Part 1 This Is MIT
Here's a quick look at what makes MIT tick—the ingredients of a world-class educational institution.
On February 20, 1865, four years after approval of its founding charter, the Massachusetts Institute of Technology opened its doors to admit the first class of 15 students. The event marked the culmination of an effort by William Barton Rogers, MIT’s founder and first president, to create a new kind of educational institution relevant to the times and to the nation’s need, where students would be educated in the application as well as the acquisition of knowledge. A distinguished natural scientist, Rogers stressed the importance of basic research and believed that professional competence was best fostered by the coupling of teaching and research and attention to real-world problems. Teaching and research—with relevance to the practical world as a guiding principle—continue to be MIT’s primary purpose. The Institute is independent, coeducational, and privately endowed. Its five schools—Architecture and Planning; Engineering; Humanities, Arts, and Social Sciences; Management; and Science—and one college encompass 34 academic departments, divisions, and degree-granting programs, as well as numerous interdisciplinary centers, laboratories, and programs whose work extends beyond traditional departmental boundaries.

**Mission Statement**

The mission of MIT is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century.

The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world’s greatest challenges. MIT is dedicated to providing its students with an education that combines rigorous academic study and the excitement of discovery with the support and intellectual stimulation of a diverse campus community. We seek to develop in each member of the MIT community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.

**Around Campus**

The 1998 Task Force on Student Life and Learning described MIT’s educational goals in these terms: An MIT education should prepare students for life through an integrated educational program composed of academics, research, and community. Academics establish a place for rigorous study of the fundamentals of science, engineering, social science, and the humanities, as well as a format for developing problem-solving skills, familiarity with quantitative and qualitative analysis, historical and literary insight, and an understanding of the scientific method. Participation in research provides a foundation for professional competence and opportunities for learning-by-doing. Community interaction enables students to become familiar with their responsibilities, hone their leadership and communication skills, and gain self-mastery. Although each of the three components forms a distinct area of a student’s education, the contribution of each reinforces and adds to that of the others. To provide a uniquely excellent education, MIT brings students and faculty together to learn from one another through academics, research, and community.

As recommended by the Task Force, MIT has embarked on one of the most ambitious building initiatives in its history, aimed at creating a stronger campus community through enhanced residential options and the provision of advanced educational and research facilities. Upon completion, this initiative will have added nearly one million square feet of new facilities to the campus—smart residence halls and common spaces to inspire innovative collaborations, cutting-edge laboratories to support the emergence of new technologies, and visionary architecture to reinforce the intensity, curiosity, and excitement that are a defining value of the Institute, and of an MIT education.

The Institute has also moved to renovate and enhance its existing physical plant and infrastructure. Most institutional structures require renovation about every 30 years, with MIT buildings dating from the 1960s and 1970s in line for revitalization today. One recent example is the award-winning renovation of the Dreyfus Chemistry Building, a creation of I. M. Pei (MArch, 1940) that was dedicated in 1970. The building now contains state-of-the-art chemistry labs, enhanced safety and environmental systems, and a flexible space format that allows for reconfiguration as needs evolve. Another area of dramatic change is the ongoing transformation of the Vassar Streetscape, turning a nondescript urban byway into a central campus boulevard unifying the physical and aesthetic connections among MIT’s buildings and public spaces.

MIT’s building program, both in its broad outlines and specific details, reflects the Institute’s commitment to removing boundaries between life and learning, inspiring freedom of imagination, and reinventing the substance of education in the 21st century.

For more information, visit the Evolving Campus website at [http://web.mit.edu/evolving/](http://web.mit.edu/evolving/).

**Students and Faculty**

MIT enrolled 10,320 students in 2004–2005, including 4,136 undergraduates and 6,184 graduate students. These MIT students came from all 50 states, the District of Columbia, four territories, and 106 foreign countries. Seven percent of the undergraduates and 35 percent of the graduate students were international.

In the same year, there were 983 faculty members in MIT’s professorial ranks, including 278 women. The total teaching staff numbered 2,177. Most faculty members at MIT teach both undergraduate and graduate students. Undergraduates frequently register for graduate classes, and many undergraduates and graduate students participate, often together, in advanced research.

The confluence of ages, disciplines, and nationalities so characteristic of MIT brings together students and teachers, biologists and architects, humanists and engineers, young and old, and deeply influences the life and experience of every member of the academic community. The result is an academic environment with a strong focus on excellence and a diverse range of interests.
The Campus

MIT's 168-acre campus extends for more than a mile along the Cambridge side of the Charles River Basin facing historic Beacon Hill and the central sections of Boston. Most academic activities occur within a group of interconnected buildings designed to permit maximum flexibility and easy communication among the departments and schools. The extensive athletic plant and playing fields are an integral part of the campus, as are the recreational buildings, dormitories, and dining halls. This arrangement contributes greatly to the sense of unity and community involvement that characterizes the Institute.

At the eastern end of the campus are the Alfred P. Sloan Building and the Grover M. Hermann Building, which house activities in management, economics, international studies, and political science. Adjacent to them is Eastgate, a 29-story apartment tower for married students. The building at 70 Memorial Drive, along the riverfront, contains classrooms and office space for the Sloan School of Management; the Program in Science, Technology, and Society; and the School of Humanities, Arts, and Social Sciences. Also located on this end of the campus are buildings housing the Whitaker College of Health Sciences and Technology and MIT Medical's Health Services Center. The Whitaker College building includes research laboratories, classrooms, and the college headquarters. The Health Services Center provides a pharmacy, infirmary, and facilities for medical, dental, surgical, and other specialties.

Adjacent to Whitaker College is I. M. Pei's Wiesner Building, housing the Media Laboratory, the Office of the Arts, and the Albert and Vera List Visual Arts Center, comprising three exhibition galleries and a film/video theater. A team headed by Pritzker Prize–winning architect Fumihiko Maki and executive architects Leers Weinzapfel Associates has designed a 170,000-square-foot addition that will nearly double the size of the existing facility. When completed, the Media Arts and Sciences Building will link to the Wiesner Building through a multi-tiered central atrium flanked by nine fully visible laboratories.

A compelling feature of the East Campus is McDermott Court, featuring a great sculpture by Alexander Calder that rises in bold contrast to the facade of the 20-story Center for Earth Sciences (Cecil and Ida Green Building). Besides the Calder, MIT's outstanding collection of contemporary environmental sculpture includes works by Henry Moore, Louise Nevelson, Pablo Picasso, and Tony Smith.

The Institute's main buildings, enclosing Killian Court, were designed by Welles Bosworth (Class of 1899) and dedicated in 1916. Banked by rhododendrons and lined with tall shade trees, Killian Court opens to a wide view of the Charles River, the low brick buildings of old Boston, and the concrete and glass towers that rise above them.

Interconnected with these central buildings are the Center for Life Sciences (the Dorrance and the Whitaker buildings), the Karl Taylor Compton Laboratories (electronics and nuclear science), the EG&G Education Center (with lecture and laboratory facilities for the Department of Electrical Engineering and Computer Science), the Center for Materials Science and Engineering (the Vannevar Bush Building), the Sloan Laboratory, the Guggenheim Laboratory, and the Center for Advanced Engineering Study.

Stata Center

The information revolution's new home at MIT, the Ray and Maria Stata Center for Computer, Information, and Intelligence Sciences, was dedicated in May 2004.

Built on the site of MIT's legendary Building 20 is the Ray and Maria Stata Center for Computer, Information, and Intelligence Sciences, designed by Frank O. Gehry to foster the kinds of creative collaboration that can arise when curious, talented individuals and teams are brought together in the right environment. A cluster of irregular shapes wrapped around a central meeting area, the Stata Center is the home of the Computer Science and Artificial Intelligence Laboratory, the Laboratory for Information and Decision Systems, and the Department of Linguistics and Philosophy.

Across the street from the Stata Center are new facilities for the brain and cognitive sciences. Opening in the fall of 2005, the 411,000-square-foot complex will provide state-of-the-art laboratories, classrooms, and offices for the Department of Brain and Cognitive Sciences, the McGovern Institute for Brain Research, and the Picower Institute for Learning and Memory.

Across Massachusetts Avenue is the West Campus, anchored by the Stratton Student Center with social rooms, cafeterias, student activity offices, music rooms, a spacious reading room, and recreational and commercial facilities. The Student Center Plaza is bounded on the west by the Kresge Auditorium and on the east by the Chapel. Both buildings were designed by Eero Saarinen. The auditorium contains a large concert hall seating 1,200, a little theater, offices, and rehearsal rooms. The Chapel is used regularly for religious services by all faiths and is open throughout the day for meditation. The Chapel's unusual design includes an exterior moat that reflects light in changing patterns on the interior walls.

Also located on the West Campus are the duPont Athletic Center and playing fields for soccer, lacrosse, baseball, softball, touch football, rugby, cricket, track, and tennis. The Howard W. Johnson Athletics Center
OVERVIEW

The Institute, in part because of the extraordinary residential experience it provides.

A new undergraduate dormitory on Vassar Street, Simmons Hall was created by architect Steven Holl in collaboration with Perry Dean Rogers and Partners and acclaimed for the inventive ways it opens to the community. The Warehouse, a residential complex developed from a renovated industrial warehouse built in 1890, offers graduate students an attractive alternative to off-campus housing. The Sidney-Pacific Street graduate residence offers recreational and retail services at street level, giving the building a lively neighborhood presence. Westgate, an apartment complex for married students, and the Tang Residence Hall for graduate students complete the student residences at the west end of campus.

The Boston and Cambridge Environment

MIT is in Cambridge, Massachusetts, on the north bank of the Charles River, facing the city of Boston. The city of Cambridge, well known as the residence of MIT and Harvard, is home to many students and professionals. More than one-fourth of its residents are students, and one out of every six jobs is in higher education.

Cambridge is a city of 13 neighborhoods, ranging from approximately 700 to 15,000 residents. Only five cities in the United States with a population over 75,000 are more densely populated. The city’s diverse ethnicity is reflected in its black, Hispanic, Asian, American Indian, and white residents.

Within a two-mile radius of MIT are the Museum of Science and Museum of Fine Arts, the Gardner Museum, the New England Conservatory of Music, Symphony Hall, the New England Aquarium, and the Boston Public Library, as well as Fenway Park and Banknorth Garden for professional baseball, basketball, and concerts. Students can also travel easily to Boston’s theater district, where Broadway plays are previewed and local productions are staged.

Among the cultural organizations enriching life in the area are the Boston Symphony Orchestra, the Boston Pops, the Boston Ballet Company, the Opera Company of Boston, the Loeb Drama Center, and the American Repertory Theatre.

MIT is one of more than 50 schools located in the Boston area, including Boston College, Boston University, Brandeis University, Harvard University, Lesley University, Northeastern University, Simmons College, Tufts University, Wellesley College, and many specialized professional art and music schools. The concentration of academic, cultural, and intellectual activities in this area is one of the most significant in the country.

An hour or two away from MIT by car are the mountains of Vermont and New Hampshire, the ocean beaches of Cape Cod, the lakes and rivers of Maine, the small clusters of fishing towns along the New England coast, and many places of historical interest in Massachusetts alone—Salem, Sturbridge, Lexington, Concord, and Plymouth. With its varied landscapes and four distinct seasons, New England offers unlimited possibilities for recreation—skiing, mountain climbing, hiking, sailing, canoeing, kayaking, swimming, and camping.

Simmons Hall

The interior of Simmons Hall is punctuated by atriums and terraces and open to light and air. The shimmering exterior is wrapped in windows connected by a grid of anodized aluminum. As a result, the building reflects light during the day and glows with interior light after dark.

includes an indoor ice rink and field house, and Rockwell Cage accommodates varsity and intramural basketball, volleyball, and badminton. MIT’s Steinbrenner Stadium includes a six-lane, 400-meter, all-weather running track, the first of its kind in North America. The stadium also includes facilities for the steeplechase and field events, with a game field inside the track oval for intercollegiate football, soccer, lacrosse, and field hockey games.

These athletic facilities are complemented by the stunning new Albert and Barrie Zesiger Sports and Fitness Center, designed by Pritzker Prize–winning architect Kevin Roche, John Dinkeloo & Associates, and Sasaki Associates. This luminous complex contains an Olympic-class 50-meter pool, seating for 450 spectators, a training pool, an 11,000-square-foot fitness center, and six squash courts built to international competition standards.

The Charles River Basin—two miles long and a third of a mile wide—is a major feature of MIT’s physical environment. The Pierce Boathouse and the Walter C. Wood Sailing Pavilion provide centers for extensive activity in crew and in sailing.

Along Memorial Drive and facing the Charles River are additional student residences, among them the serpentine Baker House, designed by the Finnish architect Alvar Aalto and internationally recognized as a masterpiece of modernism. Recently renovated in conjunction with its fiftieth anniversary, Baker House is one of the most popular dormitories at the Institute, in part because of the extraordinary residential experience it provides.
The purpose of the academic program at MIT is to give students a solid command of basic principles, a versatility of insight and perspective concerning natural and social phenomena, the habit of continued learning, and the power that comes from a thorough and systematic approach to learning. From these attributes comes the best assurance for continued professional and personal growth, especially in today's rapidly changing world.

Each of the 34 academic departments, divisions, and programs listed below offers one or more degree-granting programs, as described in Part 2 of this Bulletin. More detailed information can be obtained from the program and department offices.

**School of Architecture and Planning**
- Architecture
- Media Arts and Sciences
- Urban Studies and Planning

**School of Engineering**
- Aeronautics and Astronautics
- Biological Engineering Division
- Chemical Engineering
- Civil and Environmental Engineering
- Computational and Systems Biology
- Electrical Engineering and Computer Science
- Engineering Systems Division
- Materials Science and Engineering
- Mechanical Engineering
- Nuclear Science and Engineering

**School of Humanities, Arts, and Social Sciences**
- Anthropology
- Comparative Media Studies
- Economics
- Foreign Languages and Literatures
- History
- Humanities
- Linguistics and Philosophy
- Literature
- Music and Theater Arts
- Political Science
- Science, Technology, and Society
- Writing and Humanistic Studies

**Sloan School of Management**
- Management

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**Infinite Corridor**

The Infinite Corridor, one of the main thoroughfares at the Institute, runs a distance of 825 feet, or 251 meters, between Building 7, the Massachusetts Avenue entrance to MIT, and Building 8, opening on Eastman Court. Nearly the length of three football fields, the corridor is 9 feet wide and 16 feet high along its principal length.

This layout allows the corridor to capture the setting sun at a particular moment, a phenomenon sometimes called "MIThenge" by analogy to Stonehenge. As viewed from a stationary point on the earth, the path of the sun through the sky traces a circle (roughly) that moves north and south as the seasons go by. In mid-November and in late January every year, the circular path crosses the axis of the Infinite Corridor. When this occurs, given favorable weather conditions, a shaft of sunlight is thrown the entire length of the corridor. This event will be visible on November 11 and 12, 2005, at 4:20 pm and on January 28 and 29, 2006, at 4:49 pm. The best viewing of the phenomenon occurs at the third-floor level, which has fewer obstructions and less traffic. For further details, see the "Infinite Corridor Astronomy" at [http://web.mit.edu/mithenge/](http://web.mit.edu/mithenge/).
School of Science
- Biology
- Brain and Cognitive Sciences
- Chemistry
- Earth, Atmospheric, and Planetary Sciences
- Mathematics
- Physics

Whitaker College of Health Sciences and Technology
- Harvard-MIT Division of Health Sciences and Technology

Joint Program with Woods Hole Oceanographic Institution

The undergraduate academic program is based on a core of General Institute Requirements and on the specific curricula offered by departments for undergraduate majors. Within the requirements and elective choices, each student, in collaboration with a faculty advisor, may develop an individual program to suit his or her interests and preparation. Graduate students may take advantage of a number of standing interdisciplinary programs (as described under Interdisciplinary Research and Study) or develop individually tailored programs in consultation with the faculty.

Undergraduate courses at MIT all lead to the Bachelor of Science (SB) degree. Graduate degrees include Master of Architecture (MArch), Master of Science (SM), Master of Engineering (MEng), Master in City Planning (MCP), Master of Business Administration (MBA), Engineer, Doctor of Philosophy (PhD), and Doctor of Science (ScD).

Engineer degrees include Civil Engineer (CE), Electrical Engineer (EE), Engineer in Aeronautics and Astronautics (EAA), Engineer in Computer Science (ECS), Environmental Engineer (EnvE), Materials Engineer (MatE), Mechanical Engineer (MechE), Metallurgical Engineer (MetE), Naval Engineer (NavE), Nuclear Engineer (NuclE), and Ocean Engineer (OceanE).

For most undergraduates, degree-granting programs, including those that provide periods of on-the-job experience off campus, require four years of full-time study for the Bachelor of Science.

Accreditation

MIT is accredited by the New England Association of Schools and Colleges, Inc., through its Commission on Institutions of Higher Education.

Inquiries regarding MIT’s accreditation status should be directed to the Office of the Vice President and Secretary of the Corporation, Massachusetts Institute of Technology. Individuals may also contact:

Commission on Institutions of Higher Education
New England Association of Schools and Colleges
209 Burlington Road, Bedford, MA 01730-1433
telephone 781-271-0022
e-mail cihe@neasc.org

Many degree programs at MIT are accredited by specialized professional accrediting bodies, including the American Assembly of Collegiate Schools of Business, the Accreditation Board for Engineering and Technology, the American Chemical Society, the American Institute of Chemical Engineers, the Computer Science Accreditation Board, the National Architectural Accrediting Board, and the Planning Accreditation Board. Academic departments can provide information on the accreditation of the specific degree programs they offer.

Administration

MIT Corporation

The Institute’s board of trustees is known as the Corporation, led by its chairman. Its members include approximately 75 distinguished leaders in science, engineering, industry, education, and public service, and (as ex officio members) the chairman, president, treasurer, and secretary of the Corporation. Between quarterly meetings, the Corporation functions through its officers and executive committee. For more information, visit the website at http://web.mit.edu/corporation/.

The Corporation appoints visiting committees for each department and for certain of the other major activities at the Institute. These committees, whose members are leaders in their respective professions, make recommendations to the Corporation concerning departmental activities and in turn provide counsel to the departments.
Academic and Administrative Organization

The Institute’s chief executive officer is the president. Senior academic and administrative officers of the Institute include the chancellor, provost, executive vice president, associate provosts, deans of the schools, vice presidents, dean for graduate students, dean for undergraduate education, dean for student life, and director of the Libraries.

The Institute’s academic departments and divisions—each under the leadership of a head, director, or associate dean—are organized within the five schools and Whitaker College. In addition, numerous interdisciplinary laboratories and centers have been organized to facilitate research in fields that extend across traditional boundaries; administration of each laboratory or center is the responsibility of the faculty member who serves as its director. Research projects sponsored by government, industry, or foundations are administered through the Office of Sponsored Programs.

Educational policy for the Institute is determined by the MIT Faculty (when capitalized, “Faculty” refers to those members of the faculty and administration who have voting privileges as designated by the Rules of the Faculty). The Faculty meets monthly during the academic year and conducts much of its business through a number of elected standing committees. The Faculty Policy Committee (FPC), which includes student members, maintains a broad overview of the Institute’s academic programs, deals with a wide range of policy issues of concern to the Faculty, and coordinates the work of the Faculty committees. The chair of the Faculty chairs the FPC.

Communication and exchange within and between the faculty and the administration are facilitated through four Institute-wide councils. Senior officers responsible for the overall administration of the Institute plus the chair of the Faculty meet regularly as the Academic Council to confer on matters of Institute policy. Department heads and directors of major laboratories and centers join them to form the Faculty Council, which meets as needed. The Administrative Council, comprised of the heads of the major administrative sections of the Institute, meets regularly during the academic year. The Creative Arts Council, chaired by the associate provost for the arts, consists of deans, department heads, directors in the arts, and campus-wide faculty representatives, and meets to confer on issues concerning arts programs and policy.

For a detailed view of MIT’s organizational structure, see the online organization chart at http://web.mit.edu/orgchart/.

ALUMNI

Association of Alumni and Alumnae

The Association of Alumni and Alumnae of MIT, founded by alumni in 1875, provides ways for the Institute’s 110,000 former students to stay in touch with one another and maintain their MIT connections. Under the direction of a volunteer alumni board, the Association staff helps members organize events, communicate with one another, and raise funds for MIT.

In addition to programs such as regional clubs and reunions, the Association invites alumni to make a virtual “infinite connection” to the MIT community at its website at http://alum.mit.edu/. More than 55,000 alumni members have made that connection and are using Email Forwarding for Life, the online alumni directory, alumni email lists, online mentoring services, events registration, and online Alumni Fund giving. More than 7,000 alumni volunteer their services for MIT each year, with many serving as class and club officers, educational counselors, and members of the MIT Corporation and its visiting committees. Other popular alumni programs include MIT On the Road, Tech Reunions, and the Enterprise Forum of MIT.

In fiscal year 2004, the Alumni Fund reported $31.5 million in gifts, contributed by more than 31,000 alumni and alumnae donors.
Life at MIT is anything but dull. But inquiring minds still need to know. Are there fraternities and sororities at MIT? What about the performing arts? Where are the dining services? Is child care available? How much does health care coverage cost? Come back to this section for these topics and more.

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ACTIVITIES

There is much more to an MIT education than study and research in classrooms and laboratories. Activities and services are available which complement academic pursuits and provide numerous opportunities for students to grow and develop new interests. This section describes just some of the activities and services that define campus life.

There are more than 350 cocurricular activities and clubs at MIT (many open to both faculty and students), including the Outing Club, the Solar Car Club, the Debate Team, the FM local broadcasting station (WMBR), the MIT Society for Women Engineers, the Student Art Association, Model UN, Circle K, the Black Student Union, the Latino Cultural Center, the Asian American Association, and the South Asian American Students Association.

Many students are actively engaged in service work either through the Public Service Center or on their own. Groups such as the Intrafraternity Council and Alpha Phi Omega (the national service fraternity), Hunger Action, Share a Vital Earth, and Educational Studies Program sponsor active social service programs. For example, the Educational Studies Program provides opportunities for MIT students to work with area high school students.

MIT also has a number of clubs geared towards students’ backgrounds and lifestyles. Over 30 international student groups on campus sponsor many programs, including discussion groups and social events. The International Students’ Association sponsors a newsletter, assemblies, and other events. MIT has an active organization of Gays, Lesbians, Bisexuals and Friends at MIT (GAMIT), which organizes weekly awareness programs and discussion groups, and sponsors social events throughout the year. The Technology Community Women (TCW) is composed of spouses of MIT students, undergraduate and graduate, and sponsors monthly programs as a social and service organization. Other interest groups focus on bridge, chess, railroad clubs, and strategic games.

For more information, contact the Association of Student Activities (ASA), Room W20-401, check the ASA’s website at http://web.mit.edu/asa/www/, or contact the Student Activities Office, Room W20-549, 617-253-6777.

ADVISING AND COUNSELING

The Institute offers a variety of resources for advising, counseling, and personal support resources. By intention, they are not centralized in one counseling center. A student is free to choose the resource that appears to be most helpful. Support is available in the form of casual conversations and scheduled appointments. It ranges from information dissemination to skilled psychotherapy.

Each student has a faculty advisor. In addition, in each academic department, there are faculty undergraduate and graduate officers, as well as academic administrators who consult with students about their academic programs. The Student Support Services section of the Office of the Dean for Student Life offers counseling and advising to all students, whether the situation is academic or personal or both. Student Support Services provides a broad range of assistance to all Institute students and has special responsibilities for supporting students who are women; minorities; or lesbian, gay, bisexual, or transgendered. Frequently, a student is able to get the help he or she wants from a fellow student or from an instructor who is not officially a faculty advisor. Coaches and activity advisors can be helpful as well.

Several offices specialize in particular areas: Student Financial Services, which includes student employment; the religious counselors; Career Services and Preprofessional Advising (see the section on Undergraduate Education in Part 1); and the Academic Resource Center. The Campus Police are frequently of help to students. For students considering particular fields, there is a Premedical Advisory Council, a Prelaw Advisory Council, and a Foreign Study Advisor.

The psychiatrists, psychologists, and social workers in the Medical Department are considered by many students to be the Institute’s most skilled counselors. In addition, the Health Education Service runs seminars ranging from stress management and smoking cessation to weight control and nutrition education, and the department’s Social Work Service provides individual and group counseling for substance abusers.

ARTS AT MIT

MIT has long valued the arts as essential elements of its education and community. More than half of MIT undergraduates enroll in arts courses each year, and over a third take music classes; many major or minor in arts-related subjects. Many programs, activities, and resources encourage extracurricular involvement in the arts for undergraduate and graduate students alike.

MIT’s arts faculty includes distinguished artists such as Pulitzer Prize-winning composer John Harbison, novelist Alan Lightman, video and performance artist Joan Jonas, and conceptual artist Krzysztof Wodiczko. A flourishing Artist-in-Residence Program complements the curriculum, allowing students to work with acclaimed visiting artists like novelist Isabel Allende, cartoonist Art Spiegelman, visual artist Cai Guo-Qiang, dancer/choreographer Elizabeth Streb, playwright David Henry Hwang, Senegalese drummer Lamine Touré, and architect/engineer Santiago Calatrava.

Each year MIT’s 62 performing groups and outside artists present over 300 music, theater, and dance events. Productions range from chamber music to electronic “hyperinstruments”; from Shakespearean plays to improv comedy; from ballroom to modern dance. MIT’s world music program features Boston’s only Balinese gamelan; Rambax MIT, a Senegalese drumming ensemble; and an acclaimed South Asian performance series.

MIT’s commitment to the arts extends beyond its campus. In 1995 the Institute became host to the Museum Loan Network, a program funded by the John S. and James L. Knight Foundation and The Pew Charitable Trusts, to promote collection sharing among US museums. MIT’s arts programs have been featured on National Public Radio and in publications such as The Chronicle of Higher Education, while MIT faculty, students, and staff attract wide attention for their arts achievements and expertise.
Office of the Arts
The Office of the Arts is the central administrative arts headquarters at MIT, established to oversee, coordinate, support, and facilitate arts activities under the direction of the Office of the Associate Provost for the Arts. The office has three branches: Arts Communication, the Council for the Arts, and Student and Artist-in-Residence Programs. For general information on arts programs and activities at MIT, call the office at 617-253-4003, or stop by Room E15-205. Also visit the Arts at MIT website at http://web.mit.edu/arts/.

Student and Artist-in-Residence Programs
Through the Student and Artist-in-Residence Programs there are many programs for students interested in finding community in the arts. The Freshman Arts Seminar Advising Program offers seminars led by MIT arts faculty and staff. Participants discover the arts resources at MIT and the Boston area and share art with one another through an Arts Share and hands-on workshops. The Arts Scholars Program enables students who are active in the arts to meet and converse at informal dinners and excursions and provides the opportunity to collaborate in workshops or on independent art projects. The Art Representative Program is a network of students in each dorm, living group, and graduate department linking students to arts events at MIT through a weekly email. The Grad Arts Forum encourages interdisciplinary communications among graduate students in the arts through a series of forums centered on themes connecting their work. Also available through Student Programs are the annual mural and origami competitions and the List Foundation Fellowship Program to support a year-long project in the arts.

The Artist-in-Residence Program provides MIT students with opportunities to interact with nationally and internationally recognized artists through master classes, small discussions, lecture-demonstrations, performances, and workshops.

Off-Campus Opportunities
MIT students enjoy a wealth of outstanding arts and cultural events offered in the Greater Boston area. Through programs run by MIT’s Council for the Arts, MIT students are eligible for free tickets to the Boston Symphony Orchestra, Collage New Music, the Boston Modern Orchestra Project, and free admission to Boston’s Museum of Fine Arts and the Photographic Resource Center. The council also funds a series of Performing Arts Excursions, through which students attend some of the area’s finest music, theater, and dance events at no cost.

Grants, Fellowships, Awards
Through the Council for the Arts’ Grants Program, students, faculty, and staff may apply for funding for arts projects in all disciplines; grants may range from a few hundred to several thousand dollars. The List Foundation Fellowship Program annually awards up to $5,000 to one eligible undergraduate for a year-long project in the performing, visual, literary arts, or new media.

Dance
Dance activities and clubs at MIT include the Folk Dance Club, Tech Squares, Ballroom Dancing Club, Dance Troupe, and various international student groups, providing regular opportunities for dancers at all levels of ability. Access their individual websites via http://web.mit.edu/arts/dance/index.html.

Lectures, Seminars, and Films
The Lecture Series Committee (LSC) is a student-run organization that provides speakers and film for the MIT community. With MIT departments or other campus groups, LSC also cosponsors events of cultural, entertainment, or educational significance. LSC is funded by its program of classic and current films. Call 617-253-3791, or visit the website at http://lsc.mit.edu/. Films and lectures are also presented by other organizations, including campus cultural, religious, and social groups.

List Visual Arts Center
During the academic year, the List Visual Arts Center in Building E15 presents exhibitions of contemporary art by an international roster of both emerging and prominent artists working today. Recent exhibiting artists include Michael Joo, Yael Bartana, Marjetica Potre, Pavel Braila, and Kimsooja. The exhibitions are presented in galleries that occupy the first floor of the I. M. Pei-designed Wiesner Building. Programs are free and open to the MIT community and general public. Gallery tours, lectures, and publications are offered in conjunction with exhibitions.

Each September, the List Center administers the popular Student Loan Art Program, which offers original works on paper, such as photographs, lithographs, IRIS prints, and woodblocks by contemporary artists, for loan to MIT students for the academic year. The List Center also administers the MIT Permanent Collection of artworks, a collection begun in the 1950s, which includes outdoor public sculpture, such as Alexander Calder’s The Big Sail (1966), sited in McDermott Court, as well as paintings, drawings, prints, and photography located in offices and public spaces throughout the Institute.

For more information about exhibitions, the Student Loan Art Program, or the Permanent Collection, call 617-253-4400, or visit http://web.mit.edu/lvac/.

Literary Arts
Through MIT’s Program in Writing and Humanistic Studies, students can take courses in fiction, poetry, playwriting, and science and nature writing with award-winning faculty. The Writers Series, Poetry@MIT series, and the Artist-in-Residence Program frequently present readings and lectures by renowned writers. Students may contribute their own writings to a variety of campus publications, and compete for annual writing prizes, awarded in several categories. For more information, call 617-253-7894, or visit the following websites at http://web.mit.edu/lit/www/, http://web.mit.edu/humanistic/www/ and http://web.mit.edu/arts/literaryarts/index.html.
Media Arts
MIT’s Media Lab is a world-renowned center of media-related research. Students and faculty at the lab explore and develop convergent communications technology through pioneering work in such disciplines as computer graphics, design, interactive cinema, narrative, cognition and learning, electronic music and holography. For more information, visit http://web.mit.edu/arts/mediaarts/index.html.

MIT Museum
MIT Museum’s mission is to document, interpret, and communicate to a diverse audience the activities and achievements of MIT and the worldwide impact of its innovation, particularly in the fields of science and technology; the Museum also seeks to enhance the spirit of community inside the Institute through the promotion of dialogue both at MIT and between the Institute and the wider world. To accomplish its mission, the museum collects and preserves artifacts that are significant in the life of MIT; produces exhibits and public outreach programs that are firmly rooted in the areas of endeavor in which MIT is or has been engaged; provides a research and teaching resource for both MIT and the larger community; engages members of the MIT community in museum activities; and provides facilities where they can meet and work together.

In addition to its main exhibition facility at 265 Massachusetts Avenue, the MIT Museum oversees the Hart Nautical Galleries in Building 5 and the Compton Gallery in Building 10. For more information, call the MIT Museum hotline at 617-253-4444, or visit the website at http://web.mit.edu/museum/.

Music
MIT’s music faculty includes internationally known composers and performers. Students may choose their level of participation in music from a wide variety of offerings. In addition to individual and class study in traditional and experimental music, students may participate in many performance groups directed by members of the faculty. These include the MIT Symphony, Wind Ensemble, Festival Jazz Ensemble, Chamber Music Society, Concert Choir, Chamber Chorus, and Gamelan Galak-Tika. There are many other student-directed ensembles and a capella groups on campus as well. In addition to performances by these student groups, concerts are presented as part of the MIT Faculty, Affiliated Artists, Guest Artists, and Thursday Noon Chapel series. Guest artists-in-residence also appear frequently on campus. For more information call 617-253-3210, or visit the website at http://web.mit.edu/arts/music/index.html.

Student Art Association
The MIT Student Art Association offers classes and facilities for many visual arts activities, including ceramics, photography, painting, drawing, and sculpting. For more information, call 617-253-7019, or visit the website at http://web.mit.edu/saa/.

Theater
MIT’s programs in theater arts offer opportunities for serious study and training in acting, directing, playwriting, stagecraft, and design. Classes are small, and students work directly with renowned faculty and guest artists, or initiate independent Student Workshop productions. A wide variety of theatrical performances are presented on the MIT campus by student organizations such as the MIT Dramashop, Shakespeare Ensemble, Musical Theatre Guild, and Gilbert & Sullivan Players, the improv group Roadkill Buffet, and by professional groups.

An annual Theater Arts Open House in early September allows students to meet the people who produce theater events, and to learn more about opportunities to get involved in various productions. For more information, call 617-253-2877, or visit the website at http://web.mit.edu/arts/theater/index.html.

Visual Arts
From large-scale public art to film and photography, the visual arts are celebrated in innovative ways at MIT. Excellent opportunities exist for members of the MIT community to view and create art in a variety of media (see List Visual Arts Center, MIT Museum, and Student Art Association above). Opportunities for curricular study in the visual arts can be found in the Visual Arts Program of the Department of Architecture, the Center for Advanced Visual Studies, and the Comparative Media Studies Program, or visit the website at http://web.mit.edu/arts/visualarts/index.html.

Athletics
Athletics and recreation play an important role in the lives of many students at MIT, and the Institute encourages everyone to participate in some type of program. Instruction is available in a wide variety of activities, many of which are considered lifetime sports.

Last year, approximately 900 men and women were active in intercollegiate varsity sports while other students, seeking more informal activities, joined club and intramural teams. The popular intramural program regularly attracts more than two-thirds of the undergraduates and a significant number of graduate students. Last year, there were over 1,100 teams with an estimated 12,000 total participants. In addition, MIT’s sailing program attracts 1,500 students, faculty, staff, and alumni, and extends sailing privileges to their families.

MIT sponsors varsity sports for men in baseball, basketball, crew (heavyweight and lightweight), cross country, fencing, football, gymnastics, indoor and outdoor track, lacrosse, skiing, soccer, swimming, tennis, volleyball, water polo, and wrestling. In addition, there are women’s varsity teams in basketball, cross country, crew, fencing, field hockey, gymnastics, ice hockey, indoor track, lacrosse, outdoor track, sailing, skiing, soccer, softball, swimming, tennis, and volleyball. Coeducational varsity opportunities are available in golf, pistol, rifle, sailing, and squash. Competition includes New England colleges and some Ivy League schools.

Men’s ice hockey is a club varsity sport.

There are intramural programs in badminton, basketball, bowling, foosball, football, ultimate frisbee, ice hockey, roller hockey, octathlon, pentathlon, pool, soccer, softball (slow pitch), squash, table tennis, tennis (individual and team), track, unihoc, volleyball, water polo, and women’s triathlon.
There are nearly 40 club sports including archery, badminton, contemporary dance, figure skating, ultimate frisbee, judo, karate, women’s ice hockey, rugby (men and women), graduate soccer, table tennis, cycling, and women’s water polo.

MIT’s excellent facilities include the Howard W. Johnson Athletics Center (with an indoor track and ice rink), the du Pont Olympic Center, Alumni Swimming Pool, Wood Sailing Pavilion, and Pierce Boathouse. The 26-acre Briggs playing fields include the du Pont outdoor tennis courts, nine softball diamonds (two with lights), and a multipurpose synthetic surface. The J. B. Carr Tennis Center includes four indoor plexi-cushion courts. Rockwell Cage was renovated to accommodate varsity and intramural basketball, volleyball, and badminton. Steinbrenner Stadium features a 400-meter all-weather track. The Zesiger Sports Fitness Center houses two swimming pools, a health fitness center, international squash courts, and a multipurpose gymnasium.

For information on the Physical Education Requirement, see the section on Undergraduate Education in Part 1.

CAMPUS DINING

MIT Campus Dining has one of the most diverse dining operations in the nation, with 20 locations on campus, including two convenience stores, four food trucks, and pizza delivery available. MIT Campus Dining is committed to providing diverse flavors, locations, and services that respect students’ budgets, valuable time, and nutritional demands.

House Dining locations offer some of the most comfortable and inviting surroundings on campus. With distinctive, award-winning architecture, views of the Charles River and Boston skyline, and decor to rival the best restaurants in the city, House Dining rooms are a true escape from the academic rigors of MIT. Cuisine is always prepared from scratch with the best and freshest ingredients available.

Kosher Dining, conveniently located in the MIT Religious Activities Center, adheres to the highest standards of Jewish dietary law. Kosher Dining is part of MIT’s House Dining program and accepts TechCASH as well as offering discounts to Preferred Dining members. The program is overseen by the Vaad Harabonim of New England (Rabbinical Council of New England), MIT Campus Dining, and MIT Hillel. Dinners are served Monday through Thursday, 6 to 8 pm, and special Shabbat dinner services start at 7 pm on Fridays.

Halal food is available Sunday through Thursday at Baker Dining from 5 to 8 pm. Choices include a special entrée prepared daily and a variety of cooked-to-order menu options.

MIT does not have traditional meal plans. Most students purchase meals using their TechCASH account. TechCASH, MIT’s convenient and secure debit account program, is accepted at all Campus Dining locations. Students and employees can find details about the advantages of opening a TechCASH account at http://web.mit.edu/mitcard/techcash.html.

Preferred Dining membership is an exclusive House Dining program designed by MIT students to support participation in House Dining and provide value to members. Preferred Dining members enjoy a 50 percent discount on most purchases at the four House Dining locations and the Simmons late-night café. At Kosher Dining, members receive $5 off the all-inclusive fixed menu price. Preferred Dining membership is available to all MIT students, faculty, and staff.

MIT enjoys several excellent on-campus catering services: The Faculty Club—MIT Catering, Tech Catering, Bon Appetit (House Dining), and Alpine Bagels—Cambridge Grill. All are dedicated exclusively to serving the MIT community and its affiliates. Details about campus caterers are available at http://web.mit.edu/dining/catering/.

Detailed information about MIT Campus Dining can be found at http://web.mit.edu/dining//. For questions or comments, call 617-253-4875 or email foodstuff@mit.edu. Campus Dining’s offices are located in W20-500.

CAMPUS MEDIA

Student publications at MIT include The Tech, a student newspaper published twice weekly; Technique, the senior yearbook; The Thistle, published by the Alternative News Collective; Voo Doo, a humor magazine; The Graduate Student News, a publication of the Graduate Student Council; Counterpoint, a joint MIT-Wellesley student publication; Rune, an artistic magazine; and a new literary magazine, Aeolus. Students may also contribute their talents to house newspapers and to a variety of departmental and organizational newsletters.

Also, WMBR is MIT’s commercial-free radio station operating under a license held by the Technology Broadcasting Corporation, and MIT Student Cable Television broadcasts original and syndicated programming 24 hours per day.

MIT Press

The MIT Press is a publisher of books and journals based at The Massachusetts Institute of Technology. One of the largest American university presses, it is also the only one whose list is based in science and technology. Committed to exploring new fields and new modes of inquiry, the MIT Press publishes about 200 new books each year along with 32 journals. It is a major publishing presence in fields as diverse as computational science, architecture, art, new media, economics, cognitive science, philosophy, environmental studies, neuroscience, and linguistics. The Press’s publications in these fields include books for professionals and scholars, trade books for general readers, textbooks, and reference works.

The Press has a long-term commitment to design excellence as well as to the efficient and creative use of new technologies. Its goal is to create books and journals that are challenging, creative, attractive, and yet affordable to individual readers. Over the years, the MIT Press has grown and thrived, and has in recent years undertaken a number of electronic publishing ventures including MIT CogNet (http://cognet.mit.edu/), an online community and resource for the cognitive sciences.

CHILD CARE AND PARENTING RESOURCES

Center for Work, Family, and Personal Life
The MIT Center for Work, Family, and Personal Life offers information on a wide range of child care, children's schooling, parenting, and other work/life issues. The center maintains listings and provides guidance on child care programs, babysitters, schools, summer camps, activity programs, and other local resources for parents and children. Be advised that child care costs are higher in Boston than in many other cities, and that space is limited; contact the center early in your planning process.

The center also houses materials and provides information on child development, balancing work and family, relocation to MIT, raising bilingual children, and many other parenting issues. Individual consultations on child care and parenting issues are available by appointment. The center offers a number of parenting workshops, briefings, and discussion groups, and maintains databases and a lending library. The office is located in Room 16-151, telephone 617-253-1592, email worklife@mit.edu. The website is at http://hrweb.mit.edu/worklife/index.html.

The Center for Work, Family, and Personal Life also coordinates a network of MIT-affiliated family child care homes. Family child care is in the home of a provider, licensed by the State Office of Child Care Services. Providers are generally spouses of graduate students living in family housing in Eastgate and Westgate. Arrangements are made by the families involved, but information about becoming a provider and referrals can be obtained from the center.

Technology Children's Center at Eastgate and Stata
Technology Children’s Center (TCC) is open year round from 8:00 am to 5:45 pm, Monday through Friday. Children may be enrolled for two, three, or five days per week, in one of three campus locations.

The Toddler Program at Eastgate offers care for children between 15 months and 2 years 9 months of age. The monthly fees are $1,500 for five days per week, $1,095 for three days per week, and $765 for two days per week.

The Preschool Program at Eastgate offers care for children from 2 years 9 months through kindergarten entry. Monthly fees are $1,274 for five days per week, $930 for three days per week, and $650 for two days per week.

The Stata Child Care Center serves children ages birth to kindergarten for a full day program. For infants 2 to 14 months, the monthly fees are $1,795 for five days per week, $1,310 for three days per week, and $915 for two days per week. For toddlers 15 months to 2 years 9 months, the monthly fees are $1,499 for five days per week, $1,095 for three days per week, and $765 for two days per week. For preschoolers 2 years 9 months to kindergarten entry, the monthly fees are $1,275 for five days per week, $931 for three days per week, and $650 for two days per week.

Westgate is temporarily closed but will be reopened in August 2005 as a child care cooperative. Information regarding the child care cooperative will be available on the web beginning in July 2005.

Enrollment is limited, and programs tend to fill early. For information, visit the TCC website at http://web.mit.edu/mitchildcare/, or contact Doug Elder, Enrollment Coordinator, at 617-253-1720, delder@mit.edu.

MIT Day Camp
The MIT Day Camp is operated by the Athletic Department weekdays from 9:00 am to 3:40 pm from late June through mid-August for children ages 6 1/2 to 13. An early drop-off starting at 8:00 am is available and an extended sitting service is available until 5:30 pm. The eight-week program is divided into two-week sessions, so that a child may be enrolled for a few weeks or for the entire summer.

Enrollment is limited. Please visit the camp website, http://web.mit.edu/daycamp/, or call the Day Camp Office at 617-253-2913 for additional information.

DISABILITIES SERVICES OFFICE
The Disabilities Services Office (DSO) is responsible for coordinating the Institute’s efforts to comply with the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973. The DSO provides qualified students with disabilities equal access to all Institute programs and services. The goals of the DSO’s support services are to encourage students to be self-sufficient, to enhance the educational process, and to support overall personal and professional development of students, without compromising existing academic programs.

These services include obtaining and reviewing disability-related documentation and determining the appropriate accommodations required; contacting faculty who work with the student, and developing plans for accommodations. Disabilities Services also provides, or arranges, a variety of auxiliary services to the MIT community, such as coordination for sign language interpreters, document translation, readers, and other academic accommodations. The Disabilities Services Office is located in Room 7-145. Please call 617-253-1674 for further information, or visit the website at http://web.mit.edu/dso/www/.

EDUCATIONAL TECHNOLOGY
Academic Media Production Services
Academic Media Production Services (AMPS) is a cost-recovery organization created in 2001 that provides educational technology services to the MIT community in support of the Institute’s strategic goals. AMPS is recognized as MIT’s provider of choice for the design, production, and delivery of multimedia educational technology products and services.

AMPS is the home of MIT Video Productions & Digital Technologies, Web Tools and Operations, the Stellar course management system, the Sakai collaborative project (http://www.sakaiproject.org/), and Web & Multimedia Development. It provides an extensive array of services in support of educational technology, including video recording of events, streaming video compression and hosting for web use, webcasting, teleconferencing and videoconferencing, educational website design and development, design and implementation of distance education facilities, and development and deployment of Stellar, MIT’s online course management system.
AMPS also provides assistance for multimedia production, such as videography, coding/programming, website building, media coordination, file compression, video editing, audio processing, and cd-rom and DVD authoring and duplication.

The staff consists of web and graphic designers, pedagogical consultants, instructional designers, videographers, video editors, streaming media specialists, project managers, programmers, teleconferencing specialists, and support personnel whose areas of expertise cover the full range of multimedia and distance learning capabilities.

For further information, please contact the executive director, Amitava (Babi) Mitra, Room 9-265, telephone 617-253-2385, or email babi@mit.edu. The AMPS website is at http://web.mit.edu/amps/.

FRATERNITIES, SORORITIES, AND INDEPENDENT LIVING GROUPS

MIT recognizes 36 fraternities, sororities, and independent living groups (FSILGs). Of these, 23 are nationally affiliated fraternities, two are local, and one is coed. There are also five living groups, four of which are coed and one is for women only. All five women’s fraternities (sororities) are nationally affiliated; three are residential. Most groups live in houses, many of which are owned by the respective chapter’s house corporation and are located off campus in the Boston, Brookline, and Cambridge communities. The Interfraternity Council (IFC) acts as the governing body for the fraternities, the Panhellenic Council represents the sororities and the Living Group Council represents the living groups. In addition, there are several historically black fraternities and sororities, and a Latino fraternity at MIT.

The oldest fraternity on campus was founded at MIT in 1873. More than 30 percent of the undergraduate population is affiliated with a fraternity, sorority, or living group. The FSILGs play an active role on campus and hold leadership positions in various clubs and organizations. Members of the FSILGs take part in a number of intramural sports as well as volunteer their time with many charitable and nonprofit organizations and raise money for local and national philanthropies.

Each fraternity, sorority, or living group is self-governing, manages all its operations and maintenance, and develops its academic, social, membership, recreational, and external policies and programs. These organizations provide a unique experience in leadership, community planning, and group interactions.

Each fraternity, sorority, or living group has a live-in resident advisor. Resident advisors serve as mentors, guides, and resources for students and serve as a liaison between the undergraduate chapter and MIT. Resident advisors are usually MIT graduate students and serve a vital role in the development and growth of members of FSILGs.

All MIT students will have the opportunity to learn more about each of the fraternities, sororities, and living groups throughout the academic year. The formal recruitment period for fraternities is usually held in September and again in February, while the formal recruitment period for sororities is held in January. However, many fraternities hold recruitment events year-round. In addition, incoming students receive information about the FSILGs via summer mailings through brochures and booklets.

For more information about FSILGs, contact the Fraternity, Sorority, and Living Group Office located in the Stratton Student Center, Room W20-549, telephone 617-253-7546, or email FSILG-Office@mit.edu.

HOUSING: UNDERGRADUATE SINGLE STUDENT

At the undergraduate level, MIT is essentially a residential university. Of the total undergraduate student body of 4,500, about 2,900 single men and women live in the 11 Institute residence halls on campus, and about 1,350 single men and women are in other residence groups including 37 MIT-approved fraternities, sororities, and independent living groups. Transfer students may be able to obtain housing on a space-available basis after the freshman housing lottery.

The residential system provides an environment conducive to personal development as well as academic achievement. The Institute relies greatly on the initiative and responsibility of both individual students and student government organizations in the residences.

Faculty families chosen for their understanding of and interest in students live in each of the Institute residence halls. They are not charged with formal academic or operational responsibilities; instead, they welcome informal associations with their fellow residents. In all of the Institute residence halls, graduate residents support the faculty residents in providing personal and academic assistance to undergraduates.

With the exception of McCormick Hall (all female), the Institute residence halls have coeducational living facilities. Most of the coed residence halls also have single-gender living areas. Although first-year students are not guaranteed an assignment to a particular residence hall or single-gender area, every effort is made to assign students to one of their top choices.

