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 (GIRs) 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 Subcommittee on the Communication Requirement (SOCR) for any substitutions in the Communication Requirement; the Subcommittee on the HASS Requirement (SHR) for any substitutions in the Humanities, Arts, and Social Sciences (HASS) Requirement; and the Committee on Curricula (COC) for any substitutions in other GIRs. Departures from the departmental programs are allowed with departmental permission. The departmental programs and degree requirements appear in the Schools section.

Bachelor of Science Degree Requirements

<table>
<thead>
<tr>
<th>General Institute Requirements (GIRs)</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science Requirement</strong></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, 8.021, or 8.022)</td>
<td></td>
</tr>
<tr>
<td>Mathematics (18.01, 18.01A, or 18.014; and 18.02, 18.02A, 18.022, or 18.024)</td>
<td></td>
</tr>
<tr>
<td>Biology (7.012, 7.013, 7.014, 7.015, or 7.016)</td>
<td></td>
</tr>
<tr>
<td><strong>Humanities, Arts, and Social Sciences (HASS) Requirement</strong></td>
<td>8</td>
</tr>
<tr>
<td>[includes 2 Communication Requirement subjects (CI-H)]</td>
<td></td>
</tr>
<tr>
<td><strong>Restricted Electives in Science and Technology (REST) Requirement</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Laboratory Requirement [12 units]</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Total GIR Subjects Required for SB Degree</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

**Communication Requirement**

2 subjects designated as communication-intensive in Humanities, Arts, and Social Sciences (CI-H; see HASS Requirement, above)

2 subjects designated as communication-intensive in the Major (CI-M; see departmental program, below)

[Communication-intensive Major subjects (CI-M) are designated on the degree charts in the Schools section]

**Physical Education Requirement**

Swimming requirement, plus four physical education courses for eight points (See Physical Education Requirement for details.)

**Departmental Program**

The departmental program may specify some of the 17 GIR subjects, and includes 180–198 additional units beyond the GIRs. 2

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.

<table>
<thead>
<tr>
<th>Total Units</th>
<th>180-198</th>
</tr>
</thead>
<tbody>
<tr>
<td>Departmental Program Units That Also Satisfy the GIRs</td>
<td>(o)</td>
</tr>
<tr>
<td><strong>Total Units Beyond the GIRs Required for SB Degree</strong></td>
<td>180-198</td>
</tr>
</tbody>
</table>

No subject can be counted both as part of the 17-subject GIRs and as part of the 180–198 units required beyond the GIRs. Every subject in the student’s departmental program will count toward one or the other, but not both.

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

2 The total of 180–198 units does not include ROTC subjects, if selected.
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 Laboratory and Restricted Electives in Science and Technology (REST) Requirements. These requirements 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 that 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 requirement in biology may be satisfied by one of five introductory subjects:

Biology (GIR)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.012</td>
<td>Introductory Biology</td>
<td>12</td>
</tr>
<tr>
<td>7.013</td>
<td>Introductory Biology 2</td>
<td>12</td>
</tr>
<tr>
<td>7.014</td>
<td>Introductory Biology 2</td>
<td>12</td>
</tr>
<tr>
<td>7.015</td>
<td>Introductory Biology 1</td>
<td>12</td>
</tr>
<tr>
<td>7.016</td>
<td>Introductory Biology 1</td>
<td>12</td>
</tr>
</tbody>
</table>

1 Offered in the fall term
2 Offered in the spring term

These five 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.

Chemistry

The Institute requirement in chemistry may be satisfied by taking one of the following:

Chemistry (GIR)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.091</td>
<td>Introduction to Solid-State Chemistry</td>
<td>12</td>
</tr>
<tr>
<td>5.111</td>
<td>Principles of Chemical Science</td>
<td>12</td>
</tr>
<tr>
<td>5.112</td>
<td>Principles of Chemical Science</td>
<td>12</td>
</tr>
</tbody>
</table>

Subject 3.091 is designed for students who are particularly interested in the chemistry of the solid state. Subjects 5.111 and 5.112 emphasize basic chemical principles and their applications. However, 5.112 is intended for students with a strong background in high school chemistry. The content of 5.111 and 5.112 is formally coordinated with more advanced subjects taught by the Department of Chemistry (e.g., 5.60 Thermodynamics and Kinetics and 5.12 Organic Chemistry I), although any one of the three GIR subjects (5.111, 5.112, or 3.091) may be used as the prerequisite for those more advanced subjects.

