1948 by Mark Weisberg of the Class of 1918.

The J. Frank Wellington Scholarship, established in 1931.

The Jonas Clark Wellington Scholarship, founded in 1906 by Mrs. Sarah C. Fisher Wellington, of Cambridge, Massachusetts.

The West Medford Woman's Club Scholarship, established to provide scholarship assistance to students in Jackson College and Tufts College, with preference given, when possible, to a resident of Medford, Massachusetts.

The Peter and Martha Wetzel Endowed Scholarship Fund was established in 2014 by Peter J. Wetzel, E'61 and Martha Wetzel to provide financial aid for students in the Tufts University School of Engineering, with an interest in supporting those from Southern California.

The Joshua S. and Harriet N. White Scholarship, founded in 1896 by Joshua S. White, of Pawtucket, Rhode Island.

The Nathaniel White Scholarship, founded in 1899 by Armenia S. White, of Concord, New Hampshire.

The Amasa and Hannah L. Whiting Scholarship, founded in 1890 by Mrs. Hannah L. Whiting, of Hingham, Massachusetts.

The Whittier Scholarship, founded in 1890 by Charles Whittier, of Roxbury, Massachusetts, in the name of Charles and Eliza Isabel Whittier.

The Allton T. and Dorothea Danver Williams Scholarship, established in 1989 by Kenneth D. Williams in honor of his parents, Allton T., A'19, and Dorothea Danver Williams, J'18, to support students in good academic standing, with financial need, pursuing a major in environmental studies.

The Willner Family Scholarship, established in 1998 to provide aid to academically promising students from New York City with family incomes that are particularly modest. Additional preference will be given to students showing promise in the visual or performing arts at Tufts.

The Gladys Emilia Wilson Scholarship, an endowed scholarship that benefits students at the School of Arts and Sciences. The scholarship was established in 2010 with a gift from the estate of Gladys Emilia Wilson, A'69.

The Gary S. Winick Scholarship was established in 2012 by Hilary Edson Polk, J'84, and Lyon Polk III, to honor the memory of Gary S. Winick, A'84. The scholarship supports financial aid for Tufts undergraduate students in the School of Arts and Sciences, with a preference for those with an interest in filmmaking.

The Thomas F. Winkler Scholarship, established in 2008 to provide need-based financial aid to undergraduate students and to increase the diversity of the Tufts undergraduate student body.

The Winnick Family Foundation Scholarship, established in 2000 to provide aid to undergraduate students at Tufts.

The Dara Wolbom Memorial Endowment, established in 1997 in memory of Dara Wolbom, J'99, to provide financial aid to Tufts undergraduates, with first preference to female students in their junior year who have distinguished themselves in English or journalism.

The Norman P. Wood Scholarship, established under the will of Nellie M. Wood, late of Northfield, Massachusetts, as "a scholarship in the Department of Classics to be known as the Norman P. Wood Scholarship."

The Frank G. Wren Memorial Scholarship, established in 1951 by friends, family, and former students of Frank G. Wren of the Class of 1894, member of the faculty (1895–1940), and dean (1907–1939).

The Paul I. and Alice T. Wren Memorial Scholarship, established in 2001 to aid deserving liberal arts and engineering students.

The Joseph N. Wright Memorial Scholarship, for undergraduate students studying in Tufts Programs Abroad, with preference for those studying in Germany.

The Robert Yanofsky, A'38 Endowed Scholarship, established in 2004 to provide financial aid for undergraduate students. Preference will be given to students with limited financial means who possess high academic potential and a demonstrated commitment to achieving scholastic excellence.

The Eric A'87 and Julie Lane J'88 Yamin Endowed Scholarship Fund was established in 2014 to provide financial aid for undergraduate students in the Tufts University School of Arts and Sciences.

The Francis Yirrel Scholarship, founded in memory of Francis Yirrel of the Class of 1949, established by his friends and classmates to assist deserving students.

The Doris W. York Endowed Scholarship Fund, established in 2005 by a bequest from Doris York of Somerville, Massachusetts, to provide financial aid to female students who attended Somerville High School.

The Howard S. Young Scholarship Fund, established in 1982 to provide scholarships for civil engineering students.

The Young Men's Philanthropic League Scholarship, established in 1960 by the Young Men's Philanthropic League of New York, the income from this fund to be used for scholarships for undergraduate and graduate students in Tufts University.

The Mariann Arrighi and Andrew James Youniss Family Endowed Scholarship was established in 2014 by Mariann Youniss, J'83 and Andrew Youniss to provide financial aid for undergraduate students in the Tufts University School of Arts and Sciences.

The Stanton "Bud" Yusem Endowed Scholarship, established in 2000 to provide financial aid to Tufts undergraduate students with financial need.

The Zeta Psi Class of 1969 Scholarship, established in 2009 to provide scholarships to undergraduate students with financial need who are likely to contribute to Tufts' educational and mission-related goals, including the benefits associated with a diverse student body. Preference will be given to qualified students who are currently fraternity brothers of the Zeta Psi fraternity.

Prize Scholarships and Academic Awards

In addition to the above university scholarship funds, the following endowed funds have been established, and prizes from the income are awarded annually in recognition of exceptional academic achievement and extracurricular activities. These prizes are not awarded unless, in the opinion of the Committee on Academic Awards, Faculty of Arts, Sciences, and Engineering, qualified candidates appear.

At an awards ceremony held each spring, public announcement is made of the recipients of these prize scholarships. Since election is made by the Committee on Academic Awards, no application is necessary. Nominations are made by faculty and staff members. Student nominations are not allowed, but students can discuss deserving peers with faculty members. Inquiries concerning these prize scholarships should be addressed to the Committee on Academic Awards.