Student governing groups establish and administer many residence hall regulations and maintain acceptable standards of community behavior. Residential student governments also organize social, athletic, and intellectual programs for residence hall members. In each Institute residence hall, a tax determined by the residents is collected by MIT and made available to the residence hall government to help support such activities. Individual fraternity, sorority, and independent living group chapters have similar charges to support their extracurricular programs.

The Institute believes that it is to the great advantage of all new students who do not live at home to reside on campus—that is, to live in residence halls. First-year undergraduates particularly gain from associations with upperclass students and participation in residence programs. Therefore, all unmarried first-year undergraduates who cannot commute daily from their own homes or those of close relatives in the greater Boston area are required to live on campus. Exceptions to this requirement may be made with the approval of the assistant director for undergraduate housing.
Institute Houses (Undergraduate)

Everett Moore Baker House
Bexley Hall
Burton-Conner House
East Campus Houses—Munroe, Hayden, Wood, Goodale, Bemis, and Walcott
Frank S. MacGregor House
Stanley McCormick Hall
New West Campus Houses—Ballard, Lawrence, Coolidge, Desmond, Fisk, and Thorn, which include Chocolate City, French House, German House and Spanish House
500 Memorial Drive (Next House)
Random Hall
Senior House
Simmons Hall

Rooms in the Institute houses are engaged for the full academic year. For 2005–2006, the rents for the houses will range from $1,621 to $2,926 per term.
A student who cancels a room assignment after the deadline of June 15 will be charged a cancellation fee. A student withdrawing from MIT during a regular term will receive a refund based on proration of the term rental over 15 weeks of occupancy.

Fraternities, Sororities, and Independent Living Groups

Undergraduates affiliated with a fraternity, sorority, or independent living group have the option of residing in the chapter house after their freshman year. Each FSILG has its own meal plan, many with chefs that cook for the entire chapter. In addition, members share responsibility for chapter house jobs and work closely with alumni and the FSILG office on the general maintenance and upkeep of the chapter facility. Room and board for each FSILG vary, ranging between $1,700 and $4,000 a semester.

Student House

The MIT Student House is a coeducational, cooperative living group for financially needy students. It is owned by a corporation of Student House alumni and alumnae and is located off campus in Boston. The 30 undergraduate members maintain the residence and do all the work except for major repairs. Students cooperate in the management of the house and the academic, recreational, and social aspects of student life, thereby creating a savings per member averaging $1,000 per semester. Student House is also a member of the Living Group Council. Information on Student House may be obtained by writing to the president, MIT Student House, 111 Bay State Road, Boston, MA 02215-1798.

Off-Campus Student Housing

Students who do not live on campus can consult the Off-Campus Housing Service, which maintains listings of available rentals in the greater Boston area. The staff helps students to locate accommodations that suit individual preferences and finances. Address correspondence to Off-Campus Housing Service, Room E19-429, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, telephone 617-253-1493, or visit the website at http://web.mit.edu/housing/och/.

Additional Information

Additional information on undergraduate housing and application procedures is contained in The Guide to Residences. Each first-year student is sent a copy of this brochure about four months before registration day of the term for which he or she has been admitted to MIT. Others may request copies from the Undergraduate Housing Office, Room E32-200, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-2811. Information about fraternities or sororities also may be obtained by writing to the Panhellenic Association and the Interfraternity Council, Room W20-549, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-7546.

HOUSING: GRADUATE SINGLE STUDENT

Approximately 40 percent of the single graduate students reside on campus in Avery Allen Ashdown House, Ping Yuan Tang Residence Hall, Harold Edgerton House, Ida Flansburgh Green Hall, NW30, and Sidney-Pacific Residence Hall. Students must be registered each term (not including the summer) in order to reside in on-campus student housing. MIT graduate housing is assigned through an allocation process run by the Graduate Housing Office. Students can enter the allocation for fall term housing between March and early May. Assignments are available in late May. A second allocation is run in November for spring term housing. Details are available at http://web.mit.edu/housing/grad/assignments/change.html.

For all residences (except NW 30, which also offers the option of a 12-month commitment), financial commitment is from the date of occupancy through August 15.

Avery Allan Ashdown House

Ashdown House, located on the corner of Massachusetts Avenue and Memorial Drive, directly across from the main buildings of MIT, houses 361 single graduate men and women in furnished single and double rooms (dormitory style).

A member of the faculty who is familiar with the aims and problems of graduate students resides with his or her family in the house, serving as the faculty family in residence. A Student House Executive Committee, acting with the advice and assistance of the faculty resident, plans and operates the activities program. Ashdown House, with facilities for social and cultural events, is a center of graduate student activities.

Rooms in Ashdown House are furnished and rented on a 12-month license to each occupant, beginning September 1. Rents range from $513 to $584 per occupant per month and include all utilities, internet access, and campus calls.

Ida F. Green Hall

Green Hall accommodates 46 single graduate women in 31 single and 8 double rooms. The dormitory is centrally located on Memorial Drive within five minutes’ walking distance of the Athletic and Student Centers, and the main campus buildings.

Rooms in Green Hall are furnished and rented on a 12-month license to each occupant, beginning September 1. Rents range from $483 to $580 per
occupant per month and include all utilities, internet access, and campus calls.

An MIT faculty member resides in the hall and assists student leaders in planning social and orientation activities. Community cooking facilities are available on each floor, or residents may purchase meals on a charge plan.

**P. Y. Tang Residence Hall**

Tang Residence Hall, located on the far west end of campus, houses 404 first-year single graduate men and women in two-, three-, and four-bedroom apartments. All units are furnished. The apartments are rented on a 12-month license to each occupant, beginning September 1. Rents range from $610 to $649 per occupant per month and include all utilities, internet access, and campus calls.

**Harold Edgerton House**

Edgerton House, which opened in 1990, houses 190 single graduate men and women.

Living arrangements at Edgerton House include efficiencies, one- to four-bedroom apartments and duplexes. All units are unfurnished, carpeted, and have central air conditioning. All units except the efficiencies have a separate living/dining area. Common facilities include a laundry room and reception area; plus a large, secure, exterior courtyard for resident social use. Prices range from $649 to $1,269 per resident per month and include all utilities, internet access, and campus calls.

**NW30 (The Warehouse)**

NW30, a new graduate residence hall, opened in fall 2001. The opening of this building added an additional 120 efficiency apartments for first-year single graduate students.

All apartments in this building are furnished and have central air conditioning. The apartments are rented on a 9-month license agreement from September 1 to June 1. Monthly rent per unit is $959 and includes all utilities, internet access, and campus phone service. Some of these apartments are available to current residents in the summer on a first-come, first-served basis. NW30 is coed, but individual apartments are single-sex. Each unit has a kitchenette with stove and refrigerator, and bathrooms and a shower stall. The building also has a bike storage room, a fitness center, and a coin-operated laundry.

A faculty housemaster is also in residence. This building is used to accommodate conferences during the summer months (June through August).

**Sidney-Pacific**

Sidney-Pacific, another new graduate residence hall, opened in fall 2002. Sidney-Pacific houses 702 single graduate students, making it the largest facility to house students on campus. The building is made up of several types of apartments: an efficiency single (one-room apartment housing one person), two-room double (two-bedroom apartment housing 1 person per room), and a two-bedroom quad (a two-bedroom apartment housing 2 people per room). Monthly rents range from $959 per person for the efficiency single apartment to $569 per person for the two-bedroom quad.

A faculty housemaster and associate housemaster are also in residence. Sidney-Pacific is coed, but individual apartments are single sex. The building is divided into four wings with a landscaped courtyard between them. Along with several lounges and study rooms, there are two indoor storage rooms for bicycles, a music room, a game room, a fitness center, and coin-operated laundry. Multipurpose rooms and common kitchens are also available for receptions and community gatherings.

**HOUSING: STUDENT FAMILY**

Residence in student family housing is limited to regular undergraduate and graduate student families registered and attending MIT who are residing together on a full-time basis, and to single parents with at least one child in residence. Except during the summer, students must be registered for each term in order to reside in on campus student housing. Assignments are made on a one-year license-agreement basis beginning on September 1 of each year.

Student family housing is managed by the MIT Graduate and Family Housing Office, Room E32-238, and is assigned through an allocation process. You can enter the allocation for fall term housing between March and early May. Assignments are available in late May. A second allocation is run in November for spring term housing. Details are available at http://web.mit.edu/housing/grad/assignments/change.html.

Westgate, a five-building complex, located at the west end of the MIT campus, provides 210 apartments for student families. Westgate consists of a 16-story tower with 90 one-room efficiency apartments and 60 one-bedroom units, and four three-story garden-type buildings with a total of 60 two-bedroom apartments. Rents range from $924 to $1,228 per month and include all utilities, internet, and campus calls.

Located adjacent to Kendall Square at the east end of the MIT campus, Eastgate is a 29-story apartment tower with 203 family units for students.

In the tower building there are 96 one-bedroom apartments, 84 larger one-bedroom apartments, and 23 two-bedroom apartments. Rents range from $1,064 to $1,367 per month and include all utilities, internet, and campus calls.

More information on all graduate residences may be found on the Graduate Housing website at http://web.mit.edu/housing/grad/.

**INFORMATION SERVICES AND TECHNOLOGY**

MIT’s computing environment gives members of the community access to a rich array of technologies and information resources.

Information Services and Technology (IS&T) is responsible for creating and fostering a technological environment that supports a full range of computing and telecommunications resources for MIT’s academic, research, and administrative activities. IS&T focuses on “common” services for everyone, such as telephones and network connections, including wireless, and on services for specific constituencies, such as academic computing and administrative computing. With these resources, members of the
MIT community can share information and programs, communicate with each other, and work together on problems and ideas in creative ways.

MITnet connects thousands of computers across the campus, and its connection to the internet gives MIT access to computers around the world. Wireless and wired access to MITnet is available across the entire campus, including all dorms. Access to MITnet when away from campus is available through iPass and other internet service providers or Tether, MIT's dial-up service.

The Athena Computing Environment is a campus-wide, networked system available to all MIT students, faculty, and staff. Athena workstations are located in public clusters, academic facilities, laboratories, libraries, dorms, and offices at MIT. Athena users have access to courseware, electronic mail, symbolic-mathematics and statistics packages, word processing and graphics programs, utilities, programming tools, printers, and a host of network services and resources, including the world wide web.

IS&T provides computer buying advice and needs analysis, with a hands-on showroom of computer equipment recommended for use at MIT, including laptops recommended for students. The Help Desk Service Center staff are available to answer questions before purchasing. Through MIT's partnerships with web-based vendors, MIT students, faculty, and staff can purchase, at educational discounts, hardware, software, and accessories.

IS&T provides a variety of support avenues, including telephone and email help lines, consulting, training, and publications, to help members of the MIT community make effective use of information technology products and services. The Adaptive Technology for Information and Computing program provides technologies for students and staff with disabilities.

Most of MIT's academic and administrative functions are carried out through networked and web-based applications. IS&T is closely involved with several initiatives that exemplify MIT's commitment to advancing educational technology. These include Academic Media Production Services, iCampus, Stellar, Sakai, and OpenCourseWare. More information about these initiatives can be found elsewhere in this catalogue. At the infrastructure level, campus facilities and classrooms are being built or redesigned to support the full spectrum of educational technologies.

In addition to the resources available from IS&T, several departments and laboratories maintain computing facilities to serve their own specialized requirements.

For more information on IS&T and computing at MIT, visit the website at http://web.mit.edu/ist/.

LIBRARIES

The MIT Libraries—with resources of more than 2.7 million print volumes and over 2.5 million additional items in special collections of microforms, maps, slides, musical scores, manuscripts, recordings, and electronic resources—are designed to support all of the Institute’s programs of study and research. The library system is composed of five major (divisional) libraries as well as a number of smaller branch libraries. These include:

- Aeronautics and Astronautics Library
- Barker Engineering Library
- Dewey Library (Management and Social Sciences)
- Humanities Library
- Institute Archives and Special Collections
- Lindgren Library (Earth, Atmospheric, and Planetary Sciences)
- Lewis Music Library
- Rotch Library of Architecture and Planning
- Rotch Library Visual Collections
- Science Library

The Libraries' website, http://libraries.mit.edu/, offers a wide range of online services, resources, and information. From here, patrons can locate items in library collections through the online catalog, Barton (http://libraries.mit.edu/barton), or search over 20,000 journals, databases and other serials through Vera (Virtual Electronic Resource Access) at http://libraries.mit.edu/vera.

MIT's membership in the Boston Library Consortium, allows students, faculty members, and research staff access to extensive research collections outside the Institute as well.

The Libraries offer workshops and instructional support (for courses and groups) on library resources, and in-depth consultations with subject specialists on research projects. Personal assistance is available from staff at each library or through the Libraries' Ask Us! service (http://libraries.mit.edu/ask/).

Other library resources and services include GIS and data resources, metadata services, reference assistance, interlibrary loans, spaces for group and private study (including a secure 24-hour study space in Hayden Library), and complete digital scanning, microfilm, and photocopying facilities.

The Libraries also manage DSpace (http://dspace.mit.edu/), a unique digital repository created to capture, preserve, and share MIT’s intellectual output with the world. DSpace currently houses over 11,000 MIT theses.

The Libraries primarily serve the MIT Community. Others wishing to use the facilities may apply to Document Services, Room 14-0551, for a library privilege card.

MEDICAL SERVICES

Medical Services on Campus

MIT Medical is a multi-specialty group practice that employs over 100 clinicians and other professionals. The department's medical staff provides care in internal medicine, pediatrics, gynecology, obstetrics, mental health, orthopedics, ophthalmology, optometry, (including contact lens service), dermatology, allergy and many other specialties. The department provides a pharmacy as well as laboratory, x-ray, and other diagnostic testing facilities. A health education service and patient advocate are also available. A major goal of the department is to provide high-quality accessible medical care. Students can choose a personal physician.

A dental service provides dental treatment to students and their spouses on a fee-for-service basis.
An 18-bed in-patient service provides care for students and spouses with acute illness or contagious diseases. This service is for patients who cannot be cared for in their living groups but do not need to be admitted to a general hospital. Children are not admitted to the inpatient unit but are referred to a nearby pediatric hospital. Patients requiring major surgery or treatment for serious illness are sent to Massachusetts General Hospital, Mount Auburn Hospital, or Children’s Hospital where their care is supervised by an MIT Medical physician.

Visits to MIT Medical are by appointment, except for urgent care. The regular hours of the department are from 8:30 am to 5:00 pm, Monday through Friday, except for holidays. Some services are open evenings until 7:00 pm on certain days. At other times, urgent medical care is available through the after-hours service on the first floor of MIT Medical. Students should call 617-253-1311 or 617-258-0656 (TTY) day or night for medical advice. If a student is too ill to come to MIT Medical without assistance, MIT Medical should be notified and will recommend suitable help.

Health Insurance

The MIT Student Health Program consists of two health plans, the MIT Student Medical Plan and the MIT Student Extended Insurance Plan. The MIT Student Medical Plan covers a wide range of services provided at MIT Medical, including primary care, many medical specialties, 24-hour urgent care, mental health care, and other services. The MIT Student Extended Insurance Plan provides coverage for more extensive care such as, hospitalization, diagnostic tests, physical therapy, surgery, prescription medication, and obstetrical care.

Registered MIT students paying tuition to MIT are automatically enrolled in the MIT Student Medical Plan as part of their tuition.

Since hospital coverage is mandatory under Massachusetts law, all regular students and special students (registered with 27 or more units), students on a J1 or F1 visa are also automatically enrolled in the MIT Student Extended Insurance Plan. Prior to the beginning of each term, Students may submit a waiver request via the online waiver system to waive the Student Extended Insurance Plan if they have comparable coverage elsewhere which meets Massachusetts minimum requirements for student health insurance. More information about Massachusetts student health insurance requirements, the MIT Student Health Plans and the student health insurance. More information about Massachusetts student health insurance requirements, the MIT Student Medical Plan and the MIT Student Extended Insurance Plan. The MIT Student Medical Plan provides all regular and special students with comprehensive health care, including primary care, many medical specialties, 24-hour urgent care, mental health care, and other services. The MIT Student Extended Insurance Plan provides coverage for more extensive care such as, hospitalization, diagnostic tests, physical therapy, surgery, prescription medication, and obstetrical care.

MIT Student Medical Plan

The MIT Student Medical Plan provides all regular and special students paying tuition to MIT with coverage for many health care services provided at MIT Medical (Building E23) at no charge. Student partners and children of students may use MIT Medical on a fee for service basis, or by paying a Partner/Child MIT Student Health Plan fee. To enroll your family, you must complete the MIT Student Health Plan enrollment form during the enrollment period. Partners and children of students who want to pay the MIT Student Health Plan fee must also provide evidence that they are enrolled in a hospital insurance plan.

Services and medical supplies that are not covered by the MIT Student Medical Plan include pre-matriculation physical exams and immunizations, Hepatitis B immunizations, allergy serum, obstetrical care, prescription drugs, routine eye examinations, eyeglasses, contact lenses, inpatient care, dental care, contraceptive devices, and those surgical procedures and outside diagnostic tests which should be covered by your hospital insurance. All off-campus medical services, such as office visits and hospital emergency room visits are not covered, even if a student is referred by an MIT physician. Coverage for these visits will be determined by the student's hospital insurance plan.

MIT Student Extended Insurance Plan

The cost of off-campus hospitalization and medical care is extremely high. In Boston-area hospitals, the cost can exceed $1,500 per day. For this reason, it is extremely important that students have adequate health insurance for themselves and their families. All regular students and special students registered with 27 or more units, and students on a J1 or F1 visa will be automatically enrolled in and billed for individual membership in the MIT Student Extended Insurance Plan. Students who want family coverage must submit a new enrollment form each academic year during the enrollment period. Students who already have comparable hospital insurance which meets Massachusetts minimum requirements may submit a waiver request via the online waiver system. J-1 students under MIT visa sponsorship may waive MIT’s qualified student health insurance program only if their policies meet specified United States Information Agency (USIA) regulations and the Massachusetts minimum requirements. New waiver forms must be filled out each academic year.

The deadline for submitting enrollment forms and waiver forms is September 30, for fall term, and February 28, for spring term.

Special students taking two or more subjects, but registered with fewer than 27 units, are eligible to purchase the MIT Student Extended Insurance Plan, but are not enrolled automatically.

Detailed health plan information, including rates, benefits, enrollment forms and the online waiver system are available on MIT Medical’s website at http://web.mit.edu/medical/.

Medical Report Form Requirements

Prior to matriculation, every undergraduate, graduate, or readmitted student is required to submit an MIT entrance medical report. The report, which is completed by the student and his or her physician or nurse practitioner, is returned to Health Screening, Room E23-177. This form consists of historical information, immunization record, physical examination, and specified laboratory studies. For specific requirements, see the website at http://web.mit.edu/medical/.

Registration will not be permitted, and an $80 fine will be imposed on any entering student who has not complied with the medical report and/or immunization requirements stated above.
**Campus Life**

**OpenCourseWare**

**MIT OpenCourseWare**

MIT OpenCourseWare (MIT OCW) is a large-scale, web-based publication of free educational materials that enables open, worldwide sharing of knowledge and learning in a way that befits MIT’s reputation as a world-class teaching and research institution.

Available at [http://ocw.mit.edu/](http://ocw.mit.edu/), MIT OCW connects visitors with the syllabi, lecture notes, and calendars of more than 1,100 courses ranging across all five MIT schools and 33 academic disciplines. In addition, most course sites include a subset of other materials such as multimedia simulations, problem sets and solutions, past exams, reading lists, sample MIT student projects, and a selection of video lectures.

Educators around the world are encouraged to use these materials for curriculum development, and students and self-learners may also draw upon them for self-guided study or supplementary use.

Course materials at the MIT OCW website may be used, copied, distributed, translated, and modified by anyone, anywhere in the world. All that is required is that the use be noncommercial (not-for-profit), that the materials be properly attributed to the original author at MIT if they are republished or reposted online, and that any adapted materials be openly shared in the same manner as MIT OCW.

OCW’s impact has been felt across the campus. Students welcome the availability of course syllabi and lecture notes, and faculty are becoming more aware of what their colleagues teach. Some MIT faculty members have already been recognized by their peers at other universities for their online courseware, and in several cases this has led to new teaching and research collaborations. Indeed, MIT faculty research proposals to agencies such as the National Science Foundation now often identify MIT OCW as part of the broad impact of research and pedagogy at MIT.

Truly a global initiative, the MIT OCW website has received more than 8 million visits from users in more than 215 countries, territories, and city-states since it was first opened to the public in September 2002. Today, an average of 12,500 unique users visit the site on a daily basis. Even more striking, MIT OCW materials have already been translated into at least 10 different languages.

For more information about MIT OpenCourseWare, contact Jon Paul Potts, Room 9-213, MIT, Cambridge, MA 02139-4307, 617-253-0266, ocw@mit.edu.

**Public Service Center**

The Public Service Center provides an array of interesting and exciting paths that connect MIT students with the greater community beyond MIT. Through volunteer activities and paid fellowships, MIT students from all over the world become part of the local community, teaching in K-12 science classrooms, serving as mentors to adolescents in math and science, helping families to learn computer skills, and creating new plans and possibilities for community service agencies. International service fellowships are also available to ensure that the MIT educational experience is as diverse and far-reaching as the ambitions of its students.

Service learning is another way for students to contribute to community benefit in ways that also enhance learning. Through service learning, MIT students can gain in-depth educational experiences while working on community projects. For example, freshmen can take advising seminars that incorporate service learning, or they can select the Public Service Design Seminars that teach engineering design skills through projects that serve needs in local communities or distant communities in developing countries. The variety of service learning classes for all students represents an increasing set of choices and projects for applied learning and community benefit.

The Public Service Center also creates educational experiences and community connections in a variety of other ways: through advising and funding for student service initiatives, information about volunteer opportunities, and service events that involve students with faculty, staff, and alumni, as well as with community members. From the long-standing tradition of CityDays to the popular IDEAS competition to the new Cambridge Science Corps mentoring program, the MIT Public Service Center is an essential and enjoyable part of campus and community life at MIT.

Other public service opportunities can be found through the many independent student service groups, as well as the residence-based service opportunities. Groups such as the Pan Hellenic Council, the Intrarfraternity Council, and Alpha Phi Omega offer a number of service opportunities each year. Likewise, groups such as Alternative Spring Break, Amnesty International, Circle K, the Freshman Urban Program, the Educational Studies Program, and the Hunger Action Group inspire students to learn about social justice and to work in the community.

The innovative and engaging outreach activities available through the departments and programs at MIT are too numerous to name. The Edgerton Center, the Media Lab, the MIT Museum, the Women’s League, the Center for Materials Science and Engineering, and the MIT Center for Space Research are just a few of the programs that share resources and inspiration with people in the community. The Public Service Center website is a useful resource for finding out more about them: [http://web.mit.edu/mitpsc/](http://web.mit.edu/mitpsc/). Another excellent resource is the Council on Primary and Secondary Education website at [http://web.mit.edu/cpse/www/](http://web.mit.edu/cpse/www/).

**Religious Organizations**

There are currently about 30 active and long-standing student religious organizations on campus that are based in the Chapel and Building W11. Ministers representing the major faiths devote all or a large part of their time to on-campus activities, counseling individual students and advising student religious organizations.

In accordance with the Chapel’s interdenominational status, the Institute has not appointed an Institute chaplain or dean of the Chapel. MIT considers that one of its responsibilities is to maintain an atmosphere of religious freedom for all and to provide all members of the MIT community opportunity for the exercise of spiritual interests.
STUDENT GOVERNMENT

Undergraduate Student Government
The Undergraduate Association (UA), the major governmental body to which all undergraduates belong, works to improve the quality of undergraduate life at MIT. It is assisted by a variety of committees. The Finance Board coordinates budgets and allocates funds to student organizations. The Committee on Educational Policy proposes educational reforms and provides student feedback to the departments and the Institute on important educational issues. The Nominations Committee recommends student representatives for more than 50 administrative and faculty committees. Representatives of the UA also sit on the Fall Festival and Spring Weekend committees.

Each class at MIT annually elects a president and executive committee for its class council, which plans and coordinates social events and programs throughout the year.

The Association of Student Activities, a joint committee of the UA and the Graduate Student Council, is responsible for recognizing student groups and activities, allocating student office space, and organizing the Activities Midway, which takes place during Orientation in August.

All living groups—both fraternities and Institute residence halls—elect governing councils responsible for the functioning of their houses. In addition to sponsoring social events, these house councils handle judicial matters within the respective houses. To deal with problems of common concern, the fraternities have formed the Interfraternity Council (IFC), while the Institute Houses have formed the Dormitory Council. The IFC works to improve relations between fraternities and Boston’s Back Bay community. The Dormitory Council coordinates common house activities such as freshman orientation, and major social events, and handles interhouse judicial problems.

Graduate Student Government
The Graduate Student Council (GSC) exists to enhance the overall graduate experience at MIT by promoting the general welfare and concerns of the graduate student body, creating new programs and initiatives to provide opportunities for growth and interaction, and communicating with the MIT faculty and administration on behalf of graduate students. The GSC seeks to emphasize, in all of its activities, the core values of representation, communication, collaboration, transparency and accountability.

The council accomplishes its goals through a structure of elected representatives, standing committees and officers. The GSC representatives carry the task of facilitating the two-way communication between the council and their constituency (either a department, academic program, living group or demographic). In addition, the GSC nominates individuals to serve on a number of Institute committees, to ensure that there is a student voice in decisions made throughout the Institute.

The GSC’s standing committees span all facets of the graduate experience. This ranges from planning and implementing orientation for all incoming graduate students, planning the career fair and a variety of academic seminars throughout the year, organizing large social and cultural activities throughout the year, and even running the Muddy Charles Pub! In addition, the GSC serves as the primary voice and advocate for the graduate student body on issues such as housing, stipends, health care, advising, and nearly any other academic or student life related issue. The GSC also interfaces with graduate student groups through the Association of Student Activities (a joint committee with the Undergraduate Association, see its description above) and the GSC funding board, which allocates event funding to these groups. To keep students apprised of the council’s activity, it publishes a regular newsletter entitled Graduate Student News and keeps a very comprehensive and updated website, http://gsc.mit.edu/, which also serves as a repository for a large amount of information relevant to graduate students.

The GSC office is located in Room 50-220, Walker Memorial, above the Muddy Charles Pub. Please visit the GSC website at http://gsc.mit.edu/ for more information.

STUDENT SERVICES CENTER

The Student Services Center (SSC), conveniently located along the infinite corridor in Room 11-120, provides students with information about their financial and academic records in one central location together with services such as registration, transcripts, enrollment certification, cross-registration, refund checks, scholarship checks, loan processing, and tuition payments. Staff are available to meet with students (and their parents) to discuss questions about student bills, financial aid, loans, payment plans, and a variety of other academic and financial matters. Students can check student employment listings in addition to picking up or dropping off many Institute forms. Copies of MIT’s course catalogue can be obtained at the center as well.

The Student Services Center is open Monday, Tuesday, Thursday, and Friday from 9 am to 5 pm, and Wednesday from 10 am to 5 pm. For further information, call 617-258-8600, or email ssc-www@mit.edu.
To earn a bachelor’s degree in any field, undergraduates must complete the General Institute Requirements as well as the course of study prescribed for the degree to be awarded. This section outlines the general requirements together with other important aspects of undergraduate education, including admissions and financial aid.
ACADEMIC PROGRAMS

The undergraduate programs at MIT are designed to help students develop the knowledge and capabilities needed to meet the challenges of modern society. An MIT education joins the power of a specific discipline to a concern for social values and goals. In addition to developing expertise in a given field, undergraduates are encouraged to take advantage of the opportunities for broad learning at MIT, and to become creative, intellectual leaders and problem solvers, whose passion for learning is lifelong.

MIT students base their studies on a core of subjects in science, mathematics, and the humanities, arts, and social sciences (the General Institute Requirements). They major in the physical or biological sciences, in management science, in architecture or urban studies and planning, in an area of the humanities, arts, and social sciences, or in one of the engineering fields. In the first year, many students take subjects from a variety of options in mathematics, physics, chemistry, biology, and humanities, arts, and social sciences. During the second year, students generally continue their studies with subjects meeting various Institute requirements and beginning subjects in departmental programs. In the third and fourth years, students focus on the departmental programs.

There is also time for students to take elective subjects each year. These elective opportunities allow students to follow social interests or to enrich their educational backgrounds. Students may also use elective time to prepare for study in a professional field such as medicine or law or to begin work toward graduate study. Students may also pursue minors in many fields.

One of the most exciting features of undergraduate education at MIT is the opportunity for students to join with faculty in ongoing research projects. For example, experiences in the Undergraduate Research Opportunities Program (UROP) encourage intellectual commitment and self-direction, and often provide a focus for students’ undergraduate studies. During the Independent Activities Period in January, students can spend time in workshops, independent research projects, intensive subjects and seminars, field trips, lecture series, and other activities that do not easily fit into the traditional academic calendar.

To complete work for a bachelor’s degree in any Course (major), each student must fulfill the General Institute Requirements and must complete the departmental program specified by that Course. Details on General Institute Requirements and on selecting a major Institute course are discussed later in this section.

The program for the SB takes four years of full-time study for most students. Of the freshmen who entered between 1993 and 1997, the percentage of students who received their degrees within six years of entrance was about 91.4 percent.

Freshman Year

During the first year at MIT, students lay the foundation for their college education. A typical program includes subjects in mathematics and the natural sciences, as well as in the humanities, arts, and social sciences. First-year students may accommodate their individual preparation and learning styles by choosing among a variety of ways to complete the core subjects and prepare for further undergraduate study. Students select specified subjects from a range of offerings. They may also enroll in one of the special freshman learning communities: the Concourse Program, the Experimental Study Group, the Media Arts and Sciences Freshman Program, and Terrascope.

To begin fulfilling the General Institute Requirements (described later in this section), freshmen choose one of several sequences in mathematics; one of two subjects in chemistry; one of several subjects in biology; one of several sequences in physics; and a wide range of subjects in the humanities, arts, and social sciences (HASS subjects), including but not limited to designated HASS-Distribution Requirement subjects. Students have various options for satisfying the first year of the Communication Requirement.

A normal program for the first year includes completion of four or five of the six science core subjects in mathematics, physics, biology, and chemistry, and two of the eight HASS subjects. Students may round out their programs with electives, often including Freshman Advising Seminars (led by the students’ advisors), other undergraduate seminars, or subject 12.000 Solving Complex Problems (9 units). Some freshmen also elect to become involved in the Undergraduate Research Opportunities Program, described later in this section.

Entering students with degree credit for one or more of the science core requirements may substitute more advanced subjects or may take electives or Restricted Electives in Science and Technology (REST) Requirement subjects. Procedures for obtaining degree credit at entrance are described in the Admissions section.

The Concourse Program, the Experimental Study Group, the Media Arts and Sciences Freshman Program, and Terrascope offer alternatives to the more traditional format, combining lectures and recitation sections. These learning communities have their own faculty, meeting places, and methods of operation. In these programs, students make progress comparable to that of other freshmen, but the manner in which individual Institute requirements are met varies from program to program and among students within each program. In all four programs there is an especially high level of student-faculty interaction.

Concourse Program

A student who chooses the Concourse Program becomes a member of a group of about 60 freshmen working with a team of faculty members in a yearlong program of study which covers most of the first-year General Institute Requirements. In structure and atmosphere, Concourse resembles a small school rather than a large institution. Concourse has operated as a special program for freshmen since 1971 and is a regular part of the MIT curriculum, operating under the aegis of the School of Engineering.

Because of the greater level of personal attention and socialization, it is possible to connect and unify the separate subjects and also to encourage students to help, communicate with, and support one another. The approach is that of a scholarly community, with intense participation and support by faculty, staff, student assistants, and freshmen. Subjects can be approached with greater rigor but the experience can be more enjoyable, and very successful experiments such as “From Russia With Love: the Thirty Year Problem Set” become possible.

Concourse faculty, representing different professional disciplines, collaborate closely in the planning and teaching of the curriculum. Regularly
scheduled class sessions, which all meet in a single Concourse Classroom or in the Concourse Lounge, are supplemented by many less formal activities, e.g., “breakfast with your chemistry teacher.” A student may carry at least one subject per term outside the Concourse Program. Subject matter is arranged so that the student receives credit for the first-year General Institute Requirements on successful completion of the program. In addition, special courses are offered. Besides promoting close and sustained contact between students and faculty, the scheduling of the program enhances participation in advisor seminars and extracurricular activities.

For 2005–2006, the program’s director is Robert M. Rose. For more information, contact Cheryl Butters, Room 16-135, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-3200. A detailed description of the program may be found online at http://web.mit.edu/concourse/.

Experimental Study Group

The Experimental Study Group (ESG) is an innovative and interactive academic community primarily, but not exclusively, geared toward first-year students who wish to take an active part in their MIT education. In place of lectures and large classes, ESG offers students the opportunity to participate in small, discussion-oriented classes and seminars, study groups, hands-on labs, and independent study. Almost all the core subjects in math, physics, biology, and chemistry are offered through ESG, in addition to several HASS and HASS-D subjects. ESG also promotes educational innovation by encouraging staff and students to develop and teach experimental six-unit seminars that combine theory and practice. New classes in the past few years have included “Kitchen Chemistry,” “The Art of Color,” “Lego Robotics,” “Religion and Experience,” and “The Physics of Sports.”

In contrast to the set structure of the regular curriculum, ESG’s flexibility allows students to go at their own pace whenever possible and to organize their schedules to suit their needs. ESG’s small classes allow students to interact more often with faculty and fellow students than is typical in larger classes, and to experiment with novel ways of learning the material. Depending on the nature of the subject, students may also choose their topics of concentration to suit their academic interests. Although ESG can be a full-time activity for freshmen, students are welcome to take one or two subjects outside the Concourse Program. Subject matter extends the lecture/problem set learning of introductory (or “core”) science subjects with studies of complex, real-world problems that require innovative solutions drawn from a variety of disciplines.

For more information contact Dr. Holly Sweet, associate director, Room 24-612, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-3200, hbsweet@mit.edu, or visit the website at http://web.mit.edu/esi/.

Media Arts and Sciences Freshman Program

The Program in Media Arts and Sciences (MAS) offers a special freshman program emphasizing research at MIT’s internationally known Media Laboratory. In the freshman program, instructors connect research topics in the Media Laboratory to core physics and chemistry subjects, and students learn firsthand how research is carried out.

The Program in Media Arts and Sciences is part of the School of Architecture and Planning. It is housed in the Media Laboratory, which carries on advanced research in the invention and creative use of technology to enhance communication and expression. (For more information on Media Arts and Sciences, see Part 3; for more information on the Media Laboratory, see Interdisciplinary Research and Study in Part 1.)

Up to 24 freshmen in the MAS Freshman Program are introduced to the learning-by-apprenticeship mode that characterizes MAS. During the fall term students take part in one of several MAS Freshman Advising Seminars, and take MAS.110 Fundamentals of Computational Media Design, with hands-on design exercises looking at the intersection between expression and technology. In the spring term they take MAS.111 Introduction to Doing Research in Media Arts and Sciences, which includes documenting and presenting research results. In conjunction with MAS.111, all students participate through the Undergraduate Research Opportunities Program (UROP) in one of the research projects at the Media Laboratory. (For descriptions of the MAS subjects, see Part 3; a description of UROP can be found later in this section.)

Researchers from the Media Laboratory teach recitation or tutorial sections in the fall for subjects 8.01 and 3.091 and in the spring for 8.02, in which they emphasize connections between the fundamentals of physics and chemistry and ongoing research at the Media Laboratory. Students take the lectures for these subjects, as well as lectures and recitations in other core and elective subjects, with other freshmen. (For descriptions of these subjects, see Part 3.)

The program director is Dr. V. Michael Bove, Jr. For information contact Linda Peterson, Room E45-401, MIT, 77 Massachusetts Avenue, Cambridge MA 02139-4307, mas@media.mit.edu, or visit the website at http://www.media.mit.edu/mas/fyo/.

Terrascope

Terrascope, the newest of MIT’s learning communities for first-year students, offers a unique opportunity for MIT freshmen to expand their academic experience beyond the walls of the classroom. Terrascope balances the lecture/problem set learning of introductory (or “core”) science subjects with studies of complex, real-world problems that require innovative solutions drawn from a variety of disciplines.

The program is based on the idea that our Earth system (see http://web.mit.edu/esi/) provides a valuable context for learning basic science and engineering concepts. Students are encouraged to apply those concepts in creative ways to understand the interdependent physical and biological processes that shape our planet, and to design strategies to ensure a sustainable environment for the future.

Terrascope is a flexible program—only two subjects are required beyond the traditional General Institute Requirements (GIRs). During the fall term, Terrascope students enroll in 12.000 Solving Complex Problems (9 units), a popular subject (also known as Mission 2009) designed to explore how teams of scientists and engineers approach difficult problems that require multidisciplinary approaches. In 2005–2006, the charge is the
realistic assessment of earthquake and tsunami hazards in the circum-Pacific region and the design of an effective emergency response strategy for coastal regions in developing countries.

Students enroll in 1.016 Communicating Complex Environmental Issues: Designing and Building Interactive Museum Exhibits (9 units) in the spring. Using 12.000 as a starting point, students work with a small team to design, engineer, and build an interactive museum-style exhibit that teaches others about some aspect of the problem on which they’ve become expert. Students may opt to enroll in a 12-unit subject for CI-H credit in spring. SP.360 Terrascope Radio explores radio as a medium for expression and communications, particularly the communication of complex scientific ideas.

Terrascope students enroll in science and math subjects with their freshmen peers.

Fieldwork and close interactions with researchers and others is an important part of the Terrascope experience. Terrascope students attend weekly lunch seminars during which researchers and others speak about their work. Students may also participate in a credit-bearing activity during MIT’s Independent Activities Period. Finally, students in the Terrascope program have the opportunity to conduct field research in a location relevant to the problem under study during spring break. The probable location in 2005–2006 is Hawaii.

Students who are not part of MIT’s residence-based advising program will be assigned an advisor within Terrascope. Those who join the residence-based advising program will be officially advised by an MIT-assigned advisor, supplemented by an advisor from within Terrascope.

Terrascope offers students a variety of facilities including classroom and study space, a kitchen, lounge, and computer cluster.

Terrascope’s codirectors for 2005–2006 are Penny Chisholm and Kip Hodges. For more information, or to apply for the program, contact Debra Acel, daczel@mit.edu, or Ruth Weinrib, rweinrib@mit.edu, or visit the website at http://web.mit.edu/terrascope/www/. Note that in order to complete your application to Terrascope, you must indicate that you would like to join both Terrascope and Mission on MIT’s Advising Application form.

Seminar XL: You Can Be A Success at MIT

For first-year students, MIT offers an academic enrichment program which uses the concept of small-group learning. Seminar XL enhances students’ academic performance in calculus, physics, chemistry, and biology as well as their understanding of MIT’s academic expectations. Groups are formed in other subjects upon request by five or more students. Each group meets for three hours per week. The small group format emphasizes the full participation of each member, with a trained facilitator acting as a guide. Seminar XL is open to all first-year students, regardless of ethnicity.

For more information, contact the Office of Minority Education, Room 4-213, MIT, Cambridge, MA 02139-4307, 617-253-5010.

First-year Academics

The preceding overview conveys the nature and scope of the academic options for first-year students. Incoming freshmen are referred to http://web.mit.edu/firstyear/ for detailed information on academics, the advisory system, and support services.

Freshman Grading

Subjects taken by freshmen in the first term and IAP are graded on a pass or no-record basis. In the first term and IAP freshmen receive grades of P, D, or F in all subjects they take, where P means C or better performance. Students who receive Ds or Fs earn no credit in those subjects, and these grades do not appear on their external records. Plus (+) and minus (-) modifiers used within MIT do not affect the definition of the P grade.

In the second term freshmen are graded A, B, C, or no record. They will receive A, B, or C grades that appear on their external records but continue to earn no credit for Ds and Fs, which do not appear on their external records. Second-term passing grades are used in calculating students’ term and cumulative ratings.

Freshman grading is designed to ease the transition from high school to college by giving students time to adjust to factors like increased workloads, variations in academic backgrounds, and performance of less than consistently A-level work. Students are encouraged to improve time-management skills and develop more mature attitudes about learning. A, B, and C grades are used during the second term so that freshmen can begin the progression to regular A-F grading in the sophomore year.

Throughout the freshman year, instructors grade students’ work and tests. Instructors also alert students if their work is of unacceptable quality and suggest ways to improve it.

Credit Limit for Freshmen

A freshman may not register or receive credit for subjects totaling more than 54 units in the fall term and 57 units in the spring term. The Committee on Academic Performance (CAP) rarely grants requests to exceed the credit limit. (Only in the fall term may freshmen exceed the 54-unit credit limit by three units to take 12.000 Solving Complex Problems, or by six units to take Seminar XL: You Can Be A Success at MIT.) Credit earned for passing an Advanced Standing Examination will be counted toward the term credit limit unless the exam is taken either in the September or February examination period. ROTC subjects (listed in Part 3) are excluded from this credit limit. Note that all MIT students are limited to 12 units during the Independent Activities Period in January.

Major Course of Study

Whether or not they enter with plans for a specific field of study, all students are encouraged to examine with an open mind the wide range of Courses (majors) available at the Institute. Students may attend departmental orientation programs to talk with faculty and others with experience in fields of potential interest. They should select electives that will help them think about possible majors. The Independent Activities Period in January, described later in this section, provides students with opportunities to investigate different fields. For many students, this consideration of fields will reinforce existing convictions, while for others it will open up new avenues of interest. MIT may, however, limit enrollment in particular fields of study to balance resources with student interest.

Each student entering MIT is assigned an advisor who assists the student in designing an effective program of study. The selection of elective subjects is an important consideration, one that students should discuss in depth with their advisors.
All undergraduate degree programs combine the study of basic principles with practical applications. This combination helps to motivate the lifelong learning necessary for professional competence.

Students usually choose a Course (major) at the end of the first year, though they need not do so until the end of the second year. There is sufficient overlap and flexibility so that selection or change of Course can be made with relative ease in the second year.

All undergraduate and graduate academic programs, as well as faculty listings, for each of the Institute’s departments are described fully in Part 2: Degree Programs and Requirements.

Detailed information on undergraduate registration may be found in Academic Procedures and Institute Regulations in Part 1.

**Electives**

Electives can be used for several different purposes. For example, students who are undecided about their eventual majors can use some part of their elective time to get more information about the various departments or fields they are considering. Students more certain of their professional goals can use electives to explore areas of secondary interest. Still other students will choose to begin work on departmental or General Institute Requirements, deferring subjects of a more supplemental nature until a later year. The study of a language also may be started or continued.

Freshmen should select electives that best suit their individual needs. There are several hundred subjects without prerequisites that students can elect during the freshman year. However, any subject offered by the Institute is open to all students, including freshmen, provided they satisfy the prerequisites.

**Program for Two Bachelor’s Degrees**

A student pursuing a bachelor’s degree may earn a second SB by satisfying the requirements of the second department and completing 90 credit units in addition to the requirements for the first degree. This means that in the combined program, the student must complete at least 270 units beyond the 17-subject General Institute Requirements (GIRs).

A student may earn no more than two bachelor’s degrees and a minor may not be taken in the same department as either of the major programs. A two-degree program should be completed in a four- or five-year period and should be planned in advance even if both degrees are not received simultaneously.

The student’s plan for completing both degrees must be outlined in a petition to the Committee on Curricula (COC). The plan must include the expected completion date of each degree.

The petition must be approved by both departments. The faculty advisor in the first department and the Undergraduate Officer of the department in which the student wishes to pursue a second SB degree should take responsibility for examining the entire program in the same way as they would for a candidate for a single SB degree. Students should consult Student Financial Services regarding any impact this arrangement might have on eligibility for MIT or federal financial aid.

The petition must be submitted by the Add Date of the term prior to the term in which the student intends to receive the first of the two degrees. Petitions submitted after this deadline will not be considered by the COC.

Only registered undergraduates who have completed at least two terms in a department at MIT may petition, typically after completing their sophomore year. Students with cumulative averages below 4.0 will not be considered except in the case of exceptional circumstances.

A student who has already earned a bachelor’s degree, either from MIT or from another institution, is not eligible to earn a second bachelor’s degree from the Institute.

**Minor Programs**

A number of fields in science, engineering, architecture, and the humanities, arts, and social sciences offer minor programs. The minors are coherent programs providing significant experience in their disciplines. Students who successfully complete minor programs will have their fields of study specified as part of their Bachelor of Science degrees, thus giving public recognition of focused work in other disciplines. The general guidelines for a minor program are as follows:

- Minor programs consist of five to seven subjects, though generally six. These subjects may count toward General Institute Requirements and Departmental Program requirements.
- Subjects taken under the junior-senior P/D/F grading option cannot be used for a minor program.
- At the discretion of the minor advisor, transfer credit may be used to fulfill a portion of the minor program. MIT subjects, including those taken through cross-registration, must comprise at least half of the minor program.
- A student may not take a minor in the area of his or her major, except students pursuing Course 4 degrees in Architectural Design or Building Technology may minor in the Course 4 HASS field of History of Art and Architecture. Minors are not allowed in either field of composite degrees combining two different fields, for example, the SB in Mathematics with Computer Science, SB in Humanities and Science, or the SB in Humanities and Engineering.
- A student may earn no more than two minors, which are awarded only when the student receives the SB degree, and which must be associated with a specific degree. This two-minor maximum applies even if the student receives two SB degrees.
- The minor program should be completed by the end of the sophomore year, but no later than Add Date, one full term preceding the one in which the SB degree is awarded. The student must complete an application form for a minor in consultation with the appropriate minor advisor. Note that the application and completion forms for HASS minors are different from those used in other fields.

**Minor in a Science, Engineering, or Architecture Field**

Minors are currently available in the following science, engineering, and architecture fields:

- Architecture
- Astronomy
- Biology
Biomedical Engineering
Brain and Cognitive Sciences
Chemistry
Civil Engineering
Earth, Atmospheric, and Planetary Sciences
Environmental Engineering Science
Materials Science and Engineering
Mathematics
Mechanical Engineering
Nuclear Engineering
Physics
Toxicology and Environmental Health

More information on minor programs appears in Part 2 of this catalogue. For additional information, instructions, and applications, students should contact the Undergraduate Office in their field of interest, or the Academic Resource Center in Room 7-104.

Minor in Humanities, Arts, or Social Sciences
Students electing a Humanities, Arts, and Social Sciences (HASS) minor program will study a field in greater depth than the HASS concentration component of the General Institute Requirements allows and will encounter the structure of an intellectual discipline to a greater degree.

Most HASS minor programs are arranged into at least three levels, or tiers, expressing different degrees of sophistication in the articulation and resolution of intellectual problems. However, subjects included in the regional studies minors are divided into four areas; students are required to distribute subjects across those four areas.

Of the six subjects required for the HASS minor, at most five will count toward satisfaction of the eight-subject Institute HASS Requirement. Of these five, at most one will count toward the satisfaction of the HASS-Distribution Requirement.

HASS minor programs have been approved in the following fields:

- African and African Diaspora Studies
- Ancient and Medieval Studies
- Anthropology
- Applied International Studies
- Chinese
- Comparative Media Studies
- East Asian Studies
- Economics
- European Studies
- French
- German
- History
- History of Art and Architecture
- Latin American Studies
- Linguistics
- Literature
- Middle Eastern Studies
- Music
- Philosophy
- Political Science
- Psychology
- Public Policy
- Russian Studies
- Science, Technology, and Society
- Spanish
- Theater Arts
- Urban Studies and Planning
- Women’s Studies
- Writing

Detailed information on all minor programs may be found in Part 2 of this catalogue and at the Humanities, Arts, and Social Sciences Education Office (Room 14N-408) administered by the Office of the Dean, School of Humanities, Arts, and Social Sciences, or on the web at http://web.mit.edu/hass/www/.

GENERAL INSTITUTE REQUIREMENTS

To be recommended for the degree of Bachelor of Science, students must have attended the Institute not less than three regular academic terms, which ordinarily must include the term of graduation. Also, students must have satisfactorily completed programs of study approved in accordance with the faculty regulations, including the General Institute Requirements described on the following pages, and the departmental program of the Course in which the degree is to be awarded. A student must petition the Committee on Curricula for any substitutions in the General Institute Requirements. Departures from the departmental programs are allowed with departmental permission. The departmental programs and degree requirements appear in Part 2.

