

## CHEMISTRY (COURSE 5)

Department of Chemistry (<https://catalog.mit.edu/schools/science/chemistry/#undergraduatetext>)

### Bachelor of Science in Chemistry (Standard Option)

#### 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	Subjects
Science Requirement	6
Humanities, Arts, and Social Sciences (HASS) Requirement; at least two of these subjects must be designated as communication-intensive (CI-H) to fulfill the Communication Requirement.	8
Restricted Electives in Science and Technology (REST) Requirement [two subjects can be satisfied by 5.07[J] (if taken under joint number 20.507[J]) and 5.12, 5.601/5.602, or 5.611/5.612 in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied from among 5.351, 5.352, 5.353, and 5.363 in the Departmental Program]	1
<b>Total GIR Subjects Required for SB Degree</b>	<b>17</b>

#### 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.

Required Subjects	Units
5.03 Principles of Inorganic Chemistry I	12
5.07[J] Introduction to Biological Chemistry	12
5.12 Organic Chemistry I	12
5.13 Organic Chemistry II	12
5.601 Thermodynamics I	6
5.602 Thermodynamics II and Kinetics	6
5.611 Introduction to Spectroscopy	6
5.612 Electronic Structure of Molecules	6
<b>Select two of the following:</b>	<b>24</b>
5.04 Principles of Inorganic Chemistry II	
5.08[J] Fundamentals of Chemical Biology	
5.43 Advanced Organic Chemistry	

5.62	Physical Chemistry	
<b>Departmental Laboratory Requirement</b>		
5.351	Fundamentals of Spectroscopy	4
5.352	Synthesis of Coordination Compounds and Kinetics (CI-M)	5
5.353	Macromolecular Prodrugs	4
5.361	Recombinant DNA Technology	4
Select three additional modules from the list of Laboratory Restricted Electives. <sup>1</sup>		12-14
<i>Choose one of the following options:</i>		20-22
<b>Option 1</b>		
Select all remaining URIECA Modules from the list of Laboratory Restricted Electives <sup>1</sup>		
<b>Option 2</b>		
5.39	Research and Communication in Chemistry (CI-M) <sup>2</sup>	
<b>Units in Major</b>		<b>147</b>
<b>Unrestricted Electives</b>		<b>57-69</b>
Units in Major That Also Satisfy the GIRs		(24-36)
<b>Total Units Beyond the GIRs Required for SB Degree</b>		<b>180</b>

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

<sup>1</sup> Laboratory Restricted Electives cannot be double-counted within the program.

<sup>2</sup> Before enrolling in 5.39, students must have completed an approved 12-unit UROP or non-credit research experience.

#### Laboratory Restricted Electives

5.362	Cancer Drug Efficacy (CI-M)	5
5.363	Organic Structure Determination	4
