Part 1

This Is MIT
OVERVIEW

CAMPUS LIFE

UNDERGRADUATE EDUCATION

GRADUATE EDUCATION

ACADEMIC PROCEDURES AND INSTITUTE REGULATIONS

INTERDISCIPLINARY RESEARCH AND STUDY
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 college of health sciences and technology encompass numerous academic departments, divisions, and degree-granting programs, as well as interdisciplinary research 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 great 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 recently 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 defining features 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.

**Students and Faculty**

MIT enrolled 10,206 students in 2006–2007, including 4,127 undergraduates and 6,126 graduate students. These MIT students came from all 50 states, the District of Columbia, three territories, and 113 foreign countries. Eight percent of the undergraduates and 36 percent of the graduate students were international.

In the same year, there were 998 faculty members in MIT’s professorial ranks, including 188 women. The total teaching staff numbered 1,671. 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 student family apartment tower. The building at 70 Memorial Drive, along the riverfront, currently contains classrooms and office space for the MIT Sloan School of Management; the Program in Science, Technology, and Society; and the School of Humanities, Arts, and Social Sciences. Now under construction is a 215,000-square-foot building that is scheduled to open in fall 2010. As the new home of the MIT Sloan School of Management, this building will create a new eastern gateway to the campus from Main Street.

Also located on the east 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 163,000-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 commanding 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, encircling 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.

The most significant expansion of the main group of campus buildings since the 1930s has just been completed. The cornerstone of the project is the Green Center, named for Cecil and Ida Green, whose leadership gift for Physics initiated a major renovation of the historic Bosworth Buildings by providing significant infrastructure renewal and modernization.
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 ever-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 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 other field events, with a game field inside the track oval for intercollegiate football, soccer, lacrosse, and field hockey.

These athletic facilities are complemented by the stunning 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.

Lining 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. Down the road from Baker House at the end of Amherst Alley is the Westgate apartment complex for students with families and the Tang Residence Hall for graduate students.

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. Currently being added to the graduate community is a 275,000-square-foot complex that will include 550 beds. Located next to Sidney-Pacific, it is scheduled to open in fall 2008.

**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 Boston’s 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 Boston Center for the Arts, Boston University’s Huntington Theatre Company, 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 activity 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.

**ACADEMIC PROGRAM**

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 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
- Chemical Engineering
- Civil and Environmental Engineering
- Computational and Systems Biology
- Electrical Engineering and Computer Science
- Engineering Systems
- 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
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 Graduate Programs) 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 (NucE), 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 for Institute Affairs 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, Suite 201, Bedford, MA 01730-1433
telephone 781-271-0022
e-mail cihe@neasc.org
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 MIT 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 (referring to those members of the faculty and administration who have voting privileges as designated by the Rules and Regulations 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 an associate provost, 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 organization chart at [http://web.mit.edu/orgchart/](http://web.mit.edu/orgchart/).

**Alumni**

**MIT Alumni Association**

The MIT Alumni Association, founded by alumni in 1875, provides ways for the Institute’s 117,000 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 offers an opportunity for alumni to make a virtual “infinite connection” to the MIT community at [http://alum.mit.edu/](http://alum.mit.edu/). More than 70,000 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 8,000 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 2006, the Alumni Fund reported $35.9 million in gifts, contributed by more than 31,545 alumni 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.
ACTIVITIES

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

There are more than 300 cocurricular clubs and activities 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), 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 groups oriented toward different backgrounds and lifestyles. Over 30 international student groups sponsor a rich array of 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 as well as graduate, and sponsors monthly programs as a social and service organization. Other interest groups focus on bridge, chess, ham radio, and strategic games.

For more information, contact the Association of Student Activities, Room W20-401; check out the ASA 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. By intention, they are not centralized in one counseling center. Students are free to choose the resource that appears to be most helpful, and support is available in many forms, including walk-in conversations as well as scheduled appointments, and with goals ranging from information dissemination to skilled psychotherapy.

Each student has a faculty advisor. In addition, there are faculty undergraduate and graduate officers in each academic department, 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. It also provides a broad range of assistance to all students and has special responsibilities for supporting students who are women, members of underrepresented minorities, or lesbian, gay, bisexual, or transgendered. In addition, students are frequently able to get the help they need 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 campus offices specialize in particular areas, such as Student Financial Services (including student employment), the religious counselors, the MIT Careers Office, the Office of Undergraduate Advising and Academic Programs, and the Study Abroad Office. The Campus Police can be helpful to students in many ways, and for students seeking information about particular fields, there is a Premedical Advisory Council and a Prelaw Advisory Council.

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

The arts at MIT are a fundamental component of MIT’s curriculum and community, reflecting and enhancing the Institute’s creativity, innovation, and excellence while advancing the self-discovery, problem-solving, and collaborative skills needed by leaders meeting the challenges of the 21st century.

More than half of all MIT undergraduates enroll in arts courses each year—over a third of them in music classes—and many major or minor in arts-related subjects. MIT’s arts faculty includes eminent artists such as the Pulitzer Prize-winning composer John Harbison, writers Alan Lightman and Junot Diaz, 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 Margaret Atwood, poet and novelist Chris Abani, composer Tan Dun, cartoonist Art Spiegelman, interdisciplinary artist and writer Coco Fusco, visual artist Cai Guo-Qiang, action architect Elizabeth Streb, filmmaker Michel Gondry, graffiti artists Tats Cru, and architect/engineer/artist 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; and from ballroom to modern dance. MIT’s world music program features Boston’s only Balinese gamelan; a Senegalese drumming ensemble; and an acclaimed South Asian performance series.

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. 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 be sure to visit Arts at MIT at http://web.mit.edu/arts/.

Student Programs
There are many programs helping students find community in the arts. Freshman seminars led by MIT arts faculty and staff encourage participants to discover the arts resources at MIT and in the Boston area and share their art experience with one another through 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 opens opportunities for them to collaborate in workshops or on independent projects. The Art Rep Program is a network of students in each dorm, living group, and graduate department linking students to arts events at MIT through weekly communications. The Grad Arts Forum encourages interdisciplinary communication among graduate students in the arts through a series of forums centered on themes connecting their artwork. Promoting the Arts Through Design, a seminar, provides students with a hands-on opportunity to learn design through the completion of a project for a local nonprofit community arts organization client. Also available through Student Programs are the annual mural and origami competitions.

Off-Campus Opportunities
MIT students enjoy a wealth of outstanding arts and cultural events available 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, Boston Chamber Music Society, Boston Secession, Collage New Music, and Boston Modern Orchestra Project, as well as free admission to Boston’s Museum of Fine Arts, the Photographic Resource Center, Harvard’s art museums, and other cultural events.

Arts Funding
MIT encourages the dreams and talents of the MIT community through arts-related grants and fellowships. Through the Council for the Arts’ Grants Program, students, faculty, and staff may apply for funding for arts projects in all disciplines; grants range from a few hundred to several thousand dollars.

Dance
Dance activities at MIT are sponsored by 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 websites via http://web.mit.edu/arts/dance/.

List Visual Arts Center
Just as MIT pushes the frontiers of scientific and intellectual inquiry, the mission of the List Visual Arts Center is to explore contemporary art in all media. Each year, the center’s challenging exhibition program looks beyond art’s traditional aesthetic functions to examine the cultural, social, political, scientific, or economic contexts that inform the work. Exhibitions are presented in three galleries on the first floor of the I. M. Pei-designed Wiesner Building (Building E15), the Media Test Wall in the Whitaker Building (Building 56), and the Dean’s Gallery in the Sloan School. All are free and open to the public. Nationally distributed catalogues, gallery talks by artists, critics, and curators, symposia, and films accompany each exhibition.

The List Center also manages MIT’s permanent collection of artworks, including a student loan program that enables students to borrow original works of art, such as prints and photographs, for up to a year, and a sizable collection of paintings, sculpture, drawings, prints, and photos sited throughout the MIT campus.

For more information about the List Center’s exhibitions and programs, call 617-253-4400, or visit http://web.mit.edu/lvac/.

MIT Museum
The MIT Museum’s broad range of exhibitions and programs for children and adults provides unique public access to what the Institute has always done best: the application of innovative research to the solution of real-world problems. On a yearly basis, over 80,000 people visit the museum and its galleries.

With the opening of a new gallery and program space in September 2007, the MIT Museum offers interactive exhibitions about the life sciences, engineering, and ocean literacy, which complement the permanent exhibitions on the history of artificial intelligence at MIT, the work of Harold Edgerton, and the ever-popular displays of holograms and historical artifacts.

In addition to the main collection at 265 Massachusetts Avenue, the MIT Museum oversees the Hart Nautical Gallery in Building 5 and the Compton Gallery in Building 10. Visit http://web.mit.edu/museum/ for an in-depth look at the museum’s collections, exhibitions, public programs, and services to the community.

Literary Arts
MIT’s Program in Writing and Humanistic Studies offers courses in fiction, poetry, playwriting, and science and nature writing taught by award-winning faculty. The Writers Series, Poetry@MIT series, and 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 http://web.mit.edu/lit/www/, http://web.mit.edu/humanistic/www/, and http://web.mit.edu/arts/literaryarts/.

Media Arts
MIT’s Media Lab is a world-renowned center of media-related research. Students and faculty at the lab explore convergent communications technologies through pioneering work in disciplines such as computer graphics, design, interactive cinema, narrative, cognition and learning, electronic music, and holography. For more information, visit http://web.mit.edu/arts/mediaarts/.

Music
MIT’s music faculty includes internationally acclaimed composers, performers, and musicologists. Students can take private lessons with depart-
mental support, music classes in composition and history, or participate in faculty-led performance ensembles at every level, from beginning to advanced. Faculty-led ensembles include the MIT Symphony Orchestra, Wind Ensemble, Festival Jazz Ensemble, Chamber Music Society, Concert Choir, Chamber Chorus, Gamelan Galak-Tika, and Rambax MIT (a Senegalese drumming ensemble); there are many student-directed ensembles and a capella groups on campus as well. Concerts are also presented as part of the MIT Faculty, Affiliated Artists, Guest Artists, and Thursday Noon Chapel series, and artists-in-residence of major national and international stature frequently come to MIT to perform and interact with students in and out of the classroom. For more information call 617-253-3210, or visit http://web.mit.edu/arts/music/.

Student Art Association
The 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 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 by MIT Dramashop, the co-curricular student-producing group of MIT Theater Arts. Extracurricular student organizations such as Shakespeare Ensemble, Musical Theatre Guild, Gilbert & Sullivan Players, and the improv group Roadkill Buffet offer additional performance and production experiences.

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 http://web.mit.edu/arts/theater/.

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 coursework in the visual arts may be found by consulting the Visual Arts Program of the Department of Architecture, the Center for Advanced Visual Studies, and the Comparative Media Studies Program, or visit http://web.mit.edu/arts/visualarts/.

ATHLETICS

Athletics and recreation are an important part of campus life for many students at MIT, and the Institute encourages everyone to participate in some type of athletic program. Instruction is available in a wide variety of sports, many of them good for a lifetime.

Last year, approximately 900 men and women participated in intercollegiate varsity athletics 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. There were more than 1,100 teams with an estimated 12,000 total participants last year. In addition, MIT’s sailing program attracts 1,500 students, faculty, staff, and alumni each year, and extends sailing privileges to their families.

MIT sponsors varsity competition for men in baseball, basketball, crew (heavyweight and lightweight), cross country, fencing, football, gymnastics, indoor and outdoor track, lacrosse, ski, soccer, swimming, tennis, volleyball, water polo, and wrestling. In addition, there are women’s varsity teams in basketball, cross country, crew (lightweight and openweight), fencing, field hockey, gymnastics, ice hockey, indoor and outdoor track, lacrosse, sailing, skiing, soccer, softball, swimming, tennis, and volleyball. Coeducational varsity opportunities are available in golf, pistol, rifle, sailing, and squash. 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 athletic facilities include the Howard W. Johnson Athletics Center (with an indoor track and ice rink), the duPont Athletic Center, Alumni Swimming Pool, Wood Sailing Pavilion, and Pierce Boathouse. The 26-acre Briggs playing fields include the duPont 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 recently 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 MIT’s Physical Education Requirement, see Undergraduate Education in Part 1.

CAMPUS DINING

MIT Campus Dining has 27 locations across the campus. A broad portfolio of food service management companies, restaurateurs, convenience store operators, and vending specialists creates a full range of diverse, convenient, healthy, and economical options.

Meals can be paid for with cash or by using Dining Dollars or TechCASH. A Dining Dollars debit account is restricted to meal purchases and can be used in all dining halls, restaurants, food courts, and cafés on campus. A TechCASH account can be used for all campus services, including food...

**CAMPUS MEDIA**

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

On the air, 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 ([http://mitpress.mit.edu/](http://mitpress.mit.edu/)) is one of the largest and most respected university presses in the world. It is a major publishing presence in diverse fields including art and architecture; cognitive science; computer science; economics; environmental studies; neuroscience; and science, technology, and society. The Press publishes journals, scholarly monographs, trade books, textbooks, and reference works, in print and electronic formats.

MIT Press authors are drawn from the worldwide academic community. The Press is known for its work in emerging fields of scholarship, for its strong international distribution, and for pioneering projects such as CogNet ([http://cognet.mit.edu/](http://cognet.mit.edu/)), an online resource for the cognitive sciences. The Press operates the MIT Press Bookstore at 292 Main Street in Kendall Square ([http://mitpress.mit.edu/bookstore/](http://mitpress.mit.edu/bookstore/)).

**CHILD CARE AND PARENTING RESOURCES**

**Center for Work, Family, and Personal Life**

The MIT Center for Work, Family, and Personal Life offers information on work/life issues including child care, children’s schooling, and parenting. The center’s comprehensive website offers listings and guidance on child care programs, babysitters, schools, summer camps, and other local resources for parents and children. Child care costs are higher in Boston than in many other cities and space is limited; plan to begin your search early and to contact the center by phone or email for additional assistance or an individual consultation.

The center also offers resources on child development, balancing work and family, relocation to MIT, raising bilingual children, and many other parenting issues. Individual consultations on child care, schooling, and parenting issues are available by appointment. The center offers a number of 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 [http://hrweb.mit.edu/worklife/](http://hrweb.mit.edu/worklife/).

**Technology Children’s Centers**

MIT’s child care network, Technology Children’s Centers (TCC), provides year-round educational care to children from two months of age through kindergarten entry (approximately six years of age). TCC includes three sites on campus, and a fourth site near Lincoln Laboratory in Lexington, MA, approximately 10 miles west of campus. TCC’s campus centers, located at Eastgate, Stata, and Westgate, serve approximately 130 children; TCC at Lincoln Laboratory (LINC) serves an additional 110 children.

TCC offers priority enrollment to all members of the MIT community, including MIT faculty and staff, undergraduate and graduate students, postdoctoral fellows and associates, and visiting scholars and researchers. TCC is managed by the MIT Center for Work, Family, and Personal Life, in partnership with Bright Horizons/Family Solutions, Inc., a child care management company.

Information about services, tuition, and financial aid, and application forms are available at [http://web.mit.edu/mitchildcare/](http://web.mit.edu/mitchildcare/).

**MIT Day Camp**

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

Enrollment is limited. Please visit [http://web.mit.edu/daycamp/](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; communicating with faculty (with the student’s permission); 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, text alternatives, and other academic accommodations. The Disabilities Services Office is located in Room 7-145. Please call 617-253-1674 for further information, or visit [http://web.mit.edu/dso/www/](http://web.mit.edu/dso/www/).
FRATERNITIES, SORORITIES, AND INDEPENDENT LIVING GROUPS

MIT recognizes 37 fraternities, sororities, and independent living groups (FSILGs). Of these, 25 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; four are residential. Most groups live in houses owned by the respective chapter’s house corporation, 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, a Latina sorority, and a Latino fraternity at MIT.

The oldest fraternity on campus was founded at MIT in 1873. More than 40 percent of the undergraduate population is affiliated with a fraternity, sorority, or living group. The FSILGs play an active role on campus, and its members hold leadership positions in various clubs and organizations. FSILG members also take part in a number of intramural sports, as well as volunteer their time with many charitable and nonprofit organizations.

Each fraternity, sorority, or living group is self-governing, manages all its operations and maintenance, and develops its own 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 act as a liaison between the undergraduate chapter and MIT. Resident advisors are usually MIT graduate students.

MIT students have opportunities 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. The formal recruitment period for sororities is held in September. However, many fraternities hold recruitment events year round. In addition, incoming students receive information about the FSILGs through summer mailings of 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 4,100, about 3,000 single men and women live in the 11 Institute residence halls on campus, and about 1,000 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 and academic achievement. The achievement of both goals relies greatly on individual initiative and responsibility, as well as on effective student governance 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 the all-female McCormick Hall, 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 a residence hall. 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 are 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, International 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 2007–2008 the rents for the houses will range from $2,315 to $3,319 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 at FSILGs vary, ranging between $1,700 and $6,000 a term.

**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 studs-request@mit.edu, or MIT Student House, 111 Bay State Road, Boston, MA 02215-1798.

**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 E19-429, 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 (sororities@mit.edu) and the Interfraternity Council (ifc-exec@mit.edu), Room W20-549, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, 617-253-7546.

**Graduate Single Student Housing**
Approximately 30 percent of MIT’s single graduate students reside on campus in Avery Allen Ashdown House, Ping Yuan Tang Residence Hall, Harold Edgerton House, Ida Flansburgh Green Hall, The Warehouse (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. New student assignments are for one year. Students receiving housing through the Continuing Allocation Process may remain in housing continuously until they graduate, as long as they are registered each term. Students sign a new license agreement each year they are in residence.

These residence halls provide a rich living environment in a number of different formats, including traditional dormitory-style rooms, suites, and apartments. All of the buildings have active student governments that plan and facilitate social and cultural events. All of the buildings except for Edgerton House have a faculty member or faculty members in residence who, along with the house manager, support the students. All units (rooms, suites, and apartments) are available as single sex, and Green Hall is exclusively for women. Coed two-bedroom units in Edgerton House and Tang Hall are also available upon request. All buildings except for Edgerton House are furnished.

The rent for all graduate residences is charged on a monthly basis and the licenses are from the date of occupancy until August 15 each year. Graduate Housing’s strict termination policies can be found on its website. All rents include heat, hot water, electricity, on-campus phone service, internet, and basic cable, as well as all building amenities, such as low-cost laundry, gym facilities, front desk services, and security patrol. Some residences have a $5 monthly tax to cover dorm social activities.

Rents range from $557 to $1,380 per month, per student. Details about each of the residences can be found at [http://web.mit.edu/housing/grad/residences.html](http://web.mit.edu/housing/grad/residences.html).

MIT graduate housing is assigned through an allocation process administered 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 takes place in November for spring term housing. Rooms that become available outside the allocation process are made available through a waiting list that runs from July through May. Details of the allocation and waiting list are available at [http://web.mit.edu/housing/grad/](http://web.mit.edu/housing/grad/).

The Graduate and Family Housing Office is located in E19-429 and can be reached at graduatehousing@mit.edu or at 617-253-5148.

**Student Family Housing**
Approximately 400 graduate and undergraduate families reside in MIT Family Housing. Family Housing is provided in one garden-style and two high-rise apartment buildings. All buildings have an active student government that plans and facilitates social and cultural events. Apartments range from efficiencies to 2-bedroom apartments and are all unfurnished.

Residence in student family housing is limited to regular undergraduate and graduate students who are registered and attending MIT and whose families reside 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 each term in order to reside in on-campus student housing. New assignments are for two years, with a new license agreement signed each year. Students receiving housing through the Continuing Allocation Process may remain in housing continuously until they graduate, as long as they are registered each term. They will also sign a new license agreement each year.

The rent for all family residences is charged on a monthly basis and the licenses are from the date of occupancy until August 15 each year. Family Housing’s strict termination policies can be found on its website. All rents include heat, hot water, electricity, on-campus phone service, internet, and basic cable, as well as all building amenities, such as low-cost laundry, gym facilities, front desk services, security patrol, and other common spaces. Some buildings have a $5 monthly tax to cover dorm social activities.
Rents range from $1,004 to $1,485 per month, per apartment. Details about each of the residences can be found at http://web.mit.edu/housing/grad/residences.html.

Student family housing is managed by the MIT Graduate and Family Housing Office, Room E19-429, and is assigned through an allocation process. Students can enter the allocation for fall term housing between March and early May. Assignments are available in late May. A second allocation takes place in November for spring term housing. Apartments that become available outside the allocation process are made available through a waiting list that runs from July through May. Details of the allocation and waiting list are available at http://web.mit.edu/housing/grad/.

Off-Campus 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, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307, telephone 617-253-1493 or visit http://web.mit.edu/housing/och/.

INFORMATION SERVICES AND TECHNOLOGY

MIT’s computing environment gives community members access to a full range of information technologies and resources. The Information Services and Technology (IS&T) department supports “universal” services for everyone, such as telephones and network connections, including wireless, as well as services for specific constituencies, such as academic and administrative computing.

MITnet connects thousands of computers across the campus, and its connection to the Internet gives MIT high-speed access to computers around the world. Wireless and wired access to MITnet is available across the entire campus, including all dorms. The Athena Computing Environment, MIT’s campus-wide networked system of Linux and Unix-based workstations, is available in academic facilities, and QuickStations in academic buildings, libraries, and dorms. Athena is complemented by Macintosh and Windows labs providing additional resources. Across these environments students have access to courseware, electronic mail, mathematics and statistics packages, graphics and multimedia applications, engineering and programming tools, productivity software, printers, and other resources.