Science Requirement

MIT expects its graduates to have an understanding and appreciation of the basic concepts and methods of the physical and biological sciences. These concepts and methods are needed in most degree programs at the Institute. More important, they are an essential part of the background that MIT graduates bring to their roles as professionals and as broadly educated citizens in a world strongly influenced by science and technology.

To provide this understanding, the Institute offers a variety of programs by which the student can fulfill the Science, Laboratory, and Restricted Electives in Science and Technology (REST) Requirements. These programs introduce basic elements of the scientific method: experimental foundations and techniques, mathematical analysis, and conceptual models for experimental facts. Important experimental as well as conceptual aspects are introduced by the chemistry and biology requirements and by the Laboratory Requirement. Mathematical methods common to much of science and technology are explored in the mathematics requirement. Basic concepts that underlie many physical phenomena are defined and elucidated in the physics and REST requirements.
In addition to a rigorous introduction to the sciences, these requirements are intended to stimulate and challenge each student to review critically his or her knowledge and to explore alternative conceptual and mathematical formulations which may provide better explanations of natural phenomena or may lead to better applications of technology.

The development of critical and constructive approaches to both theory and practice in science, engineering, and other professions is a central objective of the Institute’s educational programs.

**Biology**
The Institute requirements in biology may be satisfied by one of three introductory subjects, 7.012, 7.013, or 7.014. All three subjects cover the same core material, which includes the fundamental principles of biochemistry, genetics, molecular biology, and cell biology. In addition, each subject version has its own distinctive material. 7.012 is offered in the fall term; 7.013 and 7.014 are taught in the spring.

For a score of 5 on the Biology AP exam, credit will be given for 12 units of subject 7.012 Introductory Biology. The department recommends that all biology majors take one of the introductory biology courses at MIT before continuing on with advanced courses in the major in order to ensure sufficient depth and breadth in the field. Students who have received a score of 5 on the Biology AP exam and who enroll in, complete, and pass the course requirements for 7.012, 7.013, or 7.014 will receive 9 units of elective credit, in addition to 12 units of credit for 7.012, 7.013, or 7.014.

**Chemistry**
The requirement can be satisfied by taking 3.091 Introduction to Solid-State Chemistry, or 5.111 or 5.112 Principles of Chemical Science. The subject 3.091 is designed for students who are particularly interested in the chemistry of the solid state. The subjects 5.111 and 5.112 present an introduction to chemistry with an emphasis on basic principles and their applications.

**Mathematics**
The Institute requires all students to complete single variable calculus (18.01 or equivalent) and multivariable calculus (18.02 or equivalent).

Students with advanced standing or advanced placement credit for 18.01 may go directly into multivariable calculus, which is offered in several versions in the fall term. Of these, 18.02 is the most basic version, 18.022 is somewhat more theoretical, and 18.023 emphasizes applications. Each of these options presents calculus as it is used in science and engineering.

The sequence 18.014–18.024, Calculus with Theory, assumes a substantial background in calculus and emphasizes proofs.

Students with a year of high school calculus may qualify for 18.01A, 18.02A. This sequence covers the material in one and a half terms. (See Part 3 for more information.)

Students with advanced placement or advanced standing credit for 18.01 will lose it if they take 18.01, will receive 3 units of elective credit if they take 18.01A, and will receive 9 units of elective credit if they take 18.014.

**Physics**
The Institute requirement in physics may be satisfied through several combinations of first-term and second-term physics subjects. A majority of students find the 8.01–8.02 sequence suited to their needs. The sequence 8.012–8.022 covers essentially the same subject matter as 8.01–8.02, but is more advanced mathematically; calculus is used freely from the beginning of the term. Subject 8.01L is offered in the fall term for students who have had little exposure to physics with calculus in high school. A student may switch from a first-term subject in one sequence to a second-term subject in another.

Students who score a 5 on Parts I and II of the Physics C Advanced Placement test will receive credit for 8.01.

Students with Advanced Placement or Advanced Placement Credit for 8.01 who elect to take 8.012 will receive 6 units of elective credit in place of 8.01.

**Communication Requirement**
MIT has established the Communication Requirement to make the development of effective writing and speaking an integral part of undergraduate education at the Institute. The Communication Requirement ensures that all undergraduates receive substantial instruction and practice in general expository writing and speaking and the forms of discourse common to their professional fields.

All students who entered MIT from summer 1999 through spring 2001, and transfer students only who entered summer 2001, are subject to the Writing Requirement (revised) instead of the Communication Requirement and should refer to the next section.

The **Communication Requirement** consists of four Communication Intensive (CI) subjects sequenced throughout a student’s undergraduate career. Students take two CI subjects in the humanities, arts, and social sciences (CI-H) and two CI subjects in their major program (CI-M). Students must maintain a minimum rate in completing their CI subjects in order to remain in good standing with the Communication Requirement. They must complete one of their CI subjects by the end of the first year, two by the end of the second, three by the end of the third year, and four by graduation.

Students must earn a passing grade to receive CI credit, and only one CI-H subject per term may be counted toward completion of the Communication Requirement. However, students may receive credit for more than one CI-M subject in the same term or a CI-H and a CI-M taken concurrently.

The general structure of the requirement is described below. Additional information can be found at [http://web.mit.edu/commreq/](http://web.mit.edu/commreq/) and in the section of the Bulletin on the HASS Requirement, and specifics on the CI-M subjects for each major appear in the descriptions of the individual undergraduate degree programs.

**First year:** Students must pass one CI-H subject by the end of their second term at the Institute.

Before entering MIT, all students take the Freshman Essay Evaluation (FEE). The FEE is a placement tool, which is used to determine the best program for each undergraduate within the Communication Requirement. Students who pass the FEE or receive a score of 5 on either the Advanced Placement Language and Composition Test or the Advanced Placement
Literature and Composition Test have the option of taking any CI-H subject, including specially designated expository writing subjects (CI-HW): 21F.222 Expository Writing for Bilingual Students; 21L.010 Writing About Literature; 21W.730 Expository Writing; 21W.731 Writing and Experience; 21W.732 Introduction to Technical Communication.

All other students must take one of the designated CI-HW expository writing subjects as their first CI subject.

Students who do not complete a CI-H subject in their first term at MIT are limited to 45 units in addition to an appropriate CI-H subject and may not advance to sophomore standing in their second term.

Second year. Students must pass at least two CI subjects by the end of their fourth term at the Institute. In most cases, these first two CI subjects will satisfy the CI-H portion of the requirement, providing a foundation in written and oral exposition.

Third year. Students must pass at least three CI subjects by the end of their sixth term. Most students will take their first CI-M subject as juniors and begin to develop the communication skills specific to the professional and academic culture of their discipline.

Before receiving an SB degree. Students must complete two CI-H subjects and the two CI-M subjects specified for their SB degree program prior to receiving their degree.

Double degrees. Students who wish to receive two SB degrees must pass two CI-H subjects and complete the CI-M subjects that fulfill the communication component of each major. Normally, these students will take four CI-M subjects, that is, two in each major program. However, a CI-M subject may be used to fulfill the communication component of two majors simultaneously if the subject is approved by both departments. To be consistent with MIT policy on double degrees, departments should approve a student’s proposed program only if the CI-M subjects in the program would be acceptable for a single degree.

Writing Requirement
All students who entered MIT from summer 1999 through spring 2001, and transfer students only who entered summer 2001, are subject to the following Writing Requirement instead of the Communication Requirement.

Undergraduates who entered MIT before the summer 1999 should consult the director of writing across the curriculum, Dr. Leslie Perelman, Room 32-083, 617-253-3375.

The Writing Requirement for all students who entered in the summer of 1999 through spring 2001 and transfer students only who entered summer 2001 consists of three phases. They include the Preliminary Phase, Phase One, and Phase Two.

The Preliminary Phase ensures the student’s basic competency in expository writing. Students can complete the Preliminary Phase through one of the following options:

- Receiving a score of 5 on either the Advanced Placement Test on Language and Composition or the Advanced Placement Test on Literature and Composition;
- Receiving a score of Pass or Intermediate on the Freshman Essay Evaluation; or
- Passing one of the following expository writing subjects, 21F.222, 21L.010, 21W.730, 21W.731, and 21W.732, or another expository writing subject approved by the Subcommittee on the Communication Requirement.

Students who did not complete the Preliminary Phase by the end of their Orientation week must have enrolled in one of the expository writing subjects listed above during their first or second term at the Institute.

Phase One ensures the student’s proficiency in writing clear and effective English expository prose. Students may use one of the following options to complete this phase of the requirement:

- Receiving a score of 5 on the College Board Advanced Placement Examination in Language and Composition. (Neither a 5 on the College Board Advanced Placement Test in Literature and Composition nor a 750 or above on the SAT II Writing Test can be used to satisfy Phase One.)
- Receiving a score of Pass on the Freshman Essay Evaluation.
- Completing at the grade-level of A or B one of the following expository writing subjects: 21F.222, 21L.010, 21W.730, 21W.731, 21W.732, or another expository writing subject approved by the Subcommittee on the Communication Requirement.
- After passing the Preliminary Phase, completing at the grade-level of A or B an approved Communication-intensive subject (CI-H) offered in the Humanities, Arts, and Social Sciences. For a current list of approved CI-H subjects, see http://web.mit.edu/hass/www/cicourses.html.

Students must complete Phase One by the end of their third term at MIT.

Phase Two is designed to engage upperclass students in the more specialized forms of writing that are necessary within their disciplines.

Phase Two is administered by individual departments. Students should contact their departmental advisor or writing coordinator for specific information on completing this part of the requirement.

Phase Two should be satisfied by the end of the junior year and must be satisfied by the end of the first term of a student’s senior year. Students who fail to complete Phase Two by registration day of the term in which they plan to graduate will be withheld from the final degree list. (Note that the deadline to submit Phase Two papers is much earlier than registration day.) These students can graduate that term only by enrolling in 21F.226 Advanced Workshop in Writing for Science and Engineering: English as a Second Language; 21F.228 Advanced Workshop in Writing for the Social Sciences and Architecture: English as a Second Language; 21W.780 Communicating in Technical Organizations or 21W.783 Scientific and Engineering Writing for Phase Two; or by petitioning the Subcommittee on the Communication Requirement, and receiving a grade of B or better in the subject.

The options for completing Phase Two are as follows:

- Receiving a grade of B or better for the quality of writing for a paper written in a cooperative writing subject approved by a student’s major department. These cooperative engineering and science subjects...
Bachelor of Science Degree Requirements¹

General Institute Requirements (GIRs) | Subjects
--- | ---
Science Requirement: | 6
- Chemistry (3.091 or 5.111 or 5.112)
- Physics (8.01 or 8.011 or 8.012 or 8.01L, and 8.02 or 8.022)
- Calculus (18.01 or 18.01A or 18.014 and 18.02 or 18.02A or 18.022 or 18.023 or 18.024)
- Biology (7.012 or 7.013 or 7.014)
- Laboratory (LAB) Requirement (12 units) | 1
- Restricted Electives in Science and Technology (REST) Requirement | 2
- Humanities, Arts, and Social Sciences Requirement | 8
  - includes 2 Communication Requirement subjects (CI-H)

Total GIR Subjects Required for SB Degree | 17

Physical Education Requirement
Freshmen entering in the summer of 2001 or later

Communication Requirement
to be satisfied by 4 subjects:
- 2 Communication-Intensive HASS subjects (CI-H)
- 2 Communication-Intensive Major subjects (CI-M)²

Undergraduates who entered prior to the summer of 2001
Writing Requirement
To be satisfied in two stages

PLUS

Departmental Program and Unrestricted Electives
The departmental program may specify some of the GIR subjects, and includes an additional 180–198³ units beyond the GIRs.

Students track their progress by checking off the subjects that count towards the 17 GIR subjects. The remaining units then count toward the additional 180–198 units beyond the General Institute Requirements. Students are allowed a minimum of 48 units of unrestricted electives.

Students schedule their programs each year within a normal load of the equivalent of 32–34 subjects, and complete all degree requirements within the equivalent of 72–94 subjects.

Notes
¹ Transfer students generally will graduate under the requirements that apply to the class they join when they enter MIT.
² Communication-Intensive Major subjects (CI-M) are designated on the degree charts in Part 2.
³ The total of 180–198 units does not include ROTC subjects, if elected.

include instruction and evaluation by Writing Program faculty and provide excellent opportunities for satisfying Phase Two.

- Receiving a grade of B or better in any one of the following advanced subjects in scientific and engineering writing: 21F.226, 21F.228, 21W.780, or other subjects specifically designated as communication-intensive for Phase Two by the Subcommittee on the Communication Requirement. The junior-senior P/D/F option may not be used with any of these subjects to fulfill Phase Two.
- Submitting a paper of 10 pages (2,500 words) or more of prose from an MIT subject or UROP activity approved by the student’s major department. This paper must be judged satisfactory by both the instructor or supervisor and by evaluators for the requirement. A paper must be submitted long before the Registration Day of the term in which a student plans to receive the SB degree. Students who wish to use this option to complete Phase Two should contact their departmental writing coordinator for specific deadlines and details.

Students may not use a senior thesis or its equivalent to satisfy Phase Two unless the paper is completed in the junior year. Information on the Writing Requirement is available on the website at http://web.mit.edu/writing/writerreq/. Students are also encouraged to discuss any questions they may have about the requirement with their departmental writing coordinator or with the director of writing across the curriculum, Dr. Leslie C. Perelman, Room 32-083, 617-253-3375.

Humanities, Arts, and Social Sciences (HASS) Requirement
MIT provides a substantial and varied program in the humanities, arts, and social sciences that forms an essential part of the education of every undergraduate. This program is intended to ensure that students develop a broad understanding of human society, its traditions, and its institutions. The requirement enables students to deepen their knowledge in a variety of cultural and disciplinary areas and encourages the development of sensibilities and skills vital to an effective and satisfying life as an individual, a professional, and a member of society.

More specifically, the objectives of the program are to develop skills in communication, both oral and written; knowledge of human cultures, past and present, and of the ways in which they have influenced one another; awareness of concepts, ideas, and systems of thought that underlie human activities; understanding of the social, political, and economic framework of different societies; and, finally, sensitivity to modes of communication and self-expression in the arts. Work in these areas will, where appropriate, display a special concern with the relation of science and technology to society.

The student’s program in the Humanities, Arts, and Social Sciences (HASS) is based on the following Institute requirement:

Minimum. Every candidate for a bachelor’s degree must have completed a minimum of eight term subjects (of at least 9 units each) in the humanities, arts, and social sciences. For students entering MIT in the summer of 2001 or later, two of the HASS subjects that are designated Communication Intensive may be used toward the Communication Requirement. See the description of the Communication Requirement earlier in this section.
**Distribution.** Three of the eight subjects must be chosen from a specially designated list of distribution subjects in the humanities, arts, and social sciences. The three subjects may be taken at any stage of the student’s undergraduate career, although students are encouraged to complete their HASS-D Requirement by the end of their junior year. Refer to the section below on the HASS Distribution Subjects for specifics.

**Concentration.** Before the third year, each student selects a field of concentration. The requirements for concentration are set by each field and consist of either three or four subjects. An individual’s program of concentration is arranged in consultation with a designated advisor in the field. A distribution subject in a given category or field may also be counted as one of the required concentration subjects with the permission of the concentration advisor. In individual cases, a special interdisciplinary program of concentration may be arranged with the approval of an advisor designated by the Dean of the School of Humanities, Arts, and Social Sciences. This approval must be obtained ahead of time, before the desired combination of subjects has been completed.

Currently, the following fields of concentration are offered:

- American Studies
- Ancient and Medieval Studies
- Anthropology
- Archaeology and Archaeological Science
- Black Studies
- Comparative Media Studies
- East Asian Studies
- Economics
- Ethnic Studies
- Foreign Languages and Literatures
  - Chinese, ESL, French, German, Japanese, Spanish
- History
- History of Art and Architecture
- Labor in Industrial Society
- Latin American Studies
- Linguistics
- Literature
- Middle Eastern Studies
- Music
- Philosophy
- Political Science
- Psychology
- Religious Studies
- Russian Studies
- Studies in International Literature and Cultures (SILC)
- Science, Technology, and Society (STS)
- Theater Arts
- Urban Studies
- Visual Arts and Design
- Women’s Studies
- Writing

Students interested in exploring or registering for a field of concentration should speak with an advisor designated by that field.

**HASS Information.** For detailed information on distribution subjects and on the concentration requirements in any field, and for assistance with any aspect of the Humanities, Arts, and Social Sciences Requirement, visit the HASS Education Office, Room 14N-408, 617-253-4441, or check the HASS Education Office home page at [http://web.mit.edu/hass/www/](http://web.mit.edu/hass/www/).

**HASS Distribution Subjects**

Humanities, Arts, and Social Sciences Distribution (HASS-D) subjects are humanistic in orientation and of broad general interest, with a subject matter clearly drawn from one or more of the disciplines in the humanities, arts, and social sciences. Such subjects meet in sections small enough to allow discussions in which every student can participate, and—except for some art and music composition subjects—call for a substantial amount of writing.

Almost all distribution subjects are without prerequisites and are appropriate for students at all levels. Students are encouraged, though not required, to take one or two distribution subjects in their freshman year, in order to begin satisfying the Institute requirement and to sample offerings in different fields.

Students are free to take more than the necessary minimum of three distribution subjects; those taken in excess of the minimum may be used as electives toward completion of the eight-subject requirement or in some cases, with the approval of the relevant field advisor, may be accepted as part of a program of concentration. Note, however, that in no case may more than one subject in a given category be counted toward distribution.

The Humanities, Arts, and Social Sciences Distribution (HASS-D) Requirement was introduced in 1988 to provide increased intellectual structure and cohesion. The HASS-D Requirement is meant to complement the General Institute Requirement in Science, emphasizing modes of inquiry and discourse that are qualitative and contextual. HASS-D subjects aim to develop substantive knowledge and analytical skills. They are to have a broad intellectual range and include a generous view of the alternative and competing assumptions, perspectives, and intellectual tendencies in the field. They are to incorporate, where appropriate, materials and insights drawn from the full range of contemporary scholarship, including that on women, minorities, and nonwestern cultures.

**HASS-Distribution Requirement**

Undergraduates must take three HASS-D subjects from three different categories listed below. Each category consists of subjects that are appropriate for students who may never take another subject in that area of learning, and the five categories together offer a range of choices suited to the different interests, abilities, and preparations of MIT undergraduates.

**Language Option.** Because the Institute regards competence in foreign language as a fundamental value, a student may substitute one language subject at level III or IV for one HASS-D subject. The two remaining HASS-D subjects may be taken from any two categories. A student selecting this language option may not choose a second distribution subject taught in the same foreign language.
The 2005–2006 HASS-D subjects listed by category areas are as follows:

**Category 1: Literary and Textual Studies**

This category consists of subjects devoted to the interpretation of texts, to literary traditions, and to genres.

21F.010 Introduction to European and Latin American Fiction
21F.022J International Women’s Voices [SP.461J]
21F.311 Introduction to French Culture
21F.716 Introduction to Contemporary Hispanic Literature
21L.003 Introduction to Fiction
21L.004 Major Poets
21L.006 American Literature
21L.007 After Columbus: Literature of Exploration, Exile, and Cultural Contact
21L.009 Shakespeare
21L.012 Forms of Western Narrative
21L.421 Comedy
21W.735 Writing and Reading the Essay
21W.775 Writing about Nature and Environmental Issues

**Category 2: Language, Thought, and Value**

Subjects in this category focus on the study of concepts, principles, and modes of expression basic to our efforts to understand individuals and their place in the universe.

21F.059 Paradigms of European Thought and Culture
21L.001 Foundations of Western Culture I: Homer to Dante
21L.002 Foundations of Western Culture II: Renaissance to Modernity
21L.448J Darwin and Design [21W.739J]
21W.747 Rhetoric
24.00 Problems of Philosophy
24.01 Classics of Western Philosophy
24.02 Moral Problems and the Good Life
24.04J Justice [17.03J]
24.06J Bioethics [STS.006J]
24.09 Minds and Machines
24.10J Thinking about Life: Philosophical Problems in Evolution and Development [STS.004J]
24.900 Introduction to Linguistics
SP.2H3 Ancient Philosophy and Mathematics
STS.011 American Science: Ethical Conflicts and Political Choices

**Category 3: Visual and Performing Arts**

Subjects in this category are drawn from music, the visual arts, drama and dance, and film. Some are historical and analytical; others are more directly concerned with the creation of art.

4.301 Introduction to the Visual Arts
4.601 Introduction to Art History
4.602 Modern Art and Mass Culture
4.605 Introduction to the History and Theory of Architecture
4.614 Religious Architecture and Islamic Cultures

21L.005 Introduction to Drama
21L.011 The Film Experience
21M.011 Introduction to Western Music
21M.026 Jazz
21M.030 Introduction to World Music
21M.065 Introduction to Music Composition
21M.223J Folk Music from the British Isles and North America
21M.301 Harmony and Counterpoint I
21M.611 Foundations of Theater Practice
21M.621 Theater and Cultural Diversity in the U.S.
21M.670J Traditions in American Concert Dance: Gender and Autobiography [SP.591J]

**Category 4: Cultural and Social Studies**

Subjects in this category study human societies by examining forms of social, cultural, economic, political, and religious organization and behavior.

3.986 The Human Past: Introduction to Archaeology
9.00 Introduction to Psychology
11.002J Fundamentals of Public Policy [17.30J]
11.020 Poverty, Public Policy, and Controversy
14.63 The American Labor Force in a Changing Economy
14.72 Capitalism and Its Critics
17.20 Introduction to the American Political Process
17.32 Environmental Politics and Policy
17.40 American Foreign Policy: Past, Present, Future
17.42 Causes and Prevention of War
17.50 Introduction to Comparative Politics
17.52 Ethnic Identity Politics and Democracy
17.55J Introduction to Latin American Studies [21A.224J, 21F.084J]
21A.100 Introduction to Anthropology
21A.109 Understanding Culture
21F.043J Introduction to Asian American Studies: Literature, Culture, and Historical Experience [21H.150J]
21F.064 Introduction to Japanese Culture
21L.015 Introduction to Media Studies
21W.784 Becoming Digital: Writing about Media Change
SP.401 Introduction to Women’s and Gender Studies
SP.409 Women and Global Activism in Art, Media, and Politics

**Category 5: Historical Studies**

Subjects in this category study the development of people, institutions, or countries over a considerable period of time.

21A.441 The Conquest of America
21H.102 American History Since 1865
21H.105 American Classics
21H.301 The Ancient World: Greece
21H.302 The Ancient World: Rome
21H.416J Medieval Economic History in Comparative Perspective [14.70J]
Restricted Electives in Science and Technology (REST) Requirement

Through Restricted Electives in Science and Technology (REST) Requirement subjects, students can broaden and deepen the educational foundation in basic science begun in the first-year program and further the understanding of scientific inquiry. These subjects are designed to give students the opportunity to proceed further in areas already studied, or to explore other areas of potential interest.

REST subjects vary in approach and emphasis. Some give a systematic introduction to the fundamental concepts and principles of a field; others illustrate through examples some of the attitudes, concerns, and methods that characterize professional work in the field. In general, REST subjects are not too specialized, too advanced, or devoted chiefly to instruction in a particular skill. Students typically take REST subjects in the second year, although-with the proper prerequisites—they may begin taking them in the first year.

Students meet the REST Requirement by taking two subjects from the list below. Of the subjects used to fulfill the requirement, the student can take no more than one in his or her department. However, subjects designated with a J that are offered jointly with another department do not fall under the departmental limitation.

In many cases, subjects required by a Departmental Program for the SB degree are also on the lists of REST and Laboratory Requirement subjects. Thus, students who follow a particular Departmental Program may simultaneously satisfy some part of these requirements.

Refer to Subject Credits and Designations in the section on Academic Regulations in Part 1 for information on Credit hours (units) assigned to each subject.

REST Requirement Subjects

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>Introduction to Computers and Engineering Problem Solving</td>
</tr>
<tr>
<td>1.018J</td>
<td>Ecology I: The Earth System (2.30J)</td>
</tr>
<tr>
<td>1.050</td>
<td>Engineering Mechanics</td>
</tr>
<tr>
<td>2.001</td>
<td>Mechanics and Materials I</td>
</tr>
<tr>
<td>2.003</td>
<td>Modeling Dynamics and Control I</td>
</tr>
<tr>
<td>2.005</td>
<td>Thermal-Fluids Engineering I</td>
</tr>
<tr>
<td>2.011</td>
<td>Introduction to Ocean Science and Engineering (13.00)</td>
</tr>
<tr>
<td>3.012</td>
<td>Fundamentals of Materials Science and Engineering</td>
</tr>
<tr>
<td>3.046</td>
<td>Thermodynamics of Materials</td>
</tr>
<tr>
<td>4.440</td>
<td>Basic Structural Design</td>
</tr>
<tr>
<td>5.07</td>
<td>Biological Chemistry</td>
</tr>
<tr>
<td>5.12</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>5.60</td>
<td>Thermodynamics and Kinetics</td>
</tr>
<tr>
<td>5.601</td>
<td>Thermodynamics of Biomolecular Systems</td>
</tr>
<tr>
<td>5.61</td>
<td>Physical Chemistry</td>
</tr>
<tr>
<td>6.001</td>
<td>Structure and Interpretation of Computer Programs</td>
</tr>
<tr>
<td>6.002</td>
<td>Circuits and Electronics</td>
</tr>
<tr>
<td>6.041</td>
<td>Probabilistic Systems Analysis</td>
</tr>
<tr>
<td>6.071</td>
<td>Introduction to Electronics</td>
</tr>
<tr>
<td>7.03</td>
<td>Genetics</td>
</tr>
</tbody>
</table>
Part 1

Undergraduate Education

7.05 General Biochemistry
8.03 Physics III
8.04 Quantum Physics I
8.20 Introduction to Special Relativity
8.282J Introduction to Astronomy [12.402J]
8.286 The Early Universe
9.01 Introduction to Neuroscience
10.301 Fluid Mechanics
12.001 Introduction to Geology
12.002 Physics and Chemistry of the Terrestrial Planets
12.003 Physics of the Atmosphere and Ocean
12.004 Introduction to Planetary Science
12.102 Environmental Earth Science
12.400 The Solar System
14.30 Introduction to Statistical Method in Economics
16.01 Unified Engineering I [16.010]
18.03 Differential Equations
18.034 Differential Equations
18.05 Introduction to Probability and Statistics
18.06 Linear Algebra
18.700 Linear Algebra
22.00 Introduction to Modeling and Simulation
22.01 Introduction to Ionizing Radiation
22.02 Introduction to Applied Nuclear Physics
BE.110 Thermodynamics of Biomolecular Systems [2.722]
BE.111 Thermodynamics and Kinetics

Laboratory Requirement

The Laboratory Requirement (one subject of 12 units or two subjects of 6 units) is met by enrolling in subjects designed for this purpose, and normally is fulfilled in the first two years. The available subjects are listed below.

A typical laboratory subject offers the student an opportunity to set up and carry out experiments dealing with phenomena of the natural world. Under faculty supervision, the student plays a substantial role in planning the design of the experiment, selecting the measurement technique, and determining the procedure to be used for validation of the data. Hypotheses are formulated and then tested by comparing them with the results of the experiments. The student then compares and discusses the experimental results in terms of the current state of knowledge and prepares progress reports and final reports of the work.

The laboratory subjects call for a major commitment of the student's attention to one or more experimental problems, exercising the same type of initiative and resourcefulness as a professional would in similar circumstances. If the subject is more than 12 units, 12 units will be used to meet the Laboratory Requirement and the additional units will be counted as elective units.

Laboratory Requirement Subjects

1.101 Introduction to Civil and Environmental Engineering Design I
1.102 Introduction to Civil and Environmental Engineering Design II
1.103 Civil Engineering Materials Laboratory (1-2-3)
1.105 Solid Mechanics Laboratory (0-3-3)
1.106 Environmental Fluid Transport Processes and Hydrology Laboratory (0-4-2)
1.107 Environmental Chemistry and Biology Laboratory (0-4-2)
2.008 Design and Manufacturing II (3-5-4) [gives 6 units of laboratory credit]
2.019 Design of Ocean Systems (2-4-6) [13.018] [gives 6 units of laboratory credit]
2.671 Measurement and Instrumentation (2-3-7) [gives 6 units of laboratory credit]
2.672 Project Laboratory (1-3-2)
2.673 Materials Laboratory (1-4-7)
4.411 Building Technology Laboratory (2-4-6)
5.310 Laboratory Chemistry (2-8-2)
5.311 Introductory Chemical Experimentation (2-4-6)
6.101 Introductory Analog Electronics Laboratory (2-9-1)
6.111 Introductory Digital Systems Laboratory (3-7-2)
6.115 Microcomputer Project Laboratory (3-6-3)
6.121J Bioelectronics Project Laboratory (2-8-2) [HST.575J]
6.131 Power Electronics Laboratory (3-6-3)
6.151 Semiconductor Devices Project Laboratory (0-12-0)
6.161 Modern Optics Project Laboratory (3-6-3)
6.163 Strobe Project Laboratory (2-8-2)
6.182 Psychoacoustics Project Laboratory (3-6-3)
7.02 Introduction to Experimental Biology and Communications (2-8-2)
8.13 Experimental Physics I (0-6-12)
8.14 Experimental Physics II (0-6-12)
9.02 Brain Laboratory (1-5-6)
9.12 Experimental Molecular Biology (2-4-6)
9.50 Research in Brain and Cognitive Sciences (2-8-2)
9.63 Laboratory in Cognitive Science (3-6-3)
10.467 Polymer Science Laboratory (2-7-6)
10.702 Introduction to Experimental Biology and Communication (4-8-6)
11.188 Urban Planning and Social Science Laboratory (3-6-3)
12.105 Experimental Investigations of the Charles River (3-3-6)
12.115 Field Geology II (0-18-0)
12.119 Analytical Techniques for Studying Environmental and Geologic Samples (2-6-4)
Physical Education Requirement

The mission of the Physical Education Program is to provide learners with the instruction and skills necessary to lead healthy, active lifestyles and to foster both personal growth and a sense of community through physical activity. The program is designed to enable students to engage in physical activity while they are involved in rigorous academic study. Major emphasis is placed on the development of skills that can be used for lifetime fitness and wellness. Students receive a strong background in the fundamentals of the activity selected. Instruction is offered in fitness/wellness, individual and team sports, martial arts, dance, aquatics, and outdoor adventure activities. Information on classes, including descriptions of current offerings, is available on the web at http://web.mit.edu/athletics/www/physed.html.

To satisfy the Physical Education Requirement undergraduates must take four physical education classes (for eight points) or participate in equivalent activities, and pass a swimming test or complete a beginning swimming class. In addition to taking classes, students may earn physical education credit in the following ways.

- Varsity sports: Four points are awarded to players in their major season of competition.
- Advanced credit examinations: Two points are awarded for each exam passed up to a maximum of four points. Examinations are offered in many different activities, including a physical fitness test. Most exams involve a written and practical portion and are administered by appointment only. Students are encouraged to take advanced credit exams prior to their sophomore year.
- ROTC Programs (Air Force, Army, Navy): Two points are awarded per year of ROTC participation up to a maximum of four units.

New undergraduates are strongly encouraged to complete the swim test during Orientation or register for a swim class during first quarter. Physical education classes are offered in two six-week quarters during the fall term and during the spring term. A fifth “quarter” is offered during the January Independent Activities Period. Two points are awarded for each class per quarter. Students who enter as freshmen are required to complete eight points (four classes). They are urged to complete four points (two classes) as freshmen. Transfer students need to complete four points (two classes), as well as the swimming requirement. A student may repeat a class at any level and receive credit for the class.

Physical education registration is open to the entire MIT community. Registration is conducted online at http://web.mit.edu/athletics/www/physed.html. Information on registration can be obtained through WebSIS at http://student.mit.edu/. Registration dates are posted in the Institute Calendar.

Physical education classes offered last year included Aerobics (Body Sculpting, Bootcamp Workout, Cardio Kickboxing, Kickboxing Interval Training, Hi/Lo, Pilates, Step), Archery, Badminton, Basketball, Boxing, Dance (Ballet/Modern, Choreography, Square, Folk, Tap), Fencing, Field Hockey (Indoor), Figure Skating, Fitness Programming, Golf, Gymnastics, Ice Hockey, Lacrosse, Martial Arts (Aikido, Jiu-Jitsu, Shotokan, Sport Taekwondo, Taekwon Do), Pilates, Pistol, Ropes Adventure, Sailing, Scuba, Sculling, Self Defense (Women), Skating, Skiing/Snowboarding, Soccer (Indoor and outdoor), Squash, Table Tennis, Tennis, Volleyball, Water Aerobics, Weight Training, and Yoga.

Students must supply appropriate attire for activity classes. Please consult with the instructor for guidelines in selecting appropriate attire. Most classes supply all necessary equipment. Students must supply skates and sticks for ice hockey classes, and rackets for tennis classes. Undergraduate and graduate students may use their MIT ID card to gain entrance to all athletics facilities at no additional charge.

All faculty, staff, employees, and alumni who use athletics facilities for physical education, intramurals, intercollegiate sports, club programs, or any form of general recreation are required to purchase an athletics membership. Purchase of the membership allows the user to gain access to all athletics facilities with an MIT ID card.

For further information contact the Physical Education Office, Room W35-297X, 617-253-4291, or visit the website at http://web.mit.edu/athletics/www/physed.html.

Academic and Research Options

Independent Activities Period

Independent Activities Period (IAP) is a four-week period in January during which faculty and students are freed from the rigors of regularly scheduled classes for flexible teaching and learning and for independent study and research. IAP is part of the academic program of the Institute—the “1” month in MIT’s “4-1-4” academic calendar. Students are encouraged to explore the educational resources of the Institute by taking specially designed subjects, arranging individual projects with faculty members, or organizing and participating in IAP activities. They may also pursue interests independently either on or off campus.
Departmental programs may require students to complete a subject (of no more than 12 units) during one IAP.

**Activities**

More than 600 activities are offered each year on a wide range of topics, both academic and nonacademic. In addition, “special topic” subjects exist in most departments, for which students can arrange credit for individual work.

Many IAP activities, both credit and noncredit, are organized each fall. They are advertised, beginning in October, on the IAP website at http://web.mit.edu/iap/.

**Organizing Activities**

Nonacademic activities may be organized or attended by members of the MIT Community: faculty, students, and employees. Tips on organizing an IAP activity are available on the web at http://web.mit.edu/iap/. Organizers may approach MIT departments and organizations to help defray expenses.

Students find organizing IAP activities a rewarding challenge. For many, it is their first opportunity to develop and teach a program from their own ideas. In doing so, they acquire organizational and leadership skills that prove invaluable to their careers.

**Tuition, Room, and Board**

Full-time students paying full tuition in either the fall or spring term do not have to pay additional tuition or room fees to the Institute during IAP. The meal plan spans the entire academic year and includes IAP.

**Academic Credit and Grades**

Students should follow directions published on MIT’s IAP website at http://web.mit.edu/iap/ regarding registration for subjects. In addition to the organized subjects, students may make arrangements to earn credit for independent work under faculty supervision. The total credits a student can earn during IAP is limited to 12 credit hours. Credits received by freshmen during IAP are not counted toward their credit limits for the spring or fall term.

All credit-bearing subjects during IAP are to be graded following the grading system approved for that subject number. A subject may be graded P/D/F during IAP only if it has been approved with P/D/F grading. Similarly, the number of units awarded must be as specified for that subject. Faculty sometimes offer newly organized credit activities under special problem subject numbers for which credits are “to be arranged.”

For students to receive credit for work done in IAP, grades must be submitted to the Registrar’s Office by the deadline at the end of IAP given in the academic calendar. If a grade is received after the Add Date of the succeeding term and the student did not register in the subject during IAP, the student must petition in order to receive credit. IAP credit will not be given if the grade is received after the end of the succeeding spring term.

Students may view their IAP grades on WebSIS shortly after the start of the spring term. Students who do not receive grades when expected should check promptly with their instructors or the Registrar’s Office to ensure the grades are submitted and recorded.

**Special Students**

Applications for special student status solely for IAP will not be accepted. Special students admitted to the fall or spring term do not automatically have IAP privileges. Those admitted by the Dean of Admissions must consult the Admissions Office concerning their status during IAP. Former students reenrolled as special students by the Committee on Academic Performance (CAP) or the Student Support Services (S³) section of the Division of Student Life must consult the appropriate office for permission to participate in IAP. If the special student has paid full tuition during the first term or is admitted to do so in the second, there will not be an additional tuition charge for IAP. If the student has not been paying full tuition, he or she will be charged either the minimum special student fee or the amount necessary to bring tuition for the term up to full tuition.

Special students wanting credit for IAP work should consult the Registrar’s Office, Room 5-119, 617-258-6409, if they were admitted by CAP or S³, or the Admissions Office if they were admitted by the director of admissions.

**Wellesley Cross-Registration**

The Institute’s regular cross-registration with Wellesley College remains in effect during IAP. MIT students are encouraged to take advantage of their flexible schedules during IAP to participate in Wellesley’s winter session.

There is no cross-registration with Harvard, the Massachusetts College of Art, or the School of the Museum of Fine Arts during IAP.

**Undergraduate Research Opportunities Program**

The Undergraduate Research Opportunities Program (UROP) invites undergraduates to participate with MIT faculty in a wide range of research activities in every academic department and most interdisciplinary laboratories and centers.

There are many advantages to becoming involved in such pursuits as early as possible in an undergraduate career: establishing ties to faculty; investigating a potential major; acquiring data-gathering and laboratory techniques; exploring the frontiers of a field; undertaking topics not amenable to the classroom; facing a real-world problem; and establishing a focus for educational experiences. Through UROP, students may gain a better understanding of the intellectual process of inquiry, while having the opportunity to experience personal and professional growth. Students may earn pay or academic credit, or may work on a volunteer basis. Whatever the chosen mode, all UROP work is expected to be worth academic credit.

Guidelines for participating can be found on the UROP website at http://web.mit.edu/urop/. The site lists UROP contacts for Institute departments, laboratories, and centers. While these people are prepared to assist students, a certain amount of footwork and negotiation is required to achieve a satisfying collaboration. The UROP experience is unlike any other; its benefits and rewards are great, but expectations and standards are commensurate. For advice and assistance, contact the UROP staff in the Academic Resource Center, Room 7-104, 617-253-7306, fax 617-258-8816, email urop@mit.edu.
Undergraduate Seminars and Freshman Advising Seminars

Undergraduate seminars, offered in the fall and spring terms, provide undergraduates with an opportunity to interact closely with faculty on topics of current interest. Freshman Advising Seminars are a special subset of seminars open only to first-term freshmen, in which the seminar leader is also the freshman advisor to the seminar participants. Seminars vary tremendously both in style and topic. Some are oriented around small group discussion, others have speakers, go on field trips, or engage in hands-on learning. All seminars carry six units of credit, and the class size is restricted to a small group. All seminars are graded P/D/F.

Information about undergraduate seminars, including titles and descriptions, may be found on the web at http://student.mit.edu/catalog/Undergraduate_Seminars.html. Information about Freshman Advising Seminars, including title, descriptions, and application information for incoming freshmen, can be found at http://web.mit.edu/firstyear/. These websites are maintained by the Academic Resource Center, Room 7-104, MIT, Cambridge, MA 02139-4307, 617-253-6771, email firstyear-www@mit.edu.

Edgerton Center

The Edgerton Center provides resources and opportunities for students to pursue hands-on projects, activities, and seminars. The center can provide a workplace, test equipment, access to the Student Machine Shop, or simply advice and encouragement.

The laboratory, classroom, and studio are located in Strobe Alley on the fourth floor of Building 4. For more information on using facilities, contact Jim Bales at bales@mit.edu, Tony Caloggero at acalogge@mit.edu, or Ed Moriarty at mory@mit.edu. The Student Shop (http://web.mit.edu/Edgerton/www/Shop.html) is located in Room 44-023 and offers regular training sessions; contact manager Fred Cote at fpcole@mit.edu for access and training.

Typical subjects offered include introductory electronics, digital photography, seminars for public service, and alternative energies. In addition, the strobe project laboratory (6.163) is taught each term. During IAP, staff members lead workshops teaching technical skills that many students find useful for UROP projects. A listing of the subjects offered can be found at http://web.mit.edu/Edgerton/www/Courses.html.

The Edgerton Center is the joint sponsor for the Service Learning Initiative at MIT with the Public Service Center, bringing community service projects into the academic agenda. It is also cosponsor of the IDEAS Competition, promoting innovative projects that benefit communities, both local and international. For more information about the Service Learning opportunities contact Steven Banzarta, sgtist@mit.edu, 617-253-5594. For more information on the IDEAS Competition, contact Alison Hynd at hynd@mit.edu, 617-258-0691.

D-Lab is a yearlong series of classes and field trips that begins in the fall with a class on international development and appropriate technology (SP.721). Over IAP, students travel overseas to work with local community partners in developing countries to identify projects they can work on during the spring term design seminars, including subject SP.722. For more information about D-Lab, contact Amy Smith at 617-253-5985, mmadinot@mit.edu.

The Edgerton Center Outreach Program gives MIT students an on-campus opportunity to teach engineering and science to 4th through 8th graders from area schools. Topics include Lego machines, circuits, optics and biology. Contact Amy Fitzgerald at amyfitz@mit.edu or 617-253-7931 to become involved.

The center also supports a range of hands-on student activities, including the Solar Electric Vehicle Team, the Rocket Team, Project ORCA, Formula SAE, and a variety of robotics groups. Ed Moriarty, mory@mit.edu, and Steven Banzarta, sgtist@mit.edu, are the liaisons with student teams.

In addition, Professor Harold Edgerton’s high-speed photography legacy lives on with the Strobe Alley exhibition of Edgerton photographs. Hands-on experiments in science and engineering are attractions of the corridor laboratory as well.

The center offers UROP projects for students in engineering design, high-speed video motion analysis, scientific photography and community outreach. Positions are also available for student instructors at the center throughout the year.

The faculty director of the Edgerton Center is Professor J. Kim Vandiver, MIT, Room 4-405, Cambridge, MA 02139-4307, kimv@mit.edu. For general information, contact Sandi Lipnoski in Room 4-405, 617-253-4629, slipnosk@mit.edu, or visit the website at http://web.mit.edu/edgerton/main.html.

Sophomore Exploratory Subjects

Sophomores are able to designate one subject as Exploratory in each of their fall and spring terms. An Exploratory subject is one in which the student may either accept the grade awarded in the subject or change the subject to Listener status after the end of the term. Any subject at MIT—including an Institute or departmental requirement—may be designated as Exploratory.

Exploratory subjects are offered under a five-year experiment authorized by the Committee on the Undergraduate Program through the academic year 2007–2008. The goals of the experiment are: to ease the transition into the sophomore year by creating a flexible grading option; to encourage academic exploration in the sophomore year just as the grading system encourages exploration in the other academic years; and to encourage sophomores to consider unconventional majors at the start of their second year.

Students should designate the Exploratory option using a special form from Registration Day through Add Date. Students who choose to drop the subject completely can do so up until Drop Date. After Drop Date and until Registration Day of the succeeding term, students may request a change in the status of an Exploratory subject from graded to listener. (Students should be aware that the status change will not be processed by the Registrar’s Office until after grades are posted for the term.)

The Committee on Academic Performance will not consider petitions from students to add the Exploratory status after Add Date or to reinstate the grade and credit once a student has forfeited them.

Students and advisors are cautioned to check that a forfeiture of units does not affect the student’s status for financial aid, immigration, or varsity sports eligibility.
Junior-Senior P/D/F Option
A student may opt to take a total of two subjects to be graded P, D, or F during his or her junior and senior years, where P indicates C or better performance (C- with modifier used within MIT). This option is intended to provide students with an opportunity to broaden their education by taking subjects that may not be in their area of expertise without concern for the effect on their academic record. Although this option should be designated when the student initially registers for the subject, the deadline for this decision is Add Date. Such subjects may not be used to fulfill General Institute, departmental, or minor requirements. Students receive credit for P-level and D-level performance.

Study at Other Universities
There are a number of opportunities for MIT undergraduates to study at other universities, including both programs for a term or year away as well as cross-registration programs with local universities. Students who spend a term or a year studying abroad or at another US university find that in addition to the intellectual benefit, they are enriched by day-to-day exposure to different cultural and social experiences. Through the cross-registration programs students can take subjects not offered at MIT or explore institutions emphasizing other curricula while continuing their studies at MIT.

Year or Term Away Programs
Cambridge–MIT Undergraduate Student Exchange Program
In 2004–2005, the undergraduate exchange program between MIT and the University of Cambridge in England celebrated its fourth full year. Students from 12 MIT departments are spending their junior year studying and living as members of the Cambridge University community.

Founded in 1209, Cambridge University consists of 31 self-governing colleges where students live and study in a supportive and personal educational environment. Lectures, laboratories, and project work are organized by the university; the colleges organize small-group sessions (“supervisions”) designed to complement the lectures. As well as teaching, research is of major importance at Cambridge; since the beginning of the 20th century, more than 60 members of the University of Cambridge have won Nobel Prizes.

MIT students who study for a year at Cambridge receive sufficient transfer credit to permit normal progress toward their MIT degree. For the academic year 2005–2006, participating departments include Aeronautics and Astronautics; Biology; Brain and Cognitive Sciences; Chemical Engineering; Chemistry; Civil Engineering; Earth, Atmospheric and Planetary Sciences; Economics; Electrical Engineering; Materials Science and Engineering; Mathematics; Mechanical Engineering; and Physics.

Participation in CME does not add appreciable cost to a student’s educational expenses. MIT students pay tuition to MIT; they are billed at Cambridge for the costs of board and housing only.

Interested students should discuss their plans with their advisors as early as possible. For further information, students should contact Dean Peggy Enders, 617-253-3561, peggy@mit.edu, or their department undergraduate officers. Information is available at http://web.mit.edu/cmi/ue/ as well.

Departmental Exchange Programs
The Department of Aeronautics and Astronautics offers study at several European schools, while the Department of Architecture has an exchange program with Delft University of Technology in the Netherlands. For more information see the descriptions of these undergraduate programs in Part 2.

Study Abroad
MIT students may also apply directly to foreign institutions for admissions or to a study abroad program administered by another US institution. Plans for study abroad should be worked out by each student with his or her faculty advisor and an MIT study abroad advisor. Although it is most common to study abroad during the junior year, it is possible to study abroad in the sophomore or junior year or during a summer.

A student on an approved study abroad program pays tuition to the outside institution rather than to MIT. Such a student is officially registered as an Undergraduate on Foreign Study. The cost of studying abroad for a term is often less than the cost of a term at MIT.

Numerous institutions offer programs abroad taught in English. It is possible to study in a foreign country without prior knowledge of the host country’s language. However, a working command of the language can add greatly to the overseas experience. Even a student without prior skills can achieve some proficiency in a foreign language by the beginning of the junior year if he or she begins study by spring term of freshman year.

Students who successfully complete an approved program of study abroad may receive transfer credit toward their MIT degree. By the end of the 11th week (Drop Date) of the term in which they return, students must submit complete documentation for transfer credit to the Registrar’s Office ($40 late fee).

For further information, contact the MIT Careers Office, Room 12-170, 617-253-4733, or view the website at http://web.mit.edu/career/www/students/studyabroad.html.

Internships Abroad
In addition to study abroad programs, MIT students may gain international experience by working as interns in companies or research institutes abroad. The MIT International Science and Technology Initiatives (MISTI) offer internship opportunities in China, France, Germany, India, Italy, Japan, Mexico, and Singapore. Internships range between three months and one year. Arrangements after graduation are also possible. For more information, see the description of MISTI in the section on Interdisciplinary Research and Study in Part 1 or on the web at http://web.mit.edu/MISTI/www/.

Domestic Year Away
Students may choose to spend from one term to one year studying at another academic institution within the US. A student studying at another university pays tuition to the outside institution rather than to MIT. Such a student is officially registered as an Undergraduate on Domestic Study Away.

To qualify for Domestic Year Away status, a student must show that his or her proposed program of study draws upon resources available at
the outside institution that are not generally available at MIT, or at the institutions with which MIT has cross-registration privileges. In addition, a student’s planned program of study should be consistent with his or her overall degree program at MIT. Students must be accepted by a school of established academic merit and undertake a workload comparable to that at MIT. Plans for domestic study away should be worked out by each student with his or her faculty advisor and an MIT study abroad advisor.