Mathematics

The Institute requires all students to complete single-variable calculus, denoted as Calculus I (GIR), and multivariable calculus, denoted as Calculus II (GIR).

Calculus I (GIR)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.01</td>
<td>Calculus</td>
<td>12</td>
</tr>
<tr>
<td>18.01A</td>
<td>Calculus</td>
<td>12</td>
</tr>
<tr>
<td>18.014</td>
<td>Calculus with Theory</td>
<td>12</td>
</tr>
</tbody>
</table>

Calculus II (GIR)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.02</td>
<td>Calculus</td>
<td>12</td>
</tr>
<tr>
<td>18.02A</td>
<td>Calculus</td>
<td>12</td>
</tr>
<tr>
<td>18.022</td>
<td>Calculus</td>
<td>12</td>
</tr>
<tr>
<td>18.024</td>
<td>Calculus with Theory</td>
<td>12</td>
</tr>
</tbody>
</table>

Students with advanced standing, advanced placement, or transfer credit for 18.01 may go directly into multivariable calculus. Two versions are offered in the fall term: 18.02, the basic version, and 18.022, a more theoretical version. Both 18.02 and 18.022 present calculus as it is used in science and engineering.

The sequence of 18.014/18.024 assumes a substantial background in calculus and emphasizes proofs.

Students with a year of high school calculus may qualify for the accelerated sequence of 18.01A/18.02A, which covers the material in one and a half terms. See the subject descriptions for details about how each subject is taught within that timeframe.

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

**Physics**
The Institute requirement in physics may be satisfied through several combinations of introductory physics subjects.

<table>
<thead>
<tr>
<th>Physics I (GIR)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8.01 Physics I</td>
<td>12</td>
</tr>
<tr>
<td>8.01L Physics I</td>
<td>12</td>
</tr>
<tr>
<td>8.01L Physics I</td>
<td>12</td>
</tr>
<tr>
<td>8.012 Physics I</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physics II (GIR)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8.02 Physics II</td>
<td>12</td>
</tr>
<tr>
<td>8.021 Physics II</td>
<td>12</td>
</tr>
<tr>
<td>8.022 Physics II</td>
<td>12</td>
</tr>
</tbody>
</table>

Most students find the sequence of 8.01 and 8.02 suited to their needs. The sequence of 8.012 and 8.022 covers essentially the same subject matter as 8.01 and 8.02, but is more advanced mathematically; calculus is used freely from the beginning of the term. Subject 8.01L is offered for students who have had little exposure to physics with calculus in high school; it covers the same material as 8.01, but is taught over a longer interval that begins in the fall and continues through the end of January (IAP [http://catalog.mit.edu/mit/undergraduate-education/academic-research-options/independent-activities-period]).

A student may combine a Physics I (GIR) subject in one sequence with a Physics II (GIR) subject in another to satisfy the requirement. However, under no circumstances may a student enroll in a Physics II (GIR) subject without having first received credit for a Physics I (GIR) subject.

Students who score a 5 on Parts I and II of the Physics C Advanced Placement test receive credit for 8.01. Students with advanced-placement or advanced-standing credit for 8.01 who elect to take 8.012 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.

The Communication Requirement consists of four communication-intensive (CI) subjects sequenced throughout a student’s undergraduate career. Students take two CI subjects in the humanities, arts, and social sciences (CI-H) and two CI subjects in their major program (CI-M). Students must maintain a minimum pace 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 CI subjects must be taken for a letter grade. Therefore, students may not use their junior-senior P/D/F option for these subjects. 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 completed concurrently.

More information on CI-H subjects is included in the section of the Bulletin on the HASS Requirement. Specifics on the CI-M subjects for each major appear in the descriptions of the individual undergraduate degree programs. Additional information can be found on the Communication Requirement website.

The general structure of the Requirement is described below.

**First year.** Students must pass one CI-H or CI-HW subject ([http://web.mit.edu/commreq/cih.html](http://web.mit.edu/commreq/cih.html)) by the end of their second term at the Institute.