The Air Force ROTC Prize Award was established in 2008 by Tufts Air Force alumni. First preference for the prize will be awarded to junior or senior students from the Tufts undergraduate colleges who are enrolled in an AFROTC program with recommendation to the Awards Committee by an AFROTC Staff Officer. The award is based on scholastic achievement, demonstrated leadership, and significant contributions by the candidates to the university and greater community.

The Vida H. Allen Prize is presented annually to the student who has written the best senior honors thesis in the Department of History.

The Alpha Omicron Pi Prize Scholarship, founded by the Boston Alumnae of the Delta Chapter of Alpha Omicron Pi, is awarded to that student who best represents the combination of very high scholarship and significant participation in social service work.

The Alpha Xi Delta Prize Scholarship, founded by the Boston Alumnae Chapter of Alpha Xi Delta, is awarded to that junior who, throughout the freshman and sophomore years, has attained a high scholastic record and who, by loyal cooperation in college activities of merit, has given evidence of the greatest promise of future achievement.

The Nancy W. Anderson Award for Environmental Sustainability is awarded to a junior or senior normally majoring in environmental studies whose work in the natural and social sciences, engineering, or humanities promotes integration of those subjects in informing public

policy decisions that may protect endangered natural resources while promoting sound social and economic development.

The Department of Anthropology Prize is awarded annually to a student who has shown excellence in anthropological studies.

The Arabic Language, Culture and Literature Prize is awarded annually to a graduating senior who has demonstrated excellence in the studies of the Arabic language, literature, and culture.

The Architectural Studies Prize is awarded annually to a senior majoring in architectural studies who has demonstrated academic excellence and a commitment to the field of architectural studies. The prize is supported by the memorial fund for Margaret Henderson Floyd, professor of art and architectural history.

The Army ROTC Prize Award was established in 2008 by Tufts Army alumni. First preference for the prize will be awarded to junior or senior students from the Tufts undergraduate colleges who are enrolled in an AROTC program with recommendation to achievement, demonstrated leadership, and significant contributions by the candidate to the university and greater community.

The Art and Art History Prize is awarded each year by the Department of Art and Art History to a graduating senior who has demonstrated a combination of superior academic achievement in course work (and independent study) and commitment to the field through participation in relevant activities beyond the classroom, such as work, internships or exhibitions, study abroad, and involvement with professional groups. Attention is given to the number, range and level of classes taken in Art and Art History, to performance in FAH 100 (our capstone course), and to the quality of written work produced throughout. Selection is by faculty vote, and advisors are responsible for recommending candidates.

The Robert Asch Prize was established in 2002 by friends and family of Bob Asch to honor the former director of the Tufts-in-Tübingen program. A beloved friend to all who knew him, Bob served as director from 1972 to 2001. He was known both for his zest for life and a humanistic approach to his quest for international understanding. Awarded to juniors or seniors who will use the fund for research, projects, or internships in a German-speaking country.

The Asian Studies Prize is awarded to a graduating senior who has demonstrated excellence and interest for future development in Asian studies.

The Association of Tufts Alumnae Seventy-fifth

Anniversary Award is established to honor a woman student who has provided meritorious service to the Tufts University community, adding to the university by her presence. The student should be a junior or senior with good academic standing. This award was established by the Association of Tufts Alumnae on the occasion of its seventy-fifth anniversary.

The Michael E. Avtges Memorial Prize was established in 1989 by Mr. and Mrs. Nicholas E. Avtges and the Boston Chapter, Society of American Military Engineers in memory of Michael E. Avtges, a student in the College of Engineering. Prizes are awarded to deserving students in the Department of Civil and Environmental Engineering, with preference to those who are interested in computer science and engineering.

The Peter Belfer Award in Political Science is given annually for an outstanding piece of written work done in a political science course or independently by a political science major. This award was established in 1973 by Mrs. Ann Belfer Goldstein in memory of her late husband, Peter Belfer, A'67.

The Bennett Memorial Scholarship was founded in 1924 by the Class of 1914 in memory of William Joseph Bennett, scholar, soldier, athlete, and a member of this class, who met his death during World War I. The scholarship is awarded to that student who best exemplifies the qualities of true sportsmanship as exhibited by the man whose name it bears.

The Charles G. Bluhdorn Prize in Economics is awarded annually to an undergraduate majoring in economics who has demonstrated outstanding scholastic ability. This prize was founded in 1983 by Donald Gaston in memory of Charles G. Bluhdorn.

The Anne E. Borghesani Memorial Prize is an annual incentive award that will enable the recipient(s) to undertake a project, activity, or plan of study in any field involving international issues. The prize is designed to encourage personal growth and independence, while increasing one's understanding of all peoples and encouraging a commitment to the world community. The award honors the memory of Anne E. Borghesani, J'89, an international relations major. Anne's years at Tufts were a time of intellectual and personal challenge, adventure, and increasing commitment to her friends, the Tufts community, and the world. Anne's love of people and her fascination with travel and other cultures made her major a natural choice.

The Boston Greek Prize, founded in 1962 with income from a fund raised by the Committee for the Promotion of Greek Studies at Tufts University, is awarded for meritorious achievement in the Greek language only when students of conspicuous merit are nominated by the Department of Classics faculty.

The Benjamin G. Brown Scholarships were established in 1947 by the bequest of Robert C. Brown of the Class of 1888 in honor of his father, Benjamin G. Brown, onetime Walker Professor of Mathematics at Tufts. These scholarships are awarded to seniors who have shown promise in scientific research in fields other than chemistry.

The Moses True Brown Prize was established in 1903 by Moses True Brown, who was Tufts College's first professor of Oratory (from 1866 to 1890). The prize is awarded, whenever a suitable candidate appears, to a senior majoring in drama who combines high achievement in dramatic scholarship with a strong potential for successful teaching in the field of dramatic literature, criticism, and theatre history.