Students may receive transfer credit for their studies outside MIT. By the end of the 11th week (Drop Date) of the term in which they return, students must submit complete documentation for transfer credit to the Registrar’s Office ($40 late fee).

For further information, contact the MIT Careers Office, Room 12-170, 617-253-4733, or view the website at http://web.mit.edu/career/www/students/studyabroad.html.

Cross-Registration Programs

Harvard University
MIT undergraduates are permitted to take subjects at Harvard University (except for Harvard Business School, Harvard Extension School, and Harvard Summer School) for degree credit at no extra charge. This cooperative arrangement is not applicable to the summer session or IAP. In general, MIT students take subjects at Harvard which are not offered regularly at MIT. Cross-registration is normally limited to upperclass students who must be regularly enrolled at MIT and paying full tuition for the term in question. No more than half of a student’s registration (up to a maximum of 24 units) may be taken at Harvard in any one term.

Arrangements are made through the Humanities, Arts, and Social Sciences Education Office, Room 14N-408, 617-253-4441. In most cases, students must submit a petition in order for such subjects to count toward fulfillment of the HASS Requirement. Letter grades earned in Harvard subjects appear on the transcripts of MIT undergraduates. Detailed information about the Harvard cross-registration option for undergraduates is available on the web at http://web.mit.edu/hass/www/guide/hrvdcr.html.

Wellesley College
Under the Wellesley-MIT Exchange Program, students may cross-register for any courses at the other school, if they present the necessary prerequisites. This cooperative arrangement is not applicable to the summer session. Wellesley is a small, liberal arts college for women located on a 500-acre woodland campus 20 miles west of Boston.

Through the Wellesley Education Department, MIT students may earn Massachusetts certification to teach at the elementary or high school level. This certification is recognized by many other states.

Wellesley operates free weekday bus service between the two campuses. The service is open to everyone with an MIT and Wellesley identification card, but priority will be given to cross-registered students. The ride is about 50 minutes each way.

For upperclass students, letter grades will be recorded for Wellesley subjects, unless the student designates a Wellesley subject as one of his or her two electives to be graded P, D, or F. Grades for freshmen will be converted to the MIT first year grading system.

Students generally cannot substitute Wellesley subjects for MIT Science Requirement subjects (Chemistry, Biology, Physics, and Calculus) or Laboratory Requirement subjects. They may take Wellesley subjects to satisfy Restricted Electives in Science and Technology (REST) Requirements, but need the approval of the Committee on Curricula.

Wellesley subjects may be designated as part of the Concentration for the Humanities, Arts, and Social Sciences at the discretion of the designated advisor in that field of concentration. Students may use Wellesley courses as unrestricted electives toward fulfilling the Humanities, Arts, and Social Sciences Requirement, but they must petition to do so.

Wellesley subjects may be used to fulfill departmental major and minor requirements with the permission of a faculty advisor.

Students may take physical education classes at Wellesley on a space-available basis and may apply these classes toward their MIT physical education requirements. MIT students receive full library privileges at the Wellesley College Library.

Complete details on registration procedures and programs, as well as copies of the Wellesley Bulletin and class schedules, are available in the Student Services Center, Room 339C, Green Hall, 781-283-2320 or MIT tie line 187-2320.

Massachusetts College of Art and the School of the Museum of Fine Arts
Massachusetts College of Art (MassArt), a state college, and the School of the Museum of Fine Arts (SMFA), a private school affiliated with the Museum of Fine Arts Boston and with Tufts University, are both highly respected art schools in Boston. In 1998 a cross-registration program between MIT and the two art schools was initiated. MIT undergraduates may cross-register for selected classes at MassArt and the SMFA, and in turn, students from MassArt and SMFA may cross-register for selected classes at MIT. This cooperative arrangement is not applicable to the summer session or IAP.

Popular classes at these two art schools include drawing, painting, printmaking, jewelry and filmmaking, all studio classes that are not offered for credit at MIT. MassArt and SMFA students are offered classes at MIT in the visual arts, anthropology, foreign languages, history, literature, music, theater, writing, and media studies.

Classes taken at MassArt and SMFA through the cross-registration program are graded P/D/F and may not be used to satisfy Institute, departmental, or minor requirements. They may be used toward unrestricted elective credit. Only one subject may be taken per term from either school.

Students must submit a completed cross-registration form by the deadline set by the MIT Registrar. The cross-registration form is available in the Student Services Center, Room 11-120. A list of approved subjects and detailed information are available on the web at http://web.mit.edu/vap/resources/curriculum_xreg_massart.html.


**CAREER AND PROFESSIONAL OPTIONS**

**MIT Careers Office**

The MIT Careers Office helps students learn to make informed decisions about career goals and find opportunities related to their professional objectives. Students are encouraged to begin their career education early, including visiting the website to register with the office during freshman year, and to learn what career resources are available.

The goal of career services is to help students become self-managed learners. Career development at MIT is an ongoing process that includes: self-assessment, competency development, research into career options, experiential learning, and preparation for the job search or for the graduate/professional school application process.

The Careers Office helps students learn about:

- the relationship between what they are doing at MIT and life after graduation
- career options in relation to choice of major
- competencies required beyond their technical knowledge to succeed in the competitive global marketplace, and contribute to society
- networking, informational interviewing, mentoring, internships, summer jobs, and other opportunities to gain experience in fields of interest
- applying to medical, law, or other graduate/professional school
- internships, study abroad, and other experiential learning
- writing a resume and conducting interviews
- finding employment after graduation

Career development programs include individual and group career counseling, workshops, and seminars on a variety of topics.

An employment recruiting program provides students with opportunities for internships, summer jobs, and full-time positions after graduation. Hundreds of employers recruit students through a password-protected database at [http://www.jobtrak.com/](http://www.jobtrak.com/), and on-campus recruiting visits.

Many employers also host presentations and seminars to discuss employment prospects and find out about careers at different organizations.

For further information, contact the MIT Careers Office, Room 12-170, 617-253-4733, fax 617-253-8457, or visit the website at [http://web.mit.edu/career/www/](http://web.mit.edu/career/www/).

**Law, Medicine, and Other Health Professions**

Students interested in exploring and applying to medical, dental, and other health-related professional schools, as well as law school, are supported by the Preprofessional Advising staff in the MIT Careers Office (12-170). Students from all majors can apply to law and health-related professional schools. However, individuals interested in a health profession must fulfill certain subject requirements. Students should visit the Preprofessional Advising website at [http://web.mit.edu/career/www/preprof/](http://web.mit.edu/career/www/preprof/) to get information on admissions criteria, application process, advisor assignment process, and services provided. As with most aspects of career planning, it is never too early to take the first steps.

**Teacher Training and Education**

Options for MIT students interested in teaching elementary or secondary school range from exploratory activities such as tutoring and UROP activities to formal certification programs.

For students who wish to explore teaching as a career (in the short or long term), the MIT/Wellesley Teacher Education Program (TEP), which is housed in the Department of Urban Studies and Planning, provides the requirements for Massachusetts State Teacher Certification in math and science at the middle and high school levels. Courses offered through the TEP are also useful for students preparing to teach at the college level, as well as those who wish to apply their work to related research fields such as psychology, cognitive science, innovation in curriculum development, or educational policy-making and administration. Those going into industry find that the TEP can contribute to work in advancing educational programs, as well as work on human-computer interface and software development.

Education subjects that focus on math/science teaching at the secondary level (grades 5-12) are offered through Course 11, Urban Studies and Planning. To receive Massachusetts Teacher Certification, students must complete supervised practice teaching and additional coursework at MIT, or through Wellesley College. A HASS concentration in education is offered as part of the undergraduate curriculum in Course 11.

For additional information see the TEP home page at [http://education.mit.edu/tep/](http://education.mit.edu/tep/).

To explore K-12 teaching opportunities less formally, students may volunteer as tutors or teacher assistants in local schools, offer informal classes through the Educational Studies Program, or work with faculty members who conduct research in schools. (Refer to the UROP Directory for a list of faculty members interested in such research.) The Student Services Center, Room 11-120, and the Center for Public Service, Room 3-123, can also provide assistance.

**ROTC Programs**

Military training has existed at MIT ever since the Institute opened its doors in 1865. More than 12,000 officers have been commissioned from MIT, of whom more than 150 have reached the rank of general or admiral. Students who are United States citizens or who have applied for citizenship, are of good moral character, and are medically qualified for military service, may participate in the programs. Non-citizens who fulfill naturalization requirements for citizenship prior to graduation may enroll and participate in the four-year nonscholarship programs.

All three programs have the following characteristics in common:

- Application is voluntary.
- Admission is selective.
- All admit men and women.
- Federal law and Department of Defense regulations presently exclude from the Armed Forces people who engage in homosexual conduct.
Air Force ROTC

The Air Force ROTC program provides students the opportunity to become commissioned officers in the Air Force while completing their undergraduate or graduate degree. It is designed to develop the leadership and management skills essential for an Air Force officer while preparing the student for assignment in a career field related to his or her academic specialty. The Office of Aerospace Studies offers two programs—one of four years and one of two years—for students to qualify for commissions.

Four-Year Program

The four-year program consists of classroom and leadership laboratory work during the four years of academic study and one summer training period of four weeks between the second and third years at an Air Force Base. Students with three academic years remaining may enroll in the four-year program by combining the first two years.

The first two years of the four-year program are known as the General Military Course (GMC). Upon completion of the GMC and summer field training, students may compete for entry into the Professional Officer Course (POC). Selection into the POC is based on academic aptitude and performance, successful completion of the GMC and field training, and recommendation of the professor of aerospace studies.

Two-Year Program

The two-year program is for those students who do not complete the first two years of the four-year Air Force ROTC program. Such students may apply if they have two years remaining in their academic program at MIT. In lieu of completing the GMC, these students receive six weeks of field training at an Air Force base during the summer preceding their entry into Air Force ROTC. They receive the same benefits and complete the same academic program required of POC members in the four-year program.

Scholarships

Air Force ROTC scholarships are available on a competitive basis to qualified applicants in selected academic majors. Scholarships pay up to full tuition, include $600 per year for textbooks, and a $250–400 nontaxable allowance each month. One- to three-and-a-half year scholarships are offered on a competitive basis subject to availability of funds in addition to the four-year scholarships offered to high school seniors.

Program of Instruction

The Aerospace Studies curriculum emphasizes the history, organization, and mission of the Air Force, including its role in national defense strategy and American society. Academic classes and leadership laboratory activities provide training and practical experience in developing leadership and managerial skills.

Eligibility Requirements

To be eligible for the Air Force ROTC scholarship program and the POC, students must be citizens of the United States; physically qualified in accordance with existing Air Force regulations; and enrolled at MIT, Harvard, Tufts, or Wellesley as full-time students.

Application Procedure

Interested students can sign up for the Air Force ROTC program by visiting the Office of Aerospace Studies, Room W59-114, MIT, Cambridge, MA 02139-4309, or by calling 617-253-3755.

Army ROTC

All students at MIT, Harvard, Tufts, and Wellesley College are eligible to enroll in Army ROTC classes at MIT. Eligibility requirements for the program, which leads to a commission as a Second Lieutenant in the Active Army, Army Reserve, or Army National Guard, are listed below. Freshmen and sophomores normally enroll in the standard four-year program, while graduate students and selected undergraduates with two or more academic years remaining may apply for the Army ROTC two-year program. Successful completion of both academic and summer training requirements qualifies the student for commission upon graduation.

Although the normal pattern is for the student to progress through the military science programs sequentially, students may, on a case-by-case basis, be granted credit for military work experience or studies completed abroad under the auspices of the university.
Students completing the ROTC program will receive their commission upon graduation and go on to serve as active or reserve duty officers. The service obligation depends upon the commissioning program, scholarship status, and the needs of the service. Commissions are offered in all of the Army’s basic branches with actual branch assignment determined by the needs of the Army, the desires of the student, and the academic background and experience of the student. There is an opportunity, primarily for students going on to law or medical school, to defer the service obligation until completion of their graduate studies.

Enrollment for freshmen or sophomore students is voluntary and does not obligate the student to any type of active or reserve duty commitment. However, since a monthly stipend is paid to every junior and senior in the program, participation is acknowledged by way of a contract and subsequent service obligation.

The summer training requirement for students in the four-year program is limited to the five-week Leader Development and Assessment Course, completed between the junior and senior years. In addition to travel expenses, students at the course will receive a stipend of approximately $750.

Two-, three-, and four-year scholarships are available each year, and are awarded on campus. In general, the scholarships pay full tuition, a flat rate of $900 for books and supplies, and a stipend of $250–400 per month.

In addition to the requirements outlined above, Army Airborne, Air Assault, Northern Warfare, and other military schooling and training programs are available on a voluntary basis to qualified students. Full details on all these programs are available from the Army ROTC program.

Program of Instruction
The Army ROTC program of instruction is designed to enhance a student’s college education by providing unique leadership and management training along with practical experience. The program has three equally important aspects. The first consists of professional military subjects taught by the Department of Military Science and academic subjects taught by the Institute, for which the student receives academic credit. Military science subjects are described in the section ROTC in Part 3.

The second consists of a physical fitness regimen that establishes minimum standards which every cadet must reach prior to attending the Leader Development and Assessment Course. These required standards are for specific events: push-ups, sit-ups, and a two-mile run. (Participation in at least two years of the ROTC program satisfies one-half of the Institute’s Physical Education Requirement.)

The third aspect consists of hands-on, performance-oriented training conducted during monthly leadership laboratories, one weekend of field training exercise each term, and the five-week summer camp near Seattle, WA. The purpose of this integrated approach to Army ROTC is to develop officers skilled not only in the pragmatics of military science, but in related human and social skills as well.

Eligibility Criteria
The traditional four-year Army ROTC Program offered at MIT is divided into two parts: the basic course and the advanced course. The basic course is usually taken during the first two years of college. Any student attending MIT full time may participate in the basic course. The advanced course is taken during the final two years of college. Students who have completed the basic course or have been granted credit for equivalent study, and who have demonstrated the potential to become Army officers, and who are otherwise eligible, are offered the opportunity to contract into the advanced course.

Application Procedure
Application for the four-year program normally begins by enrollment in MS.101 Introduction to ROTC and the Army. Students enroll in this subject during the regular registration period at MIT. Students interested in the two-year program should apply through the Army ROTC program. Further details may be obtained at Building W59, MIT, Cambridge, MA 02139-4307, 617-253-4471. The director of the program is Lieutenant Colonel Brian L. Baker, Corps of Engineers, visiting professor of military science.

Naval ROTC
The purpose of the Naval ROTC program is to provide instruction and training in naval science subjects which, when coupled with a bachelor’s degree, qualify selected students for commissions in the US Navy. Primary officer program options available include aviation, submarines, surface warfare, and the Marine Corps.

The Naval ROTC unit at MIT offers two officer development programs: the Scholarship Program and the College Program. The Scholarship Program provides full tuition, certain fees, use of books and uniforms, and $250 per month for two, three, or four years. All scholarship students incur an active duty obligation of four or more years. Students in the College Program for two, three, or four years receive naval science books and all uniforms in addition to $250 per month during the last two academic years. Students in this program must complete one summer cruise after their junior year and incur a three-year active duty obligation. Each year many of the top College Program students receive scholarships for their remaining years in school.

Harvard and Tufts students are eligible for both the Scholarship and College Programs.

Upon completion of the program and receipt of a baccalaureate degree, graduates are commissioned as Ensigns or Second Lieutenants in the Navy or Marine Corps Reserve. Newly commissioned officers report directly to active duty within one year of commissioning (generally within a few months). Upon completion of the active duty obligation, the officer may be released to inactive duty, but must remain in the reserves for a total of eight years from the date of original commissioning.

Program of Instruction
The Naval ROTC program of instruction encompasses the science of nautical matters and principles of leadership and management, all vital to being a naval officer. The program has three interacting and equally important aspects. The first aspect consists of the professional academic subjects taught by the Department of Naval Science, and the second aspect consists of the academic subjects taught by the Institute. In addition to recommended coursework, one year of calculus, physics, English, and one term of
American military history or national security policy, and computer science are required. The third aspect consists of the professional training gained from leadership laboratories (two hours a week throughout the school year), tours conducted to local naval facilities, cruises aboard ship, and practical navigation and piloting practice conducted aboard training craft.

Between academic years, midshipmen attend a month of summer training aboard ship and at shore bases to become familiar with Navy and Marine Corps procedures. One two-hour or three-hour naval science subject is required each term. Several of these are presented in conjunction with MIT professors and carry academic credit.

Eligibility Requirements
To be eligible for the four-year Naval ROTC program, an entering student must be a citizen of the United States, at least 17 years of age, and physically qualified.

Application Procedure
Further information can be obtained from the Commanding Officer, NROTC and Naval Administrative Unit, Room W59-110, MIT, Cambridge, MA 02139-4307, at any US Navy Recruiting Station, or the web at http://navyrotc.mit.edu/.

ADMISSIONS

Freshman Admissions

Secondary School Preparation
The majority of undergraduate men and women enter MIT as members of the freshman class, directly following completion of secondary school studies. MIT expects that its applicants will have enrolled in a broad, rigorous program in high school. Applicants should be able to read with intelligence and sensitivity and to express ideas clearly in spoken and written form. In mathematics, emphasis should be on mastery of fundamental principles, operations, and definitions, and on preparation for the study of calculus. Work in the sciences should stress basic concepts and quantitative understanding, both in the classroom and in the laboratory. Ideal preparation for MIT includes English (four years), history and social studies (two or more years), mathematics (four years, including a strong preparation in algebra, plane geometry, trigonometry, and calculus), sciences (four years, preferably including general science, biology, chemistry, and physics), and a foreign language. However, interested students whose high school program does not match this curriculum in every detail are also invited to apply.

Application Procedures
Applicants are encouraged to visit MIT’s website at http://admissions.mit.edu/ or to write for information during their junior year. Candidates in their last year of high school must complete the application process by January 1 of the year of intended entrance. Early Action (available to citizens and permanent residents of the United States only) has a November 1 deadline. There is a $65 application fee.

Personal Conferences
MIT highly recommends that applicants interview with a member of the MIT Educational Council. Council members are MIT graduates who have volunteered to interview for the Office of Admissions. Each applicant will be referred to a member of the council near the applicant’s home. This conference must take place before December 15 of the year prior to entrance (before November 1 for Early Action applicants).

Campus Tours
Prospective applicants and their families are welcome to visit the Admissions Office Monday through Friday between 9 am and 5 pm. Student-guided tours of the campus are offered year-round each weekday (except holidays) at 10:45 am and 2:45 pm, departing from Lobby 7. From April through November, the tours are directly preceded by a group information session (10:00 am and 2:00 pm) in Room 10-100.

Project Interphase
Project Interphase is a rigorous seven-and-a-half week residential, academic enrichment, confidence- and community-building program for admitted freshmen who will benefit from support in their transition to MIT. The program emphasizes accelerated adjustment to the rigorous MIT environment and has a dual focus: academic excellence, and the development of social and institutional networks and skills. It also provides academic support in order to enhance matriculation and promote higher retention and greater excellence among participants. Project Interphase builds in students the skills necessary to achieve success in the study and fields of science and engineering, and promotes the importance to our nation of underrepresented minorities (African American, Mexican American, Hispanic/Latino and Native American) successfully pursuing higher education and careers in these fields. Individuals of all races and national origins are encouraged to apply.

For more information, write to the Office of Minority Education, MIT, Room 4-113, 77 Massachusetts Avenue, Cambridge, MA 02139-4307.

Deferred Admissions
Occasionally, students may wish to take a year off between secondary school and college. In such cases, it is recommended that the student follow normal admissions procedures, as if going directly on to college, and then request deferment. Deferrals are granted for any reason except full-time enrollment at another university.

Advanced Placement
MIT has always encouraged students to move ahead academically according to their capabilities. There are four procedures by which students entering from secondary schools may receive credit and/or placement: the College Board Advanced Placement Program; GCE/GCSE A-levels, the International Baccalaureate, and other foreign exams; college transcript; and Advanced Standing Examination at MIT.

Students who take college-level subjects offered in their schools in cooperation with the College Board Advanced Placement Program should take the appropriate examinations administered by the board each year in May and instruct the board to send the scores to MIT. Degree credit...
for MIT subjects and, where appropriate, advanced placement, is given on the basis of a high achievement on the tests (in most cases a score of 5). A score of 5 on humanities, arts, and social sciences tests recognized by MIT will enable students to receive credit (9 units) applicable to the unrestricted elective requirements only. This credit does not reduce the General Institute Requirements of eight one-term subjects in the areas of Humanities, Arts, and Social Sciences.

In some secondary schools, selected students take college-level subjects at a local college. Such students may submit an official transcript from the college showing subjects taken and grades earned in order to receive MIT credit under the regular college transfer procedures.

Students will be notified about the credit offered before registration.

### Entrance Examinations

All candidates are required to complete one of the following testing options:

- **Option 1** for native English speakers: the SAT I (old or new) or the ACT (with or without writing component), and three SAT II Subject Tests (one in biology, chemistry, or physics; one in math level Ic or math level IIc; and one in a subject of the applicant’s choosing).

- **Option 2** for non-native English speakers: the TOEFL (Test of English as a Foreign Language) and two SAT II Subject Tests (one in biology, chemistry, or physics; and one in math level Ic or math level IIc).

The last acceptable testing date for freshman admission to the Class of 2010 is the December 2005 testing date. January 2006 tests will be accepted on a case-by-case basis. Note that the closing dates for registration are usually four to six weeks (five to seven weeks outside the United States) before the testing date. Students should request that the testing agency send all scores directly to MIT (code 3514 for the SAT; code 1858 for the ACT).

These examinations are offered throughout the world. The test dates, locations, and fees for the SAT I and SAT II Subject Tests are outlined in an information bulletin that may be obtained from most guidance offices or by writing directly to the College Board, 45 Columbus Avenue, New York, NY 10023. Information about the TOEFL can be obtained from the same address. Information about the ACT may be obtained by writing to ACT, 500 ACT Drive, P.O. Box 168, Iowa City, IA 52243.

### Personal Conferences

Applicants will receive instructions about arranging a personal conference (interview) with a local MIT alumnus or alumna if there is availability in the area.

### Early Action

**Early action is available only to citizens and permanent residents of the United States.**

MIT requires a complete set of application materials before considering a candidate for admission. A student who takes all the required tests by the November test date, and files all of the application material no later than November 1 may request the Committee on Admissions to review the application by mid-December. At that time the committee may offer admission, deny admission, or defer the decision. Deferred applications are reconsidered without prejudice in March. A student who seeks early consideration in this way is free to file applications at other colleges and, if offered admission at MIT, is not required to reply to the Institute before the candidates’ reply date of May 1.

### International Undergraduate Admissions

The MIT undergraduate student body includes citizens from all over the world. A faculty-imposed quota limits international undergraduates to eight percent of the undergraduate student body. Students are encouraged to plan on completing the Higher School Certificate, the General Certificate of Education/General Certificate of Secondary Education at the Advanced Level, the Baccalaureate, the Maturite, or the Abitur, even though decisions on admission to MIT are made in March, prior to the time when most exams are normally taken.

### Application Procedures

Students should visit [http://admissions.mit.edu/](http://admissions.mit.edu/) or write to the Office of Admissions at least one year before they plan to enter MIT for information about application procedures. The Admissions Office sends application materials in the summer of the year prior to proposed entry. All documents must be completed in English or accompanied by attested translations of the original into English. In order to receive consideration, the final application must be completed and returned by January 1, and the required tests (including, if appropriate, the Test of English as a Foreign Language, TOEFL) must be taken on or by the December test date. All students are urged to register for the tests at least six to eight weeks in advance of the testing date.

### Facility in English

Lectures, laboratory sessions, and written or oral examinations at MIT are conducted in English.

### Entrance Examinations for International Applicants

The required tests are listed in the section Entrance Examinations.

### College Transfer Admissions

Students who have completed a minimum of one year and a maximum of two and one-half years may be considered for transfer admission.

A transfer student’s eligibility for admission will be determined by the Committee on Admissions after a review of his or her record. The Admissions Office welcomes inquiry from all transfer applicants.

A student contemplating transfer to MIT should plan a program of studies to include as many as possible of the mathematics, physics, biology, chemistry, and humanities, arts, and social sciences subjects as are included in the typical first two years of MIT.

Testing requirements for transfer students are the same as those for freshman applicants, listed in the section Entrance Examinations.
Transfer applicants from foreign countries are admitted only for September entrance. Admitted and enrolling transfer students are required to complete at least three terms at MIT in order to earn a degree.

**Application Procedures**

Applicants must submit the following documents:

- A completed application for transfer admission with a nonreturnable fee of $65. Final applications should be submitted by March 15 for entry in September and by November 15 for entry in February.
- A certified transcript of the college record to date.
- Catalogue pages describing all subjects that will have been completed. Applicants should have completed (or plan to complete before entry) two terms of calculus, two terms of physics, and one term each of biology and chemistry.
- Three evaluation reports, including two from faculty instructors and one from the dean of students or the applicant’s chief faculty advisor.
- A report from the secondary school attended. The report should be made on the form provided with the final application and should be sent directly from the secondary school to the Admissions Office.
- Standardized test reports.

Applicants will be informed of decisions six to eight weeks after the application deadlines. In some cases, action may be deferred until final grades are available.

**Financial Aid**

Information on financial aid is included with final application forms.

**Advanced Credit**

Students admitted by transfer may receive credit for subjects of study completed elsewhere (with a grade of C or higher) that are substantially equivalent to corresponding Institute subjects.

**Special Student Admissions**

The Institute can accept a limited number of undergraduates who wish to undertake special studies and who are not degree candidates at MIT, but who have had at least one year of study at another college or university. The students enroll as special students; they enjoy most of the privileges of the regular student but are not eligible for campus housing or financial assistance from MIT. Students wishing to apply for special student status should discuss eligibility with a member of the Admissions staff.

Special student status is granted for one term only, and a new application for this status is required for any successive terms. Admission as a special student does not carry any implication for other applications. Applicants must present academic credentials of high quality or evidence of professional experience relevant to the proposed program. Admission is subject to available places in the classroom or laboratory.

The Admissions Office will supply application forms upon request. There is an application fee of $70. The fee will cover two sequential terms. A new application is required for each subsequent term.

Applicants must present academic credentials of high quality or evidence as a special student does not carry any implication for other applications. An application for this status is required for any successive terms. Admission should discuss eligibility with a member of the Admissions staff.

**COSTS**

Undergraduate student costs for the academic year 2005–2006 at MIT will be about $44,600. This includes tuition and an estimate for the costs of room and board, books, supplies, and personal expenses. An allowance for travel is added to the student costs if the student lives in the United States. The allowance varies depending on the student’s home address. The cost of books and supplies, clothes, laundry, recreation, and other personal necessities vary widely, depending upon interests, tastes, and needs, but typically total about $2,800. There are many kinds of dining and housing arrangements at MIT and the range of student expenses for room and board is broad. Student Financial Services uses a standard allowance of $9,501 for room and meals. Actual costs for 2005–2006 may be more or less than the standard allowances based on individual costs.

The following are the basic tuition and fees at MIT for the academic year 2005–2006 (which are reviewed and likely to increase each year):

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>$32,100</td>
</tr>
<tr>
<td>Student Activity Fee</td>
<td>$200</td>
</tr>
<tr>
<td>MIT Student Extended Insurance Plan</td>
<td>$1,440</td>
</tr>
</tbody>
</table>

Payment of the tuition fee entitles all regular and special students to many health care services at MIT Medical (Building E23) at no charge.

The MIT Student Extended Insurance Plan covers hospitalization due to accidents or illness. The insurance is required for all students, unless they can demonstrate that they have comparable coverage through another insurance program. Refer to the section Medical Services in the section on Campus Life in Part 1 for additional details or visit MIT’s website at http://web.mit.edu/medical/.

The tuition for all regular undergraduates in the fall and spring terms is $16,050 per term. Full tuition in either term of the current year covers the January Independent Activities Period (IAP). Tuition rates for the Summer Session are published each year in the Summer Session Catalogue available in April.

Regular undergraduate students who have permission to take only a few subjects are initially charged full tuition. They may then apply to have their tuition charged at the rate of $505 per unit with the approval of the faculty advisor. In such cases, there is a minimum fee of $3,050 for subjects and a minimum of $1,335 for the SB thesis. Upon recommendation of a department, the Dean for Undergraduate Education, in the case of an undergraduate student, may set a special tuition rate in unusual circumstances. Financial aid may be adjusted based on enrollment costs. Some classes (including ROTC and classes taken on Listener status) are not included in the determination of financial aid eligibility.
Special students are charged at the rate of $505 per unit taken either for credit or not for credit. This unit fee applies up to a maximum of $16,050 per term and is subject to the following minimum fees:

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members of the MIT Community</td>
<td>$3,050</td>
</tr>
<tr>
<td>(Includes special students who are full-time employees of the Institute or who are dependents of full-time employees or regular students.)</td>
<td></td>
</tr>
<tr>
<td>Other Special Students</td>
<td>$4,565</td>
</tr>
</tbody>
</table>

Internship and cooperative programs offered by MIT provide industrial and research experience through a series of work assignments interwoven with regular study at the Institute. The tuition fee for these programs is the same as that for other regular undergraduate students.

Electrical Science and Engineering, or Electrical Engineering and Computer Science, or Computer Science and Engineering, Course 6A
Materials Science and Engineering, Course 3B

Upon recommendation of the department, a special tuition rate for any cooperative program may be set in an unusual case. Light-load tuition adjustments are not normally available to students who are (or were) in cooperative and internship programs.

A student withdrawing before the start of a term is not charged any tuition for that term, and any tuition payments previously made for that term will be refunded. Students withdrawing during the fall or spring term are charged one-twelfth of the stated tuition for the term for each week from the starting date of the term, with a minimum two-week charge. A student is financially obligated to the Institute for the tuition appropriate to the program approved by his or her Faculty Advisor at the beginning of the term. Any subsequent reduction in fees is based on the date that cancellation of subject or withdrawal from the Institute is effected. At that time, any excess payments which the student has made will be refunded.

If the student receives financial aid through one of the Title IV federally based student financial aid programs, and aid is reduced as a consequence of the reduced tuition, the reduction in aid will be made in accordance with current federal regulations. Contact Student Financial Services for examples of refund calculations.

**Miscellaneous Fees**

The application fee for undergraduate admission is $65.

The fee for late submission of pre-registration is $40 ($75 if very late).

The fee for late filing of the degree application is $40 ($75 if very late—see Academic Calendar preceding the Overview section in Part 1).

The fee for late initiation of the registration process or very late registration is $100. Miscellaneous fees are nonrefundable unless levied in error.

**Payment of Tuition and Other Charges**

Student Financial Services gathers, bills, and collects student charges and provides an electronic (e-bill) statement of that activity. These charges originate in the offices from which the student receives Institute services. An electronic (e-bill) student account statement is generated monthly on MIT Pay when activity has occurred on an account, reflects charges (e.g., tuition, fees, housing, library fees), payments (personal funds, financial aid, tuition awards), additional amounts due, and payment deadlines.

When an individual registers as a student at MIT, he or she agrees to pay all charges on the student’s account by the due date, and acknowledges that the Institute may assess late charges (or finance charges for the MIT Monthly Payment Plan accounts), suspend registration, revoke Institute services, withhold the degree if these charges are not paid, and assess collection costs if the unpaid account is placed with an outside agency for collection.

Payment in full or a satisfactory arrangement for payment is due prior to the beginning of each term in August and January. If a student anticipates that he or she may not be able to pay the entire account by the August or January deadline, the MIT Monthly Payment Plan option available from Student Financial Services should be considered.

Participation in the MIT Monthly Payment Plan allows an installment payment arrangement over four months each term (three months during the summer). The interest rate is currently 0.67 percent per month, or 8.0 percent annual percentage rate.

Outside loans, such as the MEFA Loan from the Massachusetts Education Financing Authority and the Federal Direct PLUS Loan, are attractive options as well. Contact Student Financial Aid in Room 11-320 for brochures or applications.

If a student fails to make satisfactory arrangements for payment and has amounts outstanding after a payment due date, that balance will be subject to late fees of 1.5 percent per month (or 18.0 percent annually). Outstanding balances at the end of a term will prevent registration.

Outstanding balances will prevent graduation. All Student Account balances must be resolved prior to either Committee on Academic Progress (CAP) or Committee on Graduate School Programs (CGSP) meetings. If this is not done, students will not receive their diplomas, march, or otherwise participate in Commencement.

If a student leaves MIT with an unpaid balance and does not make arrangements to pay, the student may be reported to credit reporting agencies and/or placed with an outside collection agency. Agency fees are assessed at 33 1/3 percent of the outstanding balance for the first placement. If payments are not forthcoming, a second placement results in 50 percent of the outstanding balance.

Undergraduate students are subject to the Financial Hold policy adopted by the Committee on the Undergraduate Program (CUP) and the Committee on Academic Performance (CAP) in 1998. Students who have not paid their outstanding student account balance, made satisfactory arrangements with Student Financial Services to pay the balance, or completed a financial aid application by the end of the term will lose access to student services for subsequent terms. Removal of services includes the right to register for the term, Athena access, MIT housing, dining, the MIT Card, and library access. Students who have not made efforts to resolve their financial problems will not be allowed to register or receive credit retroactively.
The staff of the Student Services Center is available to answer questions or offer assistance in resolving billing matters related to the student account, funding alternatives, payment options, long-term educational loans, refunds and cash advances. Visit the Student Services Center website at http://web.mit.edu/ssc/.

Non-Payment of Tuition and Other Charges
If a student has outstanding balances at the end of the term, including Independent Living Group charges, the student’s graduation or registration for the subsequent term is placed on hold.

Students who have unanticipated financial problems during a term should resolve them using the resources of Student Financial Services and of Student Support Services, as well as outside sources such as parents and siblings. The policy is designed to allow students sufficient time to resolve their financial difficulties. Students owing fall term balances have six months, from August to January, to clear their accounts before a hold on registration is imposed. Students owing spring term balances have five months, from January through May. This time frame should be enough for students to deal with their financial issues.

To resolve financial holds, students should contact their student account counselors in the Student Services Center, Room 11-120.

Policy on Undergraduate Financial Holds
Undergraduates who have not paid their MIT term bill will not be allowed to register for any subsequent term, receive credit retroactively, nor receive any student services, including MIT housing, library, and computing resources. To assure the timely payment of bills and equitable treatment of students, as well as to educate students about their rights and responsibilities in meeting their financial obligations to the Institute, the following procedures have been approved by the Committee on the Undergraduate Program and the Committee on Academic Performance.

Notifications to Undergraduates with Unpaid Balances
After the fifth week of the term, Student Financial Services will identify undergraduates who have unpaid balances on their student accounts for that term and who have not made satisfactory arrangements for payment of those balances. Student Financial Services will notify these students—both through the regular billing process and with additional direct communications—informing them of the MIT policy regarding registration holds for the subsequent term.

After the 11th week of the term, Student Financial Services will provide Student Support Services with a list of the undergraduates still carrying unpaid balances. The academic advisors of those students will also be notified. Student Financial Services will contact these students and inform them of the Institute’s policy. Counseling deans and student advisors will also be consulted as to offering assistance to students in resolving such matters.

Only charges accruing before and during the first 10 weeks of a term will result in the hold policies detailed below. For charges applied to a student’s bill after the 10th week of the term, the application of the hold policy will be deferred for one term.

Removal of Services
An undergraduate who has not paid or negotiated for settlement of his or her Institute bill from the previous term may not register for the subsequent term, and therefore may not partake of Institute student services. To make this restriction effective, the Institute will take the following six actions when an undergraduate has not made satisfactory payment arrangements within two weeks after the end of the final exam period in the spring term or the last day of IAP for the fall term.

- The right to live in MIT housing will be revoked. Undergraduates currently living in MIT housing will be expected to move out immediately.
- Undergraduates not living in MIT housing will not be allowed to move in.
- The MIT Card will be deactivated, and undergraduates will not be authorized to use the services for which the card provides access. These services include but are not limited to the libraries, the dining system, and Institute housing.
- Students are permitted to retain an mit.edu email address, which will be forwarded to a specified outside email provider until the normal graduation date. All other computer services, including Athena access and use of MIT-licensed software, will be suspended.
- Undergraduates will be removed from the student payroll and UROP systems.
- Undergraduates will not be placed on class rosters and will be removed from class lists generated through the HASS-D lottery. They will not be allowed to participate in class projects. Work that is turned in for the class will not be graded or returned.
- Undergraduates who do not settle their prior term balance or who have not made efforts to resolve their financial problems will not be allowed to register for the subsequent term nor receive credit retroactively.

Students who face loss of services should immediately contact their student account counselors in the Student Services Center, Room 11-120.

FINANCIAL AID

Grants, Loans, and Employment
Student Financial Services provides grants and loans based on the financial need of the individual student, as determined by analysis of a statement of family financial condition. This will be provided by means of the Free Application for Federal Student Aid (FAFSA) and the CSS Profile form. A copy of the most recent parental federal tax return may be required in support of aid applications.

MIT is fortunate in having received gifts from many benefactors, alumni and alumnae, and friends to help support the educational needs of MIT students. Student Financial Services reviews applications and makes need-based awards to students from the most suitable Institute grant and loan resources.

Students choose work and/or loan eligibility to meet the first incremental portion of their self help. Student loan funds allow the student to pay part of the costs of his or her education on long-term credit under
favorable financial terms. However, MIT student loans are granted to meet systematically calculated financial need only. Undergraduate loans are provided from several sources, including the Federal Perkins Loan Program and the Federal Direct Stafford Loan Program.

Specific jobs are not assigned; rather students are expected to arrange employment most suitable to their own talents and available time. Student Employment (SEO) maintains listings of positions to assist students seeking part-time jobs during the term or full-time summer jobs. Employment is usually available on campus in residence halls, offices, libraries, and laboratories. Listings for off-campus positions are also available. Students’ earnings from part-time work depend on experience and, of course, availability of time.

SEO participates in the Federal Community Service Program. Aid-eligible students work in jobs that have a direct impact on the Cambridge and Boston communities. Wages are subsidized up to the student’s work-study eligibility. For more information, visit the SEO website at http://web.mit.edu/seo/.

All students considering MIT are strongly urged to explore all areas of financial assistance, including government scholarship and loan programs. A number of states sponsor scholarship programs for residents, and information concerning eligibility may usually be obtained from secondary school guidance counselors. ROTC programs at MIT may also provide substantial scholarship support.

Applications

**Entering Freshmen**

Students who wish to be considered for financial aid should complete the Free Application for Federal Student Aid (FAFSA) and the CSS Profile form for full consideration of all MIT funds. An application for admission is not prejudiced by an application for aid; the two decisions are entirely separate. Need criteria have no bearing on admissions, and admissions criteria have no part in determining qualifications for aid. There is no reason to be deterred from applying to MIT for admission and aid at the same time.

**International Students**

MIT meets the full need of international undergraduate students who demonstrate financial need. International students who wish to be considered for financial aid should complete and return the MIT Financial Aid Application for Foreign Students (included with their admissions material) by the March 1 deadline.

Students should seek aid from sources other than MIT. *International students should make all arrangements for their financial obligations to MIT for the entire stay in the United States before leaving their country.*

**Transfer Students**

Transfer applicants who wish to be considered for financial aid should complete the FAFSA and the CSS Profile form for full consideration of all MIT funds.

**Upperclass Students**

MIT awards are made on an annual basis, and recipients are required to reapply each year for continued assistance in the following year. Award applications must be submitted no later than April 15 of the year preceding the term in which aid is anticipated to avoid penalty. Upperclass students must complete the Free Application for Federal Student Aid (FAFSA) and the CSS Profile form for full consideration of all MIT funds. Part of the application process requires a copy of the most recent parental federal tax return, and all applicants are expected to apply for a state grant where applicable, and for any and all renewable grants received in prior years.

A student’s eligibility for MIT undergraduate grant funds will end when the student receives an initial degree, or after the equivalent of eight terms, whichever occurs first. Eligibility for Federal Pell Grants may continue beyond the eighth term, under some conditions, but ends with receipt of a bachelor’s degree.

Eligibility for undergraduate loans continues through all undergraduate programs. A student becomes eligible for the higher loan maximums that pertain to graduate students upon enrollment in a graduate program. Additional information is available on the website at http://web.mit.edu/finaid/.
What graduate degrees does MIT offer? Can graduate students take classes at other institutions? What are the dates for submitting admissions materials? How much will it all cost? For current and prospective graduate students, this section has the answers.
GRADUATE STUDY AT MIT

For more than a century, MIT graduate programs have provided ideal environments for advanced study by faculty and students working together to extend the boundaries of knowledge. The Institute has traditionally been a national leader in engineering graduate education, and its doctoral programs in mathematics and the physical and life sciences have also attained national prominence. In addition, top-ranked graduate programs in economics; political science; linguistics; science, technology, and society; architecture; urban studies; and management have broadened the spectrum of graduate education.

The most important factor in the effectiveness of graduate programs at MIT is the quality of the faculty. MIT is proud of its nationally and internationally recognized faculty of scholars and academic leaders, who are also effective teachers and research collaborators.

The broad scope and high quality of its graduate education have made MIT an international leader. More than a third of its graduate students come from foreign nations. Significant efforts have been made, with some success, to increase the numbers of minority and women students attending MIT’s graduate programs. This representation of students from diverse backgrounds contributes greatly to the richness of the MIT community and to the excellence of its graduate academic programs.

Graduate education at MIT places special emphasis on the relevance of science and technology to the complex problems of society. Such problems frequently require an interdisciplinary approach involving expertise in several different departments.

Extensive resources for graduate study have developed naturally at MIT from a long tradition of emphasis on contributions to new knowledge. The wealth and diversity of teaching and research resources are described in the departmental sections in Part 2.

Although most graduate students find their interests served by programs available within a single department, many elect to work in interdisciplinary fields (described in the section on Interdisciplinary Research and Study in Part 1), which may reach into two or more departments and involve work in any of MIT’s laboratories and centers. Special committees provide guidance in certain areas such as biomedical engineering, economics and urban studies, environmental engineering, instrumentation, management of technology, medical engineering, medical physics, operations research, technology and policy, and transportation. In other fields, interdepartmental programs are administered by ad hoc committees approved for each student and appointed by the dean for graduate students.

MIT’s libraries are a major resource for graduate study. Comprehensive collections are available in fields where MIT concentrates its teaching and research efforts. Through participation in the Boston Library Consortium, graduate students, faculty members, and research staff have access to collections outside the Institute.

Another resource for graduate study is cross-registration in programs with Harvard University and Wellesley College, and joint degree programs with the Woods Hole Oceanographic Institution. Limited study opportunities are also available at Brandeis University, Tufts University, Boston University, and the Graduate Consortium in Women’s Studies at Radcliffe.

Graduate students are encouraged to use MIT’s extensive athletic facilities. Teams comprised of both undergraduate and graduate students participate in intercollegiate competitions and the intramural athletic program.

Graduate students also share in the cultural and social activities and recreational facilities at MIT. Concerts and dramatic performances are frequently given by Institute groups and professional performers. Leaders in many fields give on-campus lectures and seminars, which are open to all members of the Institute community. MIT students also take advantage of the numerous cultural and intellectual opportunities in the Boston area, including free admission to the Boston Museum of Fine Arts and the Museum of Science. A more detailed description of campus activities can be found in the section on Campus Life in Part 1.

Independent Activities Period
During the January Independent Activities Period (IAP), graduate students may pursue their own interests, including thesis research and preparation for qualifying exams. They also may lead or participate in special activities during this four-week period.

Graduate students should read the section Independent Activities Period in the section on Undergraduate Education of this catalogue for details concerning academic credit and grades, veterans’ benefits, and special-student status.

Graduate Students Office
The Institute has a single faculty that is responsible for both undergraduate and graduate instruction. The administration of graduate education rests with the president; the provost; the chancellor; the dean and associate dean for graduate students; and the Committee on Graduate School Programs, whose members include a faculty member from each department and program offering graduate degrees, and two representatives from the Graduate Student Council.

Each department exercises a large measure of autonomy for its graduate programs, under general guidelines established for the Institute as a whole. Each department has a departmental committee on graduate students, including one or more graduate registration officers, to administer department and Institute graduate procedures.

More detailed information about the organization, rules, regulations, and procedures of graduate education is given in the online publication, Graduate Policies and Procedures, at http://web.mit.edu/gso/gpp/.

Careers Office
The Careers Office helps students to make informed decisions about career goals and to find opportunities related to their professional objectives. Graduate students are encouraged to begin their career by visiting the office during their first year to learn what career resources are available.

Further information may be obtained from the Careers Office, Room 12-170, 617-253-4733, fax 617-253-8457, or visit the website at http://web.mit.edu/career/www/. See also the description in the section on Undergraduate Education in Part 1.
GENERAL DEGREE REQUIREMENTS

Graduate students may pursue work leading to any of the following degrees: Doctor of Philosophy (PhD); Doctor of Science (ScD); Engineer’s degrees; Master of Science (SM); Master of Engineering (MEng); Master of Architecture (MArch); Master in City Planning (MCP); and Master of Business Administration (MBA). Graduate programs are described in individual department statements in Part 2.

Each graduate student is officially enrolled in a degree program. The programs are not limited, however, to subjects offered in a single department. Subjects and research programs may be chosen from several departments, given the approval of the departmental faculty advisor to ensure that the overall program is integrated and well balanced with respect to a major field of study.

A student who expects to come to MIT for an advanced degree after earning an undergraduate degree elsewhere should give careful attention to undergraduate prerequisites as outlined by each department or program elsewhere in this catalogue. For more specific information, a student should consult the department or program in which he or she wishes to enroll.

MIT degrees are “residence” degrees in the sense that a major portion of the work must be done on campus in association with the faculty, other graduate students, and the Institute community. The amount of time required to attain any one degree varies.

Degrees are awarded by the Corporation of the Institute upon the recommendation of the faculty. Favorable faculty action is based upon approval by the Committee on Graduate School Programs on recommendations from the appropriate departmental committees on graduate students.

Master’s Degree

Master of Science With and Without Specification
For the degree of Master of Science, the student must have satisfactorily completed a program of study of at least 66 subject units, of which 42 units shall be H-level subjects, and a thesis, approved by the department in which he or she is enrolled. If 34 units of H-level subjects and the thesis are in a single approved program, as determined by a departmental committee on graduate students, the degree will be recommended with specification in this program; otherwise, the degree will be recommended without specification. The same high standard of academic performance in a program approved by a departmental committee on graduate students is required for either degree.

The choice of area of specialization must be approved by the committee on graduate students of the department in which the student is enrolled. Approval of the entire program must be obtained from this committee and from the student’s faculty advisor. A special interdepartmental committee, approved by the dean for graduate students, may be appointed to supervise a program in an interdepartmental field.

The satisfactory completion of the master’s degree requires the student to be in residence as a full-time regular graduate student for a minimum of one regular academic term (not the summer session). Every degree candidate working on a thesis must register for thesis in all semesters during which his or her thesis research or writing is actually in progress and during the term his or her name appears on the degree list.

Master of Engineering
To be awarded the graduate degree of Master of Engineering, the student must have satisfactorily completed a structured program of at least 90 units, consisting of 66 graduate subject units, of which at least 42 units must be in H-level subjects, and a thesis approved by the department of the School of Engineering in which he or she is enrolled. The candidate must also have been in residence for a minimum of one regular term.

Master of Architecture
The graduate degree Master of Architecture is awarded upon the satisfactory completion of a program of study of at least 164 subject units approved by the Department of Architecture, of which 96 units must be in H-level subjects, and the completion of a thesis acceptable to the Department of Architecture. The candidate must also have been in residence for a minimum of four regular academic terms. A student who enters without previous experience in a department of architecture may take as long as eight academic terms to complete the degree.

Master in City Planning
For the degree Master in City Planning, the student must have satisfactorily completed a minimum of 126 units, of which at least 42 units must be H-level subjects. The student must also have completed a thesis acceptable to the Department of Urban Studies and Planning, and have been in residence for a minimum of two regular academic terms.

Master of Business Administration
To be awarded the degree of Master of Business Administration (MBA), the student must satisfactorily complete a program of study, including the first-semester core classes plus 144 units of G or H-level subjects, acceptable to the Sloan School of Management (of which 42 units must be H-level). The candidate must also have been in residence for four consecutive academic terms.

