Department of Earth, Atmospheric, and Planetary Sciences (http://catalog.mit.edu/schools/science/earth-atmospheric-planetary-sciences/#undergraduatetext)

Bachelor of Science in Earth, Atmospheric, and Planetary Sciences

General Institute Requirements (GIRs)
The General Institute Requirements include a Communication Requirement that is integrated into both the HASS Requirement and the requirements of each major; see details below.

Summary of Subject Requirements

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Science Requirement</th>
<th>Humanities, Arts, and Social Sciences (HASS) Requirement</th>
<th>Restricted Electives in Science and Technology (REST)</th>
<th>Laboratory Requirement (12 units)</th>
<th>Total GIR Subjects Required for SB Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Requirement</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Humanities, Arts, and Social Sciences (HASS) Requirement</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Restricted Electives in Science and Technology (REST)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Laboratory Requirement (12 units)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total GIR Subjects Required for SB Degree</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Physical Education Requirement
Swimming requirement, plus four physical education courses for eight points.

Departmental Program
Choose at least two subjects in the major that are designated as communication-intensive (CI-M) to fulfill the Communication Requirement.

General Department Requirements

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory Subjects</td>
<td></td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
</tr>
<tr>
<td>12.001 Introduction to Geology</td>
<td>24</td>
</tr>
<tr>
<td>12.002 Introduction to Geophysics and Planetary Science</td>
<td></td>
</tr>
<tr>
<td>12.003 Introduction to Atmosphere, Ocean, and Climate Dynamics</td>
<td></td>
</tr>
<tr>
<td>12.007 Geobiology: History of Life on Earth</td>
<td></td>
</tr>
<tr>
<td>12.TIP Thesis Preparation</td>
<td>6</td>
</tr>
<tr>
<td>12.THU Undergraduate Thesis (at least 6 units, CI-M)</td>
<td></td>
</tr>
</tbody>
</table>

Laboratory/Field Subjects
Select one of the following: 12-15

<table>
<thead>
<tr>
<th>12.115 &amp; 12.116 Field Geology and Analysis of Geologic Data (CI-M)</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.307 Weather and Climate Laboratory (CI-M)</td>
<td>3</td>
</tr>
<tr>
<td>12.335 Experimental Atmospheric Chemistry (CI-M)</td>
<td>3</td>
</tr>
<tr>
<td>12.410[j] Observational Techniques of Optical Astronomy (CI-M)</td>
<td>4</td>
</tr>
</tbody>
</table>

Concentration Subjects 60-63

Supporting Subjects 36-42

Units in Major 144-156

Unrestricted Electives 48-72

Units in Major That Also Satisfy the GIRs (12-36)

Total Units Beyond the GIRs Required for SB Degree 180-192

The units for any subject that counts as one of the 17 GIR subjects cannot also be counted as units required beyond the GIRs.

1 With approval of the advisor, one subject may be counted toward concentration coursework if not taken as a General Departmental Requirement.
2 Recommended for concentration area 1. May also be applicable to areas 3 and 4.
3 Recommended for concentration areas 2 and 4.
4 Recommended for concentration area 3.

Areas of Concentration

Area 1—Geoscience: Geology, Geochemistry, Geophysics, Geobiology
Select 60-63 units:

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.005 Applications of Continuum Mechanics to Earth, Atmospheric, and Planetary Sciences</td>
</tr>
<tr>
<td>12.104 Geochemistry of Natural Waters</td>
</tr>
<tr>
<td>12.108 Structure of Earth Materials</td>
</tr>
<tr>
<td>12.109 Petrology</td>
</tr>
<tr>
<td>12.110A Sedimentary Environments</td>
</tr>
<tr>
<td>12.110B Sedimentology in the Field</td>
</tr>
<tr>
<td>12.113 Structural Geology</td>
</tr>
<tr>
<td>12.163 Geomorphology</td>
</tr>
<tr>
<td>12.177 Astrobiology, Origins and Early Evolution of Life</td>
</tr>
<tr>
<td>12.201 Essentials of Global Geophysics</td>
</tr>
<tr>
<td>12.214 Essentials of Applied Geophysics</td>
</tr>
</tbody>
</table>

Area 2—Atmospheres, Oceans, and Climate

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.301 Climate Science</td>
</tr>
</tbody>
</table>
Select 48 units:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.009[J]</td>
<td>Nonlinear Dynamics: The Natural Environment</td>
<td>12</td>
</tr>
<tr>
<td>12.086</td>
<td>Modeling Environmental Complexity</td>
<td>12</td>
</tr>
<tr>
<td>12.174</td>
<td>Biogeochemistry of Natural and Perturbed Systems</td>
<td>12</td>
</tr>
<tr>
<td>12.300[J]</td>
<td>Global Change Science</td>
<td>12</td>
</tr>
<tr>
<td>12.306</td>
<td>Atmospheric Physics and Chemistry</td>
<td>12</td>
</tr>
<tr>
<td>12.315</td>
<td>Atmospheric Radiation and Convection</td>
<td>12</td>
</tr>
<tr>
<td>12.320B[J]</td>
<td>Introduction to Hydrology Modeling</td>
<td>6</td>
</tr>
<tr>
<td>12.336[J]</td>
<td>Air Pollution</td>
<td>12</td>
</tr>
<tr>
<td>12.338</td>
<td>Aerosol and Cloud Microphysics and Chemistry</td>
<td>12</td>
</tr>
<tr>
<td>12.349</td>
<td>Mechanisms and Models of the Global Carbon Cycle</td>
<td>12</td>
</tr>
<tr>
<td>12.372</td>
<td>Elements of Modern Oceanography</td>
<td>12</td>
</tr>
<tr>
<td>12.377</td>
<td>The History of Earth's Climate</td>
<td>12</td>
</tr>
<tr>
<td>12.390</td>
<td>Fluid Dynamics of the Atmosphere and Ocean</td>
<td>12</td>
</tr>
<tr>
<td>12.422</td>
<td>Planetary Atmospheres</td>
<td>12</td>
</tr>
</tbody>
</table>