The Harry Poole Burden Prize in Electrical Engineering, established in 1973 by friends of Harry P. Burden, H'53, dean of the College of Engineering from 1936 to 1957, is for one or more prizes for the best design or research project done by an undergraduate electrical engineering student or students during the academic year of the project.

The Professor Kalman A. Burnim Prize for Scholarly Excellence is awarded annually to a Ph.D. student in drama who has completed all steps toward the degree except the dissertation and who has demonstrated distinction by excelling academically and in research and by contributing to the life of the program in an outstanding manner. The prize was established by alumni, colleagues, and friends in honor of Kalman A. Burnim, Emeritus Fletcher Professor of Drama and Oratory, and Tufts alumnus (A'50), who created the Ph.D. program in drama. During his 28 years at Tufts, Professor Burnim chaired the department for nine years and earned his reputation as a world-renowned scholar in theatre history.

The Janice Spencer Calkin Community Health Award is awarded to a junior student(s) who has demonstrated excellence in the study of Community Health. This award was established in 2011 by Janice Spencer Calkin, J'51, an alumna of Jackson College.

The Thomas Harrison Carmichael and Emily Leonard Carmichael Prize Scholarship, established in 1950 by Leonard Carmichael of the Class of 1921, seventh president of Tufts College, in memory of his parents, is awarded to assist an academically able junior or senior who has shown ability in physiological psychology or general physiology.

The Helen Morris Cartwright Memorial Prize is awarded to that senior who, in the judgment of the Department of Philosophy, has shown outstanding philosophical ability, both orally and in writing.

The Theresa McDermott Carzo Award in honor of Theresa McDermott Carzo, a 1984 graduate of Tufts through the Resumed Education for Adult Learners Program, is given to a student in the Resumed Education for Adult Learners Program who demonstrates a love of learning and the determination necessary to return to college to complete a degree despite obstacles.

The Madeline Harrison Caviness Prize, established by the Department of Art and Art History in honor of our esteemed senior colleague, will be awarded annually to the undergraduate major whose senior honors thesis merits recognition for its intellectual rigor, creativity, and scholarly promise.

The Mary Grant Charles Prize Scholarship Fund, established in 1975 by Ralph S. Charles, A'23, and his two sons, Grant H. Charles, A'51, and Ronald A. Charles, E'57, in loving memory of wife and mother, Mary Grant Charles, is awarded to an outstanding undergraduate possessing the same creative qualities in the writing of prose and poetry as Mrs. Charles, and preferentially to a student whose writing reflects an interest in ancestry and genealogy.

The Shirley and Stanley Charm Scholarship in Food and Biotechnology, established in 1984 by Dr. Stanley Charm, who was chair of the Chemical Engineering Department from 1981 to 1985, is used in the Department of Chemical and Biological Engineering as a stipend for a senior, graduate, or postdoctoral student who is committed to study and research in food science or biotechnology.

The Department of Chemical and Biological Engineering Prize is awarded to a senior who has shown excellence in chemical engineering studies.

The Chemical Engineering Special Recognition Award is awarded to a senior who has shown character and perseverance in achieving high academic standards in chemical engineering studies while overcoming difficult circumstances.

The Chinese Language and Literature Prize is awarded annually to a graduating senior who has demonstrated excellence in the studies of Chinese language, literature, and culture.

The Chinese Program Alumni Prize was established in 2011 through the generosity of the Chinese Program alumni. The purpose of the prize is to encourage and recognize academic excellence and effort in Chinese languages and culture. Awarded to seniors who will use the fund to further their Chinese studies.

The Anna Quincy Churchill Prizes in General Biology, established in 1954 by Dr. Churchill, M'17, a member of the anatomy department in the Tufts School of Medicine and Dental Medicine from 1918 until her retirement as assistant professor emerita in 1954, are awarded annually for excellence in the study of botany and zoology in the general biology course.

The Gemma Cifarelli Memorial Scholarship, established in 1956 by classmates and fellow students in memory of Gemma Cifarelli of the Class of 1957, is awarded to a junior who has combined good academic standing with participation in activities of importance to the university.

The Prize Scholarship of the Class of 1882, founded by Dr. Arthur Winslow Pierce, A'82, Litt. D'99, in the name of his college class, is reserved for an undergraduate student with great potential for intellectual leadership and creativity.

The Class of 1898 Prizes, from a fund established by the Class of 1898, are awarded as follows: one prize each to that student in the College of Liberal Arts, in Jackson College, and in the College of Engineering who, having completed two years at Tufts University, has best demonstrated high scholarly ability together with a wide range of intellectual interests and competence.

The Class of 1911 Prize Scholarships, from the Class of 1911 Fund, are awarded to seniors of engaging personality who, from matriculation as freshmen to the senior year, have, in the judgment of the Committee on Academic Awards, made most progress as measured both by academic record and by successful participation in extracurricular activities of enduring worth.

The Class of 1921–Leonard Carmichael Prize Scholarship Fund, established through the gifts of members and friends of the Class of 1921 in honor and memory of their classmate Leonard Carmichael, seventh president of Tufts, secretary of the Smithsonian Institution, and vice president of the National Geographic Society with special responsibilities for research and exploration, is awarded by the Department of Psychology to a third-year student or students whose academic achievements have been judged as outstanding.

The Class of 1942 Prize Scholarship was founded in 1985 by Elaine and Grant Curtis in honor of the women and men of the class who served their country, and in particular the five who served their Alma Mater for more than an aggregate 125 years (Professor Freeland Abbott, Dean Grant Curtis, Dr. Nelson Fontneau, Professor Burleigh Wellington, and William Wells, Esq.). The prize is awarded annually to seniors considered by other undergraduates, faculty, or staff as “the most likely to become outstanding university teachers, counselors, or administrators.” Written

nominations, stressing how the nominee has already served or contributed to the university, should be sent to the Faculty Committee on Academic Awards.