Simultaneous Registration for Two Master's Degrees

Single Thesis. This degree plan is intended for qualified graduate students who seek academic recognition in two professional fields that, although distinct, have a substantial intellectual connection. The degree plan requires a balanced choice of academic subjects, made with the advice of each of two departments, and by selection of the thesis topic.

To satisfy the minimum requirements for the program, the student must complete (in addition to thesis units) at least 132 subject units, of which 66 units are unique to each department. At least 42 of each group of 66 units must be graduate H-level subjects. In those instances where, for a single regular master’s degree or program, a department or program has established unit requirements in excess of the foregoing minimums, the department or program requirements prevail. Such excess of units in one department may not be applied to the program in the other department.

A student pursuing a Master in City Planning in addition to a second master's degree must have both programs approved in the usual way,
but the subject units for the Master in City Planning can be lowered at the discretion of the Department of Urban Studies and Planning.

Individuals who wish to qualify for a Master of Science degree in Real Estate Development, in addition to a Master of Architecture or Master in City Planning degree, will be required to satisfy all the subject requirements of each program. Specifically, candidates for the Master of Architecture degree must take 164 subject units (of which 96 units must be H-level subjects), and Master in City Planning degree candidates must take 126 subject units (of which 42 units must be H-level subjects). Individuals who wish to qualify for the master’s degree in Real Estate Development also must take at least 66 subject units unique to this program, of which at least 42 units must be H-level subjects. Students may submit a single thesis provided it is acceptable to the graduate committees of each program. It is expected that such dual degree candidates will be in residence at least one term longer than expected if enrolled in a single degree program.

Participation in a dual degree program is limited to students who are already registered in one department and who meet the admissions criteria of the second department. At least two regular terms prior to completion of the program, the student must submit to each department a statement of educational objectives along with a detailed program plan that includes a description of the proposed thesis topic. The total program must meet with the approval of each department, and a petition approved by the dean for graduate students describing the program must be filed with the Registrar’s Office.

The thesis research must be conducted under the supervision of an approved member of one of the two participating departments, with the other department providing a thesis reader. The thesis must be of superior quality. The single thesis cannot be used to satisfy the thesis requirements of any additional graduate degree programs.

In special cases, the standing committee of an approved interdisciplinary program may act in lieu of one of the two participating departments.

Two theses. Occasionally an individual, already admitted for graduate study, may wish to pursue simultaneously two distinct master’s programs, fulfilling the thesis requirement with a separate thesis for each degree program. In such cases, the usual unit requirements for each program apply separately. Registration for two degrees is contingent upon approval by the second department of a request for admission. Such a request can be initiated by a petition approved by both departments and approved by the dean for graduate students.

**Simultaneous Award of Bachelor’s and Master’s Degrees**

An undergraduate student of the Institute who is enrolled as a candidate for the bachelor’s degree may be admitted by a department as a candidate for the master’s degree. Students must register as graduate students for at least one regular academic term (not the summer session) to be recommended for the simultaneous award of the bachelor’s and master’s degrees. The thesis submitted for the master’s degree may also be accepted by the department in fulfillment of the undergraduate thesis requirement, if any. A student wishing to pursue this type of academic program must apply for graduate admission in the usual way.

**Engineer’s Degree**

The program for an engineer’s degree requires more advanced and broader competence in engineering and science subjects than for the master’s degree, but with less emphasis on original research than a doctoral program. In general, the engineer’s degree requires two academic years beyond an undergraduate degree.

The following engineer’s degrees are awarded:

- Civil Engineer (CE)
- Electrical Engineer (EE)
- Engineer in Computer Science (ECS)
- Environmental Engineer (EnvE)
- Materials Engineer (MatE)
- Mechanical Engineer (MechE)
- Metallurgical Engineer (MetE)
- Naval Engineer (NavE)

The requirement for such a degree is the satisfactory completion of a program of advanced study and research approved by the appropriate department or interdepartmental committee of the School of Engineering. The minimum program consists of at least 162 subject units (exclusive of thesis units) and the completion of an acceptable thesis. The candidate must also have been in residence for a minimum of two regular academic terms. Every degree candidate working on a thesis is expected to register for thesis in all periods during which the thesis research or writing is actually in progress and during the term his or her name appears on the degree list. A department may accept a master’s thesis of superior quality for the engineer’s degree only if the student intends to use that document to fulfill the requirements of a single master’s degree.

**Doctoral Degree**

MIT offers the degrees of Doctor of Science and Doctor of Philosophy interchangeably in the engineering and science departments (except biology and brain and cognitive sciences) and in the fields of medical engineering and medical physics. The degree of Doctor of Philosophy is awarded in architecture; biology; brain and cognitive sciences; economics; history, anthropology, and science, technology and society (HASTS); linguistics; management; media arts and sciences; philosophy; political science; technology and policy; toxicology; urban studies and planning; and from Whitaker College. These degrees certify creditable completion of an approved program of advanced study in addition to a research dissertation of high quality based on original research.

The two Institute requirements for a doctorate are completion of a program of advanced study, including a general examination, and completion and oral defense of a thesis on original research.

The course of advanced study and research leading to the doctorate must be pursued under the direction of the departmental committee on graduate students for at least four academic terms. In some cases, the required period of residence may be reduced, but in no instance can it be reduced to less than two regular academic terms and one summer session.

A student is enrolled in a program of advanced study and research approved by the department. The thesis research is in this same area, but
the program often includes subjects reaching into several departments. If the field requires substantial participation by two or more departments, an interdepartmental faculty committee, approved by the dean for graduate students, should be appointed to supervise the student’s program.

Each doctoral candidate must take a general examination in his or her program of study at such time and in such manner as the departmental or interdepartmental committee approves. This examination consists of both oral and written parts.

Nonresident Doctoral Thesis Research Status
Nonresident status is intended for doctoral students who have completed all requirements other than the thesis. These students have limited access to the facilities and academic life of the Institute, are not eligible for federal loan funds and funding from MIT, and pay a substantially reduced tuition. Permission to become a nonresident doctoral candidate must be obtained from the dean for graduate students at least one month prior to Registration Day of the term during which the student wishes to register in this category ($100 late fee). Consult the Graduate Students Office for additional information on nonresident status.

Minor Program
Although there is no Institute requirement of a minor for the doctoral degree, certain departments require that candidates take a number of subjects outside their major field.

Language Proficiency
There is no Institute language requirement; however, several departments require that a candidate be able to read or speak one or two foreign languages with intermediate competence. A student may satisfy the requirement in one of three ways: by fulfilling the requirement before entrance by passing one or more intermediate or advanced subjects with a grade of C or better; through examination by the Foreign Languages and Literatures Section; or by taking a two-term subject in a language or languages offered by the Foreign Languages and Literatures Section. Depending on student demand, the section offers a choice of two-term language subjects, stressing the ability to read or speak in Chinese, French, German, Japanese, or Spanish. For the purpose of the second alternative, the section gives written examinations in Chinese, French, German, Japanese, and Spanish twice a year at the end of each term. Examinations in other approved languages are arranged individually upon request.

OTHER UNIVERSITIES

Harvard University
A regular, full-time graduate student at MIT may enroll to take subjects (exclusive of thesis) at Harvard (except for Harvard Extension School and Harvard Summer School) without paying additional tuition, provided that this enrollment does not exceed one-half of his or her total registration for the term. Included in the above category are MIT full-time special graduate students. This cooperative arrangement is not applicable to the summer session or IAP.

Requests for registration under this cooperative arrangement must be approved by the MIT department of registration and should be confined to subjects that are not offered at MIT. Students will not be allowed to attend classes in which additional registrants put an undue load on the instructors. The procedures to be followed are available on the web at http://web.mit.edu/registrar/www/crossreg/hxfaq.html. Grades earned in Harvard subjects appear on the transcripts of MIT graduate students as the closest equivalent MIT grade.

Wellesley-MIT Exchange
Graduate students are eligible to participate in the Wellesley-MIT Exchange Program. Wellesley courses are not considered H-level subjects, but may be accepted for graduate credit toward a student’s degree with the approval of the department. For details about the exchange, see the description of the program in the section on Undergraduate Education in Part 1.

Woods Hole Oceanographic Institution
In conjunction with the Woods Hole Oceanographic Institution (WHOI), MIT offers graduate degree programs in oceanography and applied ocean science and engineering. All decisions, from admission to the conferring of the joint degree, are made by consensus of MIT/WHOI joint discipline committees. The programs in oceanography involve the departments of Biology and Earth, Atmospheric, and Planetary Sciences at MIT. The applied ocean science and engineering programs involve the departments of Chemical Engineering, Civil and Environmental Engineering, Electrical Engineering and Computer Science, Materials Science and Engineering, and Mechanical Engineering. Information regarding the program may be obtained from the MIT Joint Program Office or the Education Office at WHOI.

Boston University
An arrangement for cross-registration has been made between the MIT departments of Economics and Political Science and the African Studies Program of Boston University. Details of the procedures to be followed are similar to those for Harvard-MIT cross-registration.

Brandeis University
A cooperative arrangement exists between the MIT Department of Urban Studies and Planning and the Florence Heller Graduate School for Advanced Studies in Social Welfare at Brandeis University. Cross-registration is restricted to one or two subjects per term in the areas of social welfare at Brandeis and urban studies at MIT.

Tufts University
A cross-registration agreement exists between MIT and the School of Dental Medicine at Tufts University. The program is restricted to specific graduate subjects at each institution.

Graduate Consortium in Women’s Studies at Radcliffe
The Graduate Consortium in Women’s Studies (GCWS) is a pioneering effort by faculty at Boston College, Brandeis University, Harvard University GSAS, Harvard Divinity School, Harvard Graduate School of Education, MIT, Northeastern University, Tufts University, and Radcliffe Institute for
Advanced Study to advance women’s studies scholarship in a series of team-taught graduate seminars.

The consortium provides a unique model of graduate education designed to train a new generation of scholars and teachers in the fields of women’s studies, feminist theory, and gender studies. In keeping with the interdisciplinary nature of women’s studies, the GCWS offers interdisciplinary, team-taught seminars to students matriculated in participating graduate programs. Faculty explicitly integrate analyses of class, race, culture, ethnicity, and sexualities along with gender, and address the practical and public policy implications of feminist theory and scholarship. Subjects are designed not only to examine existing feminist scholarship, but to open paths to the creation of new knowledge. Graduate subjects also provide crucial intellectual support for students pursuing feminist work within the framework of the traditional disciplines.

Several seminars are offered per year. Enrollment in each seminar is limited. Graduate students must complete an application. Undergraduate students must first consult with the director of women’s studies at MIT. Admissions decisions are based on the student’s background and brief statement of interest. For application information, contact the consortium at 617-324-2085, or see the website at http://www.radcliffe.edu/gcws/.

ADMISSIONS

Regular Graduate Admissions

A regular graduate student is an individual who has been admitted to the Institute and who is registered for a program of advanced study and research leading to any of the post-baccalaureate degrees offered by MIT.

To be admitted as a regular graduate student, an applicant must have received a bachelor’s degree or its equivalent from a college, university, or technical school of acceptable standing. Applicants are evaluated by the department in which they propose to register on the basis of their prior performance and professional promise. These are evidenced by academic records, letters of evaluation from individuals familiar with the applicant’s capabilities, and any other pertinent data furnished by the applicant. While high academic achievement does not guarantee admission, such achievement, or other persuasive evidence of professional promise, is expected.

A student registered in a program of study leading to the simultaneous award of the bachelor’s degree and master’s degree must apply for graduate study and be registered as a graduate student for at least one academic term (not the summer session) of his or her program of study.

Some engineering departments require students seeking a doctoral degree to qualify first for a master’s degree.

Undergraduate Requirements for Advanced Degrees

In addition to preparation in the specific field of interest, most departments require significant work in mathematics and the physical sciences, but some require as little as a year of college-level work in these disciplines. Requirements of individual departments are given in Part 2 of this catalogue. Students with minor deficiencies in preparation may be admitted for graduate study; however, deficiencies in prerequisite or general or professional subjects must be made up before the student can proceed with graduate work dependent on them.

Application Procedures

Students normally begin graduate study in September. However, in several departments, suitable programs can be arranged for students entering in June or February. Prospective applicants should check with individual departments about their dates for admission and matriculation.

Students wishing to enter in June or September should apply on the prescribed forms by January 15 (exceptions to that deadline are noted in the application packet); candidates for admission in February should apply by November 1. However, applications submitted later may be considered if vacancies still exist. Fees will not be returned to late applicants, but may be applied to an application considered in the next term. Candidates for admission who are also applicants for financial aid should observe the same deadlines.

Applicants attending colleges or universities on the semester system should apply before the end of the fall semester for admission in June or September and submit a transcript of fall grades as soon as it is available.

Applications for admission should be requested from Graduate Admissions, Room 3-103, MIT, Cambridge, MA 02139-4307. A $70 application fee must accompany all application forms; applications without the fee will not be accepted. Note that the Sloan School of Management and the departments of Biology and Urban Studies and Planning should be contacted directly for application forms. The application fee is $230 for the Master’s Program in the Sloan School. All inquiries regarding graduate admission to the Sloan School are sent to the director of the master’s or doctoral program, whichever is appropriate: Room E52-112 (Master’s Program) or Room E52-003 (Doctoral Program), MIT, 50 Memorial Drive, Cambridge, MA 02142-1347.

Applications for readmission after an absence of five years or more must be approved by the dean for graduate students as well as the department.

Notification about admission for September is sent as soon as action is taken (usually before April 1); for February applicants, notification usually is sent as soon as the application is complete. Admission of a student who is in the final year of work toward a bachelor’s degree may be conditionally approved until subsequent evidence is provided that the degree has been awarded.

Inquiries about specific requirements for admission should be addressed to the chair of the appropriate departmental committee on graduate students.

Examinations

Many departments require applicants to submit scores on the Aptitude Test and the appropriate Advanced Test of the Graduate Record Examination. The requirements specified by the departments are included in the MIT graduate application material. For a test application, write to the Graduate Record Examination, Educational Testing Service, Box 955, Princeton, New Jersey 08540.
The Sloan School of Management requires that all applicants, including those from foreign countries, take the Graduate Management Admissions Test (GMAT). For the locations and dates at which this test may be taken, write to GMAT, Educational Testing Service, Princeton, New Jersey 08540.

**International Graduate Admissions**

Graduate student applicants who are citizens of countries other than the United States must have received a bachelor's degree or its equivalent from a college, university, or technical institute of acceptable standing. The academic record and all credentials must indicate the ability of the candidate to complete the approved program of graduate study and research. Applicants are evaluated by the academic departments. Admission is granted on a competitive basis. Competence in written and spoken English is expected.

Students whose native language is not English and whose schooling has not been predominantly in English, must submit scores from the Test of English as a Foreign Language (TOEFL). TOEFL is administered by the Educational Testing Service. Students wishing to take the TOEFL should do so no later than the November test date. A score of 577 is the minimum considered acceptable except as noted by departments in the application packet. (Write directly to TOEFL/TSE Services, P.O. Box 6151, Princeton, New Jersey 08541-6151 for registration material and information.)

The Graduate Application for Admission for International Students may be obtained from Graduate Admissions, Room 3-103, MIT, Cambridge, MA 02139-4307, or, in the case of the Sloan School, from the director of either the master's program, Room E52-112, or the doctoral program, Room E56-290. Applicants must submit complete application materials to the appropriate office.

Please refer to the previous section concerning individual departmental requirements for the Graduate Record Examinations.

**Special Graduate Student Admissions**

A special graduate student is one whose intended program of study is essentially graduate in nature but who is not a candidate for an advanced degree. Normally, such a student will have received a bachelor’s degree. All applications are made through the Admissions Office. Applications for the specific subjects will be evaluated and approved by the graduate committee of the appropriate department or departments. Admission is valid only for one term; a student must seek readmission each term to continue at the Institute. Those applying for special graduate student status for the first time must pay a $70 application fee. A new fee is required after two sequential terms. To be allowed to continue as a special graduate student, satisfactory academic performance must be maintained.

The term deadlines for filing special student applications are:

- **Summer**: May 1
- **Fall**: August 1
- **Spring**: January 1

Deadlines for international special student applicants are:

- **Summer**: March 1
- **Fall**: June 1
- **Spring**: November 1

International students living outside the United States are not permitted to apply for the summer term.

Permanent residents must submit a copy of the green card.

International students also need to submit copies of visas, and cannot cross-register at Harvard.

Applicants whose native language is not English must submit the Test of English as a Foreign Language (TOEFL) as noted in the section on International Graduate Admissions. A score of 577 is the minimum considered acceptable. The I-20 or IAP-66 will not be issued for subject registration of less than 36 units.

Admission as a special graduate student does not imply any commitment toward an individual’s admissibility to regular graduate student status. If a special graduate student is subsequently admitted as a degree candidate, subjects completed may be used in partial fulfillment of requirements for an advanced degree. The department will determine what subjects are acceptable. Registration as a special graduate student does not count toward minimum residency requirements for an advanced degree nor for eligibility for nonresident status. Correspondence concerning admission as a special graduate student should be addressed to the Graduate Admissions Office, Room 3-103, from whom application material and information for Special Students may be obtained.

**Graduate Student Status for Research Staff Members**

In view of their full-time responsibilities on assigned research and their corresponding salary scales, Institute research staff or employees of the Lincoln Laboratory or the Charles Stark Draper Laboratory may not be full-time regular graduate students, but may, under certain conditions, be granted the status of special graduate student. However, a research staff appointee or an employee of the Lincoln Laboratory or the Draper Laboratory who desires to work for an advanced degree must be admitted as a regular graduate student and must complete the residency and other requirements of the degree program to which the individual has been accepted. This individual may not continue to hold a research staff appointment, nor include any work completed while employed as part of the thesis for an advanced degree.

Any research staff appointee and any employee of the Lincoln Laboratory or the Draper Laboratory may, by written permission from the director of the division (or his or her designee), apply for admission as a special graduate student for enrollment in one subject only per term (but not thesis), either as a listener or for academic credit.
Acceptance for such enrollment will be granted if, in the opinion of the instructor, the individual is qualified to undertake the subject and if section size permits. For this type of enrollment, the student will be assigned to an appropriate registration officer and will pay, whether as a student or listener, the fee established at the special student rate.

Other Employment
A graduate student may not interrupt an academic program to accept employment on the academic, administrative, or research staff, or as an hourly employee at MIT, the Lincoln Laboratory, or the Draper Laboratory either during the academic year or the summer, without the approval of the department head and the appropriate academic dean, and unless the work as an employee is unrelated to the student’s thesis research. A thesis release form indicating such approval must be submitted to the appropriate personnel officer to effect such employment. A graduate student may not include in his or her thesis any material based in whole or in part upon work done while holding an academic or research staff appointment.

COSTS
The basic tuition and fees at MIT for the academic year 2005–2006 (which are reviewed and likely to increase the next year) are as follows:

<table>
<thead>
<tr>
<th></th>
<th>$32,100</th>
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<tbody>
<tr>
<td>Tuition</td>
<td></td>
</tr>
<tr>
<td>Student Activity Fee</td>
<td>$200</td>
</tr>
<tr>
<td>MIT Student Extended Insurance Plan</td>
<td>$1,440</td>
</tr>
</tbody>
</table>

Payment of the tuition fee entitles all regular and special students to many health care services at MIT Medical (Building E23) at no charge.

The MIT Student Extended Insurance Plan covers hospitalization due to accidents or illness. The insurance is required for all students, unless they can demonstrate that they have comparable coverage through another insurance program. For further information, see the section MIT Student Extended Insurance Plan in the section on Medical Services in the section on Campus Life in Part 1, or visit the website at http://web.mit.edu/medical/.

The tuition for all regular students, including graduate student staff, in the first and second terms is $16,050 per term, except for students entering the Sloan Master’s Program and the Leaders for Manufacturing Program, for whom the tuition is $19,922 per term. Full tuition in either term of the current year covers the January Independent Activities Period. The minimum term tuition charge for registration for doctoral thesis upon readmission as a resident student is $24,075 if not registered during the preceding regular term.

The tuition for all regular graduate students, including fellows, trainees, and academic staff in the 2005 summer session was $10,700. Special tuition rates apply to other students in the summer session. These are published each year in the Summer Session Catalogue available in April.

Special students (except in the Sloan School of Management) are charged at the rate of $505 per unit whether taken for credit or not. This unit fee applies up to a maximum of $16,050 per term and is subject to the following minimum fees:

<p>| | |</p>
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<tbody>
<tr>
<td>Members of the MIT Community</td>
<td>$3,050</td>
</tr>
<tr>
<td>(includes special students who are full-time employees of the Institute or who are dependents of full-time employees or regular students.)</td>
<td></td>
</tr>
<tr>
<td>Other Special Students</td>
<td>$4,565</td>
</tr>
</tbody>
</table>

Any resident graduate student making progress toward a degree is expected to register and is considered a full-time student. If a graduate student requires only part of a term to complete the thesis, full tuition for the term is charged, and adjustments to tuition are made at a later date. If the student was registered for thesis as a resident student in the immediately preceding term, regular or summer, tuition for thesis will be adjusted after acceptance by the department of the completed document on the basis of a charge of $1,335 per week from the starting date of the term, with a minimum of $1,335 for the master’s or engineer’s degree and $2,675 for the doctoral degree. If the immediately preceding term was the summer term and if the graduate student was not registered for thesis in that summer term, but was registered for thesis in residence in the previous second term, the minimum tuition for thesis is $8,025.

A student who continues to hold a fellowship, traineeship, or graduate staff appointment for the remainder of the term after delivery of the thesis continues to be regarded as a full-time student and the tuition will not be adjusted. In unusual circumstances, the dean for graduate students may set special tuition rates for graduate students.

Students who are permitted to undertake nonresident thesis research must register as nonresident doctoral candidates and pay tuition equal to approximately 15 percent of the regular full tuition ($2,405 per term for 2005–2006). Following completion of the nonresident period, the student must return to resident status for completion and presentation of the doctoral thesis. If the student requires only part of this first term back in residence to complete the thesis, the tuition will be adjusted subject to a minimum of $8,025. Please consult the Graduate Policies and Procedures online for additional information on nonresident status.

Cooperative and practice-school programs offered by MIT provide industrial and research experience through a series of work assignments interwoven with regular study at the Institute. The tuition fees for these programs are the same as those for regular graduate students:

- Chemical Engineering Practice School, Course 10-A
- Electrical Engineering and Computer Science, Course 6-A
- Materials Science and Engineering, Course 3-B

The tuition fee for special graduate students in the Sloan School of Management (except for employees of the Institute or their children) is $859 per unit of registration, with a minimum charge of $7,765. There is a maximum charge of $27,000 per term for full-time special graduate students enrolled in the program. Students interested in the Sloan Fellows
Program for Innovation and Global Leadership should consult the Sloan School of Management with regard to fees.

A student withdrawing before the start of a term is not charged any tuition for that term and any tuition payments previously made for that term will be refunded. Students withdrawing during the first or second term are charged one-twelfth of the stated tuition for the term for each week from the starting date of the term, with a minimum two-week charge. A student must pay full tuition and fees at the beginning of the term. Any subsequent reduction in fees is based on the date that cancellation of a subject or withdrawal from the Institute is effected. At that time, any excess payments which the student has made will be refunded.

**Graduate Living Costs**

Living expenses for graduate students vary widely depending on such factors as marital status, availability of resources, interests, and tastes. Monthly living costs (housing, food, and personal expenses) are roughly $1,650 for a single graduate student, $2,200 for a married graduate student, and $2,500 for a married graduate student with one child. These cost estimates do not include tuition, books, or the Hospital and Accident Insurance Policy. Campus housing for graduate students is limited and less than half of the graduate student population can be accommodated in Institute housing. On-campus dining opportunities are available to graduate students.

**Miscellaneous Fees**

Miscellaneous fees include the following:

<table>
<thead>
<tr>
<th>Service Description</th>
<th>Fee</th>
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</thead>
<tbody>
<tr>
<td>Application fee for graduate admission</td>
<td>$70</td>
</tr>
<tr>
<td>Application fee for Master's Program in Sloan School of Management</td>
<td>$230</td>
</tr>
<tr>
<td>Late submission of pre-registration material ($75 if very late)</td>
<td>$40</td>
</tr>
<tr>
<td>Late initiation of registration process or very late registration, or late submission of application for nonresident doctoral status</td>
<td>$100</td>
</tr>
<tr>
<td>Fee for late filing of degree application ($75 if very late—see Academic Calendar)</td>
<td>$40</td>
</tr>
<tr>
<td>Fee for late thesis title change</td>
<td>$75</td>
</tr>
<tr>
<td>A $100 processing fee is charged if Registration Holds for next term resulting from prior term obligations are not cleared at least two weeks prior to Registration Day of that next term. The fee for completing an Incomplete by a Not Registered Candidate is $40 per subject.</td>
<td>$105</td>
</tr>
</tbody>
</table>

Processing Charges for Late Changes in Registration

A late change in registration, which requires a petition to the Graduate Students Office, is defined as adding a subject after the fifth week or dropping a subject during the last three weeks of a term. The processing charge for late changes is $40. There is an additional charge of $40 for a retroactive change after the end of the term.

The miscellaneous fees and processing charges listed above are nonrefundable, unless levied in error.

**Payment of Tuition and Other Charges**

An individual who registers as a student at MIT agrees to pay all charges on his or her account when due, and acknowledges that the Institute may charge late charges (or finance charges for MIT Payment Plan accounts), suspend registration, revoke Institute services, and withhold the degree if these charges are not paid.

Student Financial Services gathers, bills, and collects student charges and provides a student account statement of that activity. These charges originate in the offices from which the student receives Institute services. The student account statement, mailed monthly when activity has occurred on an account, reflects charges (e.g., tuition, fees, housing, library fees), payments (financial aid, tuition awards), additional amounts due, and payment deadlines.

Payment in full or a satisfactory arrangement for payment is due prior to the beginning of each term, in August and January. New charges and credits that occur after the initial statement will appear on a subsequent statement. If a student anticipates that he or she may not be able to pay the entire account by the August or January deadlines, the MIT Payment Plan available from Student Financial Services should be considered.

Participation in the MIT Payment Plan allows an installment payment arrangement over four months each term (three months during the summer). The interest rate is currently 0.667 percent per month (or 8.0 percent annual percentage rate).

If a student fails to make satisfactory arrangements for payment and has amounts outstanding after a payment due date, that balance will be subject to late fees of 1.5 percent per month (or 18.0 percent annually). Additionally, outstanding balances at the end of a term may prevent one’s registration or graduation. If an unpaid balance is placed with an outside agency for collection, costs will be assessed on the outstanding balance.

Student accounts unpaid after the student has left MIT for whatever reason may be sent to an outside collection agency and assessed additional fees of 33.3 percent of the outstanding balance.

The staff of the Students Services Center, Room 11-120, is available to answer questions or offer assistance in resolving billing matters related to the student account, funding alternatives, payment options, long-term educational loans, refunds, and cash advances. Visit the Student Services Center website at [http://web.mit.edu/ssc/](http://web.mit.edu/ssc/).
FINANCIAL AID

MIT makes available financial support to graduate students from a variety of sources and in several different forms—fellowships, scholarships, traineeships, teaching and research assistantships, on-campus employment, and federal loans. Many forms of support are granted solely on the basis of merit, while others are granted on the basis of financial need or a combination of merit and need.

Neither a department nor the Institute itself has the financial resources to provide support for all deserving students. Thus, it is important that prospective students explore all sources of aid available outside MIT to find means of financing their graduate programs.

Information on fellowships and other financial aid resources is available from individual departments and the Graduate Students Office, Room 3-138. Information on loans is available from the Student Services Center, Room 11-120, or on the Student Financial Services website at http://web.mit.edu/finaid/.

Fellowships, Traineeships, and Scholarships

At MIT, fellowships and traineeships differ from scholarships. A fellowship award to a graduate student covers full or partial tuition, and also provides a stipend to help defray living expenses. In the context of graduate study, a scholarship covers full or partial tuition only. Although most awards are made on the basis of academic merit, financial need is a factor in some instances. Recipients must be enrolled as regular resident students.

Insofar as fellowships, scholarships, and research and teaching assistantships provide for tuition payments, these funds are nontaxable.

When fellowships are less than tuition and an accompanying stipend exists, a portion of the stipend may be applied against the remaining tuition, and that portion excluded from taxable income (provided that the terms of the fellowship do not preclude this). Expenses for books, supplies, and equipment required for courses may also be excluded from taxable income.

On the other hand, stipends accompanying teaching and research assistantships are taxable regardless of the amount of nontaxable tuition provided.

The Institute annually receives funds from individual and corporate donors for the support of fellowships and scholarships. In addition, government agencies and private foundations provide grants and fellowships—often directly to outstanding students for use at institutions of the student’s choice. But occasionally these funds are directed to the student’s choice. But occasionally these funds are directed to the Institute designation of recipients.

Applicants to MIT graduate programs who seek financial support from any of the fellowships, traineeships, or scholarships administered by MIT, including those granted by national agencies and foundations for award by the Institute, should check the appropriate items on the regular Graduate Application for Admission and Financial Aid. Applicants will be considered for awards for which they are eligible after they have been accepted into a graduate program. Currently enrolled graduate students who seek financial support should consult with the appropriate departmental office.

Applications for fellowship aid for the academic year, beginning in June or September, must be filed by January 15. Applications for fellowship aid filed after this date are considered only if funds are available. Final action on applications is taken on the recommendation of departments at the end of March, after the announcement of awards to applicants by the national agencies and foundations under their national competitive programs. A student who wins such a fellowship may be eligible for only a supplementary award in accordance with MIT’s guidelines. For further information on these guidelines, see Graduate Policies and Procedures online.

In accordance with a resolution of the Council of Graduate Schools in the United States (endorsed by most graduate schools), a student has until April 15 to accept or decline an offer. If a student does not reply to an offer by this date, it may be cancelled.

Every student holding a fellowship, traineeship, or scholarship for graduate study at the Institute must register as a full-time regular graduate student for the period of the award. If a student withdraws from the Institute before tenure expires, the award must be relinquished, and the student will be required to refund any payment made in excess of tenure.

Teaching and Research Assistantships

MIT employs about 700 graduate students each year as part-time or full-time teaching assistants to assist the faculty in grading undergraduate tutorials, instructing in the classroom and laboratory, and conducting tutorials.

The departments regard seriously the benefits of a teaching assistantship as a preparation for a career in university teaching. Each year, the Institute offers a prize, the Goodwin Medal, for conspicuously effective teaching by a graduate student.

The units for which an instructor or teaching assistant may register are determined by the department in light of the student’s assistantship duties, program of study, and compensation.

Appointments to teaching assistantships are made upon recommendation of the head of a department. A student who wishes to be considered for a teaching appointment should write to the department. Only full-time graduate students who are candidates for advanced degrees may be appointed. A Free Application for Federal Student Aid (FAFSA) is required for all teaching assistants who are United States citizens or permanent residents. This form may be obtained from the Student Services Center, Room 11-120, or at http://www.fafsa.ed.gov/.

Each year about 2,500 graduate students at MIT hold appointments as research assistants. The principal duty of a research assistant is to contribute to a program of departmental or interdepartmental research.

Most students welcome the opportunity to participate as junior colleagues of the faculty in an ongoing research project that frequently influences their choice of thesis topic. Appointments to research assistantships are made by the department head to full-time students who are candidates for advanced MIT degrees.

The units for which a research assistant may register are determined by the department in light of duties and program of study. Research assistants are compensated on the basis of time devoted to their research. In all cases they must pay full tuition.

Teaching and research assistants receive stipends for the services that they provide; these stipends are taxable income that is subject to withholding tax. Teaching and research assistants also receive a nontaxable
tuition scholarship. Students on visas should be aware of the US income tax regulations applicable to their visa status.

Students who receive financial support from other sources (fellowships, scholarships, etc.) may receive supplementary stipends as teaching or research assistants in accordance with Institute and departmental guidelines.

**Loan Funds**

A graduate student's first recourse for loan assistance should be through the Federal Direct Student Loan Program. To establish one's eligibility for this need-based loan, it is necessary to file the Free Application for Federal Student Aid (FAFSA) through the federal processor and the MIT Graduate Loan Application. This form is available on the web at [http://web.mit.edu/finaid/](http://web.mit.edu/finaid/). The maximum Federal Direct Subsidized Stafford loan per year is $8,500, and interest (which is subsidized while a student is enrolled at least half-time) for first-time Direct Loan borrowers is variable and is set annually. The interest rate is adjusted in July of each year. Application forms and details of the application procedure may be obtained from Student Financial Aid, Room 11-320. Many of our graduate students are eligible to receive loans up to $6,000 from the Federal Perkins Loans program, based on information they provide on the FAFSA.

For need remaining after a maximum subsidized Direct Loan has been obtained, the Unsubsidized Federal Direct Student Loan may be available (for a combined total of $18,500). In determining need for these programs, as well as the Direct Loan Program, MIT compares student resources available, including assets, using appropriate student budgets. Need is determined within limits based on those budgets.

Other loans that are not based on financial need are available through outside agencies. Information on these alternative programs is available from the Student Services Center, Room 11-120.

**International Students**

Students who are not United States citizens or who do not possess a permanent resident visa are not eligible for federal loans. International students must be prepared to meet their expenses without recourse to loans from the Institute. International Students may consider applying for private alternative loans. Most of these loans will require a US-based cosigner.

**Student Employment**

Employment is available both on campus and off. Student Employment (SEO), Room 11-320, keeps up-to-date listings of job opportunities that are open to graduate students. Some positions are available directly through administrative offices on campus. Graduate students who hold full-time research or teaching assistantships or who receive full support on fellowships or traineeships usually are not eligible for such employment. The Graduate Students Office should be consulted for approval before undertaking such employment. For additional information, visit the SEO website at [http://web.mit.edu/seo/](http://web.mit.edu/seo/).

Graduate students who complete the Free Application for Federal Student Aid (FAFSA) may be eligible to work in the Federal Community Service Program. Wages are subsidized for students performing direct community service at approved nonprofit agencies. Information on the FAFSA can be found on the web at [http://www.fafsa.ed.gov/](http://www.fafsa.ed.gov/).

International students may work on campus, but may require special permission from the United States government to work off campus. Citizens of other countries should contact the International Students Office, Room 5-133, before accepting employment, or visit their website at [http://web.mit.edu/iso/www/](http://web.mit.edu/iso/www/).

**Graduate Residents**

Regular resident graduate students who have completed at least one graduate year at MIT or new students who have been MIT undergraduates may apply to Student Life Programs, Room W20-549, for positions as graduate resident tutors. Such positions provide room and board but no stipend.
What is MIT’s policy on grading? On plagiarism? On harassment? Does MIT disclose information about students to persons outside the Institute? Is there student parking? This section contains the essential rules and regulations that govern day-to-day operations at MIT.
ACADEMIC PROCEDURES

Registration

Retaining Student Status
A person becomes an MIT student at the start of the term for which he or she is admitted or readmitted. Regular student status is retained until graduation, unless the student withdraws or is disqualified.

For the fall and spring terms, undergraduate and graduate students must complete the three steps listed below in order to continue student status during that term:

- Preregistration must be completed according to instructions issued by the Registrar’s Office.
- All Institute and Independent Living Group charges must be paid when due, or satisfactory alternative arrangements must be made with Student Financial Services or the Independent Living Group.
- Registration forms must be approved by the student’s advisor or registration officer, signed by the student, and returned to the Registrar’s Office.

Students who do not complete these steps by the published deadlines are subject to fines. Failure to pay charges and complete registration by the end of the fifth week of the term (Add Date) will result in the loss of student status.

Undergraduate and graduate students registered in the spring term who do not graduate or withdraw from MIT retain their student status throughout the following summer, whether or not they register for the Summer Session; they cease being students if they do not register in the fall (although the rules for student status with regard to loan repayment are somewhat different). Graduate students making progress toward a degree during the summer must register for the Summer Session in accordance with Graduate Students Office regulations. Students do not have to preregister for the Independent Activities Period to retain student status between fall and spring terms.

If a student has begun the registration process but wishes to withdraw, he or she must notify Student Support Services if an undergraduate; his or her registration officer if a graduate student; and, in addition, the International Students Office if an international student.

A person wishing to be reinstated as an undergraduate must apply for readmission through Student Support Services. A person wishing to be reinstated as a graduate student must apply for readmission through the Admissions Office and the student’s department. International students also need to be cleared by the International Students Office.

People on campus who are not registered during a term are not considered students and have no student privileges.

Registration Procedures
All students at MIT are assigned an advisor. Advisors to freshmen are MIT faculty and staff, assigned at the beginning of the freshman year. (Freshmen may change advisors through the Academic Resource Center, Room 7-104.) Upperclass undergraduates who have declared a major are assigned a departmental advisor. Each graduate student is assigned to a faculty member in his or her department who also serves as the student’s registration officer. Each student’s program must be approved by his or her advisor, and changes may be made only with the advisor’s approval.

Students register for their subjects on Registration Day at the beginning of each term. All subjects to be taken during the current term, including ROTC and thesis, should be listed on the Registration Form. Separate procedures are used for cross-registering at Harvard University, Massachusetts College of Art, School of the Museum of Fine Arts, and Wellesley College.

A third-year or fourth-year undergraduate student may take an elective subject using the junior-senior P/D/F option. The subject is then graded on a P, D, or F basis (where P means C or better performance). The faculty advisor and student must be sure that the subject designated for P/D/F grading is not used to fulfill a Departmental, Writing, Minor, or General Institute Requirement, and that the student does not take more than a total of two subjects under this option during his or her junior and senior years, until the undergraduate program is finished. The subjects may be taken in the same term or in separate terms, including IAP. The P/D/F option is not available to students for graduate degree credit. All forms to change a subject to or from P/D/F grading under the junior-senior P/D/F option must be signed and approved by the advisor and submitted by Add Date for the given term.

A second-year undergraduate student may take a subject using the exploratory option. An exploratory subject is one in which the student may either accept the grade awarded in the subject or change the subject to listener status after the end of the term. Students are able to designate one subject in each of their fall and spring terms. Any subject at MIT may be designated as exploratory. Students must use special forms, available on WebSIS, to designate a subject as exploratory, remove the designation from a subject, or change an exploratory subject from credit to listener after Drop Date. The faculty advisor’s approval and signature are required. Students can designate the exploratory option through Add Date. Students who choose to drop the subject completely can do so up until Drop Date. After Drop Date and until Registration Day of the succeeding term, students may request a change in the status of an exploratory subject from graded to listener. The Committee on Academic Performance will not consider petitions from students to add the exploratory status after Add Date, to change the grade to listener status after Registration Day of the succeeding term, or to reinstate the grade and credit once a student has forfeited them. Exploratory subjects are offered under a five-year experiment authorized by the Committee on the Undergraduate Program through the academic year 2007–2008.

Add/Drop forms signed by the student’s faculty advisor for undergraduates and registration officer for graduate students should be used for changes in registration after Registration Day. For adding a lotteried subject, the instructor’s signature is also required. For adding other subjects,
the instructor’s signature is required after the first week of the term. After
the fifth week of the term the instructor’s signature certifies that instruc-
tion in that subject began approximately at the time of approval. The
specific deadlines for such changes are listed in the Academic Calendar.
All Add/Drop forms should be hand delivered by the student to the Student
Services Center, Room 11-120.

A student is responsible for checking the accuracy of his or her initial
registration form and any subsequent forms submitted to the Registrar’s
Office, for ensuring that the office is provided with a correct current term
address, and for carefully reviewing the Status of Registration on WebSIS
to make sure that it accurately reflects his or her registration. Steps to
eliminate any discrepancies should be taken promptly by the student.
The student should keep copies of the original registration form and all subse-
quent correction forms as evidence of having followed these procedures.

If an undergraduate wishes to add or drop a subject or to make or change a
P/D/F designation after the deadline dates, the student must petition the Committee on Academic Performance (CAP), Room 7-104.
Graduate students must petition the Graduate Students Office, Room 3-
138. Such petitions are not automatically approved.

An undergraduate student who wishes to withdraw during a term or ar-
range for a leave of absence must see a dean in Student Support Services,
Room 7-104. Graduate students should consult their registration officer,
department graduate office, or the Graduate Students Office, Room 3-138.
International students should also consult the International Students
Office, Room 5-133.

In order to receive a degree, a student must submit an SB Degree
Application or Advanced Degree Application by the deadline established in
the Academic Calendar for each term. A degree will not be awarded unless
all financial obligations to the Institute are clear and there are no pending
disciplinary actions.

Prerequisites
Prerequisites are used to indicate the sequence in which subjects are to be
taken and the base of knowledge on which a particular subject will build.
Before taking a subject, a student should complete any prerequisite(s)
listed in Part 3 for that subject. (Co-requisites, which are listed in italics,
are to be taken concurrently.)

Once prerequisites and co-requisites are included in a subject listing, it is
the responsibility of the instructor to ensure that the subject is taught at
that level. At the first class, instructors should reiterate the prerequisites
and co-requisites, and describe acceptable substitutions.

Students who do not have the stated prerequisites should obtain the
permission of the instructor. Instructors may request that the Registrar’s
Office identify students without prerequisites, and in some cases, screen
them from the subjects.

If the instructor allows a student to waive or make a substitution for a
prerequisite, it is then the student’s responsibility to master any missing
background material in a timely fashion so that the content of the subject
does not change for other students in the subject.

The instructor may determine that a student does not have the required
preparation and knowledge to take a subject and may, with the help of the
Registrar’s Office, exclude the student from the subject.

Some departments require students with a D-level performance in
certain prerequisite subjects within the departmental program to do
additional work or to retake the prerequisite before proceeding with the
follow-on subject.

Credit Hours and Designations for Subjects
The credit hours (units) for each subject indicate the total number of hours
spent each week in class and laboratory, plus the estimated time that the
average student spends each week in outside preparation, for one regular
term. Each subject is listed in Part 3 with three credit numbers, showing in
sequence the units allotted to class; laboratory, design, or fieldwork; and
preparation. Each unit represents about 14 hours of work per term. The
total unit credit for a subject is obtained by adding together all the units
shown. Additional information regarding subject designations may be
found in the Explanatory Notes that introduce Part 3.

The typical undergraduate student load, based on a four-year program,
is 45 to 54 units per term (four or four and one-half subjects). However,
if approved by his or her faculty advisor, a student may follow a program
leading to an SB degree in more or less than eight terms.

Light-Load Registration by Undergraduates
The Institute feels that the concept of a four-year residential college,
requiring a full-time academic program, is central to the MIT undergraduate
experience. An MIT degree represents not only a specified number of
credit units and a collection of subjects, but an intensity and continuity of
involvement in an academic enterprise and an immersion in the culture
of MIT as well. In general, MIT is not an appropriate place for pursuing an
undergraduate education on an extended, part-time basis.

Requests from students for light-load registration status are handled
under the following policy. Once enrolled as a regular student, an under-
graduate may not carry a light load of subjects (register for fewer than 32
units) for more than a total of two terms without petitioning the Committee
on Academic Performance (CAP). The CAP allows use of the light load
beyond a second term only for very special circumstances. Arrangements
to take a reduced load of subjects should be initiated prior to the begin-
ning of the term; the student’s term bill will reflect the light-load tuition
rate if the light-load petition form is submitted several months before the
beginning of the term. The procedure to be followed in submitting a light-
load petition is described on the form, as well as in the Academic Guide
for Undergraduates and Their Advisors. Light-load tuition adjustments are
not normally available to students who are (or were) in cooperative and
internship programs.

Undergraduates taking a light load should check with the student loan
counselors at the Student Services Center about possible adjustments in
aid and, if taking less than a half-time load (as defined in the registration
instructions published each year, but generally below 18 units) should
check with the student loan counselors regarding possible impact on the
repayment and grace period of outstanding loans.

International students are required by immigration regulation to be full-
time students (36 or more units) during the academic year. Light loads can
be carried only under very special circumstances with the approval of the
international student advisor.
Advanced Standing Examinations for Undergraduates

Advanced Standing Examinations are given in August/September, December, January/February, and May. These examinations may be taken only by students who have never been registered for or attended class at MIT in the subject concerned. Special students are not eligible to take Advanced Standing Examinations.

Except for entering freshmen and transfer students, who may take Advanced Standing Examinations offered during Orientation, students must petition to take an Advanced Standing Examination. The petition must be approved by the faculty member in charge of the subject and by the student’s advisor. The petition must be submitted to the Schedules Office, Room 5-111, at least three weeks before the first day of the examination period. For more information, see the Advanced Standing Exam schedule, at http://web.mit.edu/registrar/www/schedules/advst.html.

Students interested in taking higher-level examinations should check in advance what preparation is required. The instructor may require evidence of competence in addition to the examination if the student normally involves measures of student performance that are qualitatively different from the examination.

A freshman in the first term who achieves C or better performance on an Advanced Standing Examination will receive the grade P, as well as credit for the subject. For freshmen, such credit will be counted toward the 54- or 57-unit credit limit for the current term if the examination is taken during the September examination period; nonpassing D or F grades on Advanced Standing Exams taken later in the freshman year will be posted on the internal record but not on the external transcript.

An internal record is kept of all grades for Advanced Standing Examinations taken by transfer students. If a transfer student is granted ABC/ No External Record grade reporting in his or her first term, grades for any Advanced Standing Examinations taken at the beginning or end of that term will have only A–C grades reported on the external transcript. If the examination is taken at the end of term, the credit earned would count toward the student’s 57-unit credit limit.

For all other students, including transfer students on regular grade reporting, a grade ranging from A through F will be recorded on the student’s internal record and external transcript.

A grade on an Advanced Standing Examination will not be incorporated in the student’s term or cumulative rating. A passing grade entitles the student to full credit for the subject.

If a student is on academic warning, an Advanced Standing Examination taken during the term will count toward the student’s 48-unit credit limit. Examinations taken in September or February will not count toward the credit limit.

If a student fails an Advanced Standing exam, he or she may not retake the exam, but may register for the same subject in any subsequent term.

Grade Reports and Transcripts

Students may view their grade reports on WebSIS. Students may request transcripts of their academic record at the Student Services Center, Room 11-120. Transcripts are available in an unofficial version free of charge or in an official version at a cost currently set at $4 per copy. The unofficial version is printed on blank paper and does not have an official seal or the Registrar’s signature.

Term Regulations and Examination Policies

These term regulations and examination policies derive from Rules and Regulations of the Faculty, available at http://web.mit.edu/faculty/rules/. They apply to academic exercises during the fall and spring terms. Questions of interpretation and requests for exceptions to regulations should be referred to the Chair of the Faculty.

All Subjects

Class Times. Exercises should, in general, be held between 9 am and 5 pm, Monday through Friday. Exercises begin five minutes after and end five minutes before the scheduled hour or half-hour.

Beginning of Term. Early in the term, the faculty member should inform students of expectations regarding permissible academic conduct. Particular attention should be given to such questions as the extent of collaboration permitted or encouraged, and the use of prior years’ materials in completing problem sets, lab reports, and other assignments.

Scheduling Final Examinations. Final examinations are held during the final examination period at the end of each term, and are scheduled through the Schedules Office. A final examination should last at least one hour and not more than three hours. Final examinations may not be cancelled once they are announced, and, after the final examination schedule is published, the time of the final examination may not be changed.

Students are responsible for attending the final examinations in subjects for which they are registered. The schedule is issued several months before the examination period. Students are responsible for obtaining examination schedules and reporting any conflicts in examinations to the Schedules Office before the time limit given on the examination schedule.

After the Last Scheduled Class. No classes, examinations, or exercises of any kind may be scheduled after the last regular scheduled class in a subject except for final exams scheduled through the Schedules Office. Formal review should be held during regular class periods, but the rule does not exclude the possibility of sessions after the last day of classes at which the instructing staff is available to answer questions of students who choose to attend. (The architecture design reviews that occur during finals week are considered to be equivalent to final examinations and are scheduled by the Department of Architecture.)

An instructor may give an extension to an individual student, but blanket extensions should not be given to the entire class.

Excused Absences from Final Examinations. A student may be excused from a scheduled final examination for reasons of illness or significant personal problems. Undergraduates should contact a dean in Student Support Services and graduate students should contact the dean for graduate students if they wish to seek an excused absence; faculty members with questions about this process should contact the appropriate office. See definition of “O” and “OX” under Grades.