IS&T also 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. Through MIT’s partnerships with web-based vendors, MIT students, faculty, and staff can purchase hardware, software, and accessories at educational discounts.

Technical support is provided through telephone and email help lines, consulting, training, and publications. The Adaptive Technology for Information and Computing program provides technologies for students and staff with disabilities.

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

LIBRARIES

The MIT Libraries—with holdings of more than 2.7 million print volumes and 2.5 million additional items, such as microforms, maps, slides, musical scores, manuscripts, recordings, and electronic resources—support all of the Institute’s programs of research and study. The library system is composed of five divisional libraries, four branch libraries, and the Institute Archives and Special Collections:

- Aeronautics and Astronautics Library
- Barker Engineering Library
- Dewey Library (management and social sciences)
- Humanities Library
- Lindgren Library (earth, atmospheric, and planetary sciences)
- Lewis Music Library
- Rotch Library of Architecture and Planning
- Rotch Library Visual Collections
- Science Library

A wide range of online services and resources is available through the MIT Libraries' website, at http://libraries.mit.edu/. Patrons can locate library items using the online catalog, Barton, at http://libraries.mit.edu/barton/, or search over 20,000 journals, databases, and other serial publications using Vera, at http://libraries.mit.edu/vera/.

In addition, the online interlibrary loan service, at http://libraries.mit.edu/illiad/, makes available materials from other libraries throughout the world. On-site access is provided to 18 local libraries in the Boston Library Consortium.

Workshops on library resources and instructional support are offered for MIT courses and other groups, and in-depth consultation on research projects is available with subject specialists. Reference assistance is also available through the Ask Us! service, at http://libraries.mit.edu/ask/, and from library staff.

The MIT 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 14,000 MIT theses.

While primarily serving the MIT community, library facilities at MIT can be used by others upon application to Document Services, Room 14-0551, for a library privilege card.

MEDICAL SERVICES

MIT Medical
To meet the health care needs of MIT community members, MIT Medical offers a single, centralized source of comprehensive health insurance, care and treatment at its own medical centers, and an extensive roster of health promotion programs. Convenient, on-campus access to a broad range of clinical services and medical and dental specialties is delivered by highly qualified health care professionals. Affiliations with Boston’s leading hospitals, moreover, allow clinicians to refer patients with more serious conditions to the most appropriate specialists.
Visits to MIT Medical are by appointment, except for urgent care, which is available 24 hours a day. MIT community members should call 617-253-1311 or 617-258-0656 (TTY) day or night for medical advice. MIT Medical is located in Building E23.

For more information about MIT Medical, including appointment hours, phone numbers, and clinician profiles, visit http://web.mit.edu/medical/.

MIT Student Health Plan
The MIT Student Health Plan consists of two plans: the MIT Student Medical Plan and the MIT Student Extended Insurance Plan. Further information on both can be found under Medical Requirements in the sections on Undergraduate Education and Graduate Education.

MIT OpenCourseWare
MIT pioneered the OpenCourseWare concept in 2002 with an initial pilot of 50 courses that were published online and made available, free of charge, to users anywhere in the world. Today, OCW makes available to the world the teaching materials used in virtually all undergraduate and graduate courses taught at MIT.

These course materials are accessed directly from the MIT OCW website (http://ocw.mit.edu/), which attracts well over 1 million visits per month, or from more than 100 mirror sites, primarily in Africa and South Asia. They can also be downloaded for offline use.

In addition, affiliated organizations have translated hundreds of MIT courses into about a dozen other languages, and these materials are made available from their own websites.

At MIT, OCW’s impact has been felt across the campus. Students welcome the availability of course syllabi and lecture notes and use resources such as problem sets and exams for study and practice. Some instructors refer students to OCW for part of their coursework, and a number of faculty members use OCW materials in their classroom teaching.

MIT has also been instrumental in establishing the OCW Consortium, which brings together practitioners from more than 120 institutions around the world.

For more information about MIT OpenCourseWare, contact Steve Carson, Room E70-810, 1 Broadway, 8th floor, MIT, 617-253-1250, ocw@mit.edu.

Public Service Center
The Public Service Center (PSC) offers MIT students multiple ways to enrich communities beyond MIT while expanding their own education and life experience. The guidance, resources, and support offered by PSC help students to identify the public service choices, both paid and volunteer, that are best suited to their passions and abilities.

Fellowships and Grants (http://web.mit.edu/mitpsc/): Beyond Boston and Cambridge, students have opportunities to provide Hurricane Katrina relief, help youth in Latin America develop entrepreneurial business skills, or work on community issues in their own hometown. Supported by fellowships and grants, they can work individually or as part of a team during term breaks and during the academic year. These fellowships and grants ensure that the MIT educational experience is as diverse and far-reaching as the ambitions of its students.

The MIT IDEAS Competition (http://web.mit.edu/ideas/): Student teams develop and implement projects that can make a positive change for communities across the globe. Entries are judged on innovativeness, feasibility, and community impact.

Service Learning (http://web.mit.edu/servicelearning/): Applied learning for student and community benefit is another way that students can gain valuable life experience while serving community needs. Service learning integrates coursework with academically relevant community projects. For example, freshmen can enroll in a public service design seminar, where they could build a prototype to ease vaccine transportation in the developing world, or redesign a community garden’s composting device. In doing so, they gain a deeper understanding of their subjects and a better appreciation of their own problem-solving capabilities.

Innovative, engaging outreach activities are available through student groups, Institute residences, and many MIT departments and programs. A sampling of groups can be found online through the MIT Outreach Database (http://web.mit.edu/outreach/). The PSC website, http://web.mit.edu/mitpsc/, is also a useful resource for learning more about how to participate in public service at MIT.

Religious Organizations
There are currently about 30 active and long-standing student religious organizations on campus that are based in the MIT Chapel and Building W11. The chapel’s interdenominational status maintains an atmosphere of religious freedom for all, providing MIT community members with many varied opportunities for spiritual expression. At the same time, 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.

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. 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 departments and the Institute on important educational issues. The Nominations Committee recommends student representatives for more than 50 administrative and faculty committees.

Each class at MIT annually elects a president and executive committee for its class council, which plans and coordinates programs and social events throughout the year.
The Association of Student Activities, a joint committee of the UA and the Graduate Student Council (see below), 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—fraternities, sororities, 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), the sororities have formed the Panhellenic Council, and the Institute houses have formed the Dormitory Council. The IFC and Panhellenic Council work to improve relations between fraternities and sororities 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, and communicating with the MIT faculty and administration on behalf of graduate students. The GSC seeks to emphasize, in all 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. GSC representatives facilitate communication between the council and their constituency (a department, academic program, living group, or demographic group). The standing committees span all facets of the graduate experience, including orientation for all incoming graduate students, the career fair and a variety of academic seminars throughout the year, large social and cultural activities, and even the Muddy Charles Pub.

On issues such as housing, stipends, health care, and advising, as well as nearly any other academic or student-life related issue, the GSC serves as the primary voice and advocate for the graduate student body. 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 also interfaces with graduate student groups through the Association of Student Activities (a joint committee of the GSC and the Undergraduate Association) and the GSC funding board, which allocates event funding to these groups.

The GSC office is located in Room 50-220, Walker Memorial, above the Muddy Charles Pub. To keep students apprised of the council’s activities, it publishes Graduate Student News and maintains a comprehensive website at [http://gsc.mit.edu/](http://gsc.mit.edu/) which serves as a repository for a large amount of information relevant to graduate students.

**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. SSC 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. Visit [http://web.mit.edu/sfs/about_us/](http://web.mit.edu/sfs/about_us/) for a complete description of the financial services available to students.

**WebSIS**

WebSIS is a self-service website for the MIT community. On WebSIS students can view their academic, financial, and biographic records, preregister for upcoming terms, check grades, maintain address information, and apply for their degrees; instructors and administrators can view enrollment lists and student photos; and advisors and administrators can view the academic records of students in their department. WebSIS also serves as a gateway to academic and financial information and applications used by students, faculty, and administrators.

For more information, visit [http://student.mit.edu/](http://student.mit.edu/).
To earn a bachelor’s degree, 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 complete the departmental program specified by that Course. Details on General Institute Requirements and on selecting a major course of study 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 1996 and 2000, the percentage of students who received their degrees within six years of entrance was about 92 percent.

Freshman Year

During the first year at MIT, students lay the foundation for their college education. 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.

To begin fulfilling the General Institute Requirements (described later in this section), freshmen choose subjects in mathematics, chemistry, biology, and physics to fulfill the science core, and select from 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 a project-based subject. 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 students 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. 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 Office of the Dean for Undergraduate Education. 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 addi-
tion, 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.

The program’s director is Robert M. Rose. For more information, contact Cheryl Butters, Room 16-135, MIT, 617-253-3200. A detailed description of the program may be found online at \url{http://web.mit.edu/concourse/}.

**Experimental Study Group**

The Experimental Study Group (ESG) is an innovative academic community geared primarily but not exclusively toward motivated first-year students who wish to take an active part in their MIT education. Each year some 50 freshmen, 15 sophomores, 10 staff, and 20 upperclass instructors who were in ESG as freshmen participate in the program. Staff are drawn from the departments of Biology, Chemistry, Mathematics, Physics, Electrical Engineering and Computer Science, and the School of Humanities, Arts, and Social Sciences.

In place of lectures and large classes, ESG students participate in small classes (typically fewer than 10 students), discussion-based seminars, interactive study groups, hands-on labs, and independent study. Almost all the core subjects in biology, chemistry, mathematics, and physics are offered through ESG, in addition to an introductory computer science class and several HASS and HASS-D subjects (including Expository Writing). Although ESG can be a full-time activity for freshmen, students may take one or two subjects in the regular curriculum that are not offered in ESG.

ESG’s small classes are structured to be interactive learning environments, with plenty of opportunity for lively discussion, question and answer sessions, student presentations, and peer-led problem-solving sessions. ESG also promotes educational innovation by encouraging staff and students to design and teach experimental 6-unit seminars that combine theory and practice. Recent seminars include The History of Rhythm and Blues, The Physics of Rock Climbing, Zen Arts, and Kitchen Chemistry.

ESG’s centrally located facility is comprised of 14 rooms where classes are held and weekly activities are offered, such as luncheons and dinners (free for freshmen), guest speakers, and evening study sessions. Students and staff also plan regular outings for the freshmen, including hiking and skiing trips and visits to local museums and attractions.

For more information about ESG, contact Dr. Holly Sweet, associate director, Room 24-612, MIT, 617-253-7786, hbsweet@mit.edu, or visit \url{http://web.mit.edu/ESG/}.

**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 15-401, MIT, mas@media.mit.edu, or visit \url{http://www.media.mit.edu/mas/fyo/}.

**Terrascope**

The Terrascope Program 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 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, chemical, 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 2011) designed to explore how teams of scientists and engineers approach difficult problems that require multidisciplinary approaches. Solutions will be published on a class website and participants will defend their work before a panel of outside experts. This final presentation will be broadcast live over the internet.

In the spring, students enroll in 1.016 Communicating Complex Environmental Issues: Designing and Building Interactive Museum Exhibits (9 units). Using 12.000 as a starting point, students will work in teams 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 choose to enroll in SP.360 Terrascope Radio (12 units), which provides the extraordinary opportunity to satisfy the freshman Communication Requirement by offering CI-H credit to explore radio as a
medium for expression and communication, particularly of complex scientific ideas, and produce a professional-quality radio program. This subject is optional, but recommended as a perfect integration of the Terrascope theme into the Communication Requirement.

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. Past locations have included the Amazon rainforest, Alaska, the Galapagos Islands, Chile, and New Orleans. Expenses for the trip are largely covered by the program.

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

For more information, or to apply for the program, visit http://web.mit.edu/terrascope/.

Seminar XL
Seminar XL is a collaborative undergraduate learning experience in which groups of four to six students meet for 90 minutes twice per week to share their understanding of course concepts and problem-solving methods. A facilitator guides each working group, where the facilitator is a research scientist, a graduate student, or an upperclass undergraduate student who previously earned an A in the course. Although the Office of Minority Education (OME) historically has sponsored the program for first-year students, OME encourages upperclass students to enroll as well. However, only first-year students can receive course credit, provided they attend at least 80 percent of the working group sessions. Upperclass students must register as listeners.

After the fifth week, interested students can enroll in Seminar XL Limited Edition, which operates two 90-minute working group sessions per week, as does the regular Seminar XL. There is no course credit awarded, but past students have benefited greatly from this program.

For more information about Seminar XL, Seminar XL LE, and other OME services, visit the Office of Minority Education, Room 4-113, 617-253-5010, or visit http://web.mit.edu/ome/.

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 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 6 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 select 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, with one exception: students pursuing Course 4 degrees in Architectural Design or Building Technology may take a minor in the Course 4 HASS field of History of Art and Architecture. In addition, minors are not allowed in either field of composite degrees, which combine 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 student should designate the minor program 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 an Architecture, Engineering, Management, or Science Field**

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

- Architecture
- Astronomy
- Biology
- Biomedical Engineering
- Brain and Cognitive Sciences
- Chemistry
- Civil Engineering
- Earth, Atmospheric, and Planetary Sciences
- Environmental Engineering Science
- Management
- Materials Science and Engineering
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 Office of Undergraduate Advising and Academic Programs 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
- Japanese
- 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 and Gender 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-410) administered by the Office of the Dean, School of Humanities, Arts, and Social Sciences, or 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.

Students begin with six science core subjects in mathematics, physics, biology, and chemistry, and then add the Science, Laboratory, and Restricted Electives in Science and Technology (REST) Requirements, both described later in this section. 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 four introductory subjects, 7.012, 7.013, 7.014, or 7.015. All four subjects cover the same core material, which includes the fundamental principles of biochemistry, genetics, molecular biology, and cell biology. In addition, each subject has its own distinctive material. Subject 7.012 is offered in the fall term; 7.013, 7.014, and 7.015 are taught in the spring.

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. Subject 3.091 is designed for students who are particularly interested in the chemistry of the solid state. Subjects 5.111 and 5.112 present an introduction to chemistry with an emphasis on basic principles and their applications. Subject 5.112 is intended for students with a strong background in high school chemistry.

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, advanced-placement or transfer 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, advanced-standing or transfer 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.

Bachelor of Science Degree Requirements

<table>
<thead>
<tr>
<th>General Institute Requirements (GIRs)</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Requirement:</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry (3.091, 5.111, or 5.112)</td>
<td></td>
</tr>
<tr>
<td>Physics (8.01, 8.011, 8.012, or 8.01L; and 8.02 or 8.022)</td>
<td></td>
</tr>
<tr>
<td>Calculus (18.01, 18.01A, or 18.01L; and 18.02, 18.02A, 18.022, 18.023, or 18.02L)</td>
<td></td>
</tr>
<tr>
<td>Biology (7.012, 7.013, 7.014, or 7.015)</td>
<td></td>
</tr>
<tr>
<td>Laboratory (LAB) Requirement (12 units)</td>
<td>1</td>
</tr>
<tr>
<td>Restricted Electives in Science and Technology (REST) Requirement</td>
<td>2</td>
</tr>
<tr>
<td>Humanities, Arts, and Social Sciences Requirement</td>
<td>8</td>
</tr>
<tr>
<td>includes 2 Communication Requirement subjects (CI-H)</td>
<td></td>
</tr>
<tr>
<td>Total GIR Subjects Required for SB Degree</td>
<td>17</td>
</tr>
</tbody>
</table>

Physical Education Requirement

For 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)

PLUS

Departmental Program and Unrestricted Electives

The departmental program may specify some of the GIR subjects, and includes an additional 180–198 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 8 or 8 1/2 subjects, and complete all degree requirements within the equivalent of 32–34 subjects.

Notes

Transfer students generally will graduate under the requirements that apply to the class they join when they enter MIT.

1 Communication-Intensive Major subjects (CI-M) are designated on the degree charts in Part 2.

2 The total of 180–198 units does not include ROTC subjects, if elected.
Students with Advanced Placement or Advanced Standing Credit for 8.01 who elect to take 8.012 will receive 6 units of elective credit in place of 8.01.

Communication Requirement
The Communication Requirement makes 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 contact the director of Writing Across the Curriculum, Dr. Leslie Perelman, 617-253-3375.

The Communication Requirement consists of four Communication Intensive (CI) subjects sequenced throughout a student’s undergraduate career. Students must pass CI-H/CI-HW subjects in the humanities, arts, and social sciences. 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/ 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 receive a score of “CI-H/CI-HW Required” on 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 Writing on Contemporary Issues; 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/CI-HW subject in their first term at MIT are limited to 45 units in addition to an appropriate CI-H/CI-HW 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 of the four required 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.

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 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, ELS, 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 and Gender 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-410, 617-253-4441, hass-www@mit.edu, or check the HASS Education Office home page at http://web.mit.edu/hass/www/.

HASS Distribution Subjects

Humanities, Arts, and Social Sciences Distribution (HASS-D) subjects are humanistic in orientation, 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 often 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 non-western 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.
The 2007–2008 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
- 21L.003 Reading Fiction
- 21L.004 Reading Poetry
- 21L.006 American Literature
- 21L.007 World Literatures
- 21L.009 Shakespeare
- 21L.012 Forms of Western Narrative
- 21L.421 Comedy
- 21L.735 Writing and Reading the Essay
- 21L.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: Homer to Dante
- 21L.002 Foundations of Western Culture: The Making of the Modern World
- 21L.017 The Art of the Probable
- 21L.448J Darwin and Design [21W.739J]
- 21W.742J Writing about Race [SP 575J]
- 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 [17.04J]
- 24.06J Bioethics [STS.006J]
- 24.09 Minds and Machines
- 24.900 Introduction to Linguistics
- 21L.111 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

**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
- 11.002J Introduction to the Policymaking Process [17.30J]
- 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, and Future
- 17.42 Causes and Prevention of War
- 17.50 Introduction to Comparative Politics
- 17.55J Introduction to Latin American Studies [21A.224J, 21F.084J]
- 21A.100 Introduction to Anthropology
- 21A.109 Understanding Culture
- 21F.064 Introduction to Japanese Culture [meets with 21F.592]
- 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.001 How to Stage a Revolution
- 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]
21H.421 Introduction to Environmental History
21H.433 The Age of Reason: Europe in the 17th to the Early 19th Centuries
21H.504 East Asia in the World, 1500–2000 A.D.
21H.523 Emergence of the Modern Japanese State, 1800–1952
21H.601 Islam, the Middle East, and the West
21H.912 The World Since 1492
21W.746 Humanistic Perspectives on Medicine: From Ancient Greece to Modern America
STS.001 Technology in American History
STS.002 Toward the Scientific Revolution
STS.003 The Rise of Modern Science
STS.005 Disease and Society in America

Enrollments in some HASS-D subjects may be limited. Students who did not get their first choice HASS-D in the HASS-D Lottery are guaranteed a spot in the subject the next term it is offered, but they must contact the HASS Education Office in order to exercise this option. All other students enter their preferences for HASS-D subjects into a computerized lottery system prior to each term in order to be assigned to subjects. For details see the Guide to the Humanities, Arts, and Social Sciences, available in the Humanities, Arts, and Social Sciences Education Office, Room 14N-410, or on the web at http://web.mit.edu/shass/undergraduate/.

For information on the HUM-Distribution Requirement for students who entered MIT before Academic Year 1988–1989 please consult the HASS Education Office, Room 14N-410, 617-253-4441.

Elective Subjects
The remainder of the eight-subject requirement, above and beyond Distribution and Concentration, may be fulfilled by the approved subjects in the humanities, arts, and social sciences. These elective subjects may be chosen from among most undergraduate subjects offered in the School of Humanities, Arts, and Social Sciences, a substantial number of subjects in the School of Architecture and Planning, and a smaller number from the School of Science. Subjects which may be used to fulfill the HASS Requirement without petition are designated as HASS subjects in Part 3. (Please note, however, that subjects in the Sloan School of Management cannot be used to satisfy the HASS Requirement unless the subject description specifically indicates it may be used for this purpose.)

Appropriate subjects taken by cross-registration at Harvard University or Wellesley College may also count toward the requirement; however, in most cases a petition must be submitted. Graduate subjects (designated as G subjects in Part 3) may be used to satisfy the requirement only by petition, which must include the instructor’s signature.

Further information on elective subjects may be found in the HASS Guide.

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.