The R. M. Karapetoff Cobb Chemistry Fund is awarded to the two Jackson College chemistry majors with the highest academic standing at the end of their junior year.

Morton N. Cohen Creative Writing Award is given to undergraduates who demonstrate, in a substantial piece of creative writing, the greatest distinction in creative writing. The recipient is selected by a special committee from the Department of English.

The Community Service Award is presented annually to undergraduate and graduate students who have provided exceptional community service that is much needed by the beneficiaries, even though it often goes unnoticed by the general public. The award recognizes those who, as individuals or as part of a Tufts volunteer organization, have given special service at Tufts or to the larger community. Service should generally represent activities which occur outside the student's required program of study and outside of elective office or employment.

The Donald A. Cowdery Memorial Scholarship, founded in 1946 by Jeanetta Wilson Cowdery Black, F'46, in memory of her husband, Donald A. Cowdery, Class of 1939, who was killed in action in World War II, is awarded annually to that senior or junior whose academic achievements and personal qualities of leadership and high principle have been outstanding.

The Alice E. Trexler Dance Studies Prize is given to a student who has demonstrated excellence in writing and (or) creative work in dance courses and who has an ideal attitude about learning in the liberal arts environment.

The Mabel Daniels Prize in Music and Literature, established in 1960 by Mabel Wheeler Daniels, Hon. M.A. '33, the distinguished composer, is awarded to a junior or senior who shows marked creative talent and accomplishment in music or literature.

Daughters of the Revolution Prize Scholarship is awarded on recommendation of the Department of History to a student demonstrating marked interest in American colonial history as well as excellence in scholarship.

The de Florez Prize in Human Engineering, established in 1964 by the bequest of Admiral Luis de Florez, USN (retired), H'46, is awarded to an undergraduate student, ordinarily majoring in psychology, engineering, or science, who has acquired a high degree of theoretical sophistication and demonstrates an interest in the practical application of knowledge to problems of human engineering.

The Distinguished Achievement Award in International Relations is given annually to an outstanding international relations major of high academic standing who has participated widely in the program and who, having proven a spacious understanding of and sensitivity to the richness of the international community, intends to pursue a professional career in the field of international relations.

The Amos Emerson Dolbear Scholarships, established in 1947 by the bequest of Katherine E. Dolbear of the Class of 1897 in memory of her father, the eminent scientist and inventor, who was professor of physics at Tufts from 1874 to 1910, are awarded to two seniors who have shown promise in the field of either electrical engineering or physics.

The Priscilla N. Dunne Prize Fund, founded in 1980 by Mrs. Doris Scheff in honor of her daughter, Priscilla N. Dunne, J'75, is given annually to an undergraduate psychology major with an excellent record and great promise of future achievement in the field.

The Durkee Scholarship, established by the bequest of Robert C. Brown of the Class of 1888 in honor of his sister, Henrietta N. Durkee, WA'93, G'95, G'18, and her husband, the late professor Frank W. Durkee, A'88, G'89, H'21, and their children, is awarded to senior students in the Department of Chemistry who have undertaken a research problem in the field of chemistry.

The Margaret Durkee Angell and Henrietta Brown Durkee Scholarship Fund, in memory of Professor Frank W. Durkee, is awarded to that Jackson College senior who has demonstrated high promise and achievement in the field of chemistry. The prize commemorates Professor Frank W. Durkee, A'88, G'89, H'21, who was long chairman of the department, a renowned chemist, a man of great energy and diligence in all that he undertook, and a most loyal alumnus of Tufts.

The Alex Elias Memorial Prize Scholarship, established in 1966 by the Brotherhood of Alpha Epsilon Pi and friends of Alex Elias within and outside the university, is awarded to that junior or senior who best displays those high standards in community activities and in athletic and scholastic pursuits for which Alex Elias was well known.

The Eliot-Pearson Department of Child Development Prize is awarded to that senior majoring in child development who best exemplifies a combination of high academic achievement and the promise of outstanding teaching ability.

The James Vance Elliott Political Science Prize is awarded in the senior year to the student majoring in political science whose achievements best combine academic excellence with active participation and effective leadership in campus and civic affairs.

The Frederick M. "Fish" and Dorie Ellis Memorial Prize, established in 1968 by fellow alumni, students, and friends of the late Professor Frederick "Fish" Ellis of the Class of 1929, the outstanding four-sport athlete of his day and possibly the greatest Tufts College has ever known, is awarded to a student who has demonstrated marked athletic versatility, a modest manner, successful academic achievement, and the potential for effective leadership of youth.

The Department of English Prize was created by the Class of 1898 Fund and is awarded to that student who has shown excellence in English studies.

The Ivan Galantic Special Achievement in Humanities Prize, named after Ivan Galantic, Professor of Art History 1971–1989, is awarded to a student who has demonstrated the inclination and capacity to cultivate an integrative approach to learning; one who reaches for wisdom, not simply knowledge.

The Constantine Ghikas Prize in Romance Languages was established in 1957 by George C. Ghikas in memory of his son, Constantine Ghikas of the Class of 1941, for excellence in a program of major study in romance languages.

The John S. Gibson Award, named after the first director of the International Relations Program at Tufts University, is given to the author of the most outstanding paper written by an undergraduate in one of the participating departments in the International Relations Program.

The Lily Glidden Award is given to undergraduate or graduate students who have passion for the natural world and a plan to explore it on their own terms. The goal of this award is to help students clear financial hurdles so they can step out of their comfort zone and pursue their dreams. This award was established in memory of Lily Glidden, A'12.