Before entering MIT, all students are asked to take the Freshman Essay Evaluation (FEE). The FEE is a placement tool 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 or receive a score of 7 on the English A or B Higher-Level International Baccalaureate (IB) exam have the option of taking any CI-H subject, including a writing-focused CI-H subject (CI-HW).

All other students must take one of the designated Communication Intensive in the Humanities, Arts, and Social Sciences—Writing Focused (CI-HW) subjects as their first CI subject.

Students who do not complete a CI-H/CI-HW subject in their first term at MIT 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.

Noncompliance. Students who fall behind the minimum pace of completion for the Communication Requirement are in noncompliance. At the end of each term, the names of noncompliant students are forwarded to the Committee on Academic Performance, which may take further action to bring such students into good academic standing.

Double majors. Students who wish to complete two majors 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. In certain cases a CI-M subject may be common to both departments and may be used to fulfill the communication component of two majors simultaneously.

Information about the Communication Requirement. For more detailed information about CI subjects or for assistance with any aspect of the Communication Requirement, including petitions, visit the Communication Requirement website (http://web.mit.edu/commreq). Students may also contact the Office of the Communication Requirement (commreq@mit.edu) to discuss their individual circumstances.

HASS Requirement

MIT provides a substantial and varied program in the humanities, arts, and social sciences (HASS) 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 requirements:

Minimum. Every candidate for a bachelor’s degree must have completed a minimum of eight term subjects in the humanities, arts, and social sciences, including distribution and concentration components. Subjects must be taken for a letter grade and students may not use their junior-senior P/D/F option. Two HASS subjects that are designated Communication Intensive may also be used toward the Communication Requirement.

Distribution. Three of the eight subjects must be selected from designated categories: humanities, arts, and social sciences.

- **Humanities**: Humanities subjects describe and interpret human achievements, problems, and historical changes at individual as well as societal levels. Although humanists inquiry employs a variety of methods, such disciplines as history, literature, and philosophy typically produce their accounts of cultural accomplishments through close analysis of texts and ideas: contemporary and historical, personal and communal, imaginative and reflective.

- **Arts**: Arts subjects emphasize the skilled craft, practices, and standards of excellence involved in creating representations through images, words, sounds, and movement (e.g., sculptures, stories, plays, music, dance, films, or video games). Although arts subjects also engage in critical interpretation and historical analysis, they focus more centrally on expressive and aesthetic techniques and tools, such as the uses of rhythm, texture, and line.

- **Social Sciences**: Social Science subjects engage in theory-driven as well as empirical exploration and analysis of human transactions. They address the mental and behavioral activities of individuals, groups, organizations, institutions, and nations. Social science disciplines such as anthropology, economics, linguistics, political science, and psychology seek generalizable interpretations and explanations of human interaction.

The three subjects may be taken at any stage of the student’s undergraduate career, although students are encouraged to complete their distribution by the end of their junior year. Over 600 subjects may be used to fulfill this requirement. For a complete list of the subjects in each category, consult the Subjects (http://catalog.mit.edu/subjects) section.

Concentration. Each student should designate a field of concentration, in consultation with a designated advisor in the field, by submitting a Concentration Proposal Form no later than the end of the first week of classes in the second term of junior year. Concentration requirements are set by each field and consist of either three or four subjects. One of the subjects that counts toward the distribution may also be designated as a concentration subject with the permission of the concentration advisor. Upon completion of all of the subjects noted on the Proposal Form, each student should submit a Concentration Completion Form no later than the end of the first week of classes of the final term prior to graduation. For more information, visit the HASS Requirement website (http://web.mit.edu/hassreq).
Currently, the following fields of concentration are offered:

- African and African Diaspora Studies
- American Studies
- Ancient and Medieval Studies
- Anthropology
- Archaeology and Archaeological Science
- Art, Culture and Technology
- Asian and Asian Diaspora Studies
- Comparative Media Studies
- Development Economics
- Economics
- Ethics
- Global Studies and Languages
  - Chinese
  - ELS
  - French
  - German
  - Japanese
  - Portuguese
  - Spanish
  - Studies in International Literature and Cultures
  - Theory of Languages
- History
- History of Architecture and Art
- Latin American and Latino Studies
- Linguistics
- Literature
- Middle Eastern Studies
- Music
- Philosophy
- Political Science
- Religious Studies
- Russian and Eurasian Studies
- Science, Technology, and Society
- Theater Arts
- Urban Studies
- Women’s and Gender Studies
- Writing

In individual cases, a special concentration may be arranged with advance approval. For more information, visit the HASS Requirement website (http://web.mit.edu/hassreq).