REST Requirement Subjects

<table>
<thead>
<tr>
<th>Course Number</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 [7.30]</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 [1.053]</td>
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<tr>
<td>2.005</td>
<td>Thermal-Fluids Engineering I</td>
</tr>
<tr>
<td>2.011</td>
<td>Introduction to Ocean Science and Engineering</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>5.61</td>
<td>Physical Chemistry</td>
</tr>
<tr>
<td>6.00</td>
<td>Introduction to Computer Science and Programming</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>6.042</td>
<td>Mathematics for Computer Science [18.062]</td>
</tr>
<tr>
<td>6.071</td>
<td>Introduction to Electronics [22.071]</td>
</tr>
<tr>
<td>7.03</td>
<td>Genetics</td>
</tr>
<tr>
<td>7.05</td>
<td>General Biochemistry</td>
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<tr>
<td>8.03</td>
<td>Physics III</td>
</tr>
<tr>
<td>8.04</td>
<td>Quantum Physics I</td>
</tr>
<tr>
<td>8.20</td>
<td>Introduction to Special Relativity</td>
</tr>
<tr>
<td>8.282J</td>
<td>Introduction to Astronomy [12.402]</td>
</tr>
<tr>
<td>8.286</td>
<td>The Early Universe</td>
</tr>
</tbody>
</table>
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 and emphasize as much as possible work of project type rather than routine experimental exercises. The subjects are designed to stimulate the student’s resourcefulness and ideas.

The Laboratory Requirement is not intended primarily to teach specific techniques for later experimental work, provide broad coverage of a particular field, or complement a specific subject. The laboratory subjects are planned to give each student, at an early stage of his or her educational experience at MIT, an opportunity to work on 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 (1-3-2)
1.102 Introduction to Civil and Environmental Engineering Design II (1-3-2)
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 (3-3-6) [gives 6 units of laboratory credit]
2.671 Measurement and Instrumentation (3-3-6)
2.672 Project Laboratory (1-3-2)
3.014 Materials Laboratory (1-4-7)
4.411 Building Technology Laboratory (2-4-6)
5.310 Laboratory Chemistry (2-8-2)
5.35 Introduction to Experimental Chemistry (2-8-2)
6.01 Introduction to EECS I (2-4-6) [gives 6 units of laboratory credit]
6.02 Introduction to EECS II (2-3-7) [gives 6 units of laboratory credit]
6.101 Introductory Analog Electronics Laboratory (2-9-1)
6.102 Introductory RF Design Laboratory (2-9-1)
6.111 Introductory Digital Systems Laboratory (3-7-2)
6.115 Microcomputer Project Laboratory (3-6-3)
6.121 Introduction to Experimental Chemistry (2-8-2) [HST.575]
6.131 Power Electronics Laboratory (3-6-3)
6.141 Robotics: Science and Systems I (2-6-4) [16.415]
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 Communication (4-8-6)
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)
9.61 Laboratory in Higher Level Cognition (3-6-3)
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)
12.307 Weather and Climate Laboratory (1-4-7)
12.410J Observational Techniques of Optical Astronomy (3-4-8) [8.287J] [gives 12 units of laboratory credit]
14.33 Economics Research and Communication (3-4-5)
15.301 Managerial Psychology Laboratory (3-3-9) [gives 12 units of laboratory credit]
16.622 Experimental Projects II (1-7-4)
16.821 Flight Vehicle Development (2-10-6)
16.831 Space Systems Development I (2-6-4) [gives 6 units of laboratory credit]
16.832 Space Systems Development II (1-5-0)
17.871 Political Science Laboratory (3-6-6)
18.821 Project Lab in Mathematics (0-6-6)
20.109 Laboratory Fundamentals in Biological Engineering (2-8-5) [gives 12 units of laboratory credit]
22.09 Principles of Nuclear Radiation Measurement and Protection (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 at http://web.mit.edu/pe/.

To satisfy the Physical Education Requirement undergraduates must take four physical education classes (for 8 points) and complete the swim requirement. The swim requirement can be satisfied by taking a beginning swim class or students may elect to test out on fall Registration Day. In addition to taking classes, students may earn physical education points in the following ways:

- Varsity sports: Four points are awarded to players in their major season of competition.
- ROTC Programs (Air Force, Army, Navy): Two points are awarded per year of ROTC participation up to a maximum of four units.

Successful students complete their four courses during their freshman year; however, students are responsible for completing their Physical Education Requirement by their sophomore year. Students must attend 11 of 12 sessions to receive the 2 points for a physical education course. Freshmen are expected to complete the swim test on fall Registration Day or, if they can’t swim, register for a swim class during first quarter. Students who do not complete the physical education requirement by the end of their sophomore year must petition for a time extension 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 at http://web.mit.edu/pe/.

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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). 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 points for the class.

Physical education registration is open to the entire MIT community. Registration is conducted online at http://web.mit.edu/pe/. Information on registration can be obtained through WebSIS at http://student.mit.edu/.

Registration dates are posted in the Academic Calendar.

Physical education classes offered last year included Group Exercise (Body Sculpting, Bootcamp Workout, Kickboxing, Pilates, Step, Yoga), Archery, Backpacking/Hiking, Badminton, Basketball, Basketball Officiating, Boxing, Dance (Modern, Choreography, Square, Folk), Fencing, Figure Skating, Flyfishing, Golf, Gymnastics, Ice Hockey, Juggling, Martial Arts (Aikido, Jiu-Jitsu, Shotokhan, Sport Taekwondo, Tae Kwon Do), Pistol, Ropes Adventure, Running/Jogging, Sailing, Scuba, Skating, Skiing/ Snowboarding, Soccer (indoor), Squash, Table Tennis, Tennis, Volleyball, and Weight Training.

Students must wear appropriate attire for activity classes. Most classes provide all necessary equipment. Students must supply skates and sticks for ice hockey classes, and rackets for tennis classes. Nonmarking court shoes are required for squash and tennis. Lab fees are required for some courses. Undergraduate and graduate students must activate their MIT ID card to gain access to all sport facilities at no additional charge during the academic year. There is a nominal fee to access sport facilities in the summer.

All faculty, staff, employees, and alumni who use sports facilities for physical education, intramurals, intercollegiate athletic sports, club programs, or any form of general recreation are required to purchase a Department of Athletics, Physical Education, and Recreation (DAPER) membership. Purchase of a DAPER membership allows the user access to all sport facilities.

For further information contact the Physical Education Office, Room W35-297X, 617-253-4291, physedoffice@mit.edu, or visit http://web.mit.edu/pe/.

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/.

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 regular 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. Students who have not been charged full tuition in either the fall or spring term are subject to additional tuition charges and should consult the Registrar’s Office, 5-119, 617-258-6409.

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 can 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.”

In order 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 readmitted 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 fall term or is admitted to do so in the spring, 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 dean 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 in a wide range of research activities that are available in every academic department and most interdisciplinary laboratories and centers in collaboration with MIT faculty.

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 are available at http://web.mit.edu/urop/. This website 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 UROP staff in the Office of Undergraduate Advising and Academic Programming, 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, can be found at [http://student.mit.edu/catalog/Undergraduate_Seminars.html](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 Office of Undergraduate Advising and Academic Programming, Room 7-104, MIT, 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 or Amy Fitzgerald at amyfitz@mit.edu. The Student Shop ([http://web.mit.edu/Edgerton/www/Shop.html](http://web.mit.edu/Edgerton/www/Shop.html)) is located in Room 44-023 and offers regular training sessions; contact manager Mark Belanger at mdbelang@mit.edu for access and training.

Typical subjects offered include introductory electronics, digital photography, seminars for public service, and alternative energies. In addition, the stroboscopic photography 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](http://web.mit.edu/Edgerton/www/Courses.html).

The Edgerton Center is the joint sponsor of the Service Learning Initiative at MIT with the Public Service Center, bringing community service projects into the academic curriculum. It 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.

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 mechanical engineering, circuits, optics, biology, and more. 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 Banzaret, 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, Room 4-405, MIT, kimv@mit.edu. For general information, contact Sandi Lipnoski in Room 4-405, 617-253-4629, slipnosk@mit.edu, or visit [http://web.mit.edu/edgerton/main.html](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 through Registration Day of the succeeding 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 through 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 designate or remove the exploratory status of a subject after Add Date, to change to Listener status after the next Registration Day, 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
Through the Cambridge-MIT Undergraduate Student Exchange Program, MIT students can spend their junior year studying at the University of Cambridge University in England.

Founded in 1209, the University of Cambridge 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 2007–2008, participating departments include Aeronautics and Astronautics; Biology; Brain and Cognitive Sciences; Chemical Engineering; Chemistry; Civil and Environmental Engineering; Earth, Atmospheric and Planetary Sciences; Economics; Electrical Engineering and Computer Science; Materials Science and Engineering; Mathematics; Mechanical Engineering; Physics; and History.

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. While away at Cambridge during the fall and/or spring term, a student maintains full-time status at MIT.

Interested students should discuss their plans with their advisors as early as possible. For further information, students should contact Dean Malgorzata Hedderick, 617-253-9358, malrh@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 two exchange programs, one with Delft University of Technology in the Netherlands and the other with the University of Hong Kong. For more information see the descriptions of these undergraduate programs in Part 2. In addition, the Department of Materials Science and Engineering has an exchange program with Oxford University’s Materials Department. Contact the Department of Materials Science and Engineering for more information.

Study Abroad
MIT offers programs for students to study in Canada, France, Israel, and Spain. In addition, MIT students may also apply for admission directly to foreign institutions or to a study abroad program administered by another US institution. Students interested in study abroad should make an appointment with the Study Abroad Office to begin planning. Students planning to study abroad need to work out their plans with a faculty advisor and appropriate transfer credit examiner(s) and must complete a study abroad Worksheet for Planning. While on an approved study abroad program during the fall and/or spring term, a student maintains full-time status at MIT. Although it is most common to study abroad during the junior year, it is also possible to participate in a study abroad program in the sophomore year as well as during a summer.

Financial arrangements for study abroad vary. It is best if students receive financial aid at MIT discuss their study abroad plans with the Financial Aid Office early. This will help students develop the best possible financial plans for their time abroad.

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 language skills can achieve some proficiency in a foreign language by the beginning of the junior year if he or she begins language 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. Upon return, they must submit a completed Request for Additional Credit Form, signed by the appropriate transfer credit examiner(s), and must arrange to have an official transcript sent directly to the Registrar’s Office showing work and final grade(s) completed at the outside institution.

For further information, contact the Study Abroad Office, Room 26-153, 617-253-0676, studyabroad@mit.edu, or visit http://web.mit.edu/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) offers internship opportunities in China, France, Germany, India, Italy, Japan,
Domestic Study 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 US university usually pays tuition to the outside institution rather than to MIT. While on an approved domestic study away program during the fall and/or spring term, a student maintains full-time status at MIT. Students interested in domestic study away should make an appointment with the Study Abroad Office.

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. Students planning to spend time studying at another academic institution in the US need to work out their plans with a faculty advisor and appropriate transfer credit examiner(s) and must arrange to have an official transcript sent directly to the Registrar's Office showing work and final grade(s) competed at the outside institution.

For further information, contact the MIT Study Abroad Office, Room 26-153, 617-253-0676, studyabroad@mit.edu or visit http://web.mit.edu/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.


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.

Detailed information on registration procedures is available at http://web.mit.edu/registrar/www/crossreg/wxfaq.html. The Exchange Office at Wellesley is located in 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
MIT undergraduates may cross-register at the 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. Both are highly respected art schools in Boston.

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.

Classes taken at MassArt and SMFA through the cross-registration program are graded P/D/F and may not be used to satisfy Institute,
part

Career and Professional Options

MIT Careers Office
The MIT Careers Office helps students learn to make informed career decisions and find opportunities related to their professional objectives. Students are encouraged to begin their career education early, including meeting with a counselor and visiting the Careers Office website (http://web.mit.edu/career/www/) to learn about available resources.

Career development 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 undergraduate and graduate students explore and learn about:

- The relationship between what they are doing at MIT and life after graduation
- Career options in relation to choice of major
- Life skills required to succeed in the competitive global marketplace and contribute to society
- Applying to medical, law, or other graduate/professional school
- Internships, externships, study abroad, fellowships, and other experiential learning opportunities
- Writing a resume and cover letter, networking with alumni and industry professionals, conducting informational and formal interviews, negotiating salary, and participating in career fairs
- Finding employment after graduation

The Study Abroad and Distinguished Fellowships Office provides comprehensive support to undergraduates interested in studying abroad and pursuing distinguished fellowship opportunities. The office helps students investigate study abroad options that best fit their academic and life interests, transition into their new academic environment and culture, and integrate the experience into their life at MIT and career. It also provides support and guidance to students preparing applications for distinguished fellowships, including but not limited to the Rhodes, Marshall, Mitchell, Gates, and Fulbright fellowships. For further information, see the section on Academic and Research Options in this chapter.

Admitted pre-freshmen can apply for the Freshman/Alumni Summer Internship Program, a 6-unit graded seminar (SP.800/SP.801) that offers career development training. The program accepts 100 students each year; applications are accepted on a first-come, first-served basis from June 1 through August 14 of the summer prior to matriculation at MIT. Application forms and details are available at http://web.mit.edu/fasip/.

Freshman-Sophomore Career Week is geared toward freshmen and sophomores to engage them early to develop broad career skills. This event integrates career skill-building and provides exposure to opportunities inside and outside of MIT to help students in their career exploration.

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.monstertrak.com/, and on-campus recruiting visits. Many employers also host presentations and participate in career fairs, which provide the opportunity for students at any stage in their academic program to discuss employment prospects and find out about careers at different organizations.

Students interested in exploring and applying to law or medical, dental, or other health-related professional schools 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 http://web.mit.edu/career/www/preprof/ for information on admissions criteria, application process, advisor assignment process, and services provided.

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

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), 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 (and can be transferred to many other states). 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 curriculum design or educational technology. 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 9-12) 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/.

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. (ROTC academic classes, however, are open to all students regardless of their sexual orientation.)
- Most students enter the program at the beginning of their freshman year. However, entry up to the beginning of the junior year is available through special programs.
- Students must complete the Reserve Officers’ Training Corps (ROTC) program, including summer training, and earn their bachelor’s degree in order to be eligible for a commission.
- Upon request by the student, any required summer employment financial aid contribution can be waived if summer training makes such employment impossible.
- Nonscholarship students may compete for full-tuition scholarships, which range from one to three years for the Navy and Air Force and two to three years for the Army.
- Enrollment as a scholarship recipient beyond the freshman year generally creates an obligation of four years of active service in the Army, Navy, or Air Force, or in some cases, for alternative service involving reserve duty.
- Enrollment as a nonscholarship freshman or sophomore does not involve a military service obligation.

Aerospace Studies (AS), Military Science (MS), and Naval Science (NS) subjects are not included in a student’s grade point average, and the credits do not count toward the degree. These subjects can be applied toward the Physical Education Requirement. In some cases, the ROTC programs may include departmentally approved subjects that provide academic credit.

Participants must agree by contract to maintain acceptable levels of academic performance and physical fitness. ROTC academic performance requirements may exceed Institute standards. Breach or willful evasion of the contract could lead to a period of enlisted service or to repayment of scholarship funds.

Specific information concerning benefits, ROTC training programs, career opportunities, and contractual obligations can be obtained from the program offices listed in this section.

**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. 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 five weeks of field training at an Air Force base during the summer between their two years. 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. Scholarships pay up to full tuition, include $750 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 in addition to the four-year scholarships offered to high school seniors. The detachment commander also has three-and-a-half year full-tuition scholarships to award to outstanding freshmen (technical majors) and $15,000 per year scholarships to award to non-technical students. All eligible recipients of partial scholarships have the opportunity to compete for scholarship upgrades ranging from 80% to 100% tuition.

**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 activi-
ties provide training and practical experience in developing leadership and managerial skills.

Students enrolled in the first two years of the program attend one hour of class and two hours of Leadership Laboratory (LLAB). In the final two years of the program, the class time is three hours per week with the same LLAB requirement. LLAB has always been a highlight of the program, introducing cadets to a variety of motivational and interactive activities. Aside from standard drill practice, students participate in guest-speaker events, athletic competitions, self-defense class, marksmanship training, rock climbing, career day, and much more.

Extracurricular Events
Throughout the four years of the program, cadets also have many optional extracurricular opportunities to expand their leadership skills and interact with the active duty Air Force. Many students visit Air Force bases all over the country, participate in military orientation flights, receive civilian flight training, and offer their service to others in our national service organization, the Arnold Air Society. In the summer, students can also apply for a variety of internships—13 in all—including shadowing a NASA astronaut, attending a space launch, participating as a field engineer, or foreign language immersion by living abroad.

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 Aerospace Studies Department, Room W59-114, MIT, calling 617-253-3755, or emailing airforce@mit.edu.

Army ROTC
The Army ROTC program at MIT is designed to enhance a student’s college education by integrating technology with unique, hands-on training in leadership and management. Through coursework and practical experience modules, students will develop decision-making, team-building, and time-management skills—leadership qualities that are essential to success in any field and are highly valued in corporate/research careers. Students completing the ROTC program are awarded a commission as a Second Lieutenant in the US Army. Students may participate in the first two years of Army ROTC with no commitment to military service.

The Military Science and Leadership Program is a four-year program composed of the Basic Course (freshman and sophomore years) and the Advanced Course (junior and senior years).

Four-Year Program
The four-year curriculum combines classroom and leadership laboratory work. Any MIT student is eligible to participate in the leadership development courses regardless of academic grade.

During the summer between their junior and senior years, students participate in a five-week leadership leadership and assessment course at Fort Knox, KY, in lieu of completing the Basic Course. Once they complete the Leader’s Training Course, students are eligible to receive the same benefits as members in the four-year program.

Scholarships
Army ROTC scholarships are available on a competitive basis to qualified applicants. Two-, three-, and four-year scholarships are available each year, and are awarded on campus. High school seniors may apply for four-year scholarships in conjunction with their application to MIT. Scholarships pay full tuition and all mandatory fees, a flat rate of $900 for books and supplies each year, and a tax-free stipend ranging from $300 to $500 per month. The scholarship is flexible, in that it can be used for either tuition or room and board.

Program of Instruction
The Army ROTC curriculum is designed to enhance a student’s college education by providing distinctive leadership and management training in conjunction with realistic experience. The program emphasizes leadership, organizational management, purpose and history of the military, and physical fitness.

Students enrolled in the first two years of the program attend one hour of class and three hours of physical fitness each week. Collegiate athletes who meet Army fitness standards are excused from physical fitness training while their sport is in season. In the final two years of the program, class and physical fitness total four hours per week. Students also participate in a monthly Leadership Lab that highlights a particular military activity. Finally, students participate in a field training exercise each term that includes small unit leadership training, military tactics, land navigation, rappelling, obstacle negotiation, and a helicopter orientation ride.

Extracurricular Events
The ROTC program offers MIT students a wide spectrum of opportunities to participate in numerous challenging and rewarding extracurricular activities, such as high adventure training and field training exercises. Army Airborne, Air Assault, Mountain Warfare, and other military schooling and training programs are available on a voluntary basis to qualified cadets. Also, there are global summer internships available at national research laboratories, numerous Army bases, or the Pentagon. Finally, following graduation there are opportunities—primarily for students going on to law or medical school—to
undergraduate education

defer the service obligation until completion of their graduate studies. Some graduate study opportunities are funded by the Army.

opportunities in the US Army Reserve/Army National Guard
Army ROTC offers opportunities to seek a commission as a Second Lieutenant in the Army National Guard or Reserves. This unique option provides the flexibility for newly commissioned officers to participate in the Army part time while pursuing an advanced degree or a full-time career.

Eligibility Criteria
Enrollment in the freshman and sophomore ROTC courses is open to all MIT students. To be eligible for Army ROTC scholarships and/or enrollment in the junior- and senior-year ROTC courses, students must be citizens of the United States; physically and medically qualified in accordance with existing Army regulations; and enrolled at MIT, Harvard, Tufts, Wellesley, Endicott, Gordon, or Salem State as full-time students.

Application Procedure
Students normally apply for the four-year program during their freshman year, but may enroll in the course or apply for a campus-based scholarship each semester. Interested students can sign up for the Army ROTC program by visiting the Army ROTC office at MIT in Building W59, by calling 617-253-4471, or by visiting http://web.mit.edu/armyrotc/.

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. MIT commissionees are also eligible to become Naval Reactors Engineers stationed in Washington, DC.

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 a monthly stipend 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 a monthly stipend 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 full-tuition scholarships for their remaining years in school. The monthly stipends are $250 for freshmen, $300 for sophomores, $350 for juniors, and $400 for seniors.

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 Naval Science Program, 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 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, at any US Navy Recruiting Station, or 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 Admissions website at [http://admissions.mit.edu/](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. International student applicant information is described below.

**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. 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.

**Interphase**

Interphase is a rigorous seven-week summer residential academic and community-building program for admitted MIT freshmen that instills subject mastery of calculus, physics, and chemistry, and helps them explore their cultural identities through reading, writing, and discussion. In addition, students take physical education classes, participate in laboratory research with faculty mentors, and engage in small-group learning activities and workshops designed to develop their analytical thinking and communication skills. These endeavors should position them to thrive during their MIT academic careers. Extracurricular activities include day trips to area cultural, recreational, and industrial sites. Ample opportunities to begin building social networks and faculty connections are provided. For incoming students of all races and national origins, the program offers a rich, multicultural educational experience that prepares them to become both leaders on campus and in the increasingly diverse global society. Students will be notified about the credit offered before registration.

**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 or the ACT, and two SAT II Subject Tests (one in biology, chemistry, or physics; and mathematics level 1 or mathematics level 2).
- **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 mathematics level 1 or mathematics level 2).

The last acceptable testing date for freshman admission to the Class of 2012 is the December 2007 testing date. January 2008 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.

**Early Action**

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

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 Maturité, 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.