The Goddard Rhetorical Prizes, from a fund created in 1862 by Thomas A. Goddard, then treasurer of Tufts College, are provided annually in the field of dramatic interpretation and acting. These undergraduate prizes may, at the discretion of the Department of Drama, be awarded for marked excellence in acting as demonstrated during the student's career in stage productions of the university theatre.

The Graduate School of Arts and Sciences Outstanding Academic Performance Award recognizes the overall academic achievement of graduate students as evidenced by course grades, quality of papers, theses, and projects in the arts, humanities, natural sciences, and social sciences.

The Graduate School of Arts and Sciences Outstanding Contributions to Undergraduate Education Award

recognizes excellence as a teaching assistant or other roles such as mentoring undergraduates in the arts, humanities, natural sciences, and social sciences.

The Graduate School Council Awards are given annually to outstanding graduate student organizations and faculty mentors.

The Graduate Student Research Awards are given semiannually to graduate students enrolled in either the School of Arts and Sciences or the School of Engineering. Awards are competitive and decisions are made by student peers and based on the proposal, significance of the scholarly activity and need.

The Marjorie B. Greene Award is made to a graduate occupational therapy student who has demonstrated outstanding achievement in the areas of leadership and involvement in student and professional activities.

The Greenwood Prize Scholarship, created in 1877 by Mrs. Eliza M. Greenwood of Malden, Massachusetts, is awarded for excellence in state production and technical arts, as demonstrated during the student's career in the university theatre.

The Audrey Butvay Gruss Science Award is awarded annually, with preference for a female student, to a student who has demonstrated outstanding academic work in any of the sciences and who is a scholarship recipient. This award was established in 1992 by Audrey Butvay Gruss, an alumna of Jackson College.

The Robert P. Guertin Student Leadership Award recognizes outstanding graduate student leadership in the arts, humanities, natural sciences, and social sciences. The award is given to individuals or groups of students enrolled in either the School of Arts and Sciences or the School of Engineering for accomplishments in such areas as academic or social programming, curricular initiatives, supporting the work and lives of fellow students, community service, and developing improved policies.

The Martin Guterman Award is given in memory of Martin Guterman, beloved faculty member in the Department of Mathematics, for the first-year student with the highest academic achievement in mathematics, to encourage further study in that field.

The Audrey L. Hale Prize, established in 1995 in honor of Audrey L. Hale for forty-seven years of extraordinary service to Tufts University, including fourteen years as assistant provost, is to be awarded to an undergraduate student in the junior or senior year who has demonstrated academic excellence and a commitment to international understanding through acts of compassion and humanity. The

recipient, who is able to achieve his/her educational goals through personal and financial sacrifice, will be determined and recommended by the dean of students.

The Ethel M. Hayes Scholarship, founded by the Tufts Alumnae Association in 1946, in memory of Ethel M. Hayes, Class of 1896, college librarian (1896–1943), is awarded to an undergraduate dependent to some extent on his or her own efforts to meet the cost of education and whose work throughout the preceding year has been of such excellence that he or she is deemed worthy of high academic distinction.

The Jane Anne Herman Prize is given in honor of Jane Anne Herman, J'87, who will always be remembered for her devotion to friends and family, her generosity during Thanksgiving, and her appreciation of the arts. This award is given by the Department of Drama and Dance for excellence in directing and/or stage management, as demonstrated during the student's career in the university theatre.

The Morris and Sid Heyman Prize Scholarships, established in 1980 by the bequest of Mrs. Sid L. Heyman in memory of her husband, Morris Heyman, who graduated from Tufts University in 1919 with a bachelor of science degree in electrical engineering, are awarded to one or more undergraduate students in the Department of Electrical Engineering and Computer Science, based on academic achievement and future promise.

The Marshall Hochhauser Prize is presented annually to seniors who exemplify the altruistic spirit of the man whose name it bears, while working within the system to broaden and enrich the intellectual climate at Tufts without regard for personal gain. The prize honors the memory of Marshall Hochhauser J'82P, E'79P, who, as National Chairman of the Parents' Fund at the onset of the Campaign for Tufts, labored on behalf of undergraduate education at Tufts far beyond the call of duty. The prize may be awarded to one or two seniors. The Board of the Experimental College selects the recipients of this award.

The Rob Hollister Award for Community Service and Citizenship recognizes graduate students who have contributed their time and effort to the community outside of Tufts. This contribution could be in the form of volunteer work, activism in community issues, or participation in public service activities. The award is given to individuals or groups of students in either the School of Arts and Sciences or the School of Engineering.

The Marion Ricker Houston Prize Scholarship in Economics, established in memory of a faculty wife whose friendship and gracious hospitality enriched the lives of many generations of Tufts and Jackson students, is

awarded to junior or senior economics majors who have been responsible citizens of the Tufts community and who, in the opinion of members of the economics department, have made substantial progress in mastery of their chosen field.

The Human Factors Engineering Prize is awarded to a senior who, in the judgment of the Human Factors faculty in the Mechanical Engineering Department, has excelled in the study and application of human factors engineering.

The James D. Hume Field Geology Scholarship Prize was established in 1996 by alumni, colleagues, friends, and family in memory of Jim Hume, exemplary teacher and geology department chairman, who shared his enthusiasm, knowledge, and cheerful nature with everyone he knew. This award is presented annually to one or more outstanding geology students to further their field experience in geology.

The Albert H. Imlah European History Prize, named after Albert Imlah, Professor of History 1927–1956, Walter S. Dickson Professor of English and American History 1958–1970, is awarded to a student or students for distinguished work in European history, or to promote summer reading in the honors program, or in comparable programs in history.