Electives. The remainder of the eight-subject requirement, above and beyond the Distribution and Concentration, may be fulfilled by subjects from any distribution category or by subjects that are designated as HASS electives.

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, including petitioning for a substitution, visit the HASS Requirement website (http://web.mit.edu/hassreq). Students may also contact the Office of the HASS Requirement (hassreq@mit.edu) to discuss their individual circumstances.

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>Subject</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>Engineering Computation and Data Science</td>
<td>12</td>
</tr>
<tr>
<td>1.000</td>
<td>Computer Programming for Scientific and Engineering Applications</td>
<td>12</td>
</tr>
<tr>
<td>1.050</td>
<td>Solid Mechanics</td>
<td>12</td>
</tr>
<tr>
<td>2.001</td>
<td>Mechanics and Materials I</td>
<td>12</td>
</tr>
<tr>
<td>2.003[J]</td>
<td>Dynamics and Control I</td>
<td>12</td>
</tr>
<tr>
<td>2.086</td>
<td>Numerical Computation for Mechanical Engineers</td>
<td>12</td>
</tr>
<tr>
<td>3.012</td>
<td>Fundamentals of Materials Science and Engineering</td>
<td>15</td>
</tr>
</tbody>
</table>
## GENERAL INSTITUTE REQUIREMENTS

### 3.021
Introduction to Modeling and Simulation  
12

### 3.046
Thermodynamics of Materials  
12

### 4.42[J]
Fundamentals of Energy in Buildings  
12

### 4.440[J]
Building Structural Systems I  
12

### 5.07[J]
Biological Chemistry I  
12

### 5.12
Organic Chemistry I  
12

### 5.60
Thermodynamics and Kinetics  
12

### 5.61
Physical Chemistry  
12

### 6.002
Circuits and Electronics  
12

### 6.005
Elements of Software Construction  
12

### 6.041
Probabilistic Systems Analysis  
12

### 6.042[J]
Mathematics for Computer Science  
12

### 6.071[J]
Electronics, Signals, and Measurement  
12

### 7.03
Genetics  
12

### 7.05
General Biochemistry  
12

### 8.03
Physics III  
12

### 8.033
Relativity  
12

### 8.04
Quantum Physics I  
12

### 8.20
Introduction to Special Relativity  
9

### 8.21
Physics of Energy  
12

### 8.282[J]
Introduction to Astronomy  
9

### 8.286
The Early Universe  
12

### 9.01
Introduction to Neuroscience  
12

### 10.301
Fluid Mechanics  
12

### 12.001
Introduction to Geology  
12

### 12.002
Introduction to Geophysics and Planetary Science  
12

### 12.003
Introduction to Atmosphere, Ocean, and Climate Dynamics  
12

### 12.102
Environmental Earth Science  
12

### 12.400
The Solar System  
12

### 12.425[J]
Extrasolar Planets: Physics and Detection Techniques  
12

### 14.30
Introduction to Statistical Methods in Economics  
12

### 15.079
Introduction to Applied Probability  
12

### 16.001
Unified Engineering I  
12

### 18.03
Differential Equations  
12

### 18.034
Differential Equations  
12

### 18.05
Introduction to Probability and Statistics  
12

### 18.06
Linear Algebra  
12

### 18.600
Probability and Random Variables  
12

### 18.700
Linear Algebra  
12

### 20.110[J]
Thermodynamics of Biomolecular Systems  
12

### 22.01
Introduction to Nuclear Engineering and Ionizing Radiation  
12

### 22.02
Introduction to Applied Nuclear Physics  
12

### ESD.03[J]
System Safety  
12

The following combinations of six-unit subjects also count toward the REST Requirement:

  12

- **6.0001** & **6.0002**: Introduction to Computer Science Programming in Python and Introduction to Computational Thinking and Data Science  
  12

### 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. 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. The available subjects are listed below.