**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.

**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.

**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 aid.
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.

Deadlines for filing applications are August 1 for fall term, January 1 for spring term, and May 1 for summer term. Deadlines for international student applicants are June 1 for fall term, November 1 for spring term, and March 1 for summer term. International students living abroad are not permitted to apply for the summer term.

COSTS

Undergraduate student costs for the academic year 2007–2008 at MIT will be about $46,350. 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, clothing, 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 $9,950 for room and meals. Actual costs for 2007–2008 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 2007–2008 (which are reviewed and likely to increase each year):

<table>
<thead>
<tr>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>$34,750</td>
</tr>
<tr>
<td>Student Activity Fee</td>
<td>$236</td>
</tr>
<tr>
<td>MIT Student Extended Insurance Plan (optional)</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 Medical Requirements section of this chapter for additional details or visit http://web.mit.edu/medical/.

The tuition for all regular undergraduates in the fall and spring terms is $17,375 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 $545 per unit with the approval of the faculty advisor. In such cases, there is a minimum fee of $3,300 for subjects and a minimum of $1,445 for the SB thesis. Registration for 32 or more units will be assessed the full tuition charge. 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 will 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 $545 per unit taken either for credit or not for credit. This unit fee applies up to a maximum of $17,375 per term and is subject to the following minimum fees:

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members of the MIT community</td>
<td>$3,300</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>$3,300</td>
</tr>
<tr>
<td>Other special students</td>
<td>$4,940</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

Miscellaneous fees include the following:

<table>
<thead>
<tr>
<th>Service</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application for undergraduate admission</td>
<td>$65</td>
</tr>
<tr>
<td>Late submission of preregistration ($75 if very late)</td>
<td>$40</td>
</tr>
<tr>
<td>Late filing of the degree application ($75 if very late—see Academic Calendar)</td>
<td>$40</td>
</tr>
<tr>
<td>Late initiation of the registration process or very late registration</td>
<td>$100</td>
</tr>
</tbody>
</table>

Miscellaneous fees 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 (SFS) 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. SFS bills by posting a monthly student account billing statement on MITPAY—a secure, paperless online billing and payment system. The statement is posted by the 10th of any month in which there’s a new charge or credit on the account. SFS regularly sends courtesy email reminders to check the statement and pay any balance due. The statement includes charges (e.g., tuition, fees, housing, and library fees), payments (financial aid, tuition awards), additional amounts due, and payment deadlines. Visit http://web.mit.edu/sfs/bills/index.html for more information on getting and paying the student account bill.

Payment in full or a satisfactory arrangement for payment is due prior to the beginning of each term (July 1, August 1, and January 1). 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 July, August, or January deadline, the MIT Payment Plan is available and should be considered.

Participation in the MIT Payment Plan allows an installment payment arrangement over four months each term (three months during the summer). A finance charge of 0.667 percent per month (8 percent annual percentage rate) is assessed on the unpaid account balance (excluding extended student medical insurance). To sign up for the plan, download the appropriate form from http://web.mit.edu/sfs/forms_and_publications/index.html and return it to SFS.

SFS also offer information on various loan programs as additional options, including federal and private programs. For more information visit http://web.mit.edu/sfs/loans/get_a_loan.html.

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 (18 percent annually). Outstanding balances at the end of a term will prevent the student’s registration or graduation. Student accounts unpaid after the student has left MIT for any reason may be reported to credit bureau agencies and/or sent to an outside collection agency and assessed additional fees of 33.3 percent of the outstanding balance.

SFS staff members are available to answer questions and offer assistance in resolving billing matters related to student accounts, payment options, billing sponsors, educational loans, refund and cash advances. Visit SFS in the Student Services Center, Room 11-120, or http://web.mit.edu/sfs/.

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 SFS 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.

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 Student and Support Services (S3), as well as outside sources such as parents and relatives. 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 should be sufficient time 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 balances of more than $200 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 communica-
tions—informing them of the MIT policy regarding registration holds for the subsequent term.

After the eleventh 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. S3 deans and student advisors will also be consulted as to offering assistance to students in resolving such matters.

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. When an individual has not made satisfactory payment arrangements by Registration Day of the subsequent term, Student Financial Services and other Institute offices may take the following actions:

- The right to live in MIT housing will be revoked.
- The MIT Card will be deactivated, and the individual 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, computing resources, and Institute housing.
- The individual will be permitted to retain a 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.
- The individual will be excluded 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.

Individuals who do not settle their prior term balances or who have not made efforts to resolve their financial problems will not be allowed to register for the subsequent term or receive credit retroactively. Students who face loss of services should immediately contact their student account counselors in Room 11-120.

FINANCIAL AID

Grants, Loans, and Employment
Student Financial Services (SFS) 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 financial aid is determined using the Free Application for Federal Student Aid (FAFSA) and the CSS Profile form. Copies of the most recent parental federal tax returns are required in support of aid applications.

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

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 government and private sources, including the Federal Perkins Loan Program and the Federal Direct Stafford Loan Program.

Specific jobs are not assigned; students are expected to arrange employment most suitable to their own talents and schedule. SFS Student Employment 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.

SFS Student Employment participates in the Federal Community Service Program (part of the Federal Work-Study 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 http://web.mit.edu/sfs/jobs/paid_community_service.html.

All students who are thinking of attending 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. 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.

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 International Student Financial Aid Application.

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.
**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. Upperclass students must complete the Free Application for Federal Student Aid (FAFSA) and the CSS Profile form. Part of the application process requires a copy of the most recent parental federal tax return(s), and all applicants are expected to apply for a state grant where applicable, as well as any 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 at [http://web.mit.edu/sfs/](http://web.mit.edu/sfs/).

**Veterans’ Benefits**

Students who are receiving Veterans’ Benefits need to verify their enrollment each term in order to be certified. Enrollment may be verified by submitting a copy of the approved registration form to Student Financial Services in 11-320. Students may also wait until registration information appears online, typically the second week of the term. The Veterans Administration (VA) regulations require that benefits stop between the spring and fall terms, if the period is greater than 60 days.

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 at [http://web.mit.edu/sfs/](http://web.mit.edu/sfs/).

**Medical Requirements**

**Medical Report**

MIT requires that all incoming students submit a medical history, have a complete physical examination, and document immunity against certain infectious diseases. Medical Report forms need to be submitted before registering for classes. Specific deadlines for each term are listed on the form itself. More information and downloadable Medical Report forms may be found at [http://web.mit.edu/medical/g-requirements.html](http://web.mit.edu/medical/g-requirements.html).

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.

**Health Insurance**

All MIT students must have health insurance that meets the requirements for the Massachusetts Qualified Student Health Insurance Plan (QSHIP). Students with J-1 visas under MIT sponsorship must have insurance that also meets US Department of State regulations for themselves and their spouses and children who accompany them. More information about Massachusetts health insurance requirements may be found at [http://web.mit.edu/medical/p-waiver.html](http://web.mit.edu/medical/p-waiver.html).

**MIT Student Health Plan**

The MIT Student Health Plan 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 (see Medical Services in Chapter 2). Registered MIT students paying tuition to MIT are automatically enrolled in the MIT Student Medical Plan as part of their tuition. 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 their families, students 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 health insurance plan or may purchase the MIT Student Extended Insurance Plan.

The MIT Student Extended Insurance Plan is designed to coordinate with the MIT Student Medical Plan and provides coverage for more extensive care, such as hospitalization, diagnostic tests, physical therapy, surgery, prescription medication, and obstetrical care. Since health insurance is mandatory under Massachusetts law, all regular students and special students (registered with 27 or more units), including students on a J-1 or F-1 visa, are automatically enrolled in the MIT Student Extended Insurance Plan. Prior to the beginning of each term, students may submit an online request to waive the Student Extended Insurance Plan if they already have coverage which meets the Massachusetts requirements for student health insurance. J-1 students under MIT visa sponsorship may waive the MIT Student Extended Insurance Plan only if their policies meet both the Massachusetts requirements and specified United States Information Agency (USIA) requirements. New waiver forms must be filled out each academic year.

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

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

More information about the MIT Student Health Plans, including benefits, rates, and enrollment or waiver processes, may be found at [http://web.mit.edu/medical/p-student.html](http://web.mit.edu/medical/p-student.html).

Please contact MIT Health Plans at stuplans@med.mit.edu with enrollment or waiver questions, or contact Claims and Member Service at mservices@med.mit.edu with any questions about benefits or claims.
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 the mathematical and 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 sections on Interdisciplinary Research and Study in Part 1 and Interdisciplinary Graduate Programs in Part 2), 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.

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 on Independent Activities Period in the Undergraduate Education chapter of this catalogue for details concerning academic credit and grades, 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 Programs, a standing committee of the Faculty.

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/.

MIT CAREERS OFFICE

The MIT 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 MIT Careers Office, Room 12-170, 617-253-6733, fax 617-253-8457, or visit http://web.mit.edu/career/www/. See also the MIT Careers Office description under 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 units of G- or H-level subjects, of which at least 42 units must be H-level, 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 units of G- or H-level subjects, of which at least 42 units must be H-level, 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 units of G- or H-level subjects 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 G- or H-level subjects, 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 units of G- or H-level subjects, 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 for 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 act in lieu of one of the two participating departments. 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.

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 from the Whitaker College of Health Sciences and Technology. The degree of Doctor of Philosophy is awarded in architecture; biology; biomedical engineering; 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; and urban studies and planning. 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 fed-
eral loan funds and funding from or through 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 lan-
guages with intermediate competence. A student may satisfy the require-
ment 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, stress-
ing 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 lan-
guages 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 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 ap-
proval of the department. For details about the exchange, see the program
description in the Undergraduate Education section of 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 com-
mittees. 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-registra-
tion 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
Founded in 1993, the Graduate Consortium in Women’s Studies (GCWS)
is a pioneering effort by faculty at six degree-granting institutions in the
Boston area and MIT to advance women’s studies scholarship through
a series of ongoing team-taught interdisciplinary graduate seminars,
curriculum development events, and an annual gender studies conference. Currently there are nine participating institutions, including Boston College, Boston University, Brandeis University, Harvard University, MIT, Northeastern University, Simmons College, Tufts University, and the University of Massachusetts Boston.

In keeping with the collaborative tradition of women’s studies, GCWS offers seminars to students matriculated in graduate programs at our member institutions. GCWS faculty explicitly integrate gender analyses with issues of class, race, culture, ethnicity, and sexualities, and the practical and public-policy implications of feminist theory and scholarship are considered. Courses are designed not only to examine existing feminist scholarship, but to open paths to the creation of new knowledge. Graduate courses also provide crucial intellectual support for students pursuing feminist work within the framework of traditional disciplines. There is no fee for GCWS courses. Students are granted credit for participating by their home institutions. In 2005, the GCWS office moved from the Radcliffe Institute of Advanced Study to MIT, where it continues to reside.

Several seminars are offered per year; enrollment in each is limited. Graduate students must complete an application; undergraduate students must first consult with the director of women’s and gender 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 visit http://web.mit.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 December 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.

Applications for admission should be requested from Graduate Admissions, Room 3-103, MIT. 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, NJ 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, NJ, 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, NJ 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, 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 designate), 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 2007–2008 (which are reviewed and likely to increase next year) are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>$34,750</td>
</tr>
<tr>
<td>Student Activity Fee</td>
<td>$236</td>
</tr>
<tr>
<td>MIT Student Extended Insurance Plan (optional)</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 Requirements in this chapter, or visit [http://web.mit.edu/medical/](http://web.mit.edu/medical/).

The tuition for all regular students, including graduate student staff, in the first and second terms is $17,375 per term, except for students entering the Sloan Master’s Program and the Leaders for Manufacturing Program, for whom the tuition is $22,278 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 $26,605 if not registered during the preceding regular term.

The tuition for all regular graduate students, including fellows, trainees, and academic staff in the 2007 summer session was $11,580. 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 $545 per unit whether taken for credit or not. This unit fee applies up to a maximum of $17,375 per term and is subject to the following minimum fees:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members of the MIT community</td>
<td>$3,300</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>$4,940</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 $1,445 per week from the starting date of the term, with a minimum of $1,445 for the master’s or engineer’s degree and $2,890 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 $8,690.

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, in the first three semesters of registration as a nonresident, pay tuition equal to approximately 5 percent of the regular full tuition ($865 per term for 2007-2008). For the fourth and subsequent semesters of registration as a nonresident, tuition will equal approximately 15 percent of the regular full tuition ($2,600 per term for 2007-2008). 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 $8,690. Please consult Graduate Policies and Procedures ([http://web.mit.edu/gso/gpp/](http://web.mit.edu/gso/gpp/)) 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 $947 per unit of registration, with a minimum charge of $8,558. There is a maximum charge of $20,675 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 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 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>Fee</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application for graduate admission</td>
<td>$70</td>
</tr>
<tr>
<td>Application for Master's Program in Sloan School of Management</td>
<td>$230</td>
</tr>
<tr>
<td>Late submission of preregistration material</td>
<td>$40</td>
</tr>
<tr>
<td>($75 if very late)</td>
<td></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>Late filing of degree application</td>
<td>$40</td>
</tr>
<tr>
<td>($75 if very late—see Academic Calendar)</td>
<td></td>
</tr>
<tr>
<td>Late thesis title change</td>
<td>$75</td>
</tr>
<tr>
<td>Processing fee for Registration Holds for next term resulting from prior term obligations that are not cleared at least two weeks prior to Registration Day of that next term</td>
<td>$100</td>
</tr>
<tr>
<td>Completing an Incomplete by a Not</td>
<td>$40</td>
</tr>
<tr>
<td>Registered Candidate (per subject)</td>
<td></td>
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<tr>
<td>Library processing fees:</td>
<td></td>
</tr>
<tr>
<td>Doctoral theses</td>
<td>$105</td>
</tr>
<tr>
<td>All other theses for advanced degrees</td>
<td>$50</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 (SFS) 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. SFS bills by posting a monthly student account billing statement on MITPAY—a secure, paperless online billing and payment system. The statement is posted by the 10th of any month in which there’s a new charge or credit on the account. SFS regularly sends courtesy email reminders to check the statement and pay any balance due. The statement includes charges (e.g., tuition, fees, housing, and library fees), payments (financial aid, tuition awards), additional amounts due, and payment deadlines. Visit http://web.mit.edu/sfs/bills/index.html for more information on getting and paying the student account bill.

Payment in full or a satisfactory arrangement for payment is due prior to the beginning of each term, (July 1, August 1, and January 1). 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 July, August, or January deadlines, the MIT Payment Plan is available and 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 (8 percent annually). SFS offers information on various loan programs as additional options, including federal and private. For more information, visit http://web.mit.edu/sfs/loans/get_a_loan.html.

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 (18 percent annually). Additionally, outstanding balances at the end of a term may prevent one’s registration or graduation.

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

SFS staff members are available to answer questions and offer assistance in resolving billing matters related to student accounts, payment options, billing sponsors educational loans, refunds, and cash advances. Visit SFS in the Student Services Center, Room 11-120, or http://web.mit.edu/sfs/.

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 3-158. Information on loans is available from the Student Services Center, Room 11-120, or online at http://web.mit.edu/sfs/loans/.

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 MIT for 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 inform their academic department. 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 stipend as teaching or research assistants, and 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.

The units for which an instructor or teaching assistant may register as a student 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 US citizens or permanent residents. This form may be completed online 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 a junior colleague of a faculty member 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 the Federal Direct Student Loan Program. To establish eligibility for this need-based loan, it is necessary to complete the Free Application for Federal Student Aid (FAFSA) online at http://www.fafsa.ed.gov/, and the MIT Graduate Loan Application, available on the web at http://web.mit.edu/sfs/forms_and_publications/. The maximum Federal Direct Subsidized Loan per year is $8,500 for first-time Direct Loan borrow-
ers. Application forms and details of the application procedure may be obtained from SFS 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 Federal Direct Subsidized Loan has been obtained, the Federal Direct Unsubsidized Loan may be available (for a combined total of $20,500). In determining need for these programs, as well as the Federal Direct Loan Program, MIT compares student resources available, including assets, using appropriate student budgets. Need is determined within limits based on those budgets. Students who need additional funding (beyond the $20,500 available via the Federal Direct Loan and the $6,000 available via the Federal Perkins Loan) may want to consider securing either a Federal PLUS Loan or another loan not based on financial need. The Federal PLUS Loan may be used to meet remaining financial need for dependent or independent students. The Federal PLUS Loan is secured by a US-based co-signer. MIT students who have completed the Free Application for Federal Student Aid (FAFSA) and are eligible for Federal Work-Study aid may do paid community service. Wages are subsidized for students performing direct community service at approved nonprofit agencies. Information on the FAFSA can be found at http://www.fafsa.ed.gov/.

International Students

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

Student Employment

SFS Student Employment Office keeps up-to-date listings of on-campus and off-campus 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 (http://web.mit.edu/gso/) should be consulted for approval before undertaking such employment. For additional information, visit SFS Student Employment in Room 11-320 or http://web.mit.edu/sfs/.

Graduate students who complete the Free Application for Federal Student Aid (FAFSA) are eligible for Federal Work-Study aid may do paid community service. Wages are subsidized for students performing direct community service at approved nonprofit agencies. Information on the FAFSA can be found at http://www.fafsa.ed.gov/.

Veterans’ Benefits

Students who are receiving Veterans’ Benefits need to verify their enrollment each term in order to be certified. Enrollment may be verified by submitting a copy of the approved registration form to Student Financial Services in 11-320. Students may also wait until registration information appears online, typically the second week of the term. The Veterans Administration (VA) regulations require that benefits stop between the spring and fall terms, if the period is greater than 60 days.

Medical Requirements

Medical Report

MIT requires that all incoming students submit a medical history, have a complete physical examination, and document immunity against certain infectious diseases. Medical Report forms need to be submitted before registering for classes. Specific deadlines for each term are listed on the form itself. More information and downloadable Medical Report forms may be found at http://web.mit.edu/medical/g-requirements.html.

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.

Health Insurance

All MIT students must have health insurance that meets the requirements for the Massachusetts Qualified Student Health Insurance Plan (QSHIP). Students with J-1 visas under MIT sponsorship must have insurance that also meets US Department of State regulations for themselves and their spouses and children who accompany them. More information about Massachusetts health insurance requirements may be found at http://web.mit.edu/medical/p-waiver.html.

MIT Student Health Plan

The MIT Student Health Plan 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 (see Medical Services in Chapter 2). Registered MIT students paying tuition to MIT are automatically enrolled in the MIT Student Medical Plan as part of their tuition. 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 their families, students 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 health insurance plan or may purchase the MIT Student Extended Insurance Plan.

The MIT Student Extended Insurance Plan is designed to coordinate with the MIT Student Medical Plan and provides coverage for more extensive care, such as hospitalization, diagnostic tests, physical therapy, surgery, prescription medication, and obstetrical care. Since health insurance is mandatory under Massachusetts law, all regular students and special
students (registered with 27 or more units), including students on a J-1 or F-1 visa, are automatically enrolled in the MIT Student Extended Insurance Plan. Prior to the beginning of each term, students may submit an online request to waive the Student Extended Insurance Plan if they already have coverage which meets the Massachusetts requirements for student health insurance. J-1 students under MIT visa sponsorship may waive the MIT Student Extended Insurance Plan only if their policies meet both the Massachusetts requirements and specified United States Information Agency (USIA) requirements. New waiver forms must be filled out each academic year.

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

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

More information about the MIT Student Health Plans, including benefits, rates, and enrollment or waiver processes, may be found at http://web.mit.edu/medical/p-student.html.

Please contact MIT Health Plans at stuplans@med.mit.edu with enrollment or waiver questions, or contact Claims and Member Service at mservices@med.mit.edu with any questions about benefits or claims.
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 Fraternity, Sorority, and Independent Living Group (FSILG) charges must be paid when due, or satisfactory alternative arrangements must be made with Student Financial Services or the FSILG.
- 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 Office of Undergraduate Advising and Academic Programming, 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 the 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 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 through Registration Day of the succeeding 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 through 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.

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.

Add/Drop/Change 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 lot-

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 subsequent Add/Drop/Change 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 arrange for a leave of absence must see a dean in Student Support Services, Room 5-104. 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 online 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. (Corequisites, which are listed in italics, are to be taken concurrently.)

Once prerequisites and corequisites are included in a subject listing, it is the responsibility of the instructor to ensure that the subject is taught at the appropriate level. At the first class, instructors should reiterate the prerequisites and corequisites, 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 time (lecture and/or recitation); 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.

Load Status for 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.

Undergraduates registered for fewer than 36 units (not including Listener and ROTC subjects) are considered to be less than full-time. Students who have been awarded financial aid should consult with the student financial aid staff about possible adjustments in financial aid. If taking less than a half-time load (below 18 units), undergraduates should check with the student loan counselors regarding possible impact on the repayment and grace period of outstanding loans and eligibility for new loans.

International students are required by immigration regulations to be registered full-time (36 or more units) when school is in session in order to maintain legal status in the US. Students should check with the International Students Office regarding immigration regulations.

Undergraduates planning to register for fewer than 32 units should complete a Tuition Adjustment–Light Load Form. Once enrolled as a regular student, an undergraduate 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 light load of subjects should be initiated prior to the beginning of the term; the student’s term bill will reflect the light load tuition rate if the Tuition Adjustment–Light Load Form is submitted by the beginning of July for the fall bill and the beginning of December for
the spring bill. Light load tuition adjustments are not normally available to students who are (or were) in cooperative and internship programs. Additional information is available at the Registrar’s Office, room 5-119.