The Albert H. Imlah Excellence in History Prize, named after Albert Imlah, Professor of History 1927–1956, Walter S. Dickson Professor of English and American History 1958–1970, is awarded to a senior for excellence in history. Through this award Professor Imlah sought to encourage high academic performance.

The International Letters and Visual Studies Prize is awarded annually to a graduating senior who has demonstrated excellence in the study of literature, film and visual media in an international context.

The International Relations Research Scholars Program, established in 2001, supports original, high-quality undergraduate international research. Awarded jointly to selected IR juniors who plan to undertake a senior honors thesis or other capstone research experience and their faculty mentors, the scholarship financially supports a minimum of eight weeks of summer research on an international topic. The program's objectives are to promote intensive faculty-student mentoring and to advance the development of strong international research skills critical to professional and academic goals in an increasingly interdependent world.

The Japanese Language and Literature Prize is awarded annually to a graduating senior who has demonstrated excellence in the studies of Japanese language, literature, and culture.

The Karno Dean's Award for Academic Excellence and Leadership is awarded to two sophomores (from each school) who have shown great promise in their academics and demonstrated leadership on or off campus.

The Ralph S. Kaye Memorial Prize was founded in 1947 by members of Omicron Chapter of Phi Epsilon Pi as a memorial to Ralph Sumner Kaye, of the Class of 1937, who died while serving as a lieutenant aboard a destroyer sunk in the naval battle for Okinawa (Gunto) in 1945. It is awarded to a junior or senior who, at the conclusion of two years or more of mathematics courses and irrespective of his/her major field of concentration, demonstrates a favorable combination of proficiency in mathematics and participation in extracurricular activities.

The William J. King Applied Music Award for piano performance was established by Mrs. Margaret King in memory of her husband, who was a professor of Music at Tufts for 41 years. Each spring, the award is presented to one or more students who demonstrated outstanding ability in piano performance in either classical or jazz music. Students are nominated for the award by their faculty instructors based on their fall semester performance.

The N. Hobbs Knight Prize Scholarship in Physics was established in 1957 by Mrs. Esther F. Martin in honor of her father, the late Nathaniel Hobbs Knight, a member of the faculty in the Department of Physics from 1911 to 1953. The scholarship provides two annual awards to be presented to two juniors or seniors who are majoring in physics and who have demonstrated outstanding ability in theoretical and experimental physics, selected in such manner as the Committee on Academic Awards shall determine.

The Laminan Prize in Romance Languages, established in 1963 by Toivo, A'31, and Margaret C. Laminan, is awarded each year to a student for distinguished work in the Department of Romance Languages.

The Earle F. Littleton Scholarship is awarded to worthy juniors, seniors, or graduate students in the civil engineering program who are active in professional or community affairs and show promise of becoming active and loyal alumni.

The Linda Datcher Loury Award in Economics is awarded annually to an undergraduate majoring in Economics and/or to a graduate student pursuing a M.S. in Economics for the completion of an outstanding thesis. This prize was established in 2012 in memory of Professor Linda Datcher Loury.

The Lewis F. Manly Memorial Prize was established by friends, family, and former students in memory of Lewis F. Manly, for forty years a member of the Tufts faculty, twenty-six of them as chairman of the Department of Economics. He also served for six years as head coach of basketball and for fifteen years as head coach of football, uniquely combining a dedicated career as teacher and as an athletic coach. His loyalty, devotion, and service to Tufts were of a high order. The prize is to be awarded to an undergraduate at Tufts University who combines a record of academic excellence with superior athletic performance. Preference shall be given to an economics major where there is a choice among otherwise highly qualified candidates.

The Lt. Commander Robert James Manning Memorial Prize is awarded annually to an engineering undergraduate who is industrious, competent, and enthusiastic, and who shows the same commitment to excellence that Lt. Commander Manning demonstrated throughout his life. The prize was established in 1990 by Lt. Commander Manning's wife, Nancy E. Manning, and by his parents, Mr. and Mrs. Edward V. Manning, with the support of his friends and family. Lt. Commander Manning was a 1970 Tufts graduate.

The Vincent Manno Leadership Award, named for former Tufts Mechanical Engineering Professor Vincent Manno, is given annually to a Mechanical Engineering or Human Factors student who has excelled in a leadership role. Demonstrated leadership may be related to a class project (e.g. senior design), or to on-campus clubs and competitions sponsored by technical societies. The student should have demonstrated vision, communications skills, and an ability to motivate and lead a team to achieve specific objectives with excellence under various resource constraints (e.g., manpower, budget, schedule, and specifications).

The Mechanical Engineering Prize is awarded to a senior who, in the judgment of the mechanical engineering faculty, has excelled in the study of Mechanical Engineering.

The Nadia Medina Prize is awarded to a junior or senior to recognize extraordinary contributions to collaborative learning at Tufts. The Nadia Medina Prize is given to the peer tutor or Writing Fellow whose commitment to collaborative learning exceeds the requirements of the tutor's role, as demonstrated by outreach to faculty, availability to students, and participation in developing peer-to-peer collaborative learning programs. The award honors the contributions of Nadia Medina to Tufts University as teacher, advisor, Director of the Academic Resource Center, and founder of the Writing Fellows Program.

The Alex Mendell Memorial Scholarship is awarded annually to a sophomore or junior who, through his or her leadership in a variety of campus activities, brings together students representing a broad spectrum of the community. Like the student in whose memory the award is made, the recipient should demonstrate a generosity of spirit and character that contributes both to the self-esteem of others and to their love of Tufts.

The Melissa Beth Meyers Award is presented annually to a graduating BFA or BFA in art education student in recognition of academic excellence, personal growth and his/her ability to achieve this success while overcoming substantial educational and/or personal obstacles.

The Russell E. Miller History Prize is awarded to an undergraduate of exceptional ability whose participation in advanced history courses has demonstrated an eagerness to explore problems of historical analysis and interpretation.