The faculty member in charge of a subject may excuse a student from a final examination for such reasons as conflicts either between examinations or with religious holidays. In these cases, a mutually satisfac-
tory agreement should be reached between the student and the faculty member, the agreement ratified in advance of the examination by the head of the department in which the subject is offered, and the faculty member prepared to submit a grade based on other evidence.

**Undergraduate Subjects**

**Class Times.** For undergraduate subjects, during the instructional period of the fall and spring terms, there should be no required academic exercises between 5 pm and 7 pm, Monday through Thursday, and between 5 pm Friday and 8 am Monday.

**Beginning of Term.** By the end of the first week of classes, the faculty member must provide:

- a clear and complete description of the required work including the number and kinds of assignments;
- the approximate schedule of tests and due dates for major projects;
- whether or not there will be a final examination; and
- the grading criteria and procedures to be used.

By the end of the third week, the faculty member must provide the precise schedule of tests and major assignments.

**Tests and Academic Exercise Outside Scheduled Class Times.** Tests, required reviews, and other academic exercises held outside scheduled class times should not be held on Monday nights.

In addition, tests should:

- not exceed two hours in length;
- be scheduled through the Schedules Office; and
- begin no earlier than 7:30 pm when held in the evening.

A student who is unable to take the test owing to a conflict with a scheduled academic exercise or extracurricular activity must be allowed to do so at another time.

When a test is held outside scheduled class time, during that calendar week:

- a regularly scheduled class hour (lecture or recitation) should be cancelled, or
- no assignment should fall due.

**Final Examinations.** In some undergraduate subjects, final examinations may be *ex camera* (out-of-room) examinations. *Ex camera* examinations are a different mode of testing intended to give students access to computers and libraries and evaluate their abilities to select resources and answer questions of an integrative nature. *Ex camera* final examinations are not intended as a way to increase the amount of material covered.

A faculty member must obtain the permission of the Chair of the Faculty to hold *ex camera* final examinations. Permission will be granted for no more than five years. The *ex camera* examination must:

- be offered over the course of a single afternoon-starting at 1:30 pm and ending no later than 7:30 pm; and
- permit students unrestricted use of resources.

**End-of-Term Tests and Assignments.** The Friday preceding the start of the Reading Period is defined as the Last Test Date. No tests will be held after this date until the Final Examination Period.

If a subject has a final examination, no assignment may fall due after the Last Test Date.

If a subject does not have a final examination, at most one assignment may fall due between the Last Test Date and the end of the last scheduled class period in the subject. This single assignment may include both an oral presentation and a written report if the two derive from the same project.

Optional assignments between the Last Test Date and the last scheduled class period in the subject should be for self-study, and may not be used toward part of the grade in a subject, even for extra points or as substitutes for earlier assignments.

**Graduate Subjects**

**Beginning of the Term.** By the end of the third week, the faculty member must provide:

- a clear and complete description of the required work, including the number and kinds of assignments;
- the schedule of tests and due dates for major projects;
- whether or not there will be a final examination; and
- the grading criteria and procedures to be used.

**Tests and Academic Exercise Outside Scheduled Class Times.** A student who is unable to take a test that is held outside of scheduled class time owing to a conflict with another scheduled academic exercise or extracurricular activity must be allowed to do so at another time.

**End-of-Term Tests and Assignments.** For each subject with a final examination, no test should be given and no assignment, term paper, or oral presentation should fall due after the Friday preceding the start of the Reading Period.

For each subject without a final examination, at most, either one in-class test may be given, or one assignment, term paper, or oral presentation may fall due between the Friday preceding the start of the Reading Period and the end of the last regularly scheduled class in the subject. An in-class test given during this period is limited to one normal class period (or to one and one-half hours, whichever is shorter).

**Policy for Emergency Closing during Final Exams or on Registration Day**

Every effort must be made to give final exams as scheduled during the final examination period. Because students have included the final exam in their planning for the subject, faculty members may not choose to cancel exams; they must give the exam as scheduled, or as rescheduled in the event the Institute is closed because of snow or other emergency (see below).
• In case of inclement weather during exams, getting to MIT may be difficult for individuals involved with proctoring an exam. Thus, it is the responsibility of the department and the faculty member in charge to provide in advance for alternate staff who are physically at MIT and who have access to the written exam questions. Exam proctors will accommodate late student arrivals to the extent possible.

• In case of emergency closing or delayed opening during exams, students, faculty, and staff can call 617-258-8378 (258-TEST) to get up-to-date information during exam week. In the event of an emergency closing or delayed opening, callers receive specific instructions regarding rescheduled exam times and locations. The SNOW line (253-SNOW) refers callers to 258-TEST for exam information.

• If the Institute is closed, the exams scheduled during that period are postponed to the next available "contingency" exam periods, usually evenings 6-9 pm through the last day of the exam period, and either the second day of IAP (fall exams) or the day following the exam period (spring exams). If MIT has a delayed opening, for example, 10 am, then the starting times for exams is delayed. Details are given on the telephone line 258-TEST.

• Students who miss exams given at the rescheduled times will be excused; faculty should submit the interim grade O, to which an "X" will be added routinely. These students will take a postponed final exam given near the beginning of the next regular term.

If the Institute is closed during part or all of Registration Day, students, faculty, and staff can call 617-258-8378 to get up-to-date information regarding rescheduled registration activities.

Student Absence for Religious Observances
Massachusetts state law regarding student absence due to religious beliefs has been adopted by the Institute as follows:
Any student who is unable to attend classes or participate in any examination, study, or work requirement on a particular day because of his or her religious beliefs is excused from any such activity. The student will be given the opportunity to make up the work that was missed, provided that the makeup work does not create an unreasonable burden upon MIT.

The Institute will not levy fees or charges of any kind when allowing the student to make up missed work. In addition, no adverse or prejudicial effects will result because students have made use of these provisions.

Academic Performance and Grades

Undergraduate Academic Standards
The Committee on Academic Performance (CAP) ensures that the minimum academic standards proposed by the individual departments for undergraduate students are consistent throughout the Institute and conform to the rules and regulations approved by the faculty. In view of the individual nature of student academic performance, the CAP does not establish rigid standards of academic performance to be used throughout the Institute.

The Institute generally expects undergraduate students to complete the requirements for a single SB degree in four years; the usual load of subjects is approximately 45–54 units of credit per term. Normally, however, the CAP accepts a minimum academic record of at least 36 units of credit with a term rating of 3.0 or above (on a 4.0 scale) at the end of any regular term, unless the Committee has specifically notified an individual student that a higher level of performance is required. (The latter would only occur as a result of previously poor performance.)

When these criteria are not met, the CAP considers each student’s academic performance on an individual basis. Consideration is given not only to the grades received in the various subjects for which the student is registered, but also to the total number of subject units, the nature of the subjects themselves, progress toward the degree, and those factors in the student’s own personal situation that may have affected his or her academic performance in a given term. The Academic Guide for Undergraduates and Their Advisors gives more detailed information concerning the end-of-term procedures followed by the CAP in reviewing the academic records of undergraduate students. Published by the CAP and the Office of Academic Services, this resource is available at the website http://web.mit.edu/acadinfo/undergrad/academic-guide/. For further information, contact the CAP Office, Room 7-104, 617-253-4164, or visit the CAP website at http://web.mit.edu/acadinfo/cap/.

In order to receive federal financial aid under Title IV, an undergraduate student is considered to be making satisfactory progress as long as at least 33 units per term have been completed with a term rating above 3.0 at the end of any regular term. All undergraduates whose performance falls below this standard will be considered, for Title IV purposes, to be under CAP review during the subsequent term. A student will be considered to be making satisfactory progress unless the CAP withdraws permission for the student to continue.

Graduate Academic Standards
It is the responsibility of the Committee on Graduate School Programs (CGSP) to monitor minimum academic standards for graduate students and special students in accordance with the rules and regulations of the faculty. The CGSP reviews the academic records of all graduate students at the end of each term (including the summer session), giving particular attention to students with cumulative ratings below 3.5 to 4.0. Consideration is given to low grades and factors affecting a student’s ability to meet the requirements for the degree program in which he or she is enrolled.

Recommendations for action by the CGSP are made by departmental graduate committees. Unless extenuating circumstances are found, students who are not making satisfactory progress towards a degree may be denied permission to continue or may be warned that without substantial improvement the following term, they may be refused further registration.

More detailed information concerning procedures followed by CGSP may be found in the online publication, Graduate Policies and Procedures, at http://web.mit.edu/gso/gpp/. It is also important for students to be informed about individual department requirements and expectations concerning academic performance.

In order to receive federal financial aid under Title IV purposes, a graduate student is considered to be making satisfactory progress as long as his or her cumulative grade point average exceeds 4.0, and if the number of terms of enrollment does not exceed five for a master’s candidate or 10 for a PhD or ScD candidate. Graduate students whose performance falls
Grades

Grades at MIT are not rigidly related to any numerical scores or distribution functions, that is, grades are not awarded solely according to predetermined percentages. As can be seen from the following grade descriptions, a student’s grade in a subject is related more directly to the student’s mastery of the material than to the relative performance of his or her peers. In determining a student’s grade, consideration is given for elegance of presentation, creativity, imagination, and originality where these may appropriately be called for.

Passing Grades. Undergraduate and graduate students who satisfactorily complete the work of a subject by the end of the term receive one of the following grades:

A Exceptionally good performance demonstrating a superior understanding of the subject matter, a foundation of extensive knowledge, and a skillful use of concepts and/or materials.

B Good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and an ability to handle the problems and materials encountered in the subject.

C Adequate performance demonstrating an adequate understanding of the subject matter, an ability to handle relatively simple problems, and adequate preparation for moving on to more advanced work in the field.

D Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating deficiencies serious enough to make it inadvisable to proceed further in the field without additional work. Some departments require students with D-level performance in certain prerequisite subjects within the departmental program to do additional work, or to retake the prerequisite, before proceeding with the follow-on subject.

P When use of the passing grade P is authorized, it reflects performance at the level A, B, or C, with the student graded on a P/D/F basis. Note that the internal use of plus (+) and minus (-) modifiers does not affect use of the P grade.

Non-Passing Grades. The grades and notations used for subjects not passed or not completed by the end of the term are as follows.

DN Signifies a D grade on Freshman Pass/No Record.

F Failed. This grade also signifies that the student must repeat the subject to receive credit.

FN Signifies an F grade on Freshman Pass/No Record.

O Absent. This grade indicates that the student was progressing satisfactorily during the term but was absent from the final examination, did not turn in the final paper or project, and/or was absent during the last two weeks of the term. Like an F grade, an O grade carries no credit for the subject, but the O grade can be converted to a grade of OK. Unsatisfactory performance because of absence throughout the term should be recorded as F.

OX Absence satisfactorily explained to and excused by a dean in Student Support Services in the case of an undergraduate student or by the dean for graduate students in the case of a graduate student. The faculty member in charge of the subject will be notified when an O is changed to an OX. An OX carries no credit for the subject. However, the faculty member in charge must provide the student the opportunity to receive a credit-carrying grade. This may be done with or without the instructor requiring a make-up final examination or other additional evaluation procedure.

I Incomplete. The grade I indicates that a minor part (less than one-fifth) of the subject requirements has not been fulfilled and that a passing grade is to be expected when the work is completed. The grade I for the term remains permanently on the student’s record even when the subject is completed. A typical example of a “minor portion of the work required” might be a paper or a laboratory report. The work is to be completed before Add Date of the succeeding term of the regular academic year; however, the faculty member in charge, in negotiation with the student, has the right to set an earlier or later date for pedagogical reasons or extenuating circumstances.

Graduate students may extend the five-week deadline with the explicit approval of the faculty member in charge. To complete an Incomplete after the five-week deadline, graduate students must petition the dean of graduate students. A final grade will not be posted until an approved petition is received in the Registrar’s Office.

The instructor is required to submit an Instructor’s Report form for a grade of I reported for an undergraduate. On the form, the instructor provides the date by which the outstanding work is to be completed and a default final grade. The default final grade represents the grade the student would have earned, using appropriately low scores for the missing work. If the subject has not been completed by Add Date of the succeeding regular term, the default final grade will be posted to the student’s record unless a later deadline has been specifically agreed upon by the instructor and the student.

No grade of I can be assigned to any undergraduate in the term in which he or she graduates. All grades of Incomplete awarded prior to fall 1996 must be resolved prior to graduation.

J A notation assigned for work such as thesis, UROP, Special Topics, or “At Plant” registration (internship or industrial practice), which has progressed satisfactorily, but has not been completed. Grade given upon completion of the work in a later term also covers this term. Faculty members must obtain approval from the Committee...
on Curricula or the Committee on Graduate School Programs to use the grade of J in subjects other than those mentioned above.

U A notation for thesis work that has not been completed and in which progress has been unsatisfactory. Grade given upon completion of the work in a later term also covers this term. Unless a student’s progress improves significantly, the student may expect that grade to be failing.

T Temporary notation. It is used for subjects which cover the equivalent of one term’s work, but are scheduled over parts of two normal grading periods. Prior approval must have been obtained from the Committee on Curricula for undergraduate subjects or the Committee on Graduate School Programs for graduate subjects. This notation is recorded only on the student’s internal record. A permanent grade must be assigned when the subject is finished.

Other Notations. The following notations are also used on the academic record.

S Notation for credit awarded for work done elsewhere.
SA Notation for satisfactorily completed doctoral thesis. Doctoral theses are not graded.
DR A notation to be used only on the student’s internal record for a subject dropped after the fifth week of the regular term.
LIS A notation to be used on the student’s internal record for a subject the student registered for as a listener.
URN A notation for a subject in UROP taken for pay or as a volunteer.

INSTITUTE REGULATIONS

Policies and Procedures
MIT expects that all students come to the Institute for a serious academic purpose and expects them to be responsible individuals who conduct themselves with high standards of honesty and personal conduct. Disappointments in this expectation have been rare. Therefore, it is MIT’s policy to maintain rules and regulations consistent with efficient administration and the general welfare of the MIT community.

Fundamental to the principle of independent learning and professional growth is the requirement of honesty and integrity in conduct of one’s academic and nonacademic life. Maintenance of a healthy living and learning environment requires that all members of the community exercise due respect for the basic rights of one another.

Academic Integrity
Cheating, plagiarism, unauthorized collaboration, and other forms of academic dishonesty are considered serious offenses for which disciplinary penalties can be imposed.

Early in the term, the instructor should inform students of expectations regarding academic conduct in the subject. See the information on Term Regulations earlier in this section.

Some academic offenses by students can be handled directly between the faculty member and the students involved. In some cases, it may be necessary for the department head to review, or otherwise to assist in, the resolution of the matter. When a dispute cannot be resolved satisfactorily within the department, or if it seems appropriate, a complaint against a student can be brought to the Committee on Discipline, or the dean for student life, as explained in the section on Complaint and Disciplinary Procedures.

Institute Policy on Harassment
Harassment of any kind is not acceptable behavior at MIT; it is inconsistent with the commitment to excellence that characterizes MIT’s activities. MIT is committed to creating an environment in which every individual can work, study, and live without being harassed. Harassment may therefore lead to sanctions up to and including termination of employment or student status.

Harassment is any conduct, verbal or physical, on or off campus, that has the intent or effect of unreasonably interfering with an individual’s or group’s educational or work performance at MIT or that creates an intimidating, hostile or offensive educational, work or living environment. Some kinds of harassment are prohibited by civil laws or by MIT policies on conflict of interest and nondiscrimination (see relevant sections of Policies and Procedures).

Harassment on the basis of race, color, gender, disability, religion, national origin, sexual orientation or age includes harassment of an individual in terms of a stereotyped group characteristic, or because of that person’s identification with a particular group.

Sexual harassment may take many forms. Sexual assault and requests for sexual favors that affect educational or employment decisions constitute sexual harassment. However, sexual harassment may also consist of unwanted physical contact, requests for sexual favors, visual displays of degrading sexual images, sexually suggestive conduct, or offensive remarks of a sexual nature.

The Institute is committed under this policy to stopping harassment and associated retaliatory behavior. All MIT supervisors have a responsibility to act to stop harassment in the areas under their supervision.

Any member of the MIT community who feels harassed is encouraged to seek assistance and resolution of the complaint. To implement the policy on harassment, MIT provides a variety of avenues by which an individual who feels harassed may proceed, so that each person may choose an avenue appropriate to his or her particular situation. Institute procedures are intended to protect the rights of both complainant and respondent, to protect privacy, and to prevent supervisory reprisal.

MIT’s policy on harassment appears in the guide Dealing with Harassment at MIT, which is available on the website at http://web.mit.edu/communications/hg/). General complaint procedures are described in MIT Policies and Procedures Section 9.6, and on the website at http://web.mit.edu/policies/9.6.html.

Institute Policy on Hazing
In accordance with Massachusetts state law (Chapter 269:17-19), the Institute has adopted the following policy statement on the crime of hazing.

The term “hazing” as used in this section and in sections eighteen and nineteen, shall mean any conduct or method of initiation into any student
organization, whether on public or private property, which willfully or recklessly endangers the physical or mental health of any person. Such conduct shall include whipping, beating, branding, forced calisthenics, exposure to the weather, forced consumption of any food, liquor, beverage, drug or other substance, or any other brutal treatment or forced physical activity which is likely to adversely affect the physical health of any person, or which subjects such person to extreme mental stress, including extended deprivation of sleep or rest or extended isolation.

Pursuant to the law, whoever is identified as a principal organizer or participant in the crime of hazing, shall be punished by a fine of not more than three thousand dollars or by imprisonment for not more than one year, or both.

Any person that knows that another person is the victim of hazing as defined in section 17 and is at the scene of such crime shall, to the extent that such person can do so without danger or peril to himself or others, report such crime to MIT Police or an appropriate law enforcement official for area where incident occurred as soon as practicable, to the extent that he or she can do so without danger to himself or herself, or others. Whoever fails to report such crime shall be punished by a fine of not more than $1,000.

The Office of Student Life Programs or the Department of Athletics, Physical Education and Recreation will provide a copy of the law to the heads of all groups, teams and student organizations. Each group, team or organization shall distribute a copy of the law to each of its members, plebes, pledges or applicants for membership. It shall be the duty of each such group, team or organization, acting through its designated officer, to deliver annually, to the Office of Student Life Programs (with exception of varsity teams and club sports, who may deliver acknowledgements to the Department of Athletics, Physical Education and Recreation) an acknowledgement stating that such group, team or organization has received a copy of the law, that each of its members, plebes, pledges, or applicants has received a copy of the law, and that such group, team or organization understands and agrees to comply with the provisions of this section and sections 17 and 18. Copies of the law are available at the Office of Student Life Programs and the Department of Athletics, Physical Education and Recreation.

MIT considers acts of hazing to be extremely serious offense to the community and will treat offenders accordingly.

**Statement on a Drug-Free Campus and Workplace**

Alcohol abuse and the use of illegal drugs can significantly affect the MIT community. Such abuses are harmful to relationships and family life, work and creativity, and study and research. The Institute is committed to assisting members of the MIT community in facing the challenge that drug use and alcohol abuse represent. A list of resources to help those who are facing substance abuse is included at the end of this section.

In response to this concern and in conjunction with federal laws pursuant to the Drug-Free Schools and Communities Act of 1989 and the Drug-Free Workplace Act of 1988, MIT has a comprehensive program to prevent the use of illicit drugs and the abuse of alcohol and distributes the following information to students and employees.

**Standards of Conduct**

MIT regulations prohibit the unlawful possession, use, manufacture, distribution, dispensation, and sale of illicit drugs by Institute students and employees on its property or as a part of any of its activities.

MIT observes all laws and regulations governing the sale, purchase, and serving of alcoholic beverages by all members of its community and expects that these laws, regulations and procedures will be adhered to at all events associated with MIT. This includes activities on the MIT campus, in MIT independent living groups, in any work area, and at off-campus functions sponsored and supported by MIT or any of its affiliated groups. The acquisition, possession, transportation and consumption of alcohol by individuals under 21 years of age is prohibited by law and Institute policy.

No alcoholic beverages may be served or consumed in any work area of the Institute at any time, except in Institute dining areas or at official Institute functions when expressly authorized by a member of the Academic Council.

MIT students and employees are subject to all applicable drug and alcohol policies including policies set forth in the MIT’s *Policies and Procedures* manual (9.0 Relations and Responsibilities within the MIT Community: 9.3.2 Policy on the Use of Alcohol; 9.3.3 Policy Regarding a Drug-Free Workplace), MIT’s Personnel Policy Manual (3.1 Conditions of Work and Personal Conduct: 3.1.3 Policy Regarding the Use of Alcohol; 3.1.4 Policy Regarding A Drug-Free Workplace at MIT), the Institute’s Alcohol Policies and Procedures (http://web.mit.edu/alcohol/), and other applicable rules when adopted.

**University Discipline**

Members of the MIT community who are found to be in violation of MIT’s alcohol or drug policies will be held accountable for their actions. Violation of MIT regulations can result in disciplinary action up to and including expulsion for students, required completion of a rehabilitation program, discharge/termination for employees, and/or legal prosecution in accordance with state and federal regulations.

Federal law requires that all employees engaging in the performance of work supported by a federal grant or contract, as a condition of employment, must notify the Institute of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after the conviction. Failure to report a conviction is grounds for dismissal. The Institute must notify the contracting party or granting agency within 10 days after receiving notice from the employee or otherwise receiving actual notice of such conviction. Notification of the federal agencies will be made by the Office of Sponsored Programs. Federal law also requires MIT to impose a sanction on the convicted employee within 30 days of receiving notice of the conviction, or to require the employee to participate satisfactorily in an approved drug treatment program, or both. Department heads and other supervisors, in consultation with the Human Resources Office, are responsible for imposing sanctions or alternative requirements.

**Legal Sanctions**

Local, state, and federal laws also prohibit the unlawful possession, use, distribution and sale of alcohol and illicit drugs. Criminal penalties for
violation of such laws range from fines to imprisonment for terms up to and including life.

Conviction of a drug crime can disqualify a student from receiving financial aid. A first offense carries a one-year disqualification, a second offense a two-year disqualification, and a third offense makes the student ineligible indefinitely. Convictions for selling drugs cause ineligibility for two years from the date of conviction for the first offense, and indefinitely after the second offense. A student can regain eligibility by successfully completing an approved drug rehabilitation program.

**Health Risks**

The health consequences of substance abuse may be immediate and unpredictable, such as fatalities associated with alcohol poisoning, or more subtle and long term, such as liver and brain damage associated with the prolonged use of alcohol. Some of the serious health risks associated with substance use are provided below.

In addition to health related problems, alcohol abuse and substance use is associated with financial difficulties, interpersonal conflicts, domestic violence, deterioration of the family structure, accidental injuries or fatality, and may significantly impact academic and work performance.

Selected drugs and their effects:

- Alcohol and other depressants (barbiturates, sedatives, and tranquilizers): addiction, depression, accidents as a result of impaired ability and judgment, potential for fatal overdose, damage to a developing fetus, heart, liver, and brain damage
- Marijuana: memory impairment, affects thinking and physical coordination, and impairs driving ability. Can elevate anxiety and cause a panic reaction. Has also been associated with an increase risk of lung cancer and emphysema. Can interfere with judgment, attention span, concentration and overall intellectual performance.
- Cocaine: addiction, heart attack, seizures, lung damage, severe depression, paranoia, toxic psychosis. Similar risks are associated with other stimulants, such as speed and uppers.
- Hallucinogens (e.g., LSD, PCP, MDMA): unpredictable behavior, emotional instability, violent behavior, paranoia, psychosis, organic brain damage in heavy users, convulsions, coma.
- Narcotics (e.g., heroin, Demerol, morphine, codeine): addiction, accidental overdose, risk of hepatitis and AIDS infection from contaminated needles.
- Inhalants (gas, aerosols, glue, nitrites, nitrous oxide): loss of consciousness, suffocation, damage to brain and central nervous system, sudden death, nausea and vomiting, nosebleeds, disorientation, panic.
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- Inhalants (gas, aerosols, glue, nitrites, nitrous oxide): loss of consciousness, suffocation, damage to brain and central nervous system, sudden death, nausea and vomiting, nosebleeds, disorientation, panic.

**Resources**

A variety of resources exist for alcohol and other drug prevention education, counseling and referral. Referrals will respect individual confidentiality.

For alcohol, drug or other health related information, including resources provided by MIT or agencies in the Cambridge/Boston community:

- Office of Community Development and Substance Abuse Programs at 617-253-3276
- Student Support Services at 617-253-4861
- Personal Assistance Program (for employees) at 617-253-4911
- Student Support Services at 617-253-4861
- Mental Health Service of the MIT Medical Department at 617-253-2916
- MIT Alcohol Support Group at 617-253-2916
- AA — Alcoholics Anonymous (campus support meeting) at 617-253-2916
- For counseling, referral, treatment or recovery information:
  - AA — Alcoholics Anonymous (campus support meeting) at 617-253-2916
  - MIT Alcohol Support Group at 617-253-2916
  - For additional information regarding state and federal regulations and sanctions, and the effects of alcohol and controlled substances, contact the Community Development and Substance Abuse Programs at 617-253-3276.

**Other Personal Conduct**

All members of the MIT community are expected to conduct themselves with proper respect for one another and for each other’s property.

Improper use of Institute property or facilities, including keys, computers, telephones, and so forth, or misuse of MIT’s name, or violation of Institute regulations, may result in disciplinary proceedings within the Institute, or legal proceedings outside of MIT, or both.

Off-campus misconduct may be a basis for MIT action when the Institute considers such misconduct to be a violation of the standards of behavior expected of members of the MIT community that makes it appropriate for the Institute to review the matter. The Institute reserves the right to determine its jurisdiction on a case-by-case basis. Student status in no sense renders an individual student immune from the jurisdiction of civil or criminal courts and other governmental authorities. MIT actions will take into account applicable law as well as the policies and procedures of the Institute and the standards of behavior expected of members of the educational community.

MIT handles internally some incidents that might give rise to civil or criminal liability. This is done with the understanding by the outside community that MIT deals seriously with such offenses. As is the case for many universities, local authorities often rely on MIT to resolve such issues as long as the internal policies and procedures are effective and adequate. MIT action by itself, however, does not preclude the possibility of other judicial remedy.

If an infraction causes a student to be involved both in Institute disciplinary proceedings and in criminal proceedings, and if an Institute decision might prejudice the court case, the Institute will usually hold its final decision in abeyance until after the criminal proceedings have been concluded.

MIT traditionally has placed considerable responsibility on students’ governing groups to deal with problems in the student community. Problems and disputes that cannot be resolved at the local level can be referred to the Office of the Dean for Student Life or the Committee on
Discipline for advice, guidance, mediation, or resolution. Contact the Office of Student Discipline (W32-131) for more information on these procedures or see the website at http://web.mit.edu/discipline/.

Complaint and Disciplinary Procedures
Students who believe that they have been treated improperly for any reason are encouraged to raise their concerns. Difficulties with other students can be pursued within the living group, department, other appropriate venues or groups, or else brought to the Committee on Discipline or the Office of Student Discipline (W32-131). Concerns relating to academic or work situations should be raised directly with professors, instructors, academic advisors, and immediate work supervisors, as appropriate to the nature of the problem.

If a problem cannot be resolved at this level, students should either seek assistance from their department head or dean or avail themselves of the assistance of the Office of the Dean for Student Life or Graduate Students Office. In situations where a student feels wrongly accused or unjustly penalized, the student may request advice and assistance from the Office of the Dean for Student Life regarding the possibility of further discussion among the parties or referral of the case to the Committee on Discipline. Students may also bring concerns to the attention of an ombuds-person in the Office of the President.

It is Institute policy that individuals will not be reprimanded or discriminated against for initiating an inquiry or complaint and that the rights of the individual against whom a complaint is made will be protected.

Anyone in the MIT community—including individual students, faculty members, and employees of the Institute—may bring a formal complaint against a student to the Committee on Discipline. The committee is composed of six faculty members, five students, the dean for undergraduate education, ex officio, and the dean for student life, ex officio. It adjudicates cases of academic offenses, violations of Institute regulations and standards, and other infractions alleged to have been committed by students.

A formal complaint against a student must be submitted in writing to the Office of the Dean for Student Life or to the chairperson of the Committee on Discipline. There are procedures to protect the rights of a student, including assistance in preparing a response to a complaint. The student who has been charged may select an advisor from the MIT community to assist him or her in preparing a response to the charge(s) and to attend the committee hearing with the student; the person making the charge has the same rights. Statements at a committee hearing are made by the person who brought the charge, by the student who is charged (if he or she chooses to speak), and by witnesses. Detailed procedures of the Committee on Discipline are available from the Office of Student Discipline (W32-131).

Among the sanctions available to the Committee on Discipline are reprimand, informal probation, formal probation with or without monitoring, removal from housing, and recommendation to the president that the student be suspended or expelled. Formal probation, suspension, and expulsion are noted on the student's transcript for a specified period. Such notation may be removed upon written application to the committee under conditions set forth in the statement referenced earlier.

This procedure serves also as the grievance procedure for students as required by Title IX of the Higher Education Act of 1972 with regard to grievances arising out of alleged discrimination on the basis of sex, and for disabled students alleging failure to comply with Sections 503 and 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Inquiries concerning the Institute’s policies and compliance with applicable laws, statutes, and regulations (such as Title IX and Section 504) may be directed to the vice president for human resources, Room Es9-291, 617-253-6512.

A complaint against anyone employed by MIT may go to the immediate or higher supervisor of the apparent offender, or to the Human Resources Office on campus or at Lincoln Laboratory.

A description of the complaint procedures for persons employed at MIT is included in Policies and Procedures. Refer to the guide Dealing with Harassment at MIT for the rules and regulations of the Committee on Discipline as well as procedures for formal hearings of the Office of the Dean for Student Life. Both publications are available in the Information Center, Room 7-121, and on MIT’s website.

Voter Registration
Voter registration forms and instructions are available in the Student Services Center, Room 11-120, and at the registration location on fall and spring term Registration Day.

Privacy of Student Records
MIT’s Student Information Policy governs the circumstances under which, and the persons to whom, student information may be disclosed, as well as students’ rights to access their own records and to challenge their accuracy. As required by federal law, this policy includes the rights and privacy protections provided by the Family Educational Rights and Privacy Act (Title 20, US Code, section 1232g, often referred to as “FERPA” or the “Buckley Amendment”).

The following summarizes in general terms the major student rights under FERPA. For more detailed information, the policy in its entirety should be consulted. The full text of MIT’s Student Information Policy may be found on the web at http://web.mit.edu/policies/sip/, or in printed form at the MIT Libraries and at the MIT Information Center, Room 7-121.

Education Records
Under FERPA, education records include most tangible materials, including computer records, maintained by MIT that relate directly to an identifiable student currently or formerly enrolled at MIT. These include admissions records, grades, most course work, exams, UROP records, disciplinary records, and financial aid records, as well as gender, nationality, race, ethnicity, and identification photographs. Education records do not include directory information, as described below, or those records of Institute faculty and staff members that are made for, and restricted to, their personal use. Other kinds of information, such as medical and law enforcement records, are also excluded from the definition of education records. These are sometimes governed by other laws and/or policies.
Disclosure
Under FERPA, a student has the right to consent to disclosures of personally identifiable information contained in the student’s education records, except to the extent that it authorizes disclosure without consent.

Disclosure Within MIT. Under one FERPA exception, individually identifiable information contained in a student’s education records may, without the student’s consent, be disclosed within MIT to institute officials with a legitimate educational interest, meaning officials who need that specific information in order to fulfill their professional responsibilities. A school official is a person employed by the Institute in an administrative, supervisory, academic, or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the MIT Corporation; or a student serving on an official committee, or assisting other school officials in performing their tasks. In addition, victims of crimes of violence will be informed of the outcomes of disciplinary proceedings about those incidents.

Disclosure Outside MIT. As a general rule, individually identifiable information contained in a student’s education records may be disclosed to persons outside MIT only with the student’s prior, written consent. MIT discloses education records without a student’s consent to other schools in which the student seeks enrollment or is enrolled. The student has the right, upon request, to a copy of the records disclosed to another school. Although parents normally are not entitled to review students’ education records without the student’s consent, appropriate MIT representatives may consult with parents and others in emergencies when health and safety issues so require. Disclosure may also be made without consent to government agencies or in accordance with legal process only to the extent required by law.

Directory Information. A student’s name, term and permanent home address, MIT office address, term phone number, term email address, course, year and registration type, degrees received, dates of attendance, and for an intercollegiate athletic team member, height and weight, is designated as a student’s “directory information.” This information may be disclosed within and outside of MIT without a student’s consent. Students have the right to require that some or all of their directory information not be disclosed (except as otherwise permitted under FERPA) by following the instructions on WebSIS. In order to prevent publication in the printed Student Directory published each fall this request must be made at the very beginning of the fall term.

Students’ Access to Their Own Records
A student has the right to review his or her own education records within 45 days after making a written request to the department or unit that maintains the records, to the registrar, to the Office of the Dean for Undergraduate Education, or to the Office of the Dean for Graduate Students, identifying the records the student wishes to inspect. The appropriate MIT official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the MIT official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed. The right to access includes the right to obtain copies. The right does not, however, extend to portions of a student’s education records that relate to other identifiable students.

Correction of Records
A student has the right to request the amendment of information in his or her education records that the student believes is inaccurate or misleading. Such a request may be made to the custodian of the record, to the Office of the Dean for Undergraduate Education, or to the Office of the Dean for Graduate Students and should clearly identify the part of the record the student wants changed, and state why it is inaccurate or misleading. If the requested amendment is not made, MIT will notify the student of this decision and that the student has the right to a hearing concerning the requested amendment. Additional information on the hearing procedures will be provided to the student when he or she is notified of the right to a hearing. If the correction is not made as a result of the hearing, the student may include his or her own statement in the record. Because grades and evaluations are the result of academic judgment, they are not subject to this type of challenge.

Right to File Complaint
A student has the right to file a complaint with the US Department of Education concerning alleged failures by MIT to comply with the requirements of FERPA. The name and address of the office that administers FERPA is: Family Policy Compliance Office, US Department of Education, 400 Maryland Avenue, SW, Washington DC, 20202-5920.

Motor Vehicles
Parking facilities at MIT are extremely limited. Students are advised to avoid bringing an automobile to MIT if possible. In general, the Institute cannot provide parking for freshmen. Parking space is allocated to upper-class students as available in the Westgate lot through Residence Life and Student Life Programs, Room E32-200. Graduate student residents may obtain MIT approval through the Graduate Residential Life Office in Room E32-200. Students living off campus should contact their departmental administrative office for parking permit approval. Students with disabilities who have parking requests should see the Medical Department, or the Disabilities Services Department, for approval.

Students who plan to bring motor vehicles to Cambridge should take careful note of the information regarding pertinent Massachusetts laws distributed with registration material. In addition, since the rate of car thefts in this state is one of the highest in the nation, serious consideration should be given to equipping automobiles with anti-theft devices.
Interdisciplinary research can be an invaluable way to broaden a student's education. Through the Undergraduate Research Opportunities Program, undergraduates discover avenues for participation in research projects that can count toward their major, including possibilities for thesis work. The interdisciplinary programs and facilities described in this section also provide significant opportunities for graduate students.

### MIT Centers, Labs, and Programs

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MIT CENTERS, LABS, AND PROGRAMS

Advances in knowledge, together with an awareness of how modern society functions, have led researchers to pursue complex problems that cannot be resolved from the vantage point of a single academic discipline.

At MIT, students and faculty from different fields work together in a multitude of interdisciplinary centers, laboratories, and programs that cut across departmental or school boundaries. Most of these organizations offer opportunities for undergraduate research through thesis work and UROP. For graduate students, interdisciplinary research opportunities may involve thesis topics—and often research assistantships—and can lead to advanced degrees.

Some interdepartmental educational programs have been approved for graduate students by the Committee on Graduate School Programs. Students must be admitted by a regular academic department to participate in one of these programs (with the exception of the Operations Research Center, which accepts students directly). Each has a standing faculty committee that administers the program, but degrees in the field of study are granted by the student’s department of registration. The program descriptions in this chapter indicate any advanced degrees that may be offered.

Biotechnology Process Engineering Center
Established at MIT through the National Science Foundation, the Biotechnology Process Engineering Center (BPEC) provides a unique opportunity for education and research at the forefront of biotechnology. At BPEC, the fundamentals of advanced manufacturing technologies are explored through the application of engineering principles to the life sciences. Another important objective of BPEC is to establish active collaborative programs with industry that will enrich the students’ understanding of biotechnology, expand research activities, and promote innovation. The BPEC involves both undergraduate and graduate students and postdoctoral fellows. Research is led by 12 faculty members from the Biological Engineering Division (BE), and the departments of Chemical Engineering and Chemistry.

The BPEC centralizes the various programs available for the study of biotechnology and provides a structure for new educational initiatives. For undergraduates, a strong base in chemical engineering or biology provides an ideal background for further studies in biotechnology. The Minor in Biomedical Engineering, administered by BE, serves to formally organize curricula in biotechnology. Subjects in the core of this minor, BE.361J Molecular and Engineering Aspects of Biotechnology and BE.360J Cell and Tissue Engineering, are taught by BPEC faculty. Research opportunities in biotechnology are available to all MIT undergraduates through UROP. Positions for pay or academic credit are available during the summer and academic year.

Graduate students from BE and the departments of Chemical Engineering, Chemistry, and Biology take a wide range of course material to provide the requisite integration of science and engineering knowledge. Students often elect to complete minors in management, business, or biology. Students can apply for an NIH training grant offered as part of the Interdepartmental Biotechnology Program involving 22 faculty participants or work directly for one of the center’s 10 MIT faculty members.

BPEC research is dedicated to developing enabling strategies for therapeutic biotechnology products, including both gene and protein therapeutics. There are two focal points of the research program.

The first thrust area is therapeutic gene biotechnology, aimed at solving problems associated with creation of effective gene therapy technologies. One major emphasis is to develop science and engineering based technology for expanding stem cells in culture, for ex vivo gene transfection and re-implantation. A second emphasis is to improve vehicles, both viral and non viral, that can deliver genes in a selective and stable manner to cells in vivo as well as ex vivo. A third key direction is toward enhancing the capability for regulating gene expression in vivo.

The second thrust area is therapeutic protein biotechnology, aimed at improving production, formulation, and delivery of recombinant proteins. Major efforts are directed toward molecular biology and engineering concepts, to increase the quantity of protein production from animal cells, and to improve the quality of these glycoproteins. To address the question of protein quality and quantity, research goals address optimizing and maintaining the uniformity of glycoproteins, interfacing bioanalysis of techniques, and bioreactor operations: physiology, molecular biology and engineering.

Projects directed toward understanding of protein interactions, stability, formulation, and delivery include the study of protein folding, misfolding and aggregation, inhibiting protein refolding and aggregation in vivo; computer simulations of protein aggregation; controlling inclusion body formation in vitro; protein stability, formulation and delivery, and protein delivery.

For more information, contact the director, Professor Douglas A. Lauffenburger, Biotechnology Process Engineering Center, Room 16-429, MIT, Cambridge, MA 02139-4307, 617-253-0805.

http://web.mit.edu/bpec/

Broad Institute
Launched in 2004, the Broad Institute was created to fulfill the promise of genomics for medicine.

The Broad Institute is a partnership of the Massachusetts Institute of Technology, Harvard University and affiliated hospitals, and the Whitehead Institute for Biomedical Research. This partnership underlies a scientific structure at the institute that complements the range of disciplines each partner represents.

The goal of the Broad Institute is to enable collaboration among scientists, physicians, professional staff, and students, particularly on large research projects aimed at solving problems in biomedicine that are difficult to pursue in traditional labs, and to empower collaborators through access to advanced genomic tools and ideas.

The mission of the Broad Institute is two-fold: to create the comprehensive tools for genomic medicine, making them freely available to the world, and to pioneer their application to the study and treatment of disease.

Eric S. Lander is the director and founder of the Broad Institute. A former leader of the Human Genome Project, Lander worked with colleagues now at the Broad to help identify the genetic blueprint for a human being. This work transformed biology from an unknown, unbounded frontier into a science of finite information.
Lander is a faculty member at MIT in the Department of Biology and at Harvard Medical School in the Department of Systems Biology.

Taking a global approach to uncovering the biological basis for disease requires cooperation and hard work across scientific disciplines. This tactic demands collaboration across institutions. Located in the most extraordinary biomedical community in the world, the Broad offers an organization that empowers the brightest investigators in this community to find the fundamental causes of disease. This is an endeavor that transcends individual labs, departments, even hospitals. It is bigger than any one institute.

Governed by MIT and Harvard, the Broad Institute is a true joint venture. The Broad Institute has investigators from all of its partner institutions. Many of these investigators are also faculty members at MIT, Harvard University, or Harvard Medical School. A few of the researchers are housed at the Broad, where they are core members and where their primary labs are located. A larger number of researchers have primary labs at their hospitals or departments but work together codirecting projects within the Broad.

The Broad Institute is currently located at 320 Charles Street, Cambridge. The MIT building number is NE125. In early 2006 it will relocate to a 230,000 sq ft, seven-story facility being built at 7 Cambridge Center, which is adjacent to the Whitehead Institute and across the street from MIT’s Biology Department. This location near the Kendall Square T stop is central to many of its affiliated scientists, Harvard Medical School, and the Harvard-affiliated hospitals.

For information on research opportunities, contact the office of Dr. Eric Lander at student_research@broad.mit.edu.

**Cambridge-MIT Institute**

The Cambridge-MIT Institute Ltd. (CMI) is a strategic alliance between the University of Cambridge and MIT. Bringing together two of the world’s great universities to build on the complementary strengths of each, CMI undertakes ambitious programs to enhance the competitiveness, productivity, and entrepreneurship of the UK economy.

The main strategic aims of CMI are to create:

- Educational programs and materials for wider dissemination, aimed at increasing learner knowledge, skills and attitudes in the domain of knowledge exchange
- Research projects, centered on an important idea, developed with consideration of use, and with imbedded innovations in knowledge exchange
- A program for the study of innovation in knowledge exchange to systematically learn from our innovations, produce materials for education programs, and impact more widely university, industry and government policy and practice
- Undergraduate student education and exchange programs to give learners the knowledge, skills and attitudes that will enhance knowledge exchange and entrepreneurship

For more information, please contact the executive director, Professor Ed Crawley, and the CMI office at 77 Massachusetts Avenue, Room 8-403, MIT, Cambridge, MA 02139, 617-253-7732, fax 617-258-8539, email at cmi@mit.edu. http://www.cambridge-mit.org/

**Center for Advanced Visual Studies**

The Center for Advanced Visual Studies (CAVS) offers a working environment that encourages collaborations among artists, scientists, and technologists. These are built around projects undertaken by resident fellows, who also conduct seminars and supervise undergraduate participation.

CAVS was established in 1968 by Gyorgy Kepes, who emphasized the responsibilities of artists in building bridges between individuals and their environment, between individuals in groups, and between each of us and our inner lives. Under the direction of Otto Piene, projects reached an environmental scale, and Krzysztof Wodiczko brought attention to the relationships among science, technology, and contemporary culture.

Researchers at CAVS have pioneered the use of multimedia technologies, including lasers, plasma sculptures, sky art, and scientific visualization, as tools of creative expression. Ongoing research includes Krzysztof Wodiczko’s Interrogative Design projects, Steve Benton’s holography, and Elizabeth Goldring’s Vision Arts.

CAVS provides an integrative structure for projects that span disciplinary domains. New laboratory facilities make the tools of the digital arts available for these inquiries, and provide a common ground for extensive and ambitious collaborations.

Attention is now turning toward the challenges presented to human expression and communication by emerging technologies. Artists, with their individual and special sensitivities to the nuances of human expression, have a major role to play alongside scientists and engineers in shaping and guiding new investigations, especially those that could not or would not happen except within the unique environment that MIT provides.

CAVS’s contributions to visual arts education at MIT have included “Computational Art,” “Studio/Seminar in Public Art,” “Experiences in Interactive Expression,” “Art, Science, and Technology after the Cold War,” “Design, Technology, and Ethics: Tactical Design Workshop,” and the freshman seminar “Ethical Media Art.” Although CAVS has no academic program of its own, it collaborates with the Visual Arts Program (Course 4) and the Media Laboratory on a wide range of projects.

For further information, please contact the director, Krzysztof Wodiczko, Room N52-390, MIT, Cambridge, MA 02139-4307, 617-253-4415, fax 617-253-1660, cavs@mit.edu.

**Center for Archaeological Materials**

The purpose of the center is to encourage incorporation of the natural sciences and engineering in the normal pursuit of anthropological, archaeological, and art historical inquiry. The center’s particular emphasis is on examining and explaining the nature of prehistoric and non-industrial technologies, especially those technologies of unusual importance in the development of ancient and pre-industrial societies. The center considers not only technologies of subsis-
ience, communication, and production, but technologies whose purposes are largely symbolic, such as information-bearing technologies of art.

The center is concerned with the remains of human activities in the past and the exploration of the imprint of these activities on the environment: what people did in the environment and what the environment was like. Determination of palaeoecologies—climates, floral and faunal populations, food chains, and so forth—provides a strong research focus. The center uses as its evidence all of material culture, and explores cultural and environmental materials through the most up-to-date methods common to chemistry, physics, biology, geology, and materials science and engineering, in conjunction with appropriate mathematical and statistical analyses.

The center’s teaching and research programs incorporate materials science and engineering among the range of methods that archaeologists use to try to render culture history, cultural lifeways, and culture process from what little is preserved of society’s material culture. Research activities are carried out in a network of materials laboratories that include metallurgy, ceramics, photomicrography, and computation. The center emphasizes rigorous laboratory study of artifacts and other kinds of cultural remains in order to determine the nature and structure of the materials of which they are composed and the extraction and processing regimes they have undergone.

Open to graduate students and senior undergraduates, the center offers graduate-level subjects in the Graduate Archaeological Science Laboratory. Subjects are heavily laboratory-oriented and often cover a single class of materials (e.g., ceramics or metals), or a method for interpreting archaeological data (e.g., computers in archaeology).

The Center for Archaeological Materials is administered by the Department of Materials Science and Engineering. Further information about the center may be obtained from the director, Professor Heather Lechtman, Department of Materials Science and Engineering, Room 8-138, MIT, Cambridge, MA 02139-4307, 617-253-1375; or Materials Science and Engineering Student Services, Room 8-303, 617-253-3855.

http://web.mit.edu/cmrae/cmrae_home.htm

Center for Biomedical Engineering

The Center for Biomedical Engineering (CBE) was established to enhance and coordinate research and education at the interface of engineering with biology, emphasizing bioengineering based on molecular and cellular biology.

CBE initiatives involve faculty and students from a variety of MIT departments in the Schools of Science and Engineering along with associates at Boston-area medical schools.

Core laboratory facilities in biomolecular modeling and engineering, biomolecular interactions and cell responses, cell culture, 2-photon and atomic force microscopy, and quick freeze-deep etch cryofixation facilities for cells and tissues are available to enhance teaching and research capabilities that combine engineering and life science perspectives.

For further information on these facilities, contact Dr. Shuguang Zhang, CBE associate director for facilities, 617-258-7514.

CBE’s Industrial Advisory Board includes member companies from the bioengineering and health care community and provides an interface for student recruiting into the bioengineering industrial community.

http://web.mit.edu/cbe/

Center for Cancer Research

The Center for Cancer Research, partially supported by the National Cancer Institute, provides facilities for interdepartmental work in various aspects of fundamental cancer research including molecular, cellular, and developmental biology and immunology.

The center draws faculty largely from the Department of Biology. Graduate students typically enroll in the departmental program but students in any MIT department may ask to do doctoral thesis research under the supervision of the center’s faculty. If accepted, they may be eligible for support as research assistants.

Opportunities for undergraduate research are available through the UROP program. Occasional seminars on cancer research as public colloquia of the center are available.

For further information, contact the director, Professor Tyler Jacks, Room E17-110, MIT, Cambridge, MA 02139-4307, 617-253-6400.

http://web.mit.edu/ccrhd/www/

Center for Computational Research in Economics and Management Science

This center advances knowledge about modeling in economics, finance, statistics, and management, bringing together researchers from disciplines such as econometrics, statistics, computer science, and operations research to focus on the algorithmic research and related software development that provide a basis for today's advanced modeling techniques.

Current research is focused on nonparametric modeling, dimension reduction, robust data-mining, statistical learning, selection, and risk measurement in finance, supply chain analysis, and lean manufacturing.