**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 procedures, at [http://web.mit.edu/registrar/www/schedules/advst.html](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 subject 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 either during the December or May examination period. No record will be kept of D or F performance if the exam 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 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 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 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 internal 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](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 satisfactory 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
- 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
- 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 scheduled through the Schedules Office
- Be offered over the course of a single afternoon-starting at 1:30 pm and ending no later than 7:30 pm
- 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 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
- 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.

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

**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 (617-258-TEST) or go to http://web.mit.edu/registrar/www/schedules/exams.html to get up-to-date information during exam week. Exam information is also available from the “snow” link that is provided on the MIT home page (http://web.mit.edu/) during emergencies. In the event of an emergency closing or delayed opening, callers receive specific instructions regarding rescheduled exam times and locations. The SNOW line (617-253-SNOW) refers callers to 617-258-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 are delayed. Details are given on the telephone line 617-258-TEST. A detailed schedule of postponed exams is available at http://web.mit.edu/registrar/www/schedules/exams.html.
- 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 or go to http://web.mit.edu/registrar/ 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.

For more information, visit http://web.mit.edu/registrar/www/webrel.html.

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 5.0 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 Faculty Support, this resource is available at http://web.mit.edu/acadinfo/undergrad/academic-guide/. For further information, contact the CAP Office, Room 7-104, 617-253-4164, or visit 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 Programs (CGP) to monitor minimum academic standards for graduate students and special students in accordance with the rules and regulations of the faculty. The CGP 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 CGP 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 CGP 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 below this standard will be considered, for Title IV purposes, to be under CGP review during the subsequent term. A student under CGP review will be considered to be making satisfactory progress if the CGP does not withdraw permission for the student to continue.

**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 excellence 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.

Note that the MIT internal grading system includes plus (+) and minus (-) modifiers for use with the letter grades A, B, and C for all academic subjects (except advanced standing exams). These modifiers are included on internal grade reports. However, they are not officially part of students’ grades, they do not appear on MIT transcripts, and they do not affect internally or externally reported grade-point averages.

- **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 ofOX. 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 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**  Notation to be used only on the student’s internal record for a subject dropped after the fifth week of the regular term.

**LIS**  Notation to be used on the student’s internal record for a subject the student registered for as a listener.

**URN**  Notation for a subject in UROP taken for pay or as a volunteer rather than academic credit.

**VIS**  Notation for a research subject taken as a non-degree visiting student.

**ACADEMIC PROCEDURES AND 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 Office of the Dean for Student Life, as explained in the section on Complaint and Disciplinary Procedures.

The Academic Integrity Handbook, a guide for students published by the Office of the Dean for Undergraduate Education, contains additional information that may be helpful to students and faculty (http://web.mit.edu/academicintegrity/).

**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 at http://web.mit.edu/communications/hg/.


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’ 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 student or other 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 such student or other person, or which subjects such student or other person to extreme mental stress, including extended deprivation of sleep or rest or extended isolation.

Pursuant to the law, “any person who 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 who] knows that another person is the victim of hazing as defined [above] 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 as soon as reasonably practicable. [Any student who] 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, that 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. The Institute considers the practice of “showering,” in which students are placed in the shower against their will by other individuals, as a form of hazing; therefore, “showering” is prohibited.

Statement on a Drug-Free Campus and Workplace

Alcohol abuse and the use of illegal drugs can significantly affect the MIT community. Such use and abuse is 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 challenges of drug use and alcohol abuse, and a list of resources is included at the end of this section.

In response to this concern and pursuant to the Drug-Free Schools and Communities Act Amendments of 1989 and the Drug Free Workplace Act of 1988, MIT has a comprehensive program to prevent the use of illegal drugs and the abuse of alcohol. MIT reviews its program biennially to determine its effectiveness, implement any necessary changes, and ensure that the required disciplinary sanctions are consistently enforced.

Standards of Conduct

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 the Institute. The unlawful possession, use, manufacture, distribution, or sale of illicit drugs or alcohol by any MIT student or employee on MIT property or as part of or in connection with any MIT activity is prohibited. 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.

MIT students and employees are subject to all applicable local, state, and federal laws and regulations, as well as all MIT drug and alcohol policies, including policies set forth in the MIT’s Policies and Procedures manual (9.3.2 Policy Regarding the Use of Alcohol; 9.3.3 Policy Regarding a Drug-Free Workplace), MIT’s Personnel Policy Manual (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 and policies, when adopted.

Sanctions

Legal Sanctions

Local, state, and federal law prohibits the unlawful possession, use, distribution, and sale of alcohol and illegal drugs. Criminal penalties for violation of such laws range from fines to imprisonment for terms up to and including life in prison.

Financial Aid

A student will be ineligible for financial aid if the student is convicted of an offense under federal or state law involving possession or sale of a controlled substance, provided the conduct occurred while the student was
enrolled and receiving financial aid. Ineligibility will run from the date of conviction for the following periods of time:

- For drug possession: A first offense carries a one-year disqualification, a second offense carries a two-year disqualification, and a third offense makes the student ineligible indefinitely.
- For sale of a controlled substance: A first offense carries a two-year disqualification, and a second offense makes the student ineligible indefinitely.

A student can regain eligibility by successfully completing an approved drug rehabilitation program.

Institute Sanctions
Members of the MIT community who are found to be in violation of the Institute’s alcohol and/or drug policies will face disciplinary action up to and including expulsion for students, discharge/termination for employees, and/or referral for legal prosecution in accordance with local, state, and federal laws and regulations. Disciplinary sanctions may also include completion of an appropriate rehabilitation program.

Violations of the Drug Free Workplace Act. Federal law requires that all employees engaging in the performance of work supported by a federal grant or contract must, as a condition of employment, notify the Institute of any conviction for a violation of a criminal drug statute 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. At MIT, notification of the federal agencies will be made by the Office of Sponsored Programs. Federal law also requires that, within 30 days of receiving notice of a conviction, MIT impose a sanction on the convicted employee or require satisfactory participation in an approved drug treatment program, or both. Department heads and other supervisors, in consultation with the Human Resources Office, will have the responsibility for any disciplinary action, or for requiring participation in an approved drug treatment program, or both.

Health Risks
The health consequences of alcohol abuse and substance use may be immediate and unpredictable, such as fatalities associated with alcohol poisoning and drug overdose, or more subtle and long term, such as liver and brain damage associated with the prolonged use of alcohol.

In addition to health-related problems, alcohol abuse and substance use are 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): Alcohol, tranquilizers, and sedatives are all considered depressants. These drugs depress the central nervous system by mimicking either the brain’s natural sedating chemicals or by diminishing the brain’s natural ability to produce stimulating chemicals. Short-term effects: Alcohol consumption causes a number of marked changes in behavior; even low doses significantly impair judgment and coordination. Moderate to high doses cause significant impairments in higher mental functions, severely altering a person’s ability to learn and remember information. Very high doses can cause respiratory depression and death. The effects of other depressants are similar to those of alcohol: large doses can cause slurred speech, poor motor coordination, altered perception, psychosis, hallucinations and paranoid delusions, coma, or death. Long-term effects: Long-term effects of using alcohol include addiction, depression, accidents as a result of impaired ability, ulcers, gastritis, pancreatitis, fatty liver, alcoholic hepatitis, chronic active hepatitis, and cirrhosis. Long-term use of other depressants can also lead to addiction, including both physical and psychological dependence. Regular use over time may result in a tolerance to the drug. Withdrawal symptoms may range from restlessness, insomnia, and anxiety, to convulsions and death.

Nicotine: Nicotine, one of more than 4,000 chemicals found in the smoke from tobacco products, is the primary component in tobacco that acts on the brain. Nicotine is absorbed through the skin and mucosal lining of the mouth and nose or by inhalation in the lungs. Nicotine increases the levels of dopamine in the brain. The acute effects of nicotine dissipate in a few minutes, causing the smoker to continue dosing frequently throughout the day to maintain the drug’s pleasurable effects and prevent withdrawal. Effects of use include addiction, high blood pressure, emphysema, heart and lung disease, and cancer.

Marijuana: THC (delta-9-tetrahydrocannabinol) stores itself in the fatty tissue of the brain, reproductive organs, liver, lungs, and spleen, where it causes tissue damage and hinders normal body function. In the brain, THC widens the gaps between nerve cells causing decreased transmission of impulses. This can result in speech problems, memory and learning problems, physical impairment, and can interfere with judgment, and cause difficulty thinking and solving problems. Use can also elevate anxiety and cause a panic reaction. Long-term use can cause permanent memory problems. There is also an increased risk of developing respiratory problems including, but not limited to, cancer.

Stimulants (Cocaine, Amphetamines, “speed,” “uppers”): Cocaine use interferes with reabsorption of dopamine causing euphoria, which constricts blood vessels, dilates pupils, and increases heart rate and blood pressure. Effects: Acute cardiovascular or cerebrovascular emergencies such as heart attack or stroke can result from use, regardless of frequency. Coaethylene, created by the liver when cocaine and alcohol are used, increases the chance of sudden death. Addiction, lung damage, depression, paranoia, and toxic psychosis are also possible. Similar risks are presented by the use of speed and uppers.

Ecstasy (MDMA): Ecstasy is a synthetic drug, and is similar to both methamphetamine and mescaline, which is a hallucinogenic. It mainly affects the body by affecting neurons that use the chemical serotonin, which can greatly affect mood, aggression, sexual activity, sleep, and sensitivity to pain. In high doses, MDMA can interfere with the body’s ability to regulate temperature, which can lead to a sharp increase in body temperature (hyperthermia), resulting in liver, kidney, and cardiovascular system failure.
Hallucinogens (PCP, LSD): PCP is a white crystalline powder that is readily soluble in water or alcohol. LSD (lysergic acid diethylamide) is manufactured from lysergic acid, which is found in ergot, a fungus that grows on rye and other grains. The effects of these substances are unpredictable, and depend on the amount taken, the user’s personality and mood, and the surroundings in which the drug is used. Short-term effects: These drugs alter users perception of time and space by changing the way the brain interprets stimulus. They also increase heart rate and blood pressure, which can lead to coma, or heart and lung failure. High doses can cause symptoms that mimic schizophrenia, such as delusions, hallucinations, paranoia, disordered thinking, a sensation of distance from one’s environment, and catatonia. Speech is often sparse and garbled. PCP can be addictive. Long-term effects: Flashbacks can occur days, months, or even years after use. Users can also experience decreased motivation, prolonged depression, increased anxiety, increased delusions and panic, and psychosis such as schizophrenia or severe depression.

Narcotics (Opium, morphine, codeine, heroin): Narcotics include opium, opium derivatives, and semi-synthetic substitutes of opium derivatives. Narcotic use is associated with a variety of unwanted effects including drowsiness, inability to concentrate, apathy, lessened physical activity, constriction of the pupils, dilatation of the subcutaneous blood vessels causing flushing of the face and neck, constipation, nausea and vomiting, and most significantly, respiratory depression. As the dose is increased, the subjective, analgesic (pain relief), and toxic effects become more pronounced. Short-term effects: Short term effects include restlessness, irritability, loss of appetite, nausea, tremors, and drug craving. Long-term effects: Long term effects include addiction, accidental overdose, risk of hepatitis and AIDS infection from contaminated needles.

Prescription Drug Abuse: The most commonly misused prescription drugs are: Painkillers (codeine, Oxycodone, Vicodin, Demerol); CNS depressants (Nembutal, Valium, Xanax); and stimulants (Ritalin, Dexedrine, Adherol). Short-term effects: Stimulants and CNS depressants present risks for irregular heartbeat, greatly reduced heart rate, seizures, dangerously increased body temperature, and can cause aggressive or paranoid behavior. Long-term effects: The greatest risk from these drugs is the significant chance for dependence. This can lead to greater doses and increased frequency of use. Attempting to cease use without proper medical help after dependence has been established can be dangerous and even fatal.

Inhalants (gas, aerosols, glue, nitrites, nitrous oxide): Inhalants are breathable chemical vapors that produce psychoactive effects. A variety of products common in the home and in the workplace contain substances that can be inhaled:

- Solvents—paint thinners or removers, degreasers, dry-cleaning fluids, gasoline, and glue
- Art or office supply solvents—correction fluids, felt-tip-marker fluid, and electronic contact cleaners
- Gases (used in household or commercial products)—butane lighters and propane tanks, whipped cream aerosols (whippets), and refrigerant gases
- Household aerosol propellants—contained in items such as spray paints, hair or deodorant sprays, fabric protector sprays, and aerosol computer cleaning products
- Medical anesthetic gases—ether, chloroform, halothane, and nitrous oxide
- Nitrites—volutiles including cyclohexyl, butyl, and amyl nitrites, and are commonly known as “poppers.” Volatile nitrites are often sold in small brown bottles and labeled as “video head cleaner,” “room odorizer,” “leather cleaner,” or “liquid aroma.”

Short-term effects: These chemicals slow down the body’s functions, and can cause momentary intoxication which, if continued, can lead to stimulation, reduced inhibition, and ultimately loss of consciousness. Using solvents or aerosol sprays can induce heart failure and death, known as “sudden sniffing death.” This effect is mostly associated with butane, propane, and chemicals in aerosols. Long-term effects: These chemicals can cause severe damage to the brain, liver, and kidneys. Specifically, they can cause hearing loss, peripheral neuropathies (limb spasms), central nervous system damage, and even bone marrow damage.

GHB: GHB (gamma hydroxybutyrate) is a central nervous system depressant. It is made from gamma butyrolactone and sodium or potassium hydroxide, which means that it is essentially degrading solvent or floor stripper combined with drain cleaner. In liquid form it is usually clear and looks like water. GHB and two of its precursors, gamma butyrolactone (GBL) and 1,4 butanediol (BD) have been characterized as predatory drugs used to commit acts of sexual violence. Effects: Abuse of GHB can cause amnesia, coma and/or seizures, inability to move, or impaired speech. There is also a risk of death, especially when combined with alcohol or other drugs.

Resources
A variety of resources exist for alcohol and other drug prevention, education, counseling, and referral.

For confidential counseling, referral, treatment, or recovery information:

- Office of Community Development and Substance Abuse Programs, 617-253-7848
- Health Education Service of the MIT Medical Department, 617-253-1316

For confidential counseling, referral, treatment, or recovery information:

- Mental Health Service of the MIT Medical Department, 617-253-2916
- Student Support Services, 617-253-4861
- Personal Assistance Program (for employees), 617-253-2916

For confidential on-campus support and recovery groups:

- MIT Alcohol Support Group, 617-253-2916
- AA—Alcoholics Anonymous (campus support meeting), 617-253-2916
**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 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 if the Institute considers that such misconduct impinges on the well being or functioning of the Institute. 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.

For more information, contact the Office of Student Mediation and Community Standards (OSMCS), Room W20-507, 617-253-7848.

**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 head, other appropriate venues or groups, or the Office of Student Mediation and Community Standards (OSMCS), Room W20-507, 617-253-7848. Students may also bring concerns to the attention of an ombudsperson 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 (COD). The COD reviews 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 OSMCS. The charge and its documentation are transmitted to the chair of the COD. After a review of the documentation, the chair will decide whether or not a hearing by the COD is warranted, and, if so, if such hearing should be by the full committee (COD hearing), a COD panel, or an administrative review. The COD has the authority to impose any sanction it deems appropriate. Possible sanctions include, by way of example, reprimand, informal probation, formal probation, suspension, and expulsion. Sanctions may also include requiring direct restitution and/or designated service to the community. Detailed procedures are available at [http://web.mit.edu/committees/cod/](http://web.mit.edu/committees/cod/).

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 at [http://web.mit.edu/policies/sip/](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 person 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 students’ 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 E19-429. Graduate student residents may obtain MIT approval through the Graduate Residential Life Office in Room E19-429. 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.

The MIT Parking and Transportation office is located in Room W20-022. For more information, visit [http://web.mit.edu/facilities/transportation/](http://web.mit.edu/facilities/transportation/).
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.

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MIT CENTERS, LABS, AND PROGRAMS

Advances in knowledge, together with an awareness of the complexity of today’s world, have led researchers to pursue multifaceted problems that cannot be resolved from the vantage point of a single academic discipline.

As a result, MIT students and faculty frequently 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 the Undergraduate Research Opportunities Program. 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 Programs. Students must be admitted by a regular academic department in order 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 section indicate any advanced degrees that may be offered.

Broad Institute
Launched in 2004, the Broad Institute is an unprecedented scientific undertaking that seeks to fulfill the promise of genomics for medicine by empowering creative and energetic scientists from many institutions and background to work together to build critical genomic research tools, share them with the scientific community, and pioneer their application to the study and treatment of disease.

The Institute is a partnership of the Massachusetts Institute of Technology, Harvard University and its affiliated hospitals, and the Whitehead Institute for Biomedical Research, and is governed jointly by MIT and Harvard. The Broad Institute includes investigators from all of its partner institutions, many of whom are faculty members at MIT, Whitehead, Harvard University, or Harvard Medical School. Currently there are six core faculty members, with primary labs located at Broad, and 108 associate members, with primary labs located at one of the universities or hospitals.

The Broad Institute headquarters is at 7 Cambridge Center (MIT Building NE30), across the street from MIT’s Biology Department and next door to Whitehead. Broad’s genome sequencing laboratory and its staff are at 320 Charles Street (MIT Building NE125).

For information on research opportunities, contact the office of Dr. Eric Lander at lander@broad.mit.edu.

http://www.broad.mit.edu/

Cambridge-MIT Institute
The Cambridge-MIT Institute 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 supports workshops, planning grants, and exchange activities to promote the partnership of the two universities, and to disseminate the results of its past research and education effort.

The main strategic aims of CMI are to:

• Assist the planning and development of continuing and new research partnerships between the Cambridge and MIT faculty and research staff
• Disseminate lessons from CMI and its educational programs, and related evaluation work, with particular attention to the development of innovation leaders and entrepreneurs
• Identify and pursue other opportunities to strengthen the partnership of the two universities

For more information, please contact the executive director, Dr. William A. Lucas, and the CMI office, Room 8-403, MIT, 617-253-7732, fax 617-258-8539, walucas@mit.edu. The executive director of the partnership at the University of Cambridge is Professor Michael Gregory.

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 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.

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 and Elizabeth Goldring’s Vision Arts.

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, 617-253-4415, fax 617-253-1660, cavs@mit.edu.

http://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 preindustrial societies. The center considers not only technologies of subsistence, 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 Office of the Provost. Further information about the center may be obtained from the director, Professor Heather Lechtman, Department of Materials Science and Engineering, Room 8-138, MIT, 617-253-1375.

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 real-time PCR, biomolecular modeling and engineering, biomolecular binding interactions, cell and molecular mechanics, cellular responses, cell culture, 2-photon 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.

Center for Biomedical Innovation
Launched in 2005, the MIT Center for Biomedical Innovation (CBI) is a collaboration among the MIT Schools of Engineering, Management, and Science, and the Harvard-MIT Division of Health Sciences and Technology (HST). CBI’s mission is to generate and disseminate high-impact systemic solutions that enhance efficacy, safety, and quality of patient care worldwide.

CBI conducts collaborative research within a “safe haven” environment, with participation from MIT and Harvard faculty and students as well as the active involvement of a network of academic, industry, and government experts. Our primary areas of interest include:

- Safety assessment—Improve predictability in preclinical and clinical assessment and postmarketing surveillance through better use of informatics tools and data
- Research and development redesign—Enhance productivity through new collaboration and research models
- Manufacturing and distribution systems—Rationalize the supply chain and implement quality-by-design
- Risk management (economic and regulatory)—Apply systematic approaches that anticipate evolution in stratified medicine, regulatory change, and reimbursement

CBI also offers graduate courses and sponsors lectures focused on strategies for leading biomedical innovation. This portfolio of educational initiatives is designed to address the need for scientific, technical, and managerial expertise required for innovating in the healthcare industries.

For more information, contact the Center for Biomedical Innovation, 3 Cambridge Center, Room NE20-382, Cambridge, MA 02142-1607, 617-253-0151, fax 617-253-0657, cbi@mit.edu.

Center for Cancer Research
The Center for Cancer Research (CCR), partially supported by the National Cancer Institute, provides facilities for interdisciplinary work in many areas of fundamental cancer research, including molecular, cellular, and developmental biology and immunology.

CCR draws its 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, offered as public colloquia, are also available.

For further information, contact the director, Professor Tyler Jacks, Room E17-110, MIT, 617-253-6403.

http://web.mit.edu/cbi/
Center for Collective Intelligence
The MIT Center for Collective Intelligence brings together faculty from across MIT to conduct research on how new communications technologies, especially the internet, now allow huge numbers of people all over the planet to work together in new ways. The center’s basic research question is: How can people and computers be connected so that—collectively—they act more intelligently than any individuals, groups, or computers have ever done before?

This first-of-its-kind research effort draws on the strengths of many diverse organizations across MIT including, the MIT Media Lab, the Computer Science and Artificial Intelligence Laboratory, the Department of Brain and Cognitive Sciences, and the MIT Sloan School of Management.