The Adrian Mistic Prize Fund is awarded by the Department of Athletics to a student who demonstrates excellence athletically and academically and is active in work which helps improve the human condition.

The Paul Montle Prize Scholarship is awarded to upper-classmen or women who demonstrate entrepreneurial skills and who accept along with the scholarship a moral obligation to return to Tufts later in life much more than they received, in terms of financial aid and educational benefits.

The Mary Ann Mulcahy Service in Education Award. The Department of Education and the University College of Citizenship and Public Service created this award to honor a graduate student completing the MAT middle and high school teacher licensure program who has demonstrated a strong commitment to both public service and effective classroom practice in the field experience portion of their program.

The Multicultural Service Award is for an undergraduate who has made significant efforts to define Tufts as a multicultural environment in which race, ethnicity, religion, class, gender, and sexual preference are not barriers to the full enjoyment of community membership.

The Ellen C. Myers Memorial Prize was established in 1982 in honor of Ellen Myers, J'82, an example of great courage and mental fortitude as she pursued her degree while battling an incurable illness. The prize is to be awarded to a junior or senior who has shown character, diligence, and perseverance in achieving high scholarship standards in the face of adverse circumstances while working toward a bachelor's degree at Tufts University.

The Navy V-12/NROTC Memorial Prize was established in 1998 by Tufts V-12/NROTC alumni who were enrolled in the program at Tufts during World War II. The prize is to be awarded to junior or senior students from the Tufts undergraduate colleges who are direct descendants of participants in the Tufts or other college V-12/NROTC programs during World War II, July 1943–June 1946, or are enrolled in an NROTC program. The award is based on scholastic achievement, demonstrated leadership, and significant contributions made by the candidates to the university and greater community.

The Robert L. Nichols Scholarship Prize, established in 1979 by friends and students of Robert L. Nichols and the Department of Earth and Ocean Sciences, is awarded to one or more students of demonstrated ability in geology, for the purpose of expanding their knowledge of geology by field experience.

The James P. O’Leary Design Award, named in honor of James P. O’Leary, Associate Professor of Mechanical Engineering, is presented annually to a Mechanical Engineering senior who has made outstanding contributions in the area of design.

The Daniel Ounjian Prize in Economics was established by alumni, friends, colleagues, and family in memory of Daniel Ounjian, an esteemed professor of economics at Tufts for thirty-one years. The award is given annually to a junior economics major who, in the judgment of the Department of Economics, should be encouraged to pursue graduate studies in economics and whose contributions to the Tufts community reflect the loyalty and commitment that his students and peers appreciated in Daniel Ounjian.

The Outstanding Contribution to Music at Tufts Award is given annually to a senior student whose service to the department, creativity, musical achievements, and contribution to the musical atmosphere at Tufts exemplify the highest distinction.

The Wendell Phillips Memorial Scholarship is one of two scholarships (the other being assigned to Harvard College) that was established in 1896 by the Wendell Phillips Memorial Fund Association in honor of Boston’s greatest preacher and orator. The scholarship is given annually to the junior or senior who has best demonstrated both marked ability as a speaker and a high sense of public responsibility. The recipient of the scholarship traditionally gives an address at commencement. Candidates for this award are recommended by the Committee on Student Life.

The Sarah Plummer Memorial Prize is awarded annually to a graduate student or students who demonstrate a deep commitment to the field of classical archaeology or classical studies, to the Tufts University Department of Classics and to the broader community.

The Paula Frazier Poskitt Scholarship was established in 1995 by Dr. Thomas R. Poskitt, A’66, M’70, in memory of his wife, Paula Frazier Poskitt, J’66, G’72, to provide tuition support for a senior biology major who intends to pursue graduate studies.

The Pride on the Hill Award is named for the lesbian, gay bisexual, and transgender alumni organization of Tufts. The award will honor undergraduate or graduate students who, through community involvement, artistic expression, written work, or scientific research, have contributed the most to an understanding at Tufts of gay, lesbian, bisexual, or transgender identities during the preceding academic year.

The William Howell Reed Prize in German, established through a fund left to Tufts University by Professor Reed, a member of the German department from 1904 until the time of his death in 1949, is awarded to a member of the junior or senior class for excellence and promise in German studies. The recipient should demonstrate those qualities of learning, discrimination, and taste that characterized Professor Reed’s distinguished career on the Tufts campus.

The Department of Religion Prize is awarded each year to a Religion major who has shown excellence in religious studies.

The Resumed Education for Adult Learners Prize Scholarship is awarded to the continuing education senior who has demonstrated both the greatest perseverance in pursuing his/her academic goals and the greatest generosity and effectiveness in helping other continuing education students to achieve their academic goals.

The Russian Prize is awarded annually to a junior or senior who has demonstrated excellence in the Russian language and Russian-related studies.

The Rhonda Saad Graduate Prize in Art History recognizes graduating masters students in Art History or Art History/Museum Studies for outstanding academic excellence, as well as related achievement in teaching, research, museum work, or community involvement. The award is established in memory of Rhonda Saad, MA’08, with the generous assistance of Rhonda’s classmates. A scholar of Islamic Art, pursuing a PhD at the time of her death, Saad was a cherished student, teacher, colleague, and friend whose zest and optimism profoundly impacted the lives and work of all those around her.

The Howard Sample Prize Scholarship in Physics is named in memory of Howard Sample, who was a professor in the Department of Physics at Tufts University. Professor Sample was known for his love of physics; for his generosity in assisting colleagues, graduate and undergraduate students; and for his kindness to all. The award is given annually to undergraduate students for outstanding performances in Physics 11 and Physics 12.