Area 3—Planetary Science and Astronomy

Select 48-51 units:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.009[J]</td>
<td>Nonlinear Dynamics: Chaos</td>
<td>12</td>
</tr>
<tr>
<td>12.104</td>
<td>Geochemistry of Natural Waters</td>
<td>12</td>
</tr>
<tr>
<td>12.108</td>
<td>Structure of Earth Materials</td>
<td>12</td>
</tr>
<tr>
<td>12.109</td>
<td>Petrology</td>
<td>15</td>
</tr>
<tr>
<td>12.177</td>
<td>Astrobiology, Origins and Early Evolution of Life</td>
<td>12</td>
</tr>
<tr>
<td>12.422</td>
<td>Planetary Atmospheres</td>
<td>12</td>
</tr>
<tr>
<td>12.43[J]</td>
<td>Space Systems Engineering</td>
<td>12</td>
</tr>
</tbody>
</table>

Area 4—Environmental Systems

Select 60-63 units:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.009[J]</td>
<td>Nonlinear Dynamics: The Natural Environment</td>
<td>12</td>
</tr>
<tr>
<td>12.021</td>
<td>Earth Science, Energy, and the Environment</td>
<td>12</td>
</tr>
<tr>
<td>12.086</td>
<td>Modeling Environmental Complexity</td>
<td>12</td>
</tr>
<tr>
<td>12.110A</td>
<td>Sedimentary Environments</td>
<td>6</td>
</tr>
<tr>
<td>12.110B</td>
<td>Sedimentology in the Field</td>
<td>9</td>
</tr>
<tr>
<td>12.119</td>
<td>Analytical Techniques for Studying</td>
<td>12</td>
</tr>
<tr>
<td>12.158</td>
<td>Molecular Biogeochemistry</td>
<td>9</td>
</tr>
<tr>
<td>12.163</td>
<td>Geomorphology</td>
<td>12</td>
</tr>
<tr>
<td>12.174</td>
<td>Biogeochemistry of Natural and Perturbed Systems</td>
<td>12</td>
</tr>
<tr>
<td>12.177</td>
<td>Astrobiology, Origins and Early Evolution of Life</td>
<td>12</td>
</tr>
<tr>
<td>12.301</td>
<td>Climate Science</td>
<td>12</td>
</tr>
<tr>
<td>12.349</td>
<td>Mechanisms and Models of the Global Carbon Cycle</td>
<td>12</td>
</tr>
</tbody>
</table>

Supporting Subjects

Select 36-42 units:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.060A</td>
<td>Fluid Mechanics I</td>
<td>6</td>
</tr>
<tr>
<td>1.061A</td>
<td>Transport Processes in the Environment</td>
<td>12</td>
</tr>
<tr>
<td>&amp; 1.106</td>
<td>Environmental Fluid Transport Processes and Hydrology Laboratory</td>
<td>12</td>
</tr>
<tr>
<td>1.080A</td>
<td>Environmental Chemistry I</td>
<td>12</td>
</tr>
<tr>
<td>&amp; 1.107</td>
<td>Environmental Chemistry and Biology Laboratory</td>
<td>12</td>
</tr>
<tr>
<td>2.001</td>
<td>Mechanics and Materials I</td>
<td>12</td>
</tr>
<tr>
<td>2.016</td>
<td>Hydrodynamics</td>
<td>12</td>
</tr>
<tr>
<td>3.012</td>
<td>Fundamentals of Materials Science and Engineering</td>
<td>12-15</td>
</tr>
<tr>
<td>or 5.60</td>
<td>Thermodynamics and Kinetics</td>
<td></td>
</tr>
<tr>
<td>5.12</td>
<td>Organic Chemistry I</td>
<td>12</td>
</tr>
<tr>
<td>6.00</td>
<td>Introduction to Computer Science and Programming</td>
<td>12</td>
</tr>
<tr>
<td>6.01</td>
<td>Introduction to EECS via Robotics</td>
<td>12</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td>7.05</td>
<td>General Biochemistry</td>
<td>12</td>
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<tr>
<td>8.03</td>
<td>Physics III</td>
<td>12</td>
</tr>
<tr>
<td>8.04</td>
<td>Quantum Physics I</td>
<td>12</td>
</tr>
<tr>
<td>8.044</td>
<td>Statistical Physics I</td>
<td>12</td>
</tr>
<tr>
<td>8.07</td>
<td>Electromagnetism II</td>
<td>12</td>
</tr>
<tr>
<td>8.09</td>
<td>Classical Mechanics III</td>
<td>12</td>
</tr>
<tr>
<td>12.010</td>
<td>Computational Methods of Scientific Programming</td>
<td>12</td>
</tr>
<tr>
<td>12.012</td>
<td>MatLab, Statistics, Regression, Signal Processing</td>
<td>12</td>
</tr>
<tr>
<td>14.01</td>
<td>Principles of Microeconomics</td>
<td>12</td>
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<tr>
<td>18.03</td>
<td>Differential Equations (^1)</td>
<td>12</td>
</tr>
<tr>
<td>18.05</td>
<td>Introduction to Probability and Statistics</td>
<td>12</td>
</tr>
<tr>
<td>18.06</td>
<td>Linear Algebra</td>
<td>12</td>
</tr>
<tr>
<td>18.300</td>
<td>Principles of Continuum Applied Mathematics</td>
<td>12</td>
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</tbody>
</table>

\(^2\) 18.032 Differential Equations is also an acceptable option.