The Center for Collective Intelligence is directed by Professor Thomas W. Malone. For further information, contact Robert Laubacher, 617-253-0526, rjl@mit.edu.

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, risk measurement in finance, supply chain analysis, and lean manufacturing.

For further information contact Professor Roy E. Welsch, director, Room E53-383, MIT, 617-253-6601, rwelsch@mit.edu.

Center for Educational Computing Initiatives
The Center for Educational Computing Initiatives (CECI) is an interdepartmental research center that focuses on advanced technologies emerging for educational uses. Research at CECI involves the development of innovative technologies, the application of technologies to specific learning objectives, and the evaluation of the effectiveness of new technologies. CECI projects focus on collaborative learning and on enabling technologies for educational applications, including authoring systems, toolkits or libraries of computer code that make the creation of effective computer applications easier and less expensive. CECI also evaluates how computer technology affects education, particularly how computer applications improve the quality of education.

Examples of CECI’s current projects include:

- The Technology-Enabled Active Learning project is a prototype for the reform of physics education at MIT. It is designed to help students develop better intuition about, and conceptual models of, physical phenomena. This new approach to teaching is centered on active learning. It offers a highly collaborative, hands-on environment that makes extensive use of desktop experiments, educational technology, and computer-aided analysis of experimental data, giving students direct experience with basic physical phenomena such as electrical and magnetic fields.

- The iLabs project that is developing a web-services based platform for the implementation of physical laboratories that can be operated remotely over the internet. This project, originally funded by Microsoft, has created an open specification and reference implementation of a software development kit. The software is used by laboratories in various departments at MIT and at several universities around the world.

Undergraduates may participate in CECI projects through the Undergraduate Research Opportunities Program.

For further information, contact Professor Steven R. Lerman, Room 9-317, MIT, 617-253-4277, lerman@mit.edu. http://ceci.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 the Sloan School of Management, the MIT Department of Economics, and the Laboratory for Energy and the Environment (LTEE). The center’s distinguishing characteristic is its dedication to high-quality, empirically-grounded economic analysis of corporate and public policy issues. 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 Science.

For over 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.

Professor Paul Joskow, of the Economics Department, is the center’s director. For more information, contact the executive director, John Parsons, Room E40-435, MIT, 617-324-3745, jparsons@mit.edu. http://web.mit.edu/ceepr/www/

Center for Environmental Health Sciences
The Center for Environmental Health Sciences (CEHS) applies a broad range of cutting-edge technologies to the goal of studying the biological effects of exposure to environmental agents in order to understand, and predict, how such exposures affect human health.

CEHS is funded by the National Institute of Environmental Health Sciences. Its research programs, organized in three cores and funded by the National Institutes of General Medical Sciences and the National Cancer Institute, among others, pose challenging interdisciplinary problems for graduate and undergraduate students, as well as some 28 members of the MIT and Harvard faculties.

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 Biological Engineering for Toxicology Core brings many of the strengths of MIT’s Biological Engineering Department and Computational and Systems Biology Initiative into CEHS, including the innovative application of mechanical engineering to devise new ways to monitor biological events and single-molecule biochemical events, and the development of genomic and proteomic approaches to systematic measurement of cellular responses to damaging agents.

The Environmental Systems and Health Care Core strives to understand, holistically, the relationships that link ecology and human health, including evolution, gene flow, and ecosystem processes.

These research activities are supported by three facilities cores—Bioanalytical, Genomics and Bioinformatics, and Animal Model and Pathology—that provide state-of-the-art tools and technologies for solving environmental health problems.

At MIT, graduate and undergraduate courses in molecular and systems toxicology are offered through the Biological Engineering Department, which also partners with other departments in the Schools of Science and Engineering to create cross-disciplinary opportunities in environmental health science and engineering. The Applied Biosciences PhD program integrates chemistry, molecular biology, and genetics with bioengineering approaches to the understanding of how organisms respond to environmental agents.

For further information, contact Professor Leona Samson, Room 56-235, MIT, 617-258-7813, lsamson@mit.edu.

Center for Global Change Science
The Center for Global Change Science (CGCS) is an interdepartmental organization that seeks to address long-standing scientific problems that impede the ability to accurately predict changes in the global environment. Established in 1990, CGCS builds on the long-established MIT research and education programs in meteorology, oceanography, atmospheric sciences, climate physics, chemistry, hydrology, and satellite remote sensing carried out in the Schools of Science and Engineering. Associated CGCS faculty, staff, and student researchers come from many departments, including Earth, Atmospheric, and Planetary Sciences; Civil and Environmental Engineering; Electrical Engineering and Computer Science; Chemistry; Biology; and Chemical Engineering; as well as the Woods Hole Oceanographic Institution. This multidisciplinary approach encourages collaboration among researchers with a wide variety of backgrounds and interests that is vital to understanding and predicting global change.

The long-term goal of CGCS is to use theory and observations to gain an understanding of the basic processes and mechanisms controlling the global environment, and thereby to accurately predict environmental changes. The primary objective of the center involves a sustained program of basic scientific research focused on five fundamental processes in the global climate machine: convection, atmospheric water vapor, and cloud formation; oceans and ocean-atmosphere coupling; land-surface hydrology and hydrology-vegetation coupling; biogeochemistry of the greenhouse gases and reflective aerosols; and upper atmospheric chemistry and circulation. The aim is to first understand these basic processes and their potential effects on climate change, and then to incorporate them into climate and chemical prediction models.

The CGCS modeling efforts are carried out within the MIT Climate Modeling Initiative (CMI), which is a cooperative endeavor by CGCS and the MIT Laboratory for Computer Science. Formulated in 1997 to help stimulate innovative approaches to computation, CMI provides a central modeling facility to CGCS faculty and students. CMI’s goals are to better understand the evolution of climate over earth history, and the limits to climate predictability, and thereby to inform speculations about how climate may change in the future. CMI is designed to contribute to policy studies undertaken by the MIT Joint Program on the Science and Policy of Global Change, which is a cooperative effort of CGCS and the Center for Energy and Environmental Policy Research. Launched in 1991 to analyze potential anthropogenic global climate change and its social and environmental consequences, the joint program involves CGCS in extensive collaborative efforts with faculty and student researchers in the departments of Political Science and Economics, the Sloan School of Management, the Laboratory for Energy and the Environment, the Center for International Studies, and the Marine Biological Laboratory at Woods Hole.

For further information, contact the CGCS office in Room 54-1312, 617-253-4902, fax 617-253-0354, cgcs@mit.edu. http://web.mit.edu/cgcs/

Center for International Studies
The Center for International Studies (CIS) aims to support and promote international research and education at MIT. Capitalizing on MIT’s great strengths in science and engineering, the center examines the international aspects of these fields as they relate to both policy and practice, and focuses 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 Planning, and visiting scholars from around the world. CIS sponsors 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. The center also assists 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 with the Political Science Department, and courses offered emphasize grand strategy, causes of conflict, military technology, bureaucratic politics, and budgetary issues. The SSP senior research and teaching staff includes social and natural scientists and policy analysts. A special feature of the program is the integration of technical and political analyses in studies of international security 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.

For more information on SSP, contact Magdalena Rieb, program coordinator, Room E38-624, 617-258-7608, fax 617-258-7858.

The MIT International Science and Technology Initiative (MISTI) is MIT’s cornerstone program for international education. Through country programs in China, France, Germany, India, Italy, Japan, Mexico, Singapore, and Spain, MISTI places more than 200 students per year in

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internships with companies, research labs, and universities around the world. MISTI also supports MIT faculty members in cross-border research collaborations, facilitates research opportunities for international students and postdoctoral visitors at MIT, and arranges study opportunities for MIT students at selected universities abroad.

For more information, contact Kelli Eagan, 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.

For more information, contact Tisha Gomes, program coordinator, Room E38-274, 617-258-6862, fax 617-258-7044.

The Program on Human Rights and Justice, an interdisciplinary program created by CIS and the Department of Urban Studies and Planning, focuses on teaching, research, and application in human rights, and provides a forum on human rights issues at MIT. The activities of the program include research projects and placing interns in intergovernmental organizations, private sector, and nongovernmental organizations worldwide.

For more information, contact C. J. Huang, program assistant, Room 9-426, 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, Brandeis, the Fletcher School of Law and Diplomacy, Harvard, MIT, Tufts University, and Wellesley College. The committee is hosted at MIT by the Center for International Studies.

For more information, email cis-migration@mit.edu.

The Program on Emerging Technologies (PoET) is a collaborative effort between the School of Engineering and the School of Humanities, Arts, and Social Sciences. Researchers at the Center for International Studies work together with colleagues from the Engineering Systems Division, the Technology and Policy Program, the Department of Political Science, and the Program in Science, Technology, and Society. With current, future, and historical focuses, research efforts address diverse implications of emerging technologies and how responses to anticipated policy or societal impacts may shape the way in which those technologies are developed.

For more information, contact Annie Abbondante, program assistant, Room E38-270, 617-253-8306, fax 617-253-9330, aca@mit.edu.

CIS manages the MIT-Japan International Studies Fund Grants, intended for advanced doctoral students at MIT working in close collaboration with faculty members on any international aspect of energy, environment, and international affairs.

Among the seminars and workshops sponsored by CIS are the Starr Forum, the Starr Forum on the Rise of China, the Emile Bustani Middle East Seminar, and the Security Studies Seminar Series.

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.

For more information, contact the director, Richard J. Samuels, Room E38-235, MIT, 617-253-3121. 

Center for Materials Science and Engineering

The Center for Materials Science and Engineering (CMSE), one of a nation-wide 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 postdoctoral associates from different disciplines who investigate fundamental scientific questions and engineering problems. More than 30 faculty members, representing eight different departments, are engaged in CMSE research in the following areas:

- Microphotonic materials and structures
- Nanostructured polymers
- Electronic transport in mesoscopic magnetic and semiconductor structures
- Science and engineering of solid state portable power structures
- Exotic states of correlated electrons in single crystals

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.

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 at selected universities abroad. Supported
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, 617-253-6850, fax 617-258-6478.

http://web.mit.edu/cmse/

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 MIT Sloan School of Management.

The center’s research initiatives cover a range of disciplines and areas of application within real estate, and all offer synergy between the real world of practice and MIT’s faculty and research capabilities.

New Century Development is the center’s initiative to undertake research activities and communication forums aimed at understanding and improving the physical real estate development process in the 21st century. This initiative is meant to be interdisciplinary and international in scope, providing avenues to link across various departments at MIT, and between MIT and the community of professional practice engaged in building the developments of the future.

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 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.

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 includes 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 corporate partnerships and individuals active in the real estate industry.

The center also serves as the home for the Master of Science in Real Estate Development (MSRED) program, an interdepartmental degree program that combines education in design, planning, construction, management, finance, and marketing. It prepares students to assume positions in real estate development firms. The program requires 11 months of intensive study.

For further information about the center or the Master of Science in Real Estate Development (MSRED), contact David Geltner, director, Center for Real Estate, Room W31-310, MIT.

http://web.mit.edu/cre/

Center for Technology, Policy, and Industrial Development
MIT’s Center for Technology, Policy, and Industrial Development (CT PID) is an interdisciplinary research and educational center addressing global technology and policy issues through sustained partnerships with industry, government, and academia. These partnerships are aimed at supporting global economic growth and advancing policies that preserve the environment and benefit society at large.

CT PID research focuses on contemporary industrial problems—such as how to build safe, affordable, and environmentally friendly automobiles—that span social, natural, and technological interests.

Current programs, often supported by several corporations, address industry issues in aerospace, automotive, engineering and construction, information quality, materials systems, mobility, and technology and law. Other programs examine diverse issues facing a single global corporation.

Applying CTPID’s interdisciplinary focus, a team—for example, of computer scientists, economists, and policy analysts—can join forces to solve whole problems, not just components of a problem.

Research from CTPID’s International Motor Vehicle Program (IMVP) resulted in The Machine That Changed the World, a book that articulated lean production techniques and transformed manufacturing worldwide. Recent books from CTPID’s diverse programs include The Second Century: Reconnecting Customer and Value Chain through Build-to-Order, Lean Enterprise Value: Insights from MIT’s Lean Aerospace Initiative, Future Cities: Dynamics and Sustainability, and Broadband: Bringing Home the Bits.

Center programs include the Ford-MIT Alliance, IMVP, Lean Aerospace Initiative, Lean Sustainment Initiative, Information Quality Program (MIT IQ), Materials Systems Laboratory, and the Technology and Law Program.

Established in 1985, CTPID’s 160 faculty and researchers are drawn from MIT’s Schools of Engineering, Management, and Humanities, Arts, and Social Sciences, and from peer institutions. Affiliated scholars come from universities including Harvard, Chicago, Tokyo, and Université de Paris XII. Pragmatic knowledge comes from over 65 sponsors, including Toyota Motor Corporation, General Motors Corporation, Ford Motor Company, Raytheon Company, the Boeing Company, the US Air Force, and the National Science Foundation.

Sustained by MIT’s intellectual resources and interdisciplinary tools, CTPID’s mission is to develop new knowledge, advanced technological strategies, and innovative partnerships that support global industrial growth, social well-being, and environmental health.

For further information, contact the acting director, Joel Moses, Room E40-257, MIT, 617-253-8592, ct pidcom@mit.edu.

http://web.mit.edu/ctpid/www/

Center for Transportation & Logistics
The MIT Center for Transportation & Logistics (CTL), part of the Engineering Systems Division, is a world leader in supply chain management and transportation education and research. CTL engages in three principal activities: research, outreach, and education.

Research. The center’s world-renowned research programs directly involve over 75 faculty and research staff from a wide range of academic disciplines, as well as researchers in various affiliate organizations...
around the world. CTL has three main research programs: Supply Chain Management, Transportation, and the MIT AgeLab.

Supply Chain Management projects include Supply Chain 2020, Supply Chain Response to Disruption, Demand Management, Innovations in Transportation Procurement, and Outsourcing & Postponement.

Transportation projects include the MIT/Transit Professional Development Program, the MIT Program in Intelligent Transportation Systems, and the National Center of Excellence for Aviation Operations Research.

The MIT AgeLab conducts research to improve quality of life for older adults and those who care for them, creating new ideas and translating technology into practical solutions that improve people’s functioning throughout the life span.

**Outreach.** Through the Corporate Outreach Program, industry and CTL collaborate to turn innovative research into market-winning commercial applications.

**Education.** CTL’s top-ranked academic programs include the Master of Engineering in Logistics program; the PhD program in Logistics and Supply Chain Management; and the MIT-Zaragoza International Logistics program, which offers graduate education in logistics and certificates in various logistics-related disciplines.

Through CTL, MIT is the lead university in Federal Region I of the University Transportation Centers program administered by the US Department of Transportation, which provides graduate fellowships in transportation, research and teaching assistantships, and undergraduate research opportunities.

For further information on the Center for Transportation & Logistics and its programs see the Engineering Systems Division in Part 2.

http://web.mit.edu/ctl/

**Clinical Research Center**

The MIT Clinical Research Center is an NIH-funded research facility on campus that provides an infrastructure for interested scientists to perform biomedical and nutritional 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 neuropsychopharmacology, innovative imaging strategies, infectious diseases (HIV), neuropsychology, biomechanical engineering, and obesity.

Most projects involve collaboration between physicians and clinical research 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 investigatores are faculty members and research scientists from many different departments. The center has state-of-the-art instruments to assist in data collection for resting energy expenditure, body composition, hydration status and bone density. The center also provides a core lab to support processing of samples and conducting assays as necessary for each study.

Research opportunities are available for undergraduate and graduate students contemplating careers in the medical sciences and for postdoctoral physicians. The Undergraduate Research Opportunities Program (UROP) allows undergraduate students the opportunity to participate in the research process at the Clinical Research Center—either for credit, pay or on a volunteer basis. Undergraduates also have the opportunity to enroll in subject HST.S12 Introduction to Human Clinical Investigations, taught by Dr. Ravi Thadhani, MIT CRC codirector, and held at the CRC.

For further information, contact the program codirectors, Drs. John Gabrieli and Ravi Thadhani, or the administrative officer, Suzanne Miller, Room E17-445, MIT, 617-253-3091.

http://web.mit.edu/crc/

**Computer Science and Artificial Intelligence Laboratory**

The Computer Science and Artificial Intelligence Laboratory (CSAIL) pursues fundamental research across the entire breadth of computer science and artificial intelligence. CSAIL is committed to leading the field both in new theoretical approaches and in the creation of applications that have broad societal impact.

Current research activities span four principal areas:

- **Artificial Intelligence** includes studies in core AI, machine learning, robotics, medical applications, artificial-life, and molecular and cellular biology. Recent work has focused on understanding molecular dynamics and using it to design better drugs, and understanding the gene regulatory mechanisms within cells. CSAIL is also pioneering new techniques in biosynthesis—genetically engineering cells to gain digital control of protein production for a host of applications.

- **Human/Computer Intelligent Interfaces** includes graphics, natural language, speech, and vision. The aim is to construct programs and machines that have greater sensory and cognitive capabilities so that they can communicate with people toward useful ends. In vision, real-time computing is now practical in areas such as image-guided surgery, image database and movie browsing, and continuous activity monitoring. Other work is underway on practical natural language systems to interface to the web and intelligent environments. CSAIL hosts the World Wide Web Consortium and contributes to its development of the semantic web.

- **Systems** involves architecture, compilers, languages, networks, and software engineering. The goal is to understand principles—and develop technologies—for the creation and use of highly scalable information infrastructures that interconnect human-operated and autonomous computers. CSAIL research is also directed toward 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, with emphasis on the theoretical underpinnings of computer science and information technology. Building computational theories that integrate vision, language, and learning is a key step toward the understanding of higher brain function.

CSAIL encourages student participation in its research projects. Undergraduates may become involved through UROP, and research assistantships are available to graduate students. CSAIL graduate students are typically enrolled in the Departments of Electrical Engineering and Computer Science, Mechanical Engineering, Aeronautics and Astronautics, Brain and Cognitive Sciences, Mathematics, and Linguistics and Philosophy.
Deshpande Center for Technological Innovation

The Deshpande Center was established at the MIT School of Engineering to increase the impact of MIT technologies in the marketplace. Founded with an initial donation from Jaishree and Desh Deshpande, the Deshpande Center supports a wide range of emerging technologies including biotechnology, biomedical devices, information technology, new materials, tiny tech, and energy innovations.

Since 2002, the Deshpande Center has awarded $7.1 million in Ignition and Innovation Grants to support 61 MIT faculty-led projects. The objective of the funding is to nurture ideas with market potential and reduce the uncertainty around them so that an external party would invest in the technology. In addition to the funding, the grants bring with them publicity, mentoring, and connections with the business community.

This funding is enabling MIT faculty and their students to pursue exciting new avenues of research on novel technologies. As a result, over nine projects have spun out of the center as independent startups, having collectively raised over $40M in outside financing from top-tier venture capital firms and other investors.

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 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 at http://web.mit.edu/deshpandecenter/portfolio.html.

The executive director of the Deshpande Center is Leon Sandler. The faculty director of the Deshpande Center is Professor Charles L. Cooney. For more information, contact the Deshpande Center, Room 1-229, MIT, 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 Science and 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, 617-253-5478.

http://web.mit.edu/fbml/index.shtml

Haystack Observatory

MIT Haystack Observatory provides opportunities for undergraduate and graduate student research in radio astronomy, geodesy, and atmospheric sciences.

The Haystack 37-m radio telescope is undergoing a major upgrade for high-efficiency operations at frequencies up to 115 GHz. When completed in 2008, it will again be available for spectroscopic measurements of the interstellar media, as well as mm-wavelength observations using very-long baseline interferometry. VLBI uses a global array of telescopes to make high-resolution observations of galactic and extragalactic radio sources and to do precision geodetic studies of the Earth’s plate tectonics and motions in space.

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.

Division of Comparative Medicine

The Division of Comparative Medicine has three basic missions: education, research, and the provision of comprehensive animal husbandry, clinical, and diagnostic services for all research animals at MIT. The division serves as the centralized animal resource on campus and provides the necessary expertise for investigators conducting biomedical research using animal models.

Division staff members educate the MIT research community in the biology and use of research animals as models for biomedical research. The division provides online training materials for researchers working with animals as well as one-on-one training based on individual requirements. Division members teach graduate-level courses in the Department of Biological Engineering and provide mentorship for graduate students.

With an NIH-funded postdoctoral training program for veterinarians specializing in biomedical research, the major long-range goal of the research at the division is to develop animal models or in vitro systems that are pertinent to biomedical research. The division is internationally recognized for characterizing new Helicobacter species and studying the relationship of Helicobacter to diseases that are prevalent throughout the world.

http://web.mit.edu/comp-med/
A strong instrumentation development program is conducted at Haystack Observatory, primarily in the areas of wideband signal processing and high-rate data acquisition. Current applications include the design of large radio arrays to enhance the collecting area for radio observations.

Observatory researchers are currently leading the development of an array spanning 80-300 MHz called the Mileura Widefield Array in collaboration with the MIT Kavli Institute and others, which will be placed in Western Australia. Haystack scientists and engineers also are participating in the development of a new 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, about 35 miles northwest of Cambridge. For further information, contact Dr. Alan Whitney, MIT Haystack Observatory, Route 40, Westford, MA 01886, 781-981-5407, awhitney@haystack.mit.edu.

http://www.haystack.mit.edu/

**Institute for Soldier Nanotechnologies**

Since 2002, MIT has hosted the Institute for Soldier Nanotechnologies (ISN), an interdisciplinary research center established under contract with the US Army. ISN’s mission is to develop nanomaterials and related nanotechnologies that will dramatically improve the protection and survival of soldiers.