The Jason H. and Eleanor H. Samuels Mechanical Engineering Prize will be given to a junior in Mechanical Engineering with overall achievement and with recommendation from the chair of the Mechanical Engineering Department.

The Stephen Sapuppo Prize, established in 1993 by Helen and Michele Sapuppo and family in loving memory of their son and brother Stephen, A'81, is awarded to a junior who has demonstrated outstanding academic achievement in drama, with preference for a member of Torn Ticket Two.

The James Schmolze Prize for Excellence in Computer Science is awarded annually to a junior or senior who has demonstrated excellence in computer science studies.

The School of Engineering Outstanding Contributor to Engineering Education Award is focused on full-time graduate students who through T.A. work, voluntary service, and other activities have enhanced significantly the education programs of their departments.

The School of Engineering Outstanding Graduate Researcher Award is focused on full-time, thesis program students who have distinguished themselves in research, especially technical publication.

The Charles F. Seymour, Jr., Prize is to be awarded annually with preference for a junior or senior participant in musical theatre who has an interest in business studies or career.

The Frederic J. Shepler Memorial Prize in French was established in 1984 by alumni, friends, colleagues, and family in memory of Frederic J. Shepler, an esteemed professor of French in the Department of Romance Languages. The prize is awarded annually to that senior French major who has demonstrated high achievement in the study of French literature and in the understanding of poetry in particular.

The Dr. Philip E. A. Sheridan Prize was established in 1977 by bequest of Dr. Sheridan, classes of Liberal Arts, 1908, and Medicine, 1912. The prize is awarded annually to the student who has shown the most improvement through the junior year in bachelor of arts course work.

The Sociology Prize is awarded to the member of the junior or senior class who, in the opinion of the Department of Sociology, has shown exceptional promise in either general sociological analysis or empirical social research.

The Charles E. Stearns Scholarship Prize, established in 1997 by students, colleagues, friends, and family, honors the exceptional fifty-year career of Charlie Stearns as a gifted student, a caring and intellectually stimulating professor, and a loyal and insightful dean. This award is presented annually to one or more geology students who have demonstrated attention to detail, thoughtful analysis, and insight to their geological studies.

The Joseph and Sara Stone Prize is given to a student in the field of Judaic studies who demonstrates excellence in the field and whose concern for others reflects the enormous efforts of Joseph and Sara Stone to overcome great financial hardship in attaining for themselves and their children the benefit of an excellent education.

The Joanne Mary Sullivan Prize is awarded to a junior or senior who has shown excellence and promise in the study of psychology. This prize was established in 1990 in memory of Joanne Mary Sullivan, who held a B.A. in psychology, by her parents Eugene and Vilma, her brother Eugene, Jr., G'90, and family and friends.

The Tisch Library Undergraduate Research Award is presented annually to individuals or groups to acknowledge outstanding undergraduate use of the library's collections and expertise in the production of an exemplary research paper or project for the first-year writing program. First prize is \$500 and second prize is \$250 in each of the three categories listed below: Eng 1-4 or any course taken to fulfill the college writing requirement, 001-99 level course, 100-200 level course.

The Elizabeth Vermeer Tishler Prize in Music Performance, established in 1984 by Elizabeth Vermeer Tishler, J'31, is awarded on the basis of a competition, open to all undergraduates except those enrolled in the Tufts-NEC dual-degree program. In order to be informed of the rules of the competition, those intending to compete must register not later than December 1 with the chair of the music department. Performance will be limited to classical, jazz, or modern work.

The Max Tishler Prize Scholarship, established in 1951 by Merck and Co., Inc., to honor Dr. Max Tishler of the Class of 1928, H'55, is awarded each year to an outstanding student in the sciences, preferably in chemistry, entering the senior year.

The Lloyd MacGregor Trefethen Research Award is named in honor of Lloyd Trefethen, professor of Mechanical Engineering, and is presented annually to a mechanical engineering senior who has conducted outstanding undergraduate research.

The Norbert Wiener Award in Mathematics is given on those rare occasions when a very young student exhibits such prodigious strength in mathematics as to recall the highly unusual talents of the child prodigy Norbert Wiener, LA1909, who went on to become one of the giants of twentieth-century mathematics. Aside from his vast legacy within mathematics, he left his mark on popular culture by founding the discipline and coining the term “cybernetics,” which has spawned today’s notions of cyberspace.

The Etta and Harry Winokur Prize for Outstanding Achievement in Artistic or Scholarly Work Award in the Department of Music for music majors in junior or senior years is given in recognition of outstanding achievement in artistic work such as composition or performance, and/or scholarly works such as a thesis.

The Etta and Harry Winokur Prize for Outstanding Contribution to Performance Award in the Department of Music for music majors in junior or senior years is given in recognition of continuing outstanding contribution to the performance activities sponsored by the music department, such as leadership in performance studies and department ensembles, chamber groups, and recitals, and/or leadership in audience development, concert management, and arts administration.

The Marianne J. H. Witherby Prize in Archaeology was established by Marianne Witherby, an alumna of Tufts who is a devoted supporter of archaeological studies at the university. The prize is awarded each year to an archaeology major in recognition of scholastic ability, dedication to the discipline, and resourcefulness.

The William Frank Wyatt Prize, established in 1962 for excellence in the translation of Greek or Latin, is awarded by the Department of Classics to the student who best exemplifies Professor Wyatt’s sound scholarship and catholicity of interest. Professor Wyatt was a teacher of Greek at Tufts from 1914 until his death in 1961, and chairman of the classics department from its establishment in 1940 to 1952.

The John W. and Katherine L. Zarker Award for Excellence in Classical Studies is awarded to a student who has demonstrated overall excellence in studies as determined by the members of the Department of Classics. Preference will be given, but not limited, to students who plan to pursue a teaching career.

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