For further information contact Professor Roy E. Welsch, director, Room E53-383, MIT, Cambridge, MA 02139-4307, 617-253-6601, rwelsch@mit.edu.

Center for Coordination Science

Coordination science and technology draw upon a variety of fields, including economics, computer science, organizational theory, information systems, management science, and psychology. The Center for Coordination Science conducts multidisciplinary research to improve the coordination and integration of work performed by people, firms, and computers.

Increased computer use has opened up new opportunities for people to coordinate their work, creating a need for flexible organizations that can use technology to communicate information faster, more selectively, and at lower cost. Taking advantage of these opportunities requires major extensions, or reformulations, of current theories of organizations, markets, and management.

The center’s work focuses on three project areas. They are organizational structure, which studies how people work together and how this may change with new information technology; coordination technology, which designs and studies innovative computer systems that help people work together in small or large groups; and coordination theory, which develops and tests theories about how coordination can occur in a variety of systems, such as organizations, markets, and computer networks.

For further information, contact John Quimby, 617-258-7376, fax 617-253-4424, quimby@mit.edu.

http://ccs.mit.edu/
Center for eBusiness@MIT
The Center for eBusiness at MIT was created in partnership with industry to better understand the opportunities for radical change created by the internet and related technologies. Its aim is to provide thought leadership in internet-enabled technology, management, and business strategy through initiatives in education and research. Based at the MIT Sloan School of Management, the center also draws on other MIT resources including the World Wide Web Consortium, the Laboratory for Computer Science and the Media Lab. To date the center has funded more than 65 research projects and created five new courses.

The center’s research is organized into five special interest groups: Digital Productivity, Digital Strategy, Business to Business Services, Communication Futures, and Global Financial Services. Sponsors of the center participate closely in a focused research project as well as the annual conference, topical research workshops, and biweekly, web-conferenced research lunches. Sponsors are also eligible to send their CIO to the annual MIT CIO Summit.

For more information contact Debbie Thomas, Manager, Room E53-316, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139; 617-253-6610, fax 617-258-7579, debiet@mit.edu.  
http://ebusiness.mit.edu/

Center for Energy and Environmental Policy Research
The Center for Energy and Environmental Policy Research (CEEPR) conducts policy-related research in energy and environmental economics, drawing on faculty and student resources from Sloan, the MIT Department of Economics, and the MIT Energy Laboratory. An important component of CEEPR is the Joint Program on the Science and Policy of Global Change conducted with the MIT Center for Global Change Research.

For nearly 30 years, CEEPR has made important contributions to the analysis of energy markets, the organization and regulation of energy industries, the use of financial derivatives by energy companies, and the understanding of sources and effects of productivity change on energy demand and supply. CEEPR’s current research focuses on emissions trading, electric utility restructuring, and the effectiveness of environmental regulation.

For more information, contact the director, A. Denny Ellerman, Room E40-279, MIT, Cambridge, MA 02139-4307; 617-253-3551, ellerman@mit.edu.  
http://web.mit.edu/ceepr/www/

Center for Environmental Health Sciences
The Center for Environmental Health Sciences (CEHS) represents the cross-disciplinary research and education efforts of some 28 members of the MIT faculty and two Harvard faculty. The CEHS program applies a broad range of cutting-edge technologies to the common goals of studying the biological effects of exposure to environmental agents in order to understand, and predict, how such exposures affect human health.

The center is funded by the National Institute of Environmental Health Sciences, and its associated research programs are funded through a variety of sources, including the National Institutes of General Medical Sciences and the National Cancer Institute. These research programs provide challenging interdisciplinary problems for graduate and undergraduate students.

The research activities in the center fall into three cores:

The Mutation and Cancer Research Core addresses how exposure to DNA damaging agents affects the health of cells, tissues, animals, people and populations, and in particular how these agents cause cancer and contribute to other diseases associated with the aging process. The damaging agents include reactive oxygen and nitrogen species, alkylating agents, and radiation (all ubiquitous in our environment) and the tools used include x-ray crystallography, state-of-the-art mass spectrometry, organic chemistry and biochemistry, bacterial and yeast model organisms, cultured mammalian cells, mathematical modeling of signal transduction pathways, RNAi manipulation of gene expression, transgenic and knock-out mouse model systems, genetic polymorphism detection in human populations, transcriptional profiling, functional genomics and the accompanying bioinformatics required to analyze the data. The goals are to determine the molecular details of how exposure to environmental agents cause detrimental health effects, and perhaps more importantly to determine the molecular details of how cells, tissues, animals and people ameliorate these detrimental effects.

The Biological Engineering for Toxicology Core brings many of the strengths of the Biological Engineering Division and the Computational and Systems Biology Initiative into the center. The approaches include the following: using engineered tissues (such as liver and bone marrow) to monitor and dissect biological responses to toxic environmental agents; linking systematic experiments to quantitative models of cellular responses to damaging; developing genomic and proteomic approaches for these systematic measurements; and applying state-of-the-art mechanical engineering to devise new ways of monitoring biological events and single molecule biochemical events.

The Environmental Systems and Health Core strives to understand, holistically, the relationships that link ecological processes and human health. This includes the traditional “fate and transport” model (in which chemical releases are transported and modulated by processes in the ecosystem, thus governing the extent of human exposure to the chemicals). Future advances require better understanding of evolution, gene flow, and ecosystem processes along with progress in chemical and physical modeling and measurement.

The research activities of the Center for Environmental Health Sciences are supported by three facilities cores that provide state-of-the-art technologies for solving environmental health problems:

- The Bioanalytical Core Facility is a central resource in the analytical chemistry of biological and synthetic molecules and it provides expertise, training, and access to a wide variety of instrumentation, including that for mass spectrometry, liquid chromatography, and fluorescence spectroscopy.
- The Genomics and Bioinformatics Core Facility provides access to a variety of different genomics platforms (Affymetrix GeneChips, oligonucleotide and cDNA arrays, antibody arrays) and to the Bioinformatic tools and expertise required to analyze genomic scale data. This CEHS Core Facility is allied with the BioMicro Center, which is jointly sponsored by the Biology Department, the MIT

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Center for Cancer Research, the Biological Engineering Division, and the CEHS.

- The Animal Model and Pathology Core Facility oversees husbandry for all the animals used by CEHS members (rats and mice), and provides a variety of services such as development of transgenic animal models, histopathology, advanced tissue imaging, DNA sequencing, real-time PCR and other technologies related to cell and molecular biology.

The Biological Engineering Division, allied with the Center for Environmental Health Sciences, offers both graduate and undergraduate education in molecular and systems toxicology and cross-disciplinary opportunities in environmental health science and engineering with many departments in the Schools of Science and Engineering.

The Applied Biosciences core graduate curriculum emphasizes integration of chemistry, molecular biology, and genetics with bioengineering approaches to understanding how organisms respond to environmental agents.

For further information, contact Leona Samson, Ellison American Cancer Society Research Professor and Professor of Toxicology, Room 56-235, MIT, Cambridge, MA 02139-4307, 617-258-7813, lsamson@mit.edu.

http://cehs.mit.edu/

Center for Information Systems Research

The Center for Information Systems Research (CISR) was established in 1974 and has a strong record of accomplishment of practice-based research on the management and use of information technology (IT). The center’s mission is to perform practical empirical research on how firms generate business value from IT. An international mix of almost 40 sponsoring organizations, representing a broad range of industries, assists in defining and executing this research. Faculty and staff associated with the center have conducted pioneering research in such areas as decision support systems, critical success factors, database systems, strategic IS planning, management of the IT function, and the use of information by management, including executive support systems. CISR develops concepts models and provides insights into the role of IT in enabling new business strategies, management processes, and organizational structures. Recent and current research topics include IT governance, IT infrastructure, IT architecture, IT portfolios, IT outsourcing and IT-related risk. CISR disseminates this research via electronic briefings, published articles, working papers, an annual summer conference, research workshops, and executive education short courses.

For more information about the center, contact Chris Foglia, 617-253-6657, cisr@mit.edu.

http://web.mit.edu/cISR/WWW/

Center for International Studies

The Center for International Studies (CIS) aims to support and promote international research and education at MIT. Whenever possible, we capitalize on MIT’s great strengths in science and engineering, examining the international aspects of these fields as they relate to both policy and practice, and focusing on those issues where science and engineering intersect most closely with foreign affairs.

CIS includes 160 members of the MIT faculty and staff, mainly drawn from the departments of political science and urban studies, and visiting scholars from around the world. We sponsor formal programs, multidisciplinary working groups and numerous public events. While CIS does not offer teaching programs, the center’s faculty and staff engage with students as colleagues in research, audiences in public events, and enthusiastic participants in the MISTI international internship program. We also assist MIT students in obtaining external funds for international activities through the CIS fellowship database.

Within CIS is the MIT Security Studies Program (SSP), a graduate-level research and educational program. The program’s teaching ties are primarily, though not exclusively, with MIT’s Political Science Department, and courses offered emphasize grand strategy, technology, arms control, and bureaucratic politics issues. A special feature of the program is the integration of technical and political analyses in studies of international security problems. SSP faculty members, including natural scientists and engineers as well as social scientists, advise frequently on current policy problems, but the program’s prime task is educating those who will be the next generation of scholars and practitioners in international security policy making. The program’s research and public service activities necessarily complement that effort.

For more information on SSP, contact Magdalena Rieb, assistant director, MIT Security Studies Program, Room E38-602, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-258-7608, fax 617-258-7858.

The MIT International Science and Technology Initiatives (MISTI) prepare students, faculty, and industry leaders to pursue new knowledge wherever it’s being created across the world. Specifically, MISTI internships in China, France, India, Italy, Japan, Mexico, and Singapore provide intensive professional experiences for culturally-aware MIT students in companies, research laboratories, and universities. MISTI also supports MIT faculty members in cross-border research collaborations, facilitates research opportunities for international students and postdoctoral visitors at MIT, and provides MIT students with study-abroad opportunities at selected universities abroad. In addition, MISTI offers innovative courses on globalization and organizes a wide variety of outreach and training programs on cross-border management issues.

For more information, contact Andrea Hermann, program assistant, Room E38-762B, 617-258-0385, fax 617-258-7432.

Seminar XXI is an educational program for senior military officers, government and NGO officials, and executives in the national security policy community. The program’s objective is to provide future leaders of that community with enhanced analytic skills for understanding foreign countries and the relations among them. Fellows learn to recognize assumptions that underlie assessments of foreign societies confronting them as policymakers. The fundamental criterion for fellows is that candidates should reach top decision-making levels in the next three to five years.

The program explores key policy issues by examining countries and problems critical to American interests through a variety of paradigmatic lenses. The seminar seeks to provide concrete frameworks for examining how different paradigms suggest fundamentally different, even conflicting, answers to the questions American policymakers must resolve.
For more information, contact Phaedra MacLaurin, program assistant, Room E38-600, 617-253-5143, fax 617-258-7044.

The Program on Human Rights and Justice, an interdisciplinary program created by CIS and MIT's Department of Urban Studies and Planning, focuses on teaching, research, and application in human rights. It plays a leadership role in advancing the study of and action on issues of human rights and justice, especially as related to science, technology, and the global economy. The Program on Human Rights and Justice is the first in the United States with a specific focus on these cutting-edge issues. The activities of the program include placing interns in inter-governmental organizations, multinational corporations, and non-governmental organizations worldwide. It administers a fellowship program, a seminar series, and a working paper series. Conferences and research projects are designed to advance thinking on approaches to the place of rights in securing global justice that are grounded in studies of real world situations.

For more information, contact Susan Frick, program assistant, Room E38-600, 617-258-7614, phrj@mit.edu.

The Inter-University Committee on International Migration is a focal point for migration and refugee studies at member institutions, which include Boston University, the Fletcher School of Law and Diplomacy, Harvard, MIT, Tufts University, and Wellesley College. The committee is chaired by MIT as a program of the Center for International Studies.

For more information, contact Amelia Graham, program assistant, Room E38-600, 617-324-0075, fax 617-253-9330, akgraham@mit.edu.

This program applies theories and methods from the discipline of political economy to examine public policy issues with significant science and technical content. The research component addresses failures in economic markets and political institutions, with emphasis on improving the quality of assessments of scientific knowledge and bolstering the adaptive capacity of political institutions. The educational component trains PhD candidates from Engineering Systems, the Program on Science Technology and Society, and Political Science through the multidisciplinary Program on Emerging Technologies (PoET). These activities are supported by the NSF Integrative Graduate Education and Research Traineeship Program, the Cambridge-MIT Initiative, and the Alliance for Global Sustainability.

For more information, contact Heidi Knuff, program assistant, E38-270, 617-253-8306, fax 617-253-9330, hknuff@mit.edu.

CIS manages the Energy, Technology and International Affairs Research Grants, intended for advanced doctoral students at MIT working in close collaboration with a faculty member on any international aspect of energy, environment and international affairs.

Among the seminars and workshops sponsored by CIS are the Starr Forum, the Emile Bustani Middle East Seminar; the Security Studies Seminar Series; the Future of War joint seminar; the Inter-University Seminar on International Migration; and the Political Economy of Global Energy Seminar.

Each year the center appoints as visiting fellows a few academics and government officials, both from the United States and abroad. Supported by their universities, governments, or foundations, these fellows work on problems relevant to the center’s research and training interests. The Wilhelm Visiting Fellow in International Studies is a distinguished visitor with extensive experience in government. The Elizabeth Neuffer Fellow is a woman journalist who reports on human rights and social justice. The latter fellowship is organized in conjunction with the International Women’s Media Foundation, in honor of Elizabeth Neuffer, a Boston Globe reporter who was killed in Iraq in May 2003.

The center sponsors several interdisciplinary working groups. These working groups enable MIT’s scholarly community to tackle research issues that are not confined to a single department or discipline. Several are structured to link the efforts of social science professionals with those of engineers and natural scientists on problems of academic and policy significance. They also encourage collaboration between graduate students and faculty members. Most CIS working groups are open to any MIT faculty member or student who wishes to participate; some draw participants from outside the MIT community. Topics include civil-military relations, cities in conflict, combating terror, defense technologies and industries, migration and development and identity politics.


Center for Materials Science and Engineering
The Center for Materials Science and Engineering (CMSE), one of a nationwide network of Materials Research Science and Engineering Centers funded by the National Science Foundation, fosters collaborative interdisciplinary research and education in the fundamental science of materials and in the engineering of materials for long-range applications.

CMSE supports collaborations among MIT faculty and students from different disciplines, as well as between MIT researchers and researchers of other universities, industry, and government and nonprofit laboratories, and encourages collaborative research through interdisciplinary research groups (IRGs), shared experimental facilities (SEFs), infrastructure enhancement, and outreach programs.

The IRGs are composed of teams of MIT faculty, students, and post-doctoral associates from different disciplines who investigate fundamental scientific questions and engineering problems. Currently 39 faculty, representing seven different departments, are engaged in CMSE research in the following areas:

- Microphototonic materials and structures
- Nanostructured polymers
- Electronic transport in mesoscopic magnetic and semiconductor structures
- Science and engineering of solid state portable power structures
- Chemically responsive organic optoelectronics
- Exotic states of correlated electrons in single crystals

Because research in materials science and engineering requires very sophisticated equipment and infrastructure, CMSE provides state-of-the-art instruments, maintained and supervised by trained staff, in its SEFs. This equipment is available to MIT investigators, including students, and researchers from other universities, industry, and research labs.

Facilities provide instrumentation to carry out electron microscopy; thermal, optical, and surface analysis; crystal growth; x-ray diffraction; neutron powder diffraction; x-ray scattering; and neutron scattering. They also provide technical training in the operation of these instruments to
graduate and undergraduate students. The facilities, along with researchers from several departments, are located in the Vannevar Bush Building.

CMSE offers educational opportunities to students ranging from middle school to the graduate level. Approximately 100 graduate students are engaged in research programs each year. In addition, graduate students from at least 15 different departments are trained and use SEFs. The SEFs offer IAP short courses each January.

CMSE directly supports approximately 15 UROP students each year to participate in its research. Another 15 undergraduates from other universities spend the summer performing materials research on campus through the Summer Research Internship Program, jointly sponsored by CMSE and the Materials Processing Center.

The center does not offer a degree program or subjects for academic credit. Student registration is handled by academic departments.

Other education and outreach programs sponsored by CMSE include a science and engineering summer day camp for seventh- and eighth-grade students from two Cambridge public schools and a summer research program for a small number of junior high and high school science teachers.

For further information, contact the center’s administrative office, Room 13-2106, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-6850, fax 617-258-6478. 

http://web.mit.edu/cmse/www/

Center for Real Estate
The Center for Real Estate provides an intellectual focus for research on issues affecting the real estate industry. Faculty associated with the center are drawn from the departments of Architecture, Urban Studies and Planning, Civil and Environmental Engineering, Economics, and the Sloan School of Management.

The projects we are pursuing cover a range of disciplines and areas of application within real estate, and they all offer synergy between the real world of practice and MIT’s faculty and research capabilities. These projects are highly relevant to policy makers, planners, investors, developers, advisors, asset managers, architects, and researchers, among others.

The New Century Cities project is a joint effort of the CRE, the City Design and Development group in DUSP, and the MIT Media Lab that seeks to bring MIT students and faculty together with global thought leaders in three fields of endeavor: advanced media and information technology, cutting-edge urban planning and design, and pioneering real estate development. An overview of the project is provided at http://web.mit.edu/cre/research/newcenturycities.html.

The Housing Affordability Initiative identifies ways in which MIT can make a unique, policy-relevant contribution to the challenge of the high cost of housing in eastern Massachusetts and elsewhere. Initial projects include studies of the effect of high-density mixed-income housing development on price appreciation in surrounding single-family homes, and the development of a multidimensional, micro-level housing affordability index that could help policy makers allocate funds and marshal political support for new housing development at the local level. An in-depth presentation of this initiative’s agenda is available at http://web.mit.edu/cre/research/facprojects/MIT%20Affordability%20Agenda%201.2.pdf.

The Commercial Real Estate Data Laboratory provides a space (both virtual and real) for the nurturing of databanks and quantitative tools for the measurement of commercial real estate performance. The focus of research encompasses several dimensions of commercial property performance, including investment performance, management or operational performance, and environmental or social performance.

The center encourages interaction between members of the real estate industry and the academic community through seminars, colloquia, lectures, and a series of summer courses.

The center is supported in part through memberships from firms and individuals active in the real estate industry.

The center also serves as the home for the Master of Science in Real Estate program, an interdepartmental degree program which combines education in design, planning, construction, management, finance, and marketing. It prepares students to assume positions of responsibility in private real estate companies, financial institutions, government agencies, nonprofit development organizations, and consulting firms. The program requires 11 months of intensive study.

For further information about the center or the Master of Science in Real Estate, contact David Geltner, director, Center for Real Estate, W31-310, MIT, Cambridge, MA 02139-4307. 

http://web.mit.edu/cre/

Clinical Research Center
The MIT Clinical Research Center is an NIH-funded research facility on campus that enables interested scientists to perform biomedical research involving human subjects.

Its existence allows students at all levels to gain experience with human subjects and human disease. Research projects in progress are in the areas of human nutrition and metabolism, psychiatry, neurology, endocrinology, clinical neuropharmacology, innovative imaging strategies; infectious diseases (HIV), neuropsychology, and obesity.

Most projects involve collaboration between basic and clinical scientists; some involve local hospitals such as Massachusetts General Hospital.

The facilities of the center are open to all departments in the Institute, and its principal investigators are faculty members and research scientists from many different departments. Although most patients participating in research studies at the Clinical Research Center come from the Boston area, many are referred from other parts of the United States.

Research opportunities are available for undergraduate and graduate students contemplating careers in the medical sciences and for postdoctoral physicians. For further information, contact the program director, Dr. Richard J. Wurtman, or the administrative officer, Susan D. Dalton, Room E17-445, MIT Cambridge, MA 02139-4307, 617-253-3091. 

http://web.mit.edu/crc/

Computer Science and Artificial Intelligence Laboratory
The Computer Science and Artificial Intelligence Laboratory (CSAIL) is the result of a merger between the Laboratory for Computer Science and the Laboratory for Artificial Intelligence. A key motivator for the merger was a series of successful cross-lab collaborations, which created intellectual synergy and greater research opportunities for our faculty, researchers
and students. CSAIL is committed to fundamental research across the whole range of Computer Science and Artificial Intelligence, and to new applications that these disciplines enable. We intend to lead the field in new theoretical approaches and to find practical applications that will have broad positive societal impact. We are organizing CSAIL so that we can rapidly mobilize significant research efforts when new ideas or opportunities arise, while at the same time providing the stable research environment that is necessary for students to produce groundbreaking PhD theses.

CSAIL is currently engaged in research activities that broadly span four principal areas:

Artificial Intelligence includes studies in core AI, machine learning, robotics, medical applications, Artificial-Life, and molecular and cellular biology. We explore fundamental questions in representations and machine learning. These lead to many new applications in robotics, data-mining and biology. Recent work has focused on two areas: understanding molecular dynamics and using it to design better drugs, and understanding the gene regulatory mechanisms within cells. Additionally we are pioneering new techniques in bio-synthesis, genetically engineering cells to gain digital control of protein production for a host of applications. The more theoretical problems of bio-synthesis engage us in mathematical modeling of biological self-organization and evolution. Our robotics work includes simultaneous localization and mapping for mobile robots, self-diagnosis and maintenance for long-mission robots, humanoid and other socially interacting robots, and robotic prostheses.

Human/Computer Intelligent Interfaces include graphics, natural language, speech, and vision. Our technical goals are to understand and construct programs and machines that have greater and more useful sensory and cognitive capabilities so that they may communicate with people toward useful ends. We have focused in areas such as spoken dialogue systems between people and machines, sketching and visually understanding peoples motions and gestures for input, and graphics systems used predominantly for output. In vision, real-time computing is now practical in areas such as image guided surgery, image database and movie browsing, and continuous activity monitoring. We are working on practical natural language systems to interface to the web and intelligent environments. The lab hosts the World Wide Web Consortium and contributes to its development of the semantic web.

Systems involve architecture, compilers, languages, networks, SW engineering. We desire to understand principles, and develop technologies for, the architecture and use of highly scalable information infrastructures that interconnect human-operated and autonomous computers. Research in networks and systems increasingly addresses issues in connection with mobile and context-aware networking, and the development of high-performance, practical software systems for parallel and distributed environments. We are creating architectural innovations by directly compiling applications onto programmable hardware, providing software-controlled architectures for low energy, better cache management, and easier hardware design and verification. Other research is directed towards improving the performance, reliability, availability and security of computer software by improving the methods used for its creation.

Theory involves algorithms, applied computing, complexity theory, cryptography, distributed systems, and supercomputing. We place an emphasis on the theoretical underpinnings of computer science and information technology. Among other areas, we are learning to understand higher brain function by building computational theories that integrate vision, language, and learning. Theoretical exploration permeates our research efforts in related areas.

CSAIL fosters participation in research by undergraduate and graduate students. Research assistantships are available to graduate students for work in all aspects of the research program. Graduate students typically are enrolled in the departments of Electrical Engineering and Computer Science, Mechanical Engineering, Aeronautics and Astronautics, Brain and Cognitive Sciences, Mathematics, or Linguistics and Philosophy. Undergraduates may become involved through UROP projects.

Deshpande Center for Technological Innovation

Launched in 2002 with a $20 million gift from Jaishree and Gururaj “Desh” Deshpande, the Deshpande Center seeks to serve as a significant catalyst for commercializing research in the School of Engineering and enhancing innovative companies, especially in New England.

The center cultivates relationships with venture capitalists, entrepreneurs, and innovative companies that may be a good fit for new technologies being developed at MIT. It funds about $2 million in research each year, and through its Catalyst Program helps apply other resources and connections to increase the chances of market and societal impact for these innovations.

There are two ways for students to get involved in projects funded by the Deshpande Center.

1. I-Teams (Innovation Teams). I-Teams is a course that selects ambitious and highly qualified students interested in helping to bring to market leading-edge technologies from MIT’s world-renowned research laboratories. The students join teams devoted to evaluating commercial feasibility and creating go-to-market strategies for technologies within the Deshpande Center portfolio. The course is taught jointly through the Sloan School of Management and the School of Engineering. More information can be found on the web at http://web.mit.edu/deshpandecenter/iteams/index.html.

2. Deshpande Center Grant Program. The grant program identifies and supports MIT research that can address important market opportunities. To support this research, the center awards Ignition Grants and Innovation Grants (ranging from $50,000 to $250,000 per project) to MIT faculty. Students may participate through a thesis or research assistantship in the laboratory of a faculty member. A portfolio of projects, including faculty contact information, can be found on the web at http://web.mit.edu/deshpandecenter/portfolio.html.

The executive director of the Deshpande Center is Krisztina Holly. The faculty director is Charles L. Cooney, professor of biochemical and chemical engineering. For more information, contact the Deshpande Center, MIT, Room 1-229, 77 Massachusetts Avenue, Cambridge, MA 02139, 617-253-0943, deshpandecenter@mit.edu, http://web.mit.edu/deshpandecenter/
Francis Bitter Magnet Laboratory
The Francis Bitter Magnet Laboratory conducts a program of research and development in science and engineering in areas involving magnetic fields, focused primarily on magnetic resonance.

High-field, high-resolution nuclear magnetic resonance (700, 750, and 900 MHz) and electron paramagnetic resonance (140 GHz) spectrometers are used for studies of molecules of biological interest and in areas of materials science. Spectrometers are made available on a routine basis in a collaborative and user mode to research groups from other MIT departments and institutions worldwide. In addition the laboratory operates pulsed magnets (giving fields up to 68 tesla).

Collaborative research programs are carried out with the departments of Physics, Electrical Engineering and Computer Science, Mechanical Engineering, Nuclear Science and Engineering, Materials Science and Engineering, Chemistry, and with the Plasma Fusion Center. These collaborative programs include participation by undergraduates and graduates working on theses. Undergraduate students in the UROP program and others are also employed.

For information, contact the director, Professor Robert Griffin, Room NW14-3220, MIT, Cambridge, MA 02139-4307, 617-253-5478. http://web.mit.edu/fbml/cmr/

Haystack Observatory
The Haystack Observatory provides opportunities for undergraduate and graduate student research in radio astronomy, geodesy, and atmospheric sciences.

The Haystack 37-m radio telescope is used for spectroscopic measurements of the interstellar medium. Very-long-baseline interferometry using a global array of telescopes is applied to high-resolution observations of galactic and extragalactic radio sources and to geodetic studies of the Earth’s plate tectonics and orbital parameters.

High-power radars using 46-m and 67-m antennas are used to study the structure and dynamics of Earth’s upper atmosphere. Emphasis is given to the study of the effects of geomagnetic storms induced by solar disturbances on Earth’s ionosphere.

A strong instrumentation development program is conducted at Haystack Observatory, primarily in the areas of wideband signal processing and data acquisition. Current applications include the design of large radio arrays to enhance the collecting area for radio observations.

Observatory researchers are currently operating an array at 327 MHz aimed at detecting deuterium in our galaxy, designing an array spanning 80–300 MHz called the Milevra Widefield Array, and participating in the development of a large array called the Square Kilometer Array for various astronomical studies.

Students can get involved in all these innovative projects and are welcome to use the facility instrumentation for research investigations.

The Haystack Observatory is located in Westford, MA. For further information, contact Dr. Joseph Salah, MIT Haystack Observatory, Route 40, Westford, MA 01886, 781-981-5407, jsalah@haystack.mit.edu. http://www.haystack.mit.edu/

Information Technologies Group
As information technology continues to transform the way people work, communicate, and learn, the Information Technology Group engages students of computer science, sociology, economics, psychology, engineering, organizational science, and other disciplines in understanding these transformations.

For more information about the Information Technologies Group, contact David Fitoussi at 617-253-6614, quartz@mit.edu. http://web.mit.edu/sloan-it/www/

Institute for Soldier Nanotechnologies
In 2002, the United States Army selected MIT to host the Institute for Soldier Nanotechnologies (ISN). The ISN mission is to bring about major advances in the protection and survivability capabilities of the individual soldier through revolutionary progress in nanomaterials and related nanotechnologies.

To these ends the ISN draws on faculty and students from several MIT departments, including Materials Science and Engineering, Mechanical Engineering, Chemical Engineering, Electrical Engineering and Computer Science, Aeronautics and Astronautics, Chemistry, Physics, and Mathematics to carry out unclassified research.

Among the research topics are multi-scale design and evaluation of structured materials for ballistic and blast protection; mechanically active materials, devices and exomuscles; sensing technologies and measures to protect against chemical and biological hazards; biomaterials and nanodevices for new medical technology to help the soldier; processing and fabrication of nanomaterials and devices; modeling and simulation of materials and to support nanoprocessing; and the design, hardening, and integration of systems to optimally harness multiscale nanotechnologies.

Moreover, the ISN, working in close collaboration with experts from the Army and industry, will “transition,” i.e., increase the technological maturity toward practical commercialization, innovative products of technologies created in the ISN basic research.

The ISN is thus an ideal educational test bed to study the entire journey of “productization” of practical devices from definition of requirements, to conceptualization of research ideas to respond to those requirements, to work by ISN industry partners and the Army on scale-up and prototyping of promising research outcomes, pilot testing, and eventually demonstration at critical subscale and ultimately commercial (full scale).

ISN innovations are expected to lead to new nanotechnologies for the soldier and for civilian spin-off applications.

Most of the ISN research is conducted by graduate students carrying out theses, by postdoctoral researchers, and by UROP students. These researchers are housed in a new 30,000 sq. ft. facility on the MIT campus, offering state-of-the-art equipment and laboratories for research on nanotechnology.

Another unique educational feature of the ISN is that most theses are co-supervised by two or more faculty, typically representing different areas of technical expertise and thus affording the student the opportunity to benefit from an especially rich learning environment.

Many projects also involve the participation of visiting experts from industry and Army centers of excellence, bringing additional perspectives on practical applications to students performing research in the ISN.
Students seeking to perform thesis or UROP research in the ISN should contact faculty within their own department. Information may also be obtained by contacting the ISN, at 617-324-4700 or at isn@mit.edu.  
http://web.mit.edu/isn/

Institute for Work and Employment Research  
For 60 years (1937 to 1997), the MIT Industrial Relations Section has carried on research and a PhD program devoted to the full range of issues related to work, labor and employment relations, human resource management, labor market issues, and related public policies. In 1997, in recognition of the changing economy and workforce, the name of this unit was changed to the Institute for Work and Employment Research (IWER). IWER is an MIT-wide multidisciplinary research and educational unit located within MIT Sloan and MIT’s Engineering Systems Division. Participating faculty are drawn from the Sloan School and the departments of Economics, Political Science, Urban Studies and Planning, and Engineering.

IWER faculty and graduate students conduct research on the broad range of issues related to the role of work and employment in the contemporary economy and society, including labor-management relations, human resource strategies and practices in both mature and new entrepreneurial organizations, work and family relationships, human capital and corporate governance, labor market theory and policy analysis, the changing nature of work and occupations, negotiations theory and practice, dispute resolution, and labor and employment policy. Together with other Sloan colleagues, IWER faculty and students have launched the MIT Workplace Center, which focuses on building— in theory and in practice—a mutually supportive relationship between the performance of firms and the well being of employees, their families, and communities.

The institute administers a PhD program and fellowships primarily for students enrolled in the MIT Sloan PhD program, but students from other departments at MIT are encouraged to become members of IWER, participate in weekly seminars and work closely with faculty members. The seminar series on Changes and Challenges in the World of Work is held every Tuesday and brings together faculty and students at MIT and in the Boston area to discuss work in progress and serves as a major focal point for interest in this field.

IWER’s codirectors are Thomas A. Kochan, George M. Bunker professor of management, and Paul Osterman, professor of human resources and management. For more information, contact Jacalyn Curreri, 50 Memorial Drive, Room E52-580, Cambridge, MA 02142-1347, 617-253-7696, iwer@mit.edu.  
http://mitsloan.mit.edu/iwer/

Knight Science Journalism Fellows Program  
Knight Science Journalism Fellowships are designed for mid-career journalists who cover science, technology, medicine or the environment for the general public. The program offers fellowships to reporters, writers, editors, producers, illustrators, and photographers.

Journalists who are selected spend one academic year on campus, taking courses at MIT and Harvard, participating in twice-a-week seminars with top researchers, visiting laboratories, going on field trips, and pursuing independent projects.

Science journalists face some of the most difficult challenges of reporting. They must convey complex, technical subjects in direct, simple terms to readers and viewers who demand—and have a right to—accurate, fair, and clear information about scientific developments that affect not only their views of the world, but their lives and livelihoods.

Reporting both the news and its implications is further complicated by the naturally advancing complexity of science.

Knight Fellowships are designed to help journalists face these challenges by widening their knowledge of science and technology and deepening their understanding of how these fields interact with society. Also, they provide an opportunity for journalists to re-examine old ways of practicing their craft and to develop new ways.

The John S. and James L. Knight Foundation is the principal sponsor of the fellowships, the only nine-month, mid-career program reserved for science journalists. The fellowships are part of MIT’s Program in Science, Technology, and Society.

For further information, contact Boyce Rensberger, director, Room E32-311, MIT, Cambridge, MA 02139-4307, 617-253-3442, boyce@mit.edu.  
http://web.mit.edu/knight-science/

Kavli Institute for Astrophysics and Space Research  
The Kavli Institute for Astrophysics and Space Research offers students, faculty, and professional research staff opportunities to participate in a broadly based program of space-related research. For example, research programs are carried on in x-ray, radio, optical, and planetary astronomy, space plasma and gravitational physics, the space life sciences, and space engineering.

Studies often involve experiments carried by shuttle, orbiting satellites, or deep space probes. The experimental programs are complemented by ground-based research in similar fields and by laboratory development of suitable instrumentation for the space-based and ground-based experiments.

An active program of theoretical studies in astrophysics and space physics is also supported by the institute.

The institute is the focus for MIT’s participation in the Magellan Observatory Consortium in Chile, the Laser Interferometer Gravity Wave Observatory, and the Chandra X-ray Observatory Science Center. Extensive data handling and computational facilities are available for the analysis and reduction of scientific data. An experienced, well-equipped group of engineers and technicians provides design, construction, and testing of space experiments in support of the flight programs.

The variety of scientific and technical problems that arise in these investigations affords numerous opportunities for graduate thesis research.

In addition, there is major participation by undergraduate students in programs of theoretical studies, data analysis, and the development of new instruments.

For further information, contact the director, Professor Jacqueline N. Hewitt, Room 37-241, MIT, Cambridge, MA 02139-4307, 617-253-7501.  
http://space.mit.edu/
Laboratory for Electromagnetic and Electronic Systems

The Laboratory for Electromagnetic and Electronic Systems (LEES) is home to faculty and research staff from the departments of Electrical Engineering and Computer Science, Mechanical Engineering, and Architecture.

Disciplines represented include analog and digital circuit design, power electronics, control and estimation, automotive electronics and electrical systems, electromechanics, continuum electromechanics, heat and mass transfer, high voltage and insulation research, systems analysis and economics.

Interactions with other Institute and area laboratories contribute to the success of the highly interdisciplinary research that is the style of this laboratory.

Power electronics research ranges from device analysis and fabrication to circuit design and systems development and control. Special interest focuses on automotive electrical and electronic systems, where research is funded by the laboratory's Consortium on Advanced Automotive Electrical/Electronic Systems and Components, whose international membership numbers around 50 companies. Embodied within this area is the integration of electromechanics, power electronic and digital/analog signal processing and control in motors and actuators for applications such as manufacturing systems and high-performance robots.

In collaboration with the Microsystems Technology Laboratory, LEES is engaged in the development of micro-electromechanical devices, and their application in a variety of new contexts. These silicon-based sensors and actuators show particular promise in automotive and biomedical applications.

High voltage research in LEES is concerned with the basic physics and applications of electrical conduction and breakdown behavior of gases, liquids, and solids. Measurement methods include electro-optical and electro-acoustic techniques together with electronic sensors that can measure electric charge and fields as well as the effects of temperature, moisture, and other trace materials. These measurement techniques are applied to power cables, power transformers, and fuel systems.

The laboratory is engaged in a number of projects that address the needs of the electric utility industry. This work includes the development of new methods of analysis, dynamic and load modeling, and control as demanded by systems that are increasingly deregulated and stressed to deliver reliable, high quality power economically.

All programs within the laboratory are carried out with the assistance of both undergraduate and graduate students under the supervision of faculty members.

For further information, contact the director, Professor John G. Kassakian, Room 10-172, MIT, Cambridge, MA 02139-4307, 617-253-4631. http://mit42v.mit.edu/lees/

Laboratory for Energy and the Environment

The Laboratory for Energy and the Environment (LFEF) brings together collaborating faculty and staff in 14 departments to address the complex interrelationships between energy and the environment as well as other challenges. In carrying out its mission, the LFEF takes account of the technological, economic, political, and social aspects of sustainable energy development and use and of other environmental challenges to sustainable development.

The LFEF is home to more than a dozen existing centers, groups, and programs, and serves as a focal point for energy and environmental activities throughout MIT. Educational and outreach programs coordinated by the LFEF serve MIT students as well as other academic researchers, industry professionals, and policy makers worldwide. Within the administrative structure of the LFEF, or closely associated through collaborative research efforts, are a number of more focused activities and research groups that are described briefly below.

For more information about the LFEF, contact Dr. Teresa L. Hill, assistant director for communications and programs, Room E40-453, Cambridge, MA 02139-4307, 617-253-1341, thill@mit.edu, or visit the website at http://lfee.mit.edu/.

Through the Alliance for Global Sustainability (AGS), four research universities—the University of Tokyo, the Swiss Federal Institute of Technology—Zürich, Chalmers University of Technology, and MIT—work to develop new, multicultural, strategic approaches to issues in sustainability in both developed and developing regions of the globe. Researchers at the universities collaborate on major research projects that concern the intersection of economic, environmental, and societal well-being. Issues addressed include energy for the 21st century, environmentally conscious design and manufacturing, the growth of megacities, and global demand for mobility. The AGS encourages research partnerships with business, government, and nongovernmental organizations, and the sharing of research results. Ongoing research partnerships focus on the following topics: formulating robust methods for assessing the development, adoption, and sustainability of new materials; examining social and political aspects of carbon capture and storage technologies; and identifying and developing complementarities among private environmental performance, public environmental regulation, and private business risk with a goal of improving collective environmental outcomes. In 2004, the AGS introduced a new level of collaborative research in which all campuses participate in a large-scale program focused on a global issue. The initial flagship program, Near-Term Pathways to a Sustainable Energy Future, is now being developed and will examine near- and mid-term approaches to sustainable energy.

The MIT/AGS Program sponsors research and educational initiatives on sustainability at MIT. Current work focuses on science and technology in environmental decision-making; corporate strategies for gaining competitive advantage through environmental care; technology options for transportation and sustainability; and energy pathways for the future.

For more information, contact Karen L. Gibson, program coordinator, Room E40-469, 617-258-6368, kgibson@mit.edu, or visit the international AGS website at http://www.globalsustainability.org/ or the MIT/AGS website at http://lfee.mit.edu/programs/mitags/.

The Analysis Group for Regional Electricity Alternatives (AGREA) focuses on strategic planning in energy and the environment, with an emphasis on regional energy infrastructures. Since 1988, AGREA has been collaborating with researchers across campus who need to look at how the deployment of alternative technology portfolios will affect the cost and emissions of regional energy infrastructures, primarily electricity. Fundamental to AGREA’s approach is the use of long-term planning tools within a multi-attribute tradeoff analysis framework. This approach automatically looks for cost-effective ways to attain multiple goals of cost-competitiveness and
environmental quality. Critical to the approach is public participation in the planning process via stakeholder interaction and input.

AGREA’s recent research activities encompass several AGS projects, notably the China Energy Technology Program and Mexico City Air Quality Program. AGREA’s approach is a central element in the AGS’s new energy flagship research program. Other current AGREA projects include alternatives for the transition to sustainable energy services in Scandinavia, and avoiding power plant emissions by generating electricity with solar and wind power in the US.

For more information, contact Stephen R. Connors, Room E40-465, 617-253-7985, connorsr@mit.edu, or visit the website at http://lfee.mit.edu/programs/agrea/.

Research in the Building Technology Program (BT) encompasses a wide range of building technology innovations, including recent advances in materials, in designing eco-efficient buildings with both good air quality and energy efficiency. Passive solar design, natural ventilation and other siting options, along with the incorporation of efficient appliances, distributed energy sources, and combined heat and power systems, are key to the design of eco-buildings.

BT researchers are developing and applying these techniques to the construction of new buildings. Through an MIT/AGS project in China, they are working with building designers and developers of new housing units. This effort includes educational forums for Chinese designers and planners to show them means to achieve increased building health and efficient operations. A program with Cambridge University is developing new technologies and applying them to sustainable building design concepts for major commercial buildings in Europe. For example, use of natural ventilation to replace or reduce air conditioning in commercial buildings is being investigated. Detailed monitoring of new sustainable buildings is also under way to verify the performance of new technologies and designs. A web-based design tool is being developed to aid designers in the early conceptual phase to identify more energy-efficient and sustainable alternatives. A materials-selection tool for advanced building components is being developed jointly with Cambridge University. A new daylighting research facility has been constructed to identify concepts and materials to enhance the use of daylighting in building interiors. Structural evaluation of historic masonry buildings is under way to identify unsafe conditions and means of restoration.

The BT Program is jointly sponsored by the departments of Architecture, Civil and Environmental Engineering, and Mechanical Engineering, and the research is administered by the LFEF. For more information, contact Professor Leon R. Glicksman, director, Room 5-418F, 617-253-2233, glicks@mit.edu, or visit the website at http://web.mit.edu/bt/www/.

The Carbon Capture and Sequestration Technologies Program looks at carbon capture and sequestration as a strategy to complement the current approaches to carbon mitigation (i.e., improved energy efficiency and increased use of non-carbon energy sources). Activities include technology development, assessment, and education and outreach. Attention is given to all aspects of the problem, including technological, economic, environmental, and social.

Research initiatives of this program include studies of the economics of carbon dioxide capture and storage; technology assessment studies; development of a Carbon Management Geographic Information System; and investigation of the political and social dimensions of introducing carbon dioxide sequestration technologies. A major component of the program is the Carbon Sequestration Initiative, an industrial consortium.

For more information, contact Howard J. Herzog, Room E40-447, 617-253-0688, hjherzog@mit.edu, or visit the website at http://sequestration.mit.edu/.

The Center for Advanced Nuclear Energy Systems (CANES) was established in September 2000 by the Department of Nuclear Engineering and the LFEF to create through research more efficient and environmentally desirable nuclear energy systems. The center’s programs involve development of methods for the design, operation, and regulation of advanced nuclear reactors and fuel cycles. CANES also investigates the role of nuclear energy in meeting future demands for non-electrical energy carriers such as hydrogen. In addition, CANES undertakes educational activities, including short courses, electronic offerings, and topical publications, for a variety of audiences, including nuclear engineering and energy professionals, national and international policy makers, and interested members of the public. The center’s research areas are advanced reactor technology; nuclear fuel cycle technology and economics; enhanced performance of nuclear systems; and nuclear energy and sustainability. For more information, contact Professor Mujid S. Kazimi, director, Room 24-219, 617-253-4206, kazimi@mit.edu, or visit the website at http://web.mit.edu/canes/.

The Center for Energy and Environmental Policy Research (CEEPR), sponsored by the Sloan School of Management, the Department of Economics, and the LFEF, conducts economic analysis of energy and the environment. Current areas of research are global warming, under the Joint Program on the Science and Policy of Global Change, co-sponsored with the Center for Global Change Science; emissions trading to address increased interest in market-based alternatives to traditional command-and-control environmental regulation; electric utility restructuring, focusing on the performance and regulation of the electric utility industry, especially transmission pricing and the development of electricity markets in a deregulated environment; and energy markets—research directed at understanding the markets for coal, oil, and natural gas.

For more information, contact Dr. John E. Parsons, executive director, Room E40-435, 617-253-3551, jparsons@mit.edu, or visit the website at http://web.mit.edu/ceepr/www/.

The mission of the LFEF Education Program is to enhance environmental literacy and deepen multidisciplinary environmental knowledge, particularly among the leaders of tomorrow’s science and technology communities. The program cultivates the capacity of learners at all levels both to understand and to respond effectively to the challenges of sustainability. The LFEF Education Program is dedicated to developing increased awareness of the relationship between the academic programs here at MIT and the world around us.

The LFEF Education Program pursues these goals within the MIT community as well as locally, nationally, and internationally. To carry out this mission, our projects include maintaining EnviroClasses, a web-accessible database of environmental classes at MIT (http://enviroclasses.mit.edu/); coordinating an Environmental Fellows Group that comprises the Martin Family Society of Fellows for Sustainability and the LFEF Future Energy Fellows as well as graduate fellows across campus in fields relevant to sustainability; and offering forums with innovative thinkers from a wide variety of environmental fields. The Education Program collaborates with
The focus of the Program for Sustainable Energy and Clean Chemical Processing is research on the sustainable supply and use of renewable and conventional energy and on the clean chemical processing of fuels, biomass, minerals, water, chemicals, and other energy-intensive raw materials and products. A group of faculty, staff, students, and external sponsors are engaged in research on these themes. While research projects emphasize engineering science, intellectual synergisms to companion LFEE research programs on technology and policy are encouraged. New programs of interest include chemical conversion of food, agriculture residuals, and waste energy infrastructure development and proliferation risks associated with the global nuclear power fuel cycle.

For more information, contact Professor Ernest J. Moniz, codirector of LFEE, Room E40-451, 617-253-7515, ejmoniz@mit.edu.

The Laboratory for Financial Engineering (LFE) is the quantitative analysis of financial markets using mathematical, statistical, and computational models. The goal of LFE is not only to spur advances in financial engineering, but also to develop better ways to teach students and executives how to apply financial technology in corporate settings.

Current research projects include the empirical validation and implementation of financial asset pricing models, the pricing and hedging of options and other derivative securities, risk management and control, trading technology and market microstructure, nonlinear models of financial time series, neural-network and other nonparametric estimation techniques, high-performance computing, and public policy implications of financial technology.

For more information, contact Professor Andrew W. Lo, Harris & Harris Group professor of finance, is the director of the laboratory. For further information, contact Svetlana Sussman, LFE administrator, Room E52-430, 50 Memorial Drive, Cambridge, MA 02142, 617-253-8318, fax 617-258-5727, ssussman@mit.edu.

Laboratory for Information and Decision Systems

The Laboratory for Information and Decision Systems (LIDS) is an interdisciplinary laboratory for research and education in systems, communication, and control. LIDS is staffed by faculty, research scientists, and graduate students from the departments of Electrical Engineering and Computer Science, Aeronautics and Astronautics, and Mechanical Engineering, as well as the Sloan School of Management.

LIDS began in 1939 as the Servomechanisms Laboratory, an offshoot of the Department of Electrical Engineering. In the 1940s, the “Servo Lab” helped develop control theory and conducted work in gunfire and guided missile control, radar, and flight trainer technology.

Today, research at LIDS falls into four main areas, which share common intellectual bases. The laboratory explicitly recognizes the interdepen-
dence of these fields and the fundamental role that mathematics, computers, and computation play in the research.

Research in Communication and Networks includes fundamental work on networks, information theory, and communication theory. The work extends to applications in satellite, wireless and optical communications, and data networks. The objective is to develop the scientific base needed to design data communication networks that are efficient, robust, and architecturally clean. Wide-area and local-area networks, high-speed networks, and point-to-point and broadcast communication channels are of concern. Topics of current interest include network architectures at all layers; power control; multiple antenna techniques; network coding; media access control protocols; routing in optical, wireless, and satellite networks; quality of service control; failure recovery; topological design; and the use of pricing as a mechanism for efficient resource allocation.

The Statistical Signal Processing group analyzes complex systems, phenomena, and data subject to uncertainty and statistical variability. Research spans the spectrum from broadly applicable basic theory, methodologies, and algorithms to challenging applications in a broad array of fields. Recent applications for this research include multisensor data assimilation for oceanography, hydrology, and meteorology; biomedical image analysis; object recognition and computer vision; and coordinated sensing and processing of large, distributed arrays of microsensors.