The ultimate goal is to create a 21st century battlesuit that combines high-tech capabilities with light weight and comfort. Imagine a bullet-proof jumpsuit, no thicker than ordinary spandex, that monitors health, eases injuries, communicates automatically, and maybe even lends superhuman abilities. It’s a long-range vision of how technology can make soldiers less vulnerable to enemy and environmental threats.

ISN research is mostly conducted by graduate students completing theses, by postdoctoral researchers, and by undergraduates working through UROP. These researchers work in a 30,000 sq ft facility on the MIT campus equipped with state-of-the-art laboratories purpose built for nanotech research.

Another unique feature of ISN is that most theses are co-supervised by two or more faculty members representing different areas of technical expertise. Affiliated faculty come from several MIT departments, including Materials Science and Engineering, Mechanical Engineering, Chemical Engineering, Electrical Engineering and Computer Science, Aeronautics and Astronautics, Chemistry, Mathematics, and Physics.

In addition, many projects involve the participation of visiting experts both from industry and from Army centers of excellence. These experts often bring practical perspectives that contribute significantly to the rich learning environment at ISN.

Students seeking to perform thesis or UROP research in ISN should contact affiliated faculty within their own department. Information may also be obtained from ISN by phone at 617-324-4700 or by email 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, and Urban Studies and Planning.

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 professors Thomas A. Kochan and Paul Osterman. For more information, contact Jacalyn Curreri, 50 Memorial Drive, Room E52-580, Cambridge, MA 02142-1347, 617-258-8360, fax 617-253-7696, iwer@mit.edu.

http://mitsloan.mit.edu/iwer/

**Joint Program on the Science and Policy of Global Change**

The Joint Program on the Science and Policy of Global Change conducts research and analysis on issues of global environmental change, with a concentration on climate, and communicates the results to the research community, policymakers, and the public. The program’s work focuses on the integration of natural and social science aspects of the climate issue to produce analyses relevant to ongoing national and international discussions. The effort involves an interactive group of faculty, staff, and student researchers.

Founded in 1991, the Joint Program combines the capabilities of two complimentary interdisciplinary research centers: the Center for Global Change Science (CGCS) and the Center for Energy and Environmental Policy Research (CEEPR). Resources of the parent centers are strengthened by links to the Marine Biological Laboratory’s Ecosystems Center in Woods Hole, MA; the MIT Climate Modeling Initiative; and other MIT environmental programs. Cooperative efforts engage the program with leading
research institutions and nonprofit organizations worldwide. Financial support is provided by an international group of sponsors from government organizations, foundations, and industry.

The program’s cornerstone is the MIT Integrated Global System Model (IGSM) of economic and environmental change. The IGSM is a comprehensive research tool for analyzing potential anthropogenic global climate change and its social and environmental consequences. The IGSM includes consideration of climate science, technical change, and economic and social science in an interacting set of computer models designed for study of the sensitivities and uncertainties that are crucial to policy evaluation.

Program members communicate research results, and interpret the policy relevance of the analytical work, through many professional activities, including publications, workshops, corporate and public briefings, and media interviews. Special briefings from program members have been requested by the US Congress and federal and state agencies, by governments working through their ministries and international organizations, and by independent research panels. Information is also communicated directly to international and national policy-making bodies, and to other investigators, through the program’s semiannual MIT Global Change Forum.

Professors Henry Jacoby, of the MIT Sloan School of Management, and Ronald Prinn, of the Department of Earth, Atmospheric, and Planetary Sciences, codirect the program. For further information, contact the program office, Room E40-428, MIT, 617-253-7492, fax 617-253-9845, globalchange@mit.edu. http://web.mit.edu/globalchange/

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 E19-307, MIT, 617-253-3442, boyce@mit.edu. http://web.mit.edu/knight-science/

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.

Research interests 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, reliability of complex safety-critical systems, nanotube-enhanced ultracapacitors for regenerative energy storage, and use of photonics for high-efficiency thermophotovoltaic power conversion.

Work in power electronics ranges from device analysis and fabrication to circuit design and systems development and control. Automotive electrical and electronic systems are a topic of special interest, with research being funded by LEES’s Consortium on Advanced Automotive Electrical/ Electronic Systems and Components, whose international membership numbers around 25 companies.

LEES is also collaborating with the Microsystems Technology Laboratory on 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.

All programs in LEES are carried out with the assistance of undergraduate and graduate students working under the supervision of faculty members.

For further information, contact the acting director, Professor Joel Schindall, Room 10-140H, MIT, 617-253-3934. http://lees-web.mit.edu/

Laboratory for Energy and the Environment

The Laboratory for Energy and the Environment (LTEE) brings together faculty and staff in 14 departments to address the complex interrelationships between energy and the environment. In carrying out its mission, LTEE takes account of the technological, economic, political, and social aspects of sustainable energy development and use, and of other environmental challenges to sustainable development.

LTEE 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 LTEE serve MIT students as well as other academic researchers, industry professionals, and policy makers worldwide. Within the administrative structure of LTEE, 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 LTEE, contact Dr. Teresa L. Hill, Room E40-467, MIT, 617-253-1341, thill@mit.edu, or visit http://lfee.mit.edu/.
The mission of the LFEE Education Program is to enhance environmental literacy and deepen multidisciplinary knowledge on energy and the environment within the MIT community as well as locally, nationally, and internationally. Its projects include maintaining EnviroClasses and EnergyClasses, two web-accessible databases of environmental and energy classes at MIT (respectively, http://enviroclasses.mit.edu/ and http://energyclasses.mit.edu/); coordinating an Environmental Fellows Group that comprises the Martin Family Society of Fellows for Sustainability and the LFFE 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 campus leaders to provide opportunities such as the Campus Sustainability UROP Program, which enables students to discover the MIT campus as an opportunity for environmental research and innovation. The program also develops subjects, curriculum materials, and interdisciplinary case studies taught at MIT and elsewhere. Globally, it collaborates on learning initiatives for the Alliance for Global Sustainability and participates in intensive summer institutes on sustainable development hosted by the Center for Sustainability at the Swiss Federal Institute of Technology-Zürich (ETH-Zürich) and the University of Tokyo.

For more information, contact Professor Jeffrey I. Steinfeld, director, Room 2-221, 617-253-4525, jisteinf@mit.edu, or Dr. Amanda C. Graham, education program manager, Room E40-479, 617-253-8995, agraham@mit.edu, or visit http://lfee.mit.edu/education/.

The Alliance for Global Sustainability (AGS) is an 11-year partnership among four research universities—The University of Tokyo, ETH-Zürich, Chalmers University of Technology, and MIT—that works with industry, government, and NGOs to develop sustainable solutions. AGS uses a fully integrated style of research, education, and outreach aimed at strengthening the knowledge needed for better decisions, policies, and the development of new technologies. AGS activities currently focus on energy, food, and water. The MIT/AGS Program sponsors research and educational initiatives on sustainability at MIT. Ongoing work investigates energy pathways for a low-carbon 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/education/ (programs).

The Analysis Group for Regional Energy Alternatives (AGREA) focuses on strategic planning in energy and the environment, with an emphasis on regional energy pathways. Since 1988, AGREA has been using a multi-attribute tradeoff approach to identify robust energy strategies through projects in the U.S., Europe, Asia, and Latin America. Current work in the U.S., Scandinavia, and Portugal focuses on the dynamics of renewables and energy demand, and how to design future energy systems to reduce both costs and emissions. Challenges of this type are part of LFFE’s Energy Pathways initiative within the Alliance for Global Sustainability.

For more information, contact Stephen R. Connors, Room E40-465, 617-253-7985, connorsr@mit.edu, or visit http://web.mit.edu/agrea/.

Research in the Building Technology Program encompasses a range of innovations for the design, construction, and operation of sustainable buildings. Research topics include new concepts for expanded use of daylighting, use of natural ventilation to reduce air conditioning needs, and detailed monitoring of building operation to verify performance. Other work includes design of energy-efficient urban housing for China and New Orleans and structural evaluation of historic masonry buildings to identify unsafe conditions and means of restoration. A web-based design tool is being developed to help designers identify energy-efficient and sustainable alternatives. Included is a materials-selection tool for advanced building components.

For more information, contact Professor Leon R. Glicksman, director, Room 5-418F, 617-253-2233, glicks@mit.edu, or visit http://web.mit.edu/bt/www/.

The Carbon Capture and Sequestration (CCS) Technologies Program looks at CCS as a strategy to complement the current approaches to carbon mitigation (i.e., improved energy efficiency and increased use of noncarbon energy sources). Attention is given to all aspects of the problem, including technological, economic, environmental, and social. Research initiatives include studies of CCS economics; technology assessment studies; development of a Carbon Management Geographic Information System; and investigation of the political and social dimensions of introducing CCS technologies. A major component of the program is the Carbon Sequestration Initiative, an industrial consortium currently with 17 members.

For more information, contact Howard J. Herzog, Room E40-447, 617-253-0688, hjherzog@mit.edu, or visit http://sequestration.mit.edu/.

The Center for Advanced Nuclear Energy Systems (CANES), a joint center with the Department of Nuclear Science and Engineering, aims to create more economic and environmentally desirable nuclear energy systems through development of methods for design, operation, and regulation of advanced nuclear technology. CANES also investigates the role of nuclear energy in meeting future demands for nonelectrical energy forms such as process heat and hydrogen. In addition, CANES undertakes educational activities, including short courses, electronic offerings, and topical publications for professionals and the public. The center’s research programs 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 http://web.mit.edu/canes/.

The Center for Energy and Environmental Policy Research, described earlier in this chapter, is also affiliated with LFFE.

The MIT Energy Studies program in LFFE involves research on energy technology and policy. In March 2007 an interdisciplinary MIT faculty group published The Future of Coal—Options for a Carbon Constrained World (http://web.mit.edu/coal/). This comprehensive study examined the interrelated technical, economic, environmental, and policy challenges of continued use of coal, with a special focus on carbon sequestration. In 2003 a similar MIT group published a comparable interdisciplinary study called The Future of Nuclear Power (http://web.mit.edu/nuclearpower/).

For more information, contact Professor Ernest J. Moniz, codirector of LFFE, Room E40-453, 617-253-7515, ejmoniz@mit.edu.

The Program for Sustainable Energy and Clean Chemical Processing focuses on the 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. New programs include chemical conversion and upgrading of food-processing wastes, agriculture residuals, wood wastes, low-grade fossil fuels, and
wastewaters in hydrothermal and supercritical water media; molecular modeling of gas and hydrates; environmentally benign supercritical solvents for chemical synthesis; and advanced methods for geothermal energy recovery including rock drilling using spallation/fusion methods.

For more information, contact Professor Jefferson W. Tester, Room 66-454, 617-253-7090, testerel@mit.edu.

The Sloan Automotive Laboratory has for many decades conducted research on future transportation technology, especially engines and fuels. Major theme areas are engine combustion, emissions, fuel requirements, lubrication, friction, and wear; engine diagnostics; new engine concepts; and future automotive technology and fuels options. The laboratory has major industry-sponsored consortiums focused on engine and fuels, engine lubrication, diesel emission control, and impacts of new automotive technology and fuels on transportation energy and greenhouse gas emissions.

For more information, contact Professor John B. Heywood, director, Room 3-340, 617-253-2243, jheywood@mit.edu, or visit http://web.mit.edu/sloan-auto-lab/.

http://lfee.mit.edu/

Laboratory for Financial Engineering

The techniques of financial engineering have become indispensable to a wide spectrum of business activities, including investment banking, commercial banking, corporate finance, capital budgeting, portfolio management, risk management, and financial consulting and planning.

The principal focus of 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.

Students are encouraged to participate in current research projects, which 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.

Professor Andrew W. Lo is the director of the laboratory. For further information, contact Svetlana Sussman, LFE administrator, Room E52-430, 617-253-2142, ssussman@mit.edu or visit http://lfee.mit.edu/

http://lfee.mit.edu/

Laboratory for Information and Decision Systems

The Laboratory for Information and Decision Systems (LIDS) is an interdepartmental 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.

Research at LIDS falls into four main areas, which share common intellectual bases. The laboratory explicitly recognizes the interdependence 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 multi-sensor 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 micro-sensors.

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.

For further information about LIDS, contact the director, Professor Vincent W. S. Chan, Room 32-D608, MIT, 617-253-2142.

http://lids.mit.edu/

Laboratory for Manufacturing and Productivity

The Laboratory for Manufacturing and Productivity is an interdepartmental center for education and research in manufacturing and productivity at MIT. The laboratory seeks to establish a rational foundation for manufacturing based on a systematic understanding of the complex interactions among the many areas of manufacturing. The three major objectives are:

(1) the development of the fundamental principles of manufacturing pro-
cesses, equipment, and systems; (2) the application of those principles to the manufacturing; and (3) the education of engineering leaders.

The laboratory draws upon faculty and staff mainly from the Department of Mechanical Engineering, but participates in wide-ranging programs that involve many other departments and programs at MIT. Since its establishment in 1977, LMP’s research program has contributed to innovation in manufacturing processes and equipment, and has nurtured a greater understanding of planning, design, and production operations.

LMP’s three research focus areas are micro- and nano-scale manufacturing processes and equipment, manufacturing systems and information technology, and sustainability, including photovoltaics and environmentally benign manufacturing.

Opportunities for undergraduate and graduate students are available for thesis research and UROP projects, as are a limited number of postdoctoral research positions.

For additional information, contact the director, Professor Jung-Hoon Chun, Room 35-233, MIT, 617-253-1759.

http://web.mit.edu/lmp/

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 nuclear and particle physics. The laboratory operates the Bates Linear Accelerator Center and supports the Center for Theoretical Physics. In addition, the laboratory operates the MIT Central Machine Shop.

Theoretical research in both nuclear and particle physics is carried out within the Center for Theoretical Physics, described below. In the nuclear physics experimental program, members of the laboratory are completing the analysis of data from electromagnetic experiments at the Bates Linear Accelerator Center. Experiments continue at the Thomas Jefferson National Accelerator Facility and at the Mainz Microtron in Germany, with polarized protons using RHIC at Brookhaven National Laboratory, and with neutrons at the Los Alamos Neutron Science Center. The high-energy particle physics program involves completing experiments at the Fermi National Accelerator Laboratory and the Stanford Linear Accelerator Center. A new program of experiments with both high-energy protons and heavy ions is now underway at the Large Hadron Collider at CERN in Switzerland. An experimental apparatus is being assembled that will be mounted on the International Space Station to look for antimatter in space and dark matter detector development is under way. The properties of neutrinos are being explored through the completed experiment at the Sudbury Neutrino Observatory and through a new experiment KATRIN at Karlsruhe, Germany.

Students participate in the entire range of research programs in fulfilling their graduate and undergraduate degree requirements or as participants in UROP. For further information contact the director, Professor R. Milner, Room 26-505, MIT, 617-253-2395.

The William H. Bates Linear Accelerator Center is operated by the Laboratory for Nuclear Science as a research and engineering center with particular emphasis on accelerator science and technology, attracting faculty from across the Schools of Science and Engineering. Current efforts include the development of a new technique for optical cooling of particle beams; design, construction, and testing of new detector systems; the design of the high-luminosity electron-ion collider eRHIC; and the development of Bates as a high-intensity photon radiation source. Bates is also the site of efforts to develop new techniques for screening of cargo for dangerous materials.

Students participate both through UROP projects and through undergraduate and graduate thesis work. For further information contact the director, Professor R. Redwine, Room 26-453, MIT, 617-253-3600.

The Center for Theoretical Physics is engaged in a broad range of fundamental research activities in theoretical nuclear and particle physics, including study of the fundamental constituents of matter and the theory that governs them; the structure and interactions of nuclei and hadrons; electroweak physics, lattice hadron physics, field theory, string theory and quantum gravity; many-body physics; mathematical physics; cosmology; and quantum computation.

Students participate both through undergraduate UROP research and graduate thesis research. For further information contact the director, Professor E. Farhi, Room 8-323, MIT, 617-253-4871.

http://www-lns.mit.edu/

Lean Aerospace Initiative

The Lean Aerospace Initiative (LAI) is a research partnership among industry, government, and academia with a mission to enable focused and accelerated transformation of complex enterprises through the collaborative engagement of all stakeholders to develop and institutionalize principles, processes, behaviors, and tools for enterprise excellence. Started in 1993, LAI resides within the Center for Technology, Policy and Industrial Development (CTPID) of the Engineering Systems Division (ESD) in the School of Engineering. Faculty from the departments of Aeronautics and Astronautics, ESD, and the MIT Sloan School of Management participate in LAI research.

More than 100 graduate students from Aeronautics and Astronautics, ESD, Mechanical Engineering, Sloan School of Management, and other programs have completed master and doctoral theses within the program.

LAI undertakes research in all areas related to improving enterprise processes for acquiring, designing, developing, producing, and supporting aircraft, spacecraft, engines and missiles. Research is conducted in close collaboration with industry and government partners, often with on-site data collection and validation. An array of tools have been developed to help industry and government implement lean principles and practices, including the Lean Enterprise Model, Transition to Lean Roadmaps, Lean Enterprise Self-Assessment Tool, Enterprise Value-Stream Mapping and Analysis, Systems Engineering Cost Estimation, and the Supplier Networks Transformation Toolkit. Major findings from the program were captured in the award-winning book Lean Enterprise Value: Insights from MIT’s Lean Aerospace Initiative. Further information about LAI, including research findings, briefings, and publications, may be found on the LAI website.

http://lean.mit.edu/

Lincoln Laboratory

MIT’s Lincoln Laboratory, in Lexington, Massachusetts, is a federally sponsored center for research and development in advanced electronics with special emphasis on national security applications.
Lincoln Laboratory’s activities focus on design and development of complex systems, many of them incorporating new technologies, devices, and components.

Specific programs include optical and RF communications; missile defense technology; digital signal processing; embedded computer systems; image processing; space, air, and surface surveillance; biological defense sensors and systems; environmental monitoring; and air traffic control.

Research also is conducted in optics, solid-state devices, radar systems, decision support, and information technology.

Opportunities for research are available to MIT faculty members and qualified students. Inquiries may be directed to Zachary J. Lemnios, chief technology officer, LIN S3-305B, MIT Lincoln Laboratory, 244 Wood Street, Lexington, MA 02420-9108, 781-981-7020, or zlemnios@ll.mit.edu. http://www.ll.mit.edu/

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.

MPC focuses on strengthening its intellectual community, enhancing industrial outreach, and providing superior administrative support. It creates partnerships with industry to focus research and education on industrially relevant issues for the electronics, transportation, primary materials, construction, energy, and biomaterials sectors.

The Microphotonics Center (http://mphotonics.mit.edu/) is a center within MPC that builds interdisciplinary teams focused on advancing basic materials science and emerging technology in integrated photonic 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.

In keeping with MIT’s educational mission, MPC cosponsors the MPC/CMSE Summer Scholar Program, inviting outstanding undergraduate students nationwide to participate in ongoing MIT materials research.

With its Industry Collegium, 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 are distributed widely to industrial and government contacts. MPC sponsors a major workshop and a materials research poster session during its Materials Day celebration each fall. In cooperation with MIT’s Industrial Liaison Program (http://ilp-www.mit.edu/), MPC and the Microphotonics Center also provide a forum for industrial representatives to discuss their needs and problems one-on-one with MIT faculty and researchers. MPC also encourages exchanges between academia and industry, through visiting scientist and adjunct faculty appointments and industrial internship educational opportunities.

Major industry partners collaborate with faculty to carry out larger-scale, focused research initiatives. The Microphotonics 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 also participate in the Communications Technology Roadmap Project, which provides technology development targets for the long-term evolution of photonic component integration (http://mph-roadmap.mit.edu/).

For more information on either the Materials Processing Center or the Microphotonics Center, contact Dr. George B. Kenney, associate director, Room 12-007, MIT, 617-253-3244, gbkenney@mit.edu. http://mpc-web.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.

At the McGovern Institute, the brain functions we study fall within three broad themes: perception, cognition, and action. These functions form a sequence from when we first perceive a sensory input, recognize it, evaluate it emotionally, make a decision about it, and finally have a behavioral reaction to it, which might be movement or speech. We seek to understand how these basic functions underlie all normal brain activity and how they go awry in mental disorders, brain diseases, and disabilities.

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, 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 46-3160, MIT, 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 Professor Frank Moss, director, Media Lab, Room E15-401, MIT, 617-324-3818. http://www.media.mit.edu/

Microsystems Technology Laboratories

The Microsystems Technology Laboratories (MTL) provide modern microelectronics fabrication laboratories, including cleanrooms, design and testing facilities to enable research and education in microelectronic/microfabrication technology. MTL microfabrication, testing, and computational facilities are open to the entire MIT community and researchers from other university or government laboratories, as well as limited industrial participation.

MTL facilities consist primarily of fully equipped cleanroom microfabrication laboratories and associated design, simulation, testing, and characterization infrastructure, as well as an extensive computational network, supporting a wide array of design and layout tools.