A typical laboratory subject offers the student an opportunity to set up and carry out experiments or other hands-on research projects as appropriate to the discipline. Under faculty supervision, the student plays a substantial role in planning the design of the experiment or project, 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 or projects. The student then compares and discusses the experimental or project results in terms of the current state of knowledge and prepares progress reports and final reports of the work.

The Laboratory Requirement is not intended primarily to teach specific techniques for later experimental or project work, provide broad coverage of a particular field, or complement a specific subject. 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 as a professional would in similar circumstances.
## Laboratory Requirement Subjects

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.101</td>
<td>Introduction to Civil and Environmental Engineering Design I</td>
<td>6</td>
</tr>
<tr>
<td>1.102</td>
<td>Introduction to Civil and Environmental Engineering Design II</td>
<td>6</td>
</tr>
<tr>
<td>1.106</td>
<td>Environmental Fluid Transport Processes and Hydrology Laboratory</td>
<td>6</td>
</tr>
<tr>
<td>1.107</td>
<td>Environmental Chemistry and Biology Laboratory</td>
<td>6</td>
</tr>
<tr>
<td>2.008</td>
<td>Design and Manufacturing II (6 units of laboratory credit)</td>
<td>12</td>
</tr>
<tr>
<td>2.017</td>
<td>Design of Electromechanical Robotic Systems (6 units of laboratory credit)</td>
<td>12</td>
</tr>
<tr>
<td>2.671</td>
<td>Measurement and Instrumentation</td>
<td>12</td>
</tr>
<tr>
<td>2.672</td>
<td>Project Laboratory</td>
<td>6</td>
</tr>
<tr>
<td>3.014</td>
<td>Materials Laboratory</td>
<td>12</td>
</tr>
<tr>
<td>4.411</td>
<td>D-Lab Schools: Building Technology Laboratory</td>
<td>12</td>
</tr>
<tr>
<td>5.310</td>
<td>Laboratory Chemistry</td>
<td>12</td>
</tr>
<tr>
<td>5.35</td>
<td>Introduction to Experimental Chemistry</td>
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## Physical Education Requirement

The mission of the Physical Education General Institute Requirement 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 enables 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 the Physical Education website (http://mitpe.com).

To satisfy the Physical Education Requirement, undergraduates entering MIT as freshmen must take four physical education courses (for eight points) and complete the swimming requirement. Transfer students need to complete four points (two courses) as well as the swimming requirement. A student may repeat a course at any level and receive points. The swimming requirement can be satisfied by taking a beginning swim class or by passing the swim test during orientation week in the fall. Freshmen are expected to complete the swim test on fall registration day or, if they cannot swim, register during the swim test for a first-quarter swim course. Visit the website to see a video of the swim test (http://mitpe.com/swim-boat-test/default.aspx).

In addition to taking traditional physical education courses, students may earn physical education points in the following ways:

• Varsity sports: Four points are awarded to players for each year of competition.
• ROTC Programs (Air Force, Army, Navy): Two points are awarded per year of ROTC participation up to a maximum of four points.
• Approved personal training, private swim lessons, and group exercise classes offered through the Department of Athletics, Physical Education, and Recreation.

Students find it best to complete their four courses during their freshman year, and they are responsible for completing the Physical Education Requirement by the end of their sophomore year. In general, students must attend 11 sessions/classes to receive the two points that are awarded for a physical education course. Students who do not complete the entire Physical Education Requirement by the end of their second year (typically the sophomore year) must submit a plan for a time extension with the Physical Education Office (http://mitpe.com).

Physical education courses 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 course per quarter.

Physical education registration is open to undergraduates and graduate students. Registration is first come, first serve and is conducted online (http://mitpe.com). Information on registration can be obtained through WebSIS (http://student.mit.edu). Registration dates are posted in the Academic Calendar (http://web.mit.edu/registrar/calendar) as well as on the Physical Education website (http://mitpe.com).

Physical education courses offered last year included Group Exercise (Barre Fitness, Cycling, Kickboxing, Pilates, PiYo, Step, Yoga, Zumba), Archery, Backpacking/Hiking, Badminton, Boot Camp for Athletes, Broomball, Dance (Ballroom, Hip Hop, Middle Eastern, Tango, Salsa, Swing, Square), Fencing, Figure Skating, Fitness/