Work in Optimization looks at analytical and computational methods for solving broad classes of optimization problems arising in engineering and operations research. It has applications in communication networks, control theory, power systems, and computer-aided manufacturing. In addition to traditional subjects in linear, nonlinear, dynamic, convex, and network programming, there is an emphasis on the solution of large-scale problems, including the application of neuro-dynamic programming methods.

Control and System Theory group deals with problems related to complete systems analysis design. These include learning and system identification, controller design and optimization, and basic analysis of distributed systems involving the interaction of information and control. Theoretical research quantifies the fundamental limitations and capabilities of learning and feedback control for various classes of systems in the presence of dynamic uncertainty. Application-oriented work includes control architectures for single and multiple unmanned aerial vehicles and controllers for piloting epitaxy in semiconductor manufacturing. The control group is also involved in a research effort focusing on modeling aspects of the nervous system, conducted in collaboration with other laboratories.

Research opportunities are available in the laboratory for both undergraduate and graduate students. Undergraduates may participate through UROP.

For further information, contact the director, Professor Vincent W. S. Chan, Room 32-D608, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-2142.

http://lids.mit.edu/

Laboratory for Nuclear Science
Research in the Laboratory for Nuclear Science is directed at understanding the structures and interactions of the fundamental constituents of matter. The laboratory supports research interests of faculty in the Department of Physics by maintaining and administering facilities for studies of particle and nuclear physics. The laboratory operates the Bates Linear Accelerator Center and supports the Center for Theoretical Physics. In addition, the laboratory provides a machine shop and computing facilities for staff and students.

As part of the nuclear physics program, members of the laboratory are engaged in experiments at the Bates Linear Accelerator, the Brookhaven Relativistic Heavy Ion Collider, and the Thomas Jefferson National Accelerator Facility. The high-energy particle physics program involves experiments at the Fermi National Accelerator Laboratory and the Stanford Linear Accelerator Center. Future initiatives include experiments at the Large Hadron Collider which is under construction at CERN in Geneva, Switzerland, and an experiment that will be mounted on the International Space Station.

Among many projects are theoretical studies of nuclei, particles, field theory, cosmology, string theory and quantum gravity, and mathematical physics; experimental programs using a variety of detector techniques to study strong, electromagnetic, and weak interactions of elementary particles and other high-energy phenomena; application of high-speed computer techniques to the problems of nuclear and elementary particle
Materials Processing Center

The Materials Processing Center (MPC) provides an environment where industry, government, and academia collaborate to identify and address pivotal multidisciplinary issues in materials processing and manufacturing.

The MPC focuses on continuing to strengthen the intellectual community, enhance the industrial outreach functions, and provide superior administrative support. Our approach is to create partnerships with industry that focus the research and education mission of MIT on industrially relevant issues for the electronics, transportation, primary materials, construction, energy, and biomaterials sectors.

In keeping with MIT’s mission to provide technological education relevant to the needs of society, the MPC leverages its partnership with industry in a number of educational programs. For example, the MPC/CMSE Summer Scholar Program invites outstanding undergraduate students from a variety of disciplines to MIT to participate in ongoing materials research.

With its Industry Collegium, the MPC acts as the primary window to industry for MIT’s materials community. Collegium member companies benefit from this liaison with MIT in many ways. Publications promoting materials processing activities at MIT include news articles and a comprehensive annual report (now produced jointly with CMSE), which are distributed widely to industrial and government contacts. Each year, the MPC sponsors events on a variety of materials processing topics to promote technology transfer as well as strategic planning of important new research areas. The MPC sponsors a major workshop and a materials research poster session in conjunction with its Materials Day celebration each fall. In cooperation with MIT’s Industrial Liaison Program, the MPC also provides a forum for industrial representatives to discuss their needs and problems one-on-one with MIT’s materials faculty and researchers. The MPC also encourages exchanges between academia and industry, through visiting scientist and adjunct faculty appointments and industrial internship educational opportunities.

The MPC coordinates multidisciplinary research efforts in industrial ecology, functionally graded materials, electronic, photonic, and photovoltaic materials and processes, magnetics, polymers and polymer composites, ceramics, biomaterials, chemical and physical metallurgy, environmental degradation of materials, and mathematical and physical modeling. The MPC also establishes industrial consortia in which several different companies sponsor a research initiative on campus with a defined product focus.

The Microphotonics Center is a center within the Materials Processing Center that builds interdisciplinary teams focused on advancing basic science and emerging technology in the specific materials area of integrated photonics systems. It serves as a research community in which industry, government, and academia collaborate to create new materials, structures, and architectures for the emerging “microphotonics platform”—the menu of on-chip and circuit-board level devices and components that will comprise future optoelectronics for telecommunications, computing, and sensing. The Microphotonics Center assembles expertise in all areas required to advance microphotonics technology with the goal of creating partnerships with industry that focus the research and educational mission of MIT on industrially relevant issues in microphotonics.

The Microphotonics Center emphasizes the education of faculty and students to create a skilled group of leaders in microphotonics technology.
The center holds a seminar series and plans to expand its educational offerings in this emerging field.

Major industrial partners collaborate with faculty under the Research Alliance Partnership program to carry out larger-scale, focused research initiatives. Also, the Industry Consortium creates a proactive forum where scientists, engineers, and strategists from industry and MIT can work as partners in exploring and pursuing innovative microphotonics research and development. Consortium member companies benefit from the center’s direct coupling between member companies’ needs and the basic science, engineering, and processing research taking place at MIT. In addition to supporting precompetitive research projects, consortium member companies participate in the Communications Technology Roadmap Project, which provides technology development targets for the long-term evolution of photonic component integration in the optical communication industry. In cooperation with the Industrial Liaison Program, the Microphotonics Center provides a forum for industrial representatives to discuss their needs and problems one-on-one with MIT’s microphotonics faculty and researchers.

For more information on either the Materials Processing Center or the Microphotonics Center, contact Dr. George B. Kenney, associate director, Room 12-007, MIT, Cambridge, MA 02139-4307, 617-253-3244, gbkenney@mit.edu.

http://mpc-web.mit.edu/
http://mpphotons.mit.edu/

McGovern Institute for Brain Research

The McGovern Institute for Brain Research at MIT is a research and teaching institute committed to advancing human understanding and communications. The goal of the McGovern Institute is to investigate and ultimately understand the biological basis of all higher brain function in humans.

The institute is conducting interdisciplinary research that combines and extends the results of recent breakthroughs in three major, interrelated areas:

- Systems and computational neuroscience
- Imaging and cognitive neuroscience
- Genetic and cellular neuroscience

By determining how the brain works, from the level of gene expression in individual neurons to the interrelationships between complex neural networks, the McGovern Institute’s efforts work towards improving human health, discovering the basis of learning and recognition, and enhancing education and communication. Understanding the brain will foster better ways of communicating at all levels of society, both nationally and internationally. The McGovern Institute’s work will ultimately contribute to the most basic knowledge of the fundamental mysteries of human awareness, decisions, and actions.

McGovern faculty hold primary appointments in academic departments at MIT, currently in the Department of Brain and Cognitive Sciences or the Department of Biology. When fully developed with its own building, the institute will have 16 faculty members. McGovern faculty members teach graduate students from a variety of disciplinary backgrounds, and also contribute to the undergraduate educational programs of their departments.

For further information contact the director, Dr. Robert Desimone, Room E19-307, MIT, Cambridge, MA 02139, 617-324-0141. http://web.mit.edu/mcgovern/

Media Laboratory

The Media Laboratory is about people, computation, and quality of life in a digital age. True to the vision of its founders, the laboratory continues to focus on the study, invention, and creative use of “enabling technologies for learning and expression by people and machines.” Its work is rooted in modern communication, computer science, and natural and human sciences, and its academic program is intimately linked with research. Media Arts and Sciences, the academic program linked to the laboratory, can be thought of as exploring the technical, cognitive, and aesthetic bases of satisfying human interaction as mediated by technology.

Computers and computation are the most prominent common denominators of this multidisciplinary merger of previously separate domains. The birthplace of multimedia computing, the laboratory is engaged in research that includes computing culture, electronic publishing, software agents, multi-modal interfaces, structured audio, digital and networked video, constructionist learning, conversational computing, pervasive computing, tangible media, personalized media, gender- and age-based computing, metadata representations, common-sense computing, personal fabrication, affective computing, and silicon biology.

The activities of the laboratory revolve around a core of learning, perceiving, and expressing. Current foci include both the means of expression (the underlying science and technology needed to merge the bits of the digital world with the atoms of the physical world) and its meaningful application to the arts (performance and the study of the principles of analysis and synthesis in computational media). Furthermore, the laboratory aims to address major social challenges (improving education, enhancing health care, and supporting community development) through the innovative design and use of new technologies.

Many of the laboratory’s research activities are conducted within the context of corporate-funded programs. The focus on corporate support reflects the laboratory’s commitment to collaborative research: a dialogue with industry (and other non-academic) partners provides a forum for ongoing professional critique; technology transfer moves research results out of the laboratory and into worldwide use. Drawing upon a broad, international base, industries represented range from electronics to entertainment, furniture to finance, and toys to telecommunications.

The graduate academic Program in Media Arts and Sciences is based within the School of Architecture and Planning, with its enrollment divided nearly equally between master’s and doctoral candidates. Students work closely with faculty members, as well as with laboratory sponsors.

For further information, contact Walter Bender, executive director, Media Lab, Room E15-210, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4306, 617-253-5960. http://www.media.mit.edu/
Microsystems Technology Laboratories
The Microsystems Technology Laboratories (MTL) carry out research activities in the fabrication and study of small structures and their use for the implementation of important integrated systems including x-ray lenses, VLSI circuits, micro-electro-mechanical systems (MEMS), and even some biological structures.

The expanding and dynamic research program covers solid-state devices, integrated circuits and systems, materials for electronic applications, novel process technologies, sensors and actuators, and computer-aided fabrication.

The MTL houses four clean room facilities—Integrated Circuits Laboratory (ICL), Technology Research Laboratory (TRL), Exploratory Materials Laboratory (EML), and the NanoStructures Laboratory (NSL)—associated non-clean laboratory space—Research Group Laboratories (RGL); and the Computational and Communication Network facility.

The MTL’s centerpiece facility is the Integrated Circuits Laboratory, a state-of-the-art class-10 clean lab with full capabilities for modern IC fabrication. The lab is operated by a full-time technical staff and graduate students.

The laboratory portion of the introductory undergraduate microelectronics processing subject (6.152J) has been integrated into the process facilities of the MTL, providing MTL’s state-of-the-art facilities for undergraduate teaching activities.

Personnel involved in ongoing research activities at the MTL include over 50 faculty members, 10 senior research staff, 300 graduate students, 100 undergraduate students, 30 postdoctoral fellows, 20 visiting scientists, 50 research affiliates, 23 technical support staff, and 18 administrative and support staff.

Approximately 50 percent of the funding for the lab is from industrial partners.

Each academic year, roughly 25 PhD, 35 SM, and 20 MEng degrees are awarded in conjunction with research activities whose primary area of focus is microelectronics and which are strongly coupled to facilities of the MTL. MTL’s director is Martin Schmidt, professor of electrical engineering. Anantha Chandrakasan, Jesús del Alamo, and Judy Hoyt, professors of electrical engineering, are the faculty associate directors.

For information regarding MTL’s technical operations and capabilities, contact Dr. Vicky Diadiuk, associate director, operations, 617-253-0731, email diadiuk@mit.edu. For information regarding MTL programs and other general information, please contact Samuel Crooks, associate director, administration, 617-253-3978, email crooks@mtl.mit.edu.

MIT Entrepreneurship Center
The MIT Entrepreneurship Center (E-Center) trains science, engineering, and management students who will make high-tech start-up companies successful. Subjects taught, especially when combined with professional student club activities, provide the tools and develop the mindset that entrepreneurs need to design, launch, and build successful new enterprises.

Hundreds of entrepreneurs who have built very substantial companies began their careers at MIT by taking 15.390 New Enterprises, which has been taught continuously since 1961. Another course, 15.399 Entrepreneurship Lab, places teams of engineering and management students in start-up companies where they work on a project that is keeping the CEO awake at night.

Other key entrepreneurship courses include: 15.363 Strategic Decision Making in the Biomedical Business; 15.371 Innovation Teams; 15.389 Global Entrepreneurship Lab; 15.391 Early Stage Capital; 15.393 Technology and Entrepreneurial Strategy; 15.394 Designing and Leading the Entrepreneurial Organization; 15.396 Special Seminar in Entrepreneurship; 15.398 Entrepreneurs in Innovation: Information Technology, Energy, Biotechnology, and Communications; 15.431 Entrepreneurial Finance; and 15.841 Entrepreneurial Marketing.

During IAP, people from all parts of MIT flock to attend 15.975 Nuts and Bolts of Business Plans and 15.976 Special Seminars in Management—Starting and Building a Successful High-Tech Venture.

All entrepreneurship subjects are available to MIT graduate students from all departments, and support the strong community of MIT entrepreneurship. Proseminars feature invited speakers who have significant real-world experience to share. In addition, each January, the center organizes the Entrepreneurship Development Program (EDP), an intense, one-week course for potential entrepreneurs and policy-makers from all over the world.

The MIT Entrepreneurship Center operates a global network of partnerships with Cambridge University in the United Kingdom and with others in Europe, the Middle East, and Asia.

The E-Center also supports and cooperates closely with a wide array of related organizations at MIT, including the MIT $50K Entrepreneurship Competition, the MIT Venture Capital and Private Equity Club, the Technology Licensing Office, the Deshpande Center, the Venture Mentoring Service, the MIT Enterprise Forum, the MIT Alumni Association, the MIT Sloan Career Development Office, the Lemelson-MIT prize program, the Center for Innovation in Product Development, and the Industrial Liaison Program.

Through these alliances, the MIT Entrepreneurship Center supports both faculty and students in research to better understand and enhance the high-tech entrepreneurship process.

Kenneth P. Morse is the managing director of the MIT Entrepreneurship Center and a senior lecturer at the MIT Sloan School of Management. Edward B. Roberts, David Sarnoff professor of the management of technology, is chairman. Professor Simon Johnson, MIT Sloan School of Management, (on leave) and senior lecturer John T. Preston, president and CEO, Atomic Ordered Materials, LLC, serve as assistant directors of the E-Center.

For more information, contact the center’s office in Room E40-196, 1 Amherst Street, Cambridge, MA 02142-1352, telephone 617-253-8653, fax 617-253-8633, email ecenter@mit.edu.

Nuclear Reactor Laboratory
The Nuclear Reactor Laboratory (NRL) provides the focus for a wide range of research programs involving the use of nuclear radiations. Research programs in various MIT departments and centers are supported by NRL capabilities. These include Physics; Materials Science and Engineering; Earth, Atmospheric, and Planetary Sciences; Nuclear Science and Engineering; the Parsons Laboratory; and the Center for Environmental Health Sciences.
NRL facilities are also used for teaching and research activities by other institutions. The NRL offers special capabilities to regional hospitals and industries, e.g., short-lived isotopes for medical purposes.

Current areas of research include applications of nuclear trace analysis to problems in physical and engineering sciences, life sciences, geosciences, and the environment; radiation effects on materials; advanced fuels development; dose and corrosion reduction in power reactors; reactor engineering; nuclear medicine, including brain cancer therapy development; and isotope development.

The NRL operates a five-million watt research reactor (MITR-II), which is one of the largest university reactors. Recent redesign and rebuilding of MITR-II has significantly enhanced the neutron and gamma ray intensity and the reactor’s versatility. Further upgrades in reactor power are now planned.

Experimental facilities and instrumentation at the NRL include a wide variety of sample irradiation facilities with fast and slow neutron fluxes up to 10^14 per cm^2 per second; temperature-controlled in-pile facilities, and a fissile converter facility. In-pile loops for corrosion and irradiation damage testing are available, which closely simulate the environment in light water power reactors. A high-temperature loop for advanced fuel studies is under construction. An excellent medical irradiation facility with a clinically useful epithermal beam is available for patient and animal irradiations. Current clinical trials for brain cancer use the epithermal neutron beam.

Other experimental facilities and instrumentation include radiochemistry laboratories; hot cells for dismantling or testing; nuclear detection equipment; trace analysis facilities; a materials characterization laboratory; and shielded hot cells for handling and testing radioactive materials.

Graduate student thesis research is carried on in the various research areas mentioned earlier. A current summary report is available and describes the activities at the NRL in greater detail.

For information, inquire at the office of the director, Dr. David E. Moncton, Room NW12-204, MIT, Cambridge, MA 02139-4307, 617-253-8883.

http://web.mit.edu/nrl/www/

Office of Professional Education Programs

The Office of Professional Education Programs was created by the School of Engineering as an umbrella organization for all activities associated with lifelong learning. Its mission is to engage alumni and professionals in ongoing educational opportunities that enhance science and technology leadership, practice, and innovation. It offers unique programs taught by MIT faculty. Options include full- or part-time on-campus programs, a wide range of summer short courses, customized and off-site programs, and innovative offerings utilizing both traditional and electronic delivery methods. While administratively anchored in the School of Engineering, its activities and programs cut across MIT.

For over 40 years, the Advanced Study Program (ASP) has provided opportunities for working professionals to enroll in full- or part-time study at MIT. This unique certificate program unites individuals’ educational needs, the specific requirements of their organizations, and the vast resources of an on-campus educational experience. ASP Fellows develop a custom program that draws from faculty expertise across MIT, supplemented by seminars and research. Benefits include a flexible curriculum based on the individual’s needs, personalized support, program events, and dynamic interaction with fellow students from around the world. For further information, visit the website http://web.mit.edu/advancedstudy/.

Knowledge Updates (KUs), launched in 2005, are educational briefings on topics emerging from MIT’s strengths in multidisciplinary engineering and science. Each Ku includes a video presentation by an MIT professor plus supporting articles, key concepts, transcript, and industry information. Members of the MIT community have free access to KUs via an internal website. For professionals and organizations, KUs are delivered on CD or via the web, making them a flexible learning tool to help professionals get up to speed quickly. For further information, visit the website http://knowledgeupdates.mit.edu/.

The Professional Institute offers intensive short certificate programs led by MIT faculty. These intensive two-to-five day sessions, held primarily in the summer, are designed for professionals who seek to sharpen their skills and stay up-to-date on the latest developments in their field. Programs combine MIT’s breakthrough research with insights from industry, government, and academic participants. They cover a broad range of topics, and draw faculty from departments and schools across the campus. Program attendees earn IACET continuing education units. Founded in 1949 as the MIT Summer Institute, the Professional Institute now offers over 40 programs to professionals around the world, bringing more than 600 participants to campus each year. For further information, visit the website http://web.mit.edu/professional/.

MIT World (MITW) is a free, open, streaming media website of significant public events at MIT. It features the most recent speakers and guests from across the campus and around the world, including Nobel laureates such as Robert Horvitz, and world leaders such as Kofi Annan. MITW delivers lifelong learning in its broadest sense, providing a window into the world of ideas. It serves as the venue for the MIT community, alumni, and the public at large to access videotaped events at MIT. For further information, visit the website http://web.mit.edu/mitworld/.

For further information about the Office of Professional Education Programs, contact Dr. Jennifer Stine, executive director, Professional Education Programs, Room 9-432, MIT, Cambridge, MA 02139-4307, 617-452-4362, fax 617-258-8831, jstine@mit.edu.

http://web.mit.edu/advancedstudy/
The center coordinates master’s and PhD programs in operations research, which provides a strong background in theory as well as the practical techniques used in building models for a wide variety of applications. For further information about the Operations Research Center and the degree programs contact Laura Rose, Room E40-143, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-9303, or email lrose@mit.edu.

Picower Institute for Learning and Memory
The Picower Institute for Learning and Memory is a multidisciplinary research center within the School of Science at MIT, drawing its faculty and graduate students from multiple MIT departments, including the departments of Brain and Cognitive Sciences and Biology.

The intellectual mission of the Picower Institute is to decipher the molecular, cellular, genetic, and neural systems mechanisms that underlie learning and memory and associated cognitive functions, such as perception, attention, and consciousness. The center's scientists explore:

- How animals, as models for humans, acquire information from the environment, screening for relevant information and ignoring the rest
- How they translate the acquired information into biological representations, such as new neuronal connections
- How they store the information as a short-term or long-term explicit or implicit memory
- How they recall and use the stored information (i.e., memory) on subsequent occasions

Because a number of studies suggest that long-lasting alterations occur in the network of the adult brain as a result of memory acquisition, and that these alterations share underlying mechanisms with the permanent alterations occurring in the sensory systems of the young child’s developing brain as the consequence of external stimulation, some scientists at the center are also interested in the latter type of process. Studies on the effect of childhood experience on the development of brain networks may have far-reaching implications for education.

Memory and its associated cognitive functions are central to the activities of our mind and impairments of these functions often accompany major neurological diseases, such as Alzheimer’s disease and schizophrenia. Thus, studies on these fundamental neurological processes will have a major impact not only on the progress of basic science but also on medicine in years to come.

The vision of the Picower Institute is to assemble investigators interested in the major and exciting mind/brain problems (i.e., learning and memory and neural plasticity) who are experts in complementary approaches and technologies and yet are eager to interact with each other in a synergistic manner. As a whole, the faculty covers a broad range of disciplines such as molecular, cellular, and genetic neurobiology; genomics and proteomics; electrophysiology of brain slices and cultured neurons; behavioral analysis and physiology of live animals; and computational modeling.

One area of the Picower Institute’s expertise is in production of mutant and transgenic animals. Characterization of these mutants with a range of techniques provides the thread with which the processes and events occurring at different levels of complexity can be tied together. Thus, the Picower Institute enjoys a true integration of molecular, systems, and cognitive neurosciences. This is a new form of investigator assemblage in mind/brain research, the effectiveness of which has already been demonstrated by the high quality of published and ongoing inter-laboratory research.

For further information, please contact the director, Professor Susumu Tonegawa, Room E17-353, MIT, Cambridge, MA 02139-4307, 617-253-6459, tonegawa@mit.edu.

Plasma Science and Fusion Center
The Plasma Science and Fusion Center, formed in 1976, provides a focus for experimental and theoretical studies in plasma science, magnetic fusion research and fusion energy development, and related engineering disciplines. It provides the structure required for effectively undertaking all US Department of Energy–sponsored fusion research at MIT. The timely development of fusion science, ultimately leading to the development of a practical energy source, is one of the most technically complex challenges facing the scientific community.

The center fosters independent creativity and helps integrate the collective plasma and fusion science activities into a cohesive program with broader Institute goals. These goals are to provide strong scientific leadership, both nationally and internationally, for the development of plasma and fusion science; and to provide the intellectual environment for the educational training of students, research scientists, and engineers. Research activities at the Plasma Science and Fusion Center fall into five major programmatic divisions.

The Physics Research Division is developing the basic experimental and theoretical understanding of magnetically confined plasmas, including experimental research in magnetic reconnection in plasmas, and advanced plasma diagnostics. In particular, the Versatile Toroidal Facility (VTF) is providing a test-bed for the latest theoretical models of magnetic reconnection in space and fusion plasmas. Another important facility, which has recently started operation, is the Levitated Dipole Experiment (LDX), a joint project with Columbia University located at the PSFC Nabisco Laboratory. This experimental facility will investigate the confinement, stability, heating, and transport of plasma particles and energy in a pure dipole magnetic configuration, applicable to both space and fusion plasmas. This division also participates in the US inertial confinement fusion program centered on the Omega laser program at the University of Rochester, and the National Ignition Facility at the Lawrence Livermore National Laboratory. The PSFC is designing key diagnostics to determine the properties of fuel capsules compressed by the powerful lasers used in these facilities. Additional novel diagnostic techniques have been developed for other national and international magnetic fusion facilities where PSFC staff and students participate in ongoing experiments. Finally, this division provides theoretical support for the in-house Alcator C-Mod advanced tokamak project, the LDX and VTF experiments, as well as other national and international experiments.
The Alcator C-Mod Project is developing a basic understanding of the stability and transport properties of high-temperature toroidal plasmas at reactor-level conditions, and developing and testing concepts for optimizing the toroidal confinement approach to magnetic fusion. This work is carried out in the Alcator C-Mod device, the third in a sequence of high-field tokamaks built at MIT. C-Mod’s high field and compact size enable it to make unique contributions to fusion plasma science.

The Waves and Beams Division conducts experimental and theoretical research on the physical principles of novel sources of coherent radiation ranging from the microwave to the infrared, optical, and x-ray regions of the electromagnetic spectrum. Current research includes work on the gyrotron (or cyclotron resonance maser), a novel source of millimeter wave radiation using high magnetic fields; the free electron laser; the cyclotron autoresonance maser; and the relativistic klystron. Research is conducted on application of these sources to plasma heating and high-frequency spectroscopy of biomolecules. The division also conducts research on novel concepts for high-gradient acceleration of electrons to demonstrate the principles required for future generations of electron linear accelerators. Experimental research utilizes a 25 MeV accelerator to investigate high-gradient acceleration of electrons and coherent radiation by femtosecond electron bunches. Theoretical research explores the propagation of intense charged particle beams, including the effects of periodic focusing and chaotic motion.

The Plasma Technology Division researches and develops plasma technologies for environmental and energy applications. Plasmas for waste remediation, pollution prevention, and hydrogen fuel reforming are under development. Also related diagnostic technologies are being developed for fusion plasma energy research, environmental monitoring, nuclear waste vitrification, and national security. These include fast ion diagnostics using high power gyrotrons for scattering in fusion plasmas, microwave plasma spectrometers for continuously monitoring trace metals emissions in gaseous exhaust streams, and millimeter wave technologies for monitoring remote molten material parameters (i.e., viscosity, temperature, emissivity, wall erosion) in nuclear waste glass melters. In addition, the division explores using plasmas to manufacture hydrogen rich gas that can be used as a cleaner burning fuel.

The Fusion Technology and Engineering Division provides critical engineering support for both operating confinement experiments and advanced design projects. It also develops advanced high-field copper and superconducting magnet technology for the national fusion program and the high energy physics community, and has been given a leading role in the design of the superconducting magnets for the next step fusion device. The division has expertise in magnet design for other fields, including medical applications, advanced space applications, magnetic separation, magnetically levitated high-speed ground transportation systems, and in large-scale project coordination and management.

The Plasma Science and Fusion Center has a history of important achievements in magnetic fusion research. In the mid-1980s the compact, high magnetic field tokamak, Alcator-C, established a world record by obtaining the highest product of plasma density and confinement time. Versator II, a small research tokamak built by students, was a world leader in demonstrating non-inductive current drive by radio frequency waves, as was Alcator C soon after. The results from these and other world-class experiments form the basis of the Advanced Tokamak concept, which seeks to improve the tokamak-based pulsed reactor concept by transforming it into a more economically attractive steady-state device.

Alcator C-Mod, a world-class divertor tokamak, started plasma operation in 1992. It is also a compact, high magnetic field device (up to 9 Tesla) with record high plasma current and particle densities. C-Mod’s present research program is aimed at understanding energy and particle transport at high magnetic fields and densities, comparable to that of future fusion reactors. In addition, it seeks to optimize plasma pressures with non-inductive current profile control using microwaves at 4.6 GHz frequency. This Advanced-Tokamak mode of operation is crucial to demonstrate the economic attractiveness of future tokamak-based fusion reactors. Alcator C-Mod has already demonstrated world-record levels of power density and has extended the world database on power flux by an order of magnitude.

In another area of research, the center has pioneered important environmental remediation techniques using plasmas, as well as related diagnostics, and has played a role in the development of ultra-high frequency, high-power microwave sources (the gyrotron). The PSFC is also the US center for superconducting magnet design and development for large-scale fusion systems, and is participating with international partners in testing such magnets.

The overall program at the Plasma Science and Fusion Center balances experimental and theoretical studies. Plasma science–related research activities in the departments of Physics, Nuclear Science and Engineering, Electrical Engineering and Computer Science, Materials Science and Engineering, Mechanical Engineering, and Chemical Engineering, are affiliated with the Plasma Science and Fusion Center.

The center’s programs and laboratories provide excellent forums for training students and professional researchers, and offer world-class research facilities to faculty members from many departments. Five professors and 78 research scientists and engineers work at the PSFC, and 68 graduate students are currently involved at all levels of thesis work. Undergraduates can also participate through UROP.

Further information may be obtained from the director, Professor Miklos Porkolab, NW16-288, Cambridge, MA 02139-4307, 617-253-8448, fax 617-253-0570, porkolab@psfc.mit.edu. http://www.psfc.mit.edu/

Productivity from Information Technology Initiative

Established in 1992, the Productivity from Information Technology (PROFIT) initiative explores how information technology can enhance productivity in both the private and public sectors. Its research spans diverse areas from finance to transportation, and from manufacturing to telecommunications. Current research efforts include knowledge acquisition (including the extraction of information from semi-structured web sources); knowledge management and integration (which includes the mapping and assembling of information across departmental, corporate, and national boundaries to suit new conditions and requirements); and knowledge dissemination.

For further information about PROFIT, contact Stuart Madnick, E53-321, or Michael Siegel, E53-323, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139; telephone 617-253-6671, fax 617-253-3321; or telephone 617-253-2937; email smadnick@mit.edu or msiegel@mit.edu. http://mitsloan.mit.edu/research/profit/
Program in Polymer Science and Technology

The Schools of Engineering and Science have established a graduate-level Program in Polymer Science and Technology (PPST). It is open to qualified students admitted to the graduate program of any MIT department.

PPST consists of an initial academic phase in which all students participate (regardless of previous background and research interest), followed by research in a selected area of specialization. The program leads to the doctoral degree; if desired, a master’s degree can be obtained through the student’s home department.

The core curriculum, taken by all students, provides a common base in the field of polymers. It is broad, rigorous, and covers both elementary and advanced subjects spanning the entire range from the molecular level to the continuum. This curriculum takes up the first two terms in the graduate program.

The transition from the academic phase to research is marked by the qualifying exam, which consists of both oral and written sections. The exams are offered at the end of each spring term and are based on the PPST core curriculum. Successful completion of the exam leads to selection of a research project and the preparation and defense of a thesis proposal.

Any participating faculty member at MIT can act as a research supervisor. The thesis supervisor(s) advises the graduate student on a continuing basis throughout the time of the research project. Completion and successful defense of the thesis before PPST and departmental faculty fulfill the requirements for the doctoral degree.

For more information, including admission and financial aid procedures, contact the director, Professor Gareth McKinley, Room 3-250, MIT, Cambridge, MA 02139, 617-253-0754.

http://web.mit.edu/ppst/

Research Laboratory of Electronics

Established in 1946 as the Institute’s first interdepartmental laboratory, the Research Laboratory of Electronics (RLE) has grown from its roots in the Radiation Laboratory’s pioneering study of electronics into MIT’s largest multidisciplinary research center.

RLE today is home to an extraordinary diversity of sponsored research activities, which in turn provide its members and students a premier scientific learning environment. RLE faculty pursue a broad interpretation of modern electronics. These interests are centered in four major areas of research activity:

- Quantum electronics, optics, and photonics
- Communications and signal processing
- Atomic, molecular, and optical physics
- “Living systems,” particularly language, speech, hearing, haptics, and biologically inspired materials and systems

Activities in RLE are both fundamental and applied, occupying the rich area spanning forefront basic research and the development of innovative contemporary technology. Particular examples, drawn from RLE’s four major areas of research include: design and fabrication of photonic bandgap structures and devices; development of multiuser diversity techniques for wireless communication networks; exploration of superfluid behavior in Bose-Einstein condensates; and fundamental studies of skin biomechanics. The laboratory has recently launched important new initiatives to investigate the physics of ultracold atoms, to develop technology for quantum communication and computing, and to advance the field of wireless appliance networks.

RLE, as an interdisciplinary laboratory, draws its core faculty from several academic departments. RLE faculty come primarily from the Department of Electrical Engineering and Computer Science and the Department of Physics, but its faculty also includes professors from the Department of Mechanical Engineering, the Department of Materials Science and Engineering, and the Harvard-MIT Division of Health Sciences and Technology. RLE draws its students from an even wider base of academic disciplines and Institute departments.

RLE comprises 58 principal investigators and a total of approximately 500 faculty, students, and staff. Government sources, private foundations, research institutions, and corporations fund research in RLE. Primary sponsors include the Department of Defense, the National Institutes of Health, and the National Science Foundation. Nearly 200 grants and contracts support the activities of RLE.

The research and associated learning environment of RLE is one of the most rewarding in the world. RLE investigators place special emphasis on incorporating students into their activities. RLE is the home to more graduate research assistants than any other research organization at MIT. RLE funds over 200 graduate students annually to engage them in both fundamental and applied research. Nearly 100 undergraduates also participate in the broad array of scholarly opportunities the laboratory offers.

For further information, contact the director, Professor Jeffrey H. Shapiro, Room 36-419, MIT, Cambridge, MA 02139-4307, 617-253-4179.

http://rleweb.mit.edu/
Singapore-MIT Alliance

The Singapore-MIT Alliance (SMA) is a global partnership in graduate education created by MIT, the National University of Singapore (NUS), and Nanyang Technological University (NTU). Setting a new standard for international collaboration in graduate research and education, the alliance educates young engineers to serve as leaders in a technologically advanced economy, and creates a cohort of students and faculty with creativity and entrepreneurial spirit.

The Singapore-MIT Alliance is an innovative model for graduate education programs in areas of strategic importance to academia, research institutions, and industry. SMA faculty fellows from NUS, NTU, and MIT teach graduate-level subjects, often delivered through state-of-the-art distance education technology, and conduct collaborative research.


Last year marked the successful conclusion of the initial two masters programs in SMA-1 (Advanced Materials for Micro- and Nano-Systems, and High Performance Computation for Engineered Systems); June 2005 marked the completion of the third academic program (Innovation in Manufacturing Systems and Technology). In June 2006, the final two programs (Molecular Engineering of Biological and Chemical Systems, and Computer Science) will conclude as well.

SMA launched its second phase, entitled SMA-2, in the summer of 2005. New graduate degrees are offered in three engineering disciplines and in one life science discipline: advanced materials for micro- and nano-systems; computational engineering; manufacturing systems and technology; and computational and systems biology.

The following SMA-2 programs will be offered in academic year ‘05-‘06. The Advanced Materials for Micro- and Nano-Systems (AMMNS) degree program offers a comprehensive and intensive approach to a field of study that is rapidly defining the frontier of modern technologies. The Department of Materials Science and Engineering hosts this degree at MIT. Students will be able to earn a dual degree—a master’s of engineering in materials science and engineering from MIT and either a master’s or PhD degree from NUS.

The educational component of AMMNS exposes students to the broad foundations of advanced materials that encompass processing, structure, properties and performance, with a particular emphasis on applications in microelectronics and emerging nanotechnologies. The research component of AMMNS provides an exceptional opportunity for collaboration between world-renowned faculty, and industry experts, both in Singapore and in the US. Students will also have the opportunity to interact with scientists and engineers at a number of research organizations, such as the Institute of Materials Research and Engineering and the Institute of Microelectronics. For further information, visit the website http://web.mit.edu/sma/students/programmes/ammns.htm.

The Computational Engineering (CE) degree program is one of the most technologically advanced and critically acclaimed computational engineering programs. The School of Engineering hosts this degree at MIT. Students will be able to earn a dual degree—a master’s of science in computation for design and optimization from MIT and either a master’s or PhD degree from NUS.

The educational component of CE is focused on educating the professionals who will model, simulate, optimize, and design the important engineered systems of the next decade and beyond. This educational track combines general methodology courses, discipline-specific electives, and industrial experience in a way that trains professionals for industry while also preparing doctoral students to participate in associated SMA inter-university and flagship research projects. For further information, visit the website http://web.mit.edu/sma/students/programmes/ce.htm.

The Computational and Systems Biology (CSB) degree program is a partnership between the globally recognized CSBI program at MIT and the visionary biology, bioengineering, and biotechnology programs at

Sea Grant College Program

The MIT Sea Grant College Program funds and coordinates multidisciplinary research, educational programs, and advisory services to further develop ocean and coastal resources.

Following the lead of the National Sea Grant College Program created by Congress in 1966, MIT recognized that science and engineering should play vital roles in advancing our use of the oceans. The designation of the Institute in 1976 as the nation’s 12th Sea Grant College strengthened its existing programs of ocean research and education. Today, with Sea Grant support, MIT expertise and facilities are regularly used to solve technological, social, economic, and political problems associated with marine resource utilization and coastal zone development.

Sea Grant research strives for balanced use of oceans and coasts, prudent harvests of food and useful materials from the sea, the prudent extraction of offshore oil and undersea minerals, and the application of engineering to improved methods of working in and on the seas, including design and construction of autonomous underwater vehicles for research.

At present, the principal departments involved in Sea Grant research include Civil and Environmental Engineering, Chemical Engineering, and Nuclear Science and Engineering. Students participate directly in most Sea Grant research projects at both graduate and undergraduate levels, and support is available for UROP projects.

The Sea Grant College Program also supports innovative education at MIT in ocean use and coastal zone development. The program has supported new curricula and textbooks in the field of ocean engineering. A joint project with the Massachusetts Maritime Academy is providing new educational opportunities for professional fishermen.

MIT Sea Grant’s Advisory Services publishes technical reports, sponsors symposia, and works with local governments, businesses, and organizations to transfer comprehensive information to the public on the many facets of resource development in the oceans and coastal zones. Joint research programs, conducted with related businesses and industries, assure the efficient and timely dissemination of new technologies and research results.

For more information on Sea Grant College Program projects and services, contact the director, Professor Chryssostomos Chryssostomidis, Room E38-300, MIT, Cambridge, MA 02139-4307, 617-253-7042. http://web.mit.edu/seagrant/
NUS, NTU, and Singapore's A*STAR Research Institutes. The Program in Computational and Systems Biology hosts this degree at MIT; graduates receive a PhD from either NUS or NTU, and have thesis co-supervision by a NUS/NTU faculty member and an MIT faculty member.

CSB research projects focus on the development of advanced technologies in biological probes, imaging, and computational biology, and the application of these technologies to medically relevant problems in tissue biology, including stem cell differentiation, tissue morphogenesis, infectious disease models, and tissue physiology. For further information, visit the website http://web.mit.edu/sma/students/programmes/csbl.htm.

The Manufacturing Systems and Technology (MST) degree program is a comprehensive education and research effort concentrating on enabling manufacturing systems and technologies for emerging industries. The Department of Mechanical Engineering hosts this degree at MIT. Students will be able to earn a dual degree—a master’s of engineering in mechanical engineering from MIT and either a master’s or PhD degree from NTU. For further information, visit the website http://web.mit.edu/sma/students/programmes/mst.htm.

For more information about SMA, please contact the assistant director, John C. Desforge, MIT, Room 8-407, Cambridge, MA 02139, 617-452-3014.

Spectroscopy Laboratory
The George Russell Harrison Spectroscopy Laboratory is dedicated to advancing knowledge of the structure and dynamics of atoms and molecules and the properties of liquids, solids, and biological materials utilizing the techniques of lasers and modern spectroscopy as well as conventional methods.

The Spectroscopy Laboratory encourages participation and collaboration among staff members in various disciplines of science and engineering. At present, faculty and staff from the departments of Chemistry, Physics, Chemical Engineering, Electrical Engineering and Computer Science, and the Harvard-MIT Division of Health Sciences and Technology pursue research in the laboratory. In addition, scientific visitors from both the United States and abroad participate in the work of the laboratory.

The laboratory houses one of the most extensive collections of lasers for spectroscopic research in the United States. The resources are organized into seven major laboratories: Pulsed Visible/UV Spectroscopy and Kinetics; High-Pressure Materials, Light Scattering Spectroscopy and Imaging; Tri-Model Spectroscopy; Atomic Physics, UV, Visible and Near IR Raman Spectroscopy; Biomedical Studies; Low-Coherence Interferometry; and Laser Biophysics. Facilities include excimer and Nd:YAG-pumped pulsed dye and Ti:sapphire lasers, ion laser-pumped CW dye lasers, CW Raman spectrometers, picosecond Ti:sapphire laser, streak camera; and phase microscopy set ups.

The laboratory operates two resource activity centers for physical science and biomedical science research. A collaborative physical science research program is supported by a grant from the National Science Foundation. The Laser Biomedical Research Center, supported by a grant from the National Institutes of Health, is devoted to biomedical research. The facilities of the latter are made available to researchers from universities, industry, and medical institutions.

Current research activities in the laboratory include high-resolution laser spectroscopy of excited vibrational and electronic molecular states, quantum dots, acoustic and thermal properties of high-pressure materials, carbon-centered radicals with O2, kinetics of intermediates in organo-metallic complexes, proton-coupled electron transfer studies, single-atom laser studies, and applications of lasers in medicine, including research in diagnosis of human biological tissue, in particular detection of early stages of cancer, using laser-induced fluorescence and light scattering spectroscopy and phase microscopy using low coherence interferometry, and cell biology.

Many graduate and undergraduate students perform thesis research in the laboratory; UROP projects are offered in many areas of laser research.

For further information, contact the director, Professor Michael Feld, Room 6-014, MIT, Cambridge, MA 02139-4307, 617-253-7700.

http://web.mit.edu/spectroscopy/

System Dynamics Group
The System Dynamics Group has three main research projects. The National Model Project investigates how the US economy works and analyzes the effects of proposed economic policies. Using system dynamics, which generates behavior as observed in an actual economy from the interactions of local structures and decision-making policies, the group builds a bridge that joins microstructure with macrobehavior. Corporations and individuals fund this research.

Another area of research is the System Dynamics in Education Project, established in 1990. A dozen undergraduate research assistants are writing a series of self-study guides called "Road Maps for Learning System Dynamics." The first nine chapters of Road Maps are available to download from http://sysdyn.mit.edu/.

The group also studies the design of sustainable quality improvement programs. Many companies abandon total quality management programs because they see no impact on profitability, even after performance has risen steeply. By developing formal models and original case histories, the group seeks to identify the critical interactions between quality programs and other organizational structures. Ultimately, models and case histories provide the basis for simulation microworlds where managers can experiment with policies for successful improvement without risk, accelerating individual and organizational learning.

For further information, contact Nan Lux, program manager, 30 Memorial Drive, Room E60-166, Cambridge, MA 02142, 617-253-1574.

http://sysdyn.mit.edu/

Technology and Development Program
The Technology and Development Program (TDP) provides a focus at MIT for interdisciplinary research and education related to the role of science and technology in the socioeconomic growth of newly industrialized countries.

TDP promotes an awareness among faculty and students of the relationships among science, technology, and development; provides a focal point for the activities of faculty, students, and visiting scholars interested in the field of technology and development; and serves as a resource for organizations outside MIT (government, academic, private sector) that
wish to explore the Institute’s understanding of socioeconomic and technological challenges facing the newly industrialized nations.

TDP is administered by faculty executive committees which oversee the activities of each program. Currently TDP is managing collaborative programs in Thailand and Malaysia. The primary emphasis of each program is on institution building. Through research, education, and industrial outreach activities, the program provides opportunities for industry, government, and academia to pool their resources and enhance the domestic socioeconomic growth of the host country.

TDP provides educational and research opportunities for master’s candidates interested in specific areas of technology and development. Admission to MIT must first be obtained from the appropriate academic department. The student should then submit a proposal for study to the TDP policy committee for approval. Details of the program are available upon request. Students may receive financial support in the form of research assistantships associated with current TDP research projects.

Further information about the program, including a list of current research projects, may be obtained from the director, Professor Fred Moavenzadeh, Room 1-173, MIT, Cambridge, MA 02139-4307, 617-253-7178.

http://web.mit.edu/mit-tdp/www/

Women’s Studies Program
The Program in Women’s Studies offers unique opportunities for interdisciplinary study and research for both undergraduate and graduate students. The primary objective of Women’s Studies is to promote new research about the roles of gender in all academic disciplines as well as to incorporate the experiences, perceptions, and intellectual contributions of women into existing curricula. It offers new perspectives in fields as diverse as anthropology, history, biology, psychology, engineering, and literature.

Undergraduates can choose a concentration or a minor in Women’s Studies and can petition for a major departure in Women’s Studies. The curriculum includes a core subject, Introduction to Women’s and Gender Studies, and a selection of subjects from many departments at the Institute. Special independent study topics and UROP projects can be arranged.

Several regular subjects are offered for graduate credit, and graduate students may also enroll in courses offered through the Graduate Consortium in Women’s Studies which is located at MIT. The Program in Women’s Studies is described in greater detail in Part 1; see the section on Graduate Education. Details of the program are available from the Graduate Students Office, Room 3-138, 617-253-4860, and from department graduate offices.

To facilitate interdepartmental research, the Women’s Studies Research Room in the Humanities Library offers the MIT community a multidisciplinary resource for the study of women and gender. The Women’s Studies Program is described in greater detail in Part 2; see the section on Interdisciplinary Programs in the School of Humanities, Arts, and Social Sciences.

For further information, contact the coordinator, Emily Meghan Morrow Howe, Room 14E-316, MIT, Cambridge, MA 02139-4307, 617-253-7844.

http://web.mit.edu/womens-studies/www/

OTHER AFFILIATIONS

Draper Laboratory
The Charles Stark Draper Laboratory (formerly the Instrumentation Laboratory) separated from MIT in 1973 to become an independent not-for-profit research and educational organization.

Mechanisms exist to permit the continuation of joint research activities and to allow the laboratory to continue its unique contributions to the Institute’s educational program. Opportunities are available in the 6-A Program, Space Grant, other programs, and part-time employment. Research assistantships, denoted as Draper Fellows, for SM and PhD candidates are described in the Graduate Education Manual. Copies are available from the Graduate Students Office, Room 3-138, 617-253-4860, and from department graduate offices.

The laboratory’s pioneering work in instrumentation has led to the development of highly precise sensors and ultra-reliable systems on which the world depends for safe and accurate guidance, navigation, and control. Much of Draper’s current research involves measurement, analysis, simulation, and control of complex dynamic systems, such as in robotics and autonomous vehicles. Draper is also applying its core competencies to a wide spectrum of applications such as information systems, biomedical engineering, and commercial space systems.

The corporation’s charter stresses its nonprofit responsibility to pioneer in science and technology, to contribute to the national interest, and to promote the transfer of technology through education.

A number of MIT faculty members maintain a close association with the laboratory, and thesis research opportunities exist that fulfill the residency requirement for an MIT degree in all phases of systems engineering, including basic theory, material sciences, mathematical analysis, computer studies, component design and evaluation (mechanical, electrical, and optical), and system synthesis. Students are in direct daily contact with the professional staff of engineers and scientists of the laboratory, and thus learn to appreciate the economic and human as well as the technical aspects of a system. Undergraduate and graduate students also may be employed by the laboratory and work directly on a project.

Adjacent to the main campus, Draper Laboratory is located at 555 Tech Square, Cambridge, MA 02139-3582. Information may be obtained by contacting Dr. George Schmidt, 617-258-2393.

http://www.draper.com/

Whitehead Institute for Biomedical Research
Whitehead Institute for Biomedical Research provides educational and research opportunities for graduate and undergraduate students in the biological sciences.

A nonprofit, independent research institution, Whitehead is affiliated with MIT through its members and associate members, who hold faculty positions at MIT. A small number of junior investigators also hold positions at Whitehead Institute as part of the Whitehead Fellows program.

Whitehead Institute’s research excellence is nurtured by the collaborative spirit of its faculty and the creativity and dedication of its graduate students and postdoctoral scientists. Whitehead’s primary focus is basic science, with an emphasis on molecular and cell biology, genetics and genomics, and developmental biology. Specific areas of inquiry at Whitehead
include cancer and infectious disease research, computational biology, transgenic science, membrane biology, vertebrate development, RNA catalysis, plant biology, and biological imaging. Research at the Institute is supported by an in-house bioimaging facility, as well a newly established Center for Microarray Technology.

Whitehead is engaged in research collaborations with numerous academic and industrial partners. These partnerships expand the scope of Whitehead research, as well as aid the translation of basic research into advances in disease prevention, diagnosis, and therapy.

Whitehead also supports a suite of programs that foster high school science education, and public engagement with science and technology. Students and postdoctoral candidates interested in science education and community outreach are encouraged to participate in these programs.

Each year, a number of graduate students pursue PhD degrees at Whitehead Institute through the Department of Biology. Undergraduate students pursue research objectives through UROP. Further information may be obtained through the interim director, Dr. David C. Page, Whitehead Institute, 9 Cambridge Center, Cambridge, MA 02142-1479, 617-258-5203.

http://www.whitehead.mit.edu/