Process research and device fabrication at MTL are primarily conducted in three laboratories, the Integrated Circuits Laboratory (ICL), the Technology Research Laboratory (TRL) and the Exploratory Materials Laboratory (EML). ICL is designed, equipped and staffed to serve as a highly advanced silicon integrated circuit, device, structures, and process research facility. TRL supports the development of novel process technologies and provides facilities for the fabrication of novel micro and nanostructures. EML is a highly flexible microfabrication resource with all the basic fabrication capabilities and few limitations.

More than 125 faculty and senior research staff, 550 graduate students, 150 undergraduates, and 20 postdoctoral associates are involved in ongoing activities at MTL. Approximately 55 PhD and 45 SM and MEng degrees whose primary area of research is strongly coupled to MTL facilities are awarded each academic year.

For information regarding MTL’s technical operations and capabilities, contact Dr. Vicky Diadiuk, associate director, operations, 617-253-0731, email diadiuk@mtl.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.

http://mtlweb.mit.edu/

MIT Center for Digital Business

The MIT Center for Digital Business 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 and implement tools and frameworks for analyzing internet-enabled technology, management, and business strategy through one-to-one relationships with corporate partners. Based at the MIT Sloan School of Management, the center also draws on other MIT resources, including the World Wide Web Consortium, the Center for Information Systems Research, the Center for Collective Intelligence, the Computer Science and Artificial Intelligence Laboratory, and the Media Lab. To date the center has funded more than 70 research projects with more than $30 million in corporate support.

The center’s research is organized into five special interest groups: productivity, marketing, services, communications, and security. Sponsors of the center participate closely in a focused research project as well as the annual conference, topical research workshops, and biweekly webinar lunches.

For more information contact Carlene Doucette, Room NE20-336, MIT, 617-253-7054, fax 617-452-3231, carlended@mit.edu.

http://digital.mit.edu/

MIT Entrepreneurship Center

The MIT Entrepreneurship Center (E-Center) educates and nurtures science, engineering, and management students who will make high-tech start-up companies successful. E-Center subjects, 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.

All entrepreneurship subjects, described under Course 15 in Part 3, are available to MIT graduate students from all departments, and support the strong community of MIT entrepreneurship. Courses frequently feature invited speakers who have significant real-world experience to share. In addition, each January, the E-Center organizes the Entrepreneurship Development Program, 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 like-minded centers 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 $100K Entrepreneurship Competition, the MIT Venture Capital and Private Equity Club, the Sloan Biomedical Business Club, the Sales Club, the MIT Technology Licensing Office, the Deshpande Center for Technological Innovation, the Venture
Mentoring Service, the MIT Enterprise Forum, the MIT Alumni Association, the MIT Sloan Career Development Office, 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 center and a senior lecturer at the MIT Sloan School of Management. Professor Edward B. Roberts is chairman. William K. Aulet is the entrepreneur in residence and a senior lecturer.

For more information, contact the E-Center office in Room E40-196, 1 Amherst Street, Cambridge, MA 02142-1352, telephone 617-253-8653, fax 617-253-8633, email ecenter@mit.edu. 

MIT Kavli Institute for Astrophysics and Space Research

The MIT Kavli Institute for Astrophysics and Space Research (MKI) 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 out 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 the space 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.

MKI is the focus for MIT’s participation in the Magellan Observatory Consortium in Chile, the Laser Interferometer Gravity Wave Observatory, the Chandra X-ray Observatory Science Center, and the Mileura Widefield Array radio telescope in Western Australia. 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 instrumentation in support of the ground-based and 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, 617-253-7501.

Nuclear Reactor Laboratory

The Nuclear Reactor Laboratory (NRL) operates a five-million-watt research reactor (MITR-II) that is one of the largest operated at a university.

NRL provides the focus for a wide range of research activities involving the use of nuclear radiation, including programs in the Departments of Physics, Materials Science and Engineering, Nuclear Science and Engineering, and Earth, Atmospheric, and Planetary Sciences, as well as the Parsons Laboratory and the Center for Environmental Health Sciences.

NRL is equipped with 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, a neutron diffractometer; and a fission converter facility. In-pile loops that closely simulate the environment in light water power reactors are available for corrosion and irradiation damage testing. An in-pile high-temperature irradiation facility for advanced materials and fuel studies has been successfully demonstrated to operate up to 1500°C.

An excellent medical irradiation facility with a clinically useful epithermal beam is available for patient and animal irradiations.

Other experimental facilities and instrumentation include radiochemistry laboratories; hot cells for dismantling or testing; a shielded hot box for handling and nondestructive testing of radioactive materials; nuclear detection equipment; delayed and prompt gamma activation analysis facilities; an Inductively Coupled Plasma spectrometer (ICP-OES); and a materials characterization laboratory.

Current research topics include applications of nuclear trace analysis to problems in the 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; instrumentation for neutron detection; nuclear medicine, including brain cancer therapy development; and isotope development.

NRL facilities are also used for teaching and research activities by other institutions. NRL provides special capabilities to regional hospitals and industries, e.g., radioisotopes for medical research and trace element analysis for a wide range of sample matrices.

Undergraduates can be involved in the operation of the reactor and in related research activities through special projects or senior theses. Graduate student thesis research is carried on in the various research areas mentioned earlier. A current summary report describing NRL activities in greater detail is available.

For information, inquire at the office of the director, Dr. David E. Moncton, Room 1W12-204, MIT, 617-253-8883.

Office of Professional Education Programs

The Office of Professional Education Programs (PEP) is 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 including full- or part-time on-campus programs, a wide range of summer short courses, customized and off-site programs, and innovative offerings utilizing traditional and electronic delivery methods.

The Advanced Study Program (ASP, http://web.mit.edu/advancedstudy/) provides 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, support, and dynamic interaction of an on-campus educational experience. Fellows develop a custom program that draws from faculty expertise across MIT, supplemented by seminars and research.
The Midcareer Acceleration Program (MAP, http://midcareer.mit.edu/) is a challenging program that draws on MIT’s faculty, education, intellectual resources, entrepreneurial spirit, and standards of excellence. The program incorporates career and personal development, a technical skills refresher, a semester-long MIT course, and an internship or research project. Students complete the program with either a job or a strategic plan to find a professional position that matches their abilities and ambitions.

The Professional Institute (PI, http://professional.mit.edu/) offers short certificate programs led by MIT faculty. These intensive two-to-five day summer sessions are designed for professionals seeking 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. Attendees earn IACET continuing education units.

MIT World (MITW, http://mitworld.mit.edu/) a free, open, streaming media website of significant public events at MIT featuring 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.

For further information about the Professional Education Programs, contact Laura Rose, Room E40-143, MIT, 617-253-9303, fax 617-258-8831, lrose@mit.edu.

http://web.mit.edu/mitpep/

Operations Research Center
The Operations Research Center (ORC) provides academic and research opportunities for students and faculty interested in an interdisciplinary field that draws upon ideas from engineering, management, and mathematics in order to apply scientific methods to decision making. ORC includes faculty participants from the Sloan School of Management, as well as from the departments of Electrical Engineering and Computer Science, Aeronautics and Astronautics, Mathematics, Civil and Environmental Engineering, Mechanical Engineering, Urban Studies and Planning, and Economics. Forty-seven faculty and 54 graduate students are affiliated with the center.

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 its degree programs, contact Laura Rose, Room E40-143, MIT, 617-253-9303. lrose@mit.edu.

http://web.mit.edu/orc/www/

Picower Institute for Learning and Memory
The Picower Institute for Learning and Memory is an interdisciplinary research center that draws its faculty and graduate students from multiple MIT science departments, including Brain and Cognitive Sciences and Biology.

The institute’s mission is to decipher the molecular, cellular, genetic, and neural systems mechanisms that underlie both learning and memory and the cognitive functions associated with them, such as perception, attention, and consciousness.

This means that Picower scientists explore:

• How animals, seen as models for human processes, 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

This investigation covers a broad range of complementary disciplines, including 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.

Among recent advances, a number of studies suggest that the remarkable neural plasticity of the adult brain, which occurs with memory acquisition, shares underlying mechanisms with the permanent alterations that take place in a young child’s developing brain. Some scientists at the institute are therefore pursuing the ramifications of brain development during childhood. These studies may have far-reaching implications for education.

Moreover, since impairment of memory and its associated cognitive functions often accompanies major neurological disorders, such as Alzheimer’s disease and schizophrenia, advances in the understanding of 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.

For further information, please contact the director, Professor Mark F. Bear, Room 46-3301, MIT, 617-324-7002, mbear@mit.edu.

http://web.mit.edu/picower/

Plasma Science and Fusion Center
The timely development of practical fusion energy in the 21st century is arguably one of the most important challenges facing the scientific and engineering community worldwide. The Plasma Science and Fusion Center provides a focus for experimental and theoretical studies in plasma science, magnetic and inertial fusion research, and the development of related enabling technologies. The center fosters independent creativity and provides the intellectual environment for the educational training of students, research scientists, and engineers. Research activities at the Plasma Science and Fusion Center fall into six major programmatic divisions as described below.

The Alcator C-Mod Project is developing a basic understanding of the stability and transport properties of high-temperature magnetically confined toroidal plasmas at reactor-relevant conditions. Alcator C-Mod, a world-class divertor tokamak, is 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 magnetic fields and densities comparable to that of
future fusion reactors. In addition, it seeks to optimize plasma pressures with RF heating and non-inductive current profile control using high power RF transmitters (8MW at 40-80 MHz) and microwaves (3 MW at 4.6 GHz frequency).

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 development of advanced and novel plasma diagnostics. The experimental facilities in this division include the Versatile Toroidal Facility for basic plasma science research, and the Levitated Dipole Experiment, a joint project with Columbia University. This experimental facility at PSFC studies the confinement, stability, heating, and transport of plasma particles and energy in a pure dipole magnetic configuration. World-renowned theoretical research is also carried out by scientists, students, and faculty in this division.

The High-Energy-Density Physics Division designs and implements experiments on national facilities, such as the OMEGA laser facility at the University of Rochester Laboratory for Laser Energetics, and the National Ignition Facility at Lawrence Livermore National Facility. This division also performs related theoretical calculations to study and explore the nonlinear dynamics and properties of plasmas in inertial fusion and those under the extreme conditions of density (~1000 g/cc), pressure (~1000 gigabar), and field strength (~megagauss).

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 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. The experimental research utilizes a 25 MeV accelerator to investigate high-gradient acceleration of electrons and coherent radiation by femtosecond electron bunches.

The Fusion Technology and Engineering Division provides critical engineering support for both operating magnetic 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 an important role in the design and testing of the superconducting magnets for ITER, the next-step fusion device. The division also has expertise in magnet design for other fields, including the development of proton synchrotron accelerators for cancer treatment, magnetically levitated trains, and advanced superconducting materials.

The Plasma Technology Division researches and develops plasma technologies for environmental and energy applications, including waste remediation, pollution prevention, and hydrogen fuel reforming. Novel diagnostic technologies are also being developed for fusion plasma energy research, environmental monitoring, nuclear waste vitrification, and national security. In addition, the division is exploring means to clean up diesel engine exhaust, as well as increasing engine efficiency with ethanol-boasted gasoline.

Many academic departments are affiliated with PSFC, including the Physics, Nuclear Science and Engineering, Electrical Engineering and Computer Science, Materials Science and Engineering, Mechanical Engineering, Chemical Engineering, and Aeronautics and Astronautics. 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. Fifty-eight graduate students are currently involved at all levels of thesis work. Undergraduates also can participate through UROP.

For further information contact the director, Professor Miklos Porkolab, Room NW16-288, MIT, 617-253-8448, fax 617-253-0238, porkolab@psfc.mit.edu.

http://www.psf.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, 617-253-6671, fax 617-253-3321, email smadnick@mit.edu; or Michael Siegel, E53-323, 617-253-2937, msiegel@mit.edu.

http://mitsloan.mit.edu/research/profit/

Research Laboratory of Electronics
The Research Laboratory of Electronics (RLE), was founded in 1946 as the first of the Institute’s great modern interdisciplinary research centers. RLE research is focused on six major themes:

- Circuits, Systems, Signals and Communications
- Physical Sciences
- Quantum Computation and Communication
- Photonic Materials Devices and Systems
- Nanoscale Science and Engineering
- Communication Biophysics

Sixty principal investigators—of whom 50 are MIT faculty members—direct RLE’s research projects. These faculty members are drawn from eight MIT departments and divisions: Biological Engineering, Electrical Engineering and Computer Science, Engineering Systems, Materials Science and Engineering, Mathematics, Physics, and the Harvard-MIT Division of Health Sciences and Technology.

More than 300 MIT graduate and undergraduate students—also drawn from these departments and divisions—make RLE one of the primary environments for student learning at MIT. In fact, it is the combination of forefront research with student participation across multiple academic disciplines that characterizes the RLE culture.

RLE’s research efforts are supported by the most diverse sponsor base at MIT. Principal sponsors include the Department of Defense, National
Institutes of Health, National Science Foundation, industry, and nonprofit foundations and organizations.

In addition, a significant share of RLE's activities is self-funded from gifts and from the discretionary resources of the laboratory and its principal investigators. Approximately a third of RLE's activities involves extramural collaborations with universities, institutions, and industry, making the laboratory one of MIT's principal points of connection with peer institutions, government, and the business world.

Nearly all RLE activities take place at MIT's main campus in Cambridge. Some also take place at the Massachusetts Eye and Ear Infirmary in Boston.

For further information, contact the director, Professor Chryssostomos Chryssostomidis, Shapiro, Room 36-419, MIT, 617-253-4179.

http://www.rle.mit.edu/

Sea Grant College Program
MIT's Sea Grant College Program funds and coordinates a rich blend of interdisciplinary 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 MIT 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's 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 careful 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.

MIT departments principally involved in Sea Grant research include Civil and Environmental Engineering, Chemical Engineering, and Nuclear Science and Engineering. Graduate and undergraduate students participate directly in most Sea Grant research projects, and support is available for UROP projects.

The Sea Grant College Program also supports innovative educational programs in ocean use and coastal zone development. It has supported new curricula and textbooks in the field of ocean engineering, and a joint project with the Massachusetts Maritime Academy is providing new educational opportunities for professional fishermen.

In addition, 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.

For more information on Sea Grant College Program projects and services, contact the director, Professor Chryssostomos Chryssostomidis, Room E38-300, MIT, 617-253-7042.

http://web.mit.edu/seagrant/

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.

Graduate programs are offered in four engineering disciplines and in one life science discipline: advanced materials for micro- and nano-systems; chemical and pharmaceutical engineering; computational engineering; manufacturing systems and technology; and computational and systems biology. The following programs will be offered in academic year 2007–2008.

The Advanced Materials for Micro- and Nano-Systems (AMMNS, http://web.mit.edu/sma/students/programmes/amnns.htm) 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 can earn dual degrees—a master 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.

The Chemical and Pharmaceutical Engineering (CPE, http://web.mit.edu/sma/students/programmes/cpe.htm) program offers a cutting-edge curriculum in the fields of molecular engineering and process science focused on the pharmaceutical industry. It offers a unique opportunity to obtain dual master of science degrees, one from the Chemical Engineering Practice Program of the Chemical Engineering Department at MIT and one from NUS. The dual degrees can be completed in three academic terms of coursework, and an additional term of industrial internship. The industry internship at a practice school station is in lieu of a research thesis. This program comprises innovative courses of study that integrate a molecular-level understanding of biological and chemical phenomena with advances in process engineering for the pharmaceutical and fine chemical industries.

The Computational Engineering (CE, http://web.mit.edu/sma/students/programmes/ce.htm) 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 can earn dual degrees—a master 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 interuniversity and flagship research projects.

The Computational and Systems Biology (CSB, http://web.mit.edu/sma/students/programmes/csb.htm) degree program is a partnership between the globally recognized CSBi program at MIT and the visionary biology, bioengineering, and biotechnology programs at NUS, NTU, and Singapore’s A*STAR Research Institutes. The Program in Computational and Systems Biology hosts this program at MIT; graduates receive a PhD from either NUS or NTU, with 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.

The Manufacturing Systems and Technology (MST, http://web.mit.edu/sma/students/programmes/mst.htm) degree program is a comprehensive education and research effort that concentrates on enabling manufacturing systems and technologies for emerging industries in a global context. The program defines emerging industries as those based on new technologies that are just beginning to be considered for commercialization. Currently, this includes a host of new concepts in micro- and nanotechnology, such as molecular diagnosis, advanced drug screening, new ideas for photonic devices, microrobots, nanoscale optical devices, and a multitude of potential products employing micro- and nanoscale fluidics. The Department of Mechanical Engineering hosts this degree at MIT. Students can earn dual degrees—a master of engineering in mechanical engineering from MIT and either a master’s or PhD degree from NTU.

For more information about SMA, please contact the assistant director, John C. Desforge, Room 8-407, MIT, 617-452-3014.

http://web.mit.edu/sma/  

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.

An interdisciplinary department in the School of Science, 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 projects in the laboratory. In addition, researchers from both the United States and abroad participate in the projects sponsored by the laboratory.

The Spectroscopy Laboratory houses an extensive collection of lasers for spectroscopic research. The resources are organized into eight major laboratories: Pulsed Visible/UV Spectroscopy and Kinetics; Combustion Kinetics; Tri-Model Spectroscopy and Imaging; UV, Visible, and Near IR Raman Spectroscopy; Low-Coherence Interferometry; Spectroscopy of Quantum Dots; Spectroscopy of Condensed Phases; and Picosecond Time-Resolved Spectroscopy. Major equipment includes excimer and Nd: YAG-based pulsed dye lasers, femtosecond Ti:sapphire lasers, ion laser-pumped dye lasers, CW Raman spectrometers, streak camera; and various phase microscopes.

The laboratory is a resource for researchers in both physical science and biomedical optics. The Laser Biomedical Research Center (LBRC), supported by a grant from the National Institutes of Health, is devoted to spectral diagnosis of disease and advancements in imaging techniques for cell biology and medicine. LBRC facilities 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, characterization of nanotubes, 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, 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 NW14-1106, MIT, 617-253-7700.

http://web.mit.edu/spectroscopy/

System Dynamics Group

Faculty and student in the System Dynamics Group use computer simulation and other tools for systems thinking to understand complex dynamics in a wide range of organizations, markets, and other settings, and work with these organizations to implement and assess the benefits of new policies to improve performance. Projects include the dynamics of process improvement, new product development, and service quality; improving public understanding of climate change; polio eradication post-eradication immunization strategy; and the potential transition from internal combustion and fossil fuels to alternative vehicles. Members of the group use a wide range of methods, from ethnographic field study to formal modeling. Many of the field studies and models provide the basis for simulation microworlds, or management flight simulators, where managers can experiment with policies for successful improvement without risk, accelerating individual and organizational learning. Such management flight simulators are now widely used in teaching and in organizations.

For further information, contact John Sterman, Room E53-351, 617-253-1951, fax 617-258-7579, jsterman@mit.edu.

http://web.mit.edu/sdg/www/

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. TDP currently is engaged in programs in Thailand and Abu Dhabi. 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. In addition, TDP is intellectually involved with the Global Infrastructure Fund of Japan and with the Centro de Integración Fluvial de Sur América, Colombia, as well as other initiatives, such as the Disaster Relief Network.

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 may be obtained from the director, Professor Fred Moavenzadeh, Room 1-173, MIT, 617-253-7178. http://web.mit.edu/mit-tdp/www/

Whitaker College of Health Sciences and Technology

In 1977, MIT established the Whitaker College of Health Sciences and Technology to provide an academic and administrative focus for the development of health-related activities at the Institute.

Many faculty members involved in the educational and research programs of Whitaker College hold joint appointments in the college and in other schools, departments, and interdisciplinary laboratories at MIT.

Whitaker College includes the Center for Environmental Health Sciences, the Clinical Research Center, the Harvard-MIT Division of Health Sciences and Technology (HST), and the Division of Comparative Medicine.

There are several graduate programs in Whitaker College. HST offers a number of graduate degree options that focus on different aspects of engineering and the biomedical sciences:

- The Program in Medical Engineering and Medical Physics leads to the PhD or ScD degree from MIT or the Harvard Faculty of Arts and Sciences.
- The Medical Sciences Program leads to the MD degree from Harvard Medical School.
- Both the Radiological Sciences Joint Program and the Speech and Hearing Bioscience and Technology Program lead to the PhD or ScD degree from MIT.
- The Biomedical Enterprise Program leads to the SM in Health Sciences and Technology through HST.
- The Master of Engineering in Biomedical Engineering is offered in conjunction with MIT’s Department of Biological Engineering.
- The Biomedical Informatics Training Program offers predoctoral and postdoctoral options from MIT and Harvard.
- The Clinical Investigator Training Program trains postdoctoral physicians in patient-oriented research. Fellows in this program have the option to pursue a Master of Medical Sciences degree from Harvard. http://web.mit.edu/vpr/www/whitaker.html

Women's and Gender Studies Program

The Program in Women’s and Gender 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 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. See the section on Graduate Education in Part 1 for more information.

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 and Gender 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, 617-253-8844. 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, simula-
tion, 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 the 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 director, Dr. David C. Page, Whitehead Institute, 9 Cambridge Center, Cambridge, MA 02142-1479, 617-258-5203.

http://www.whitehead.mit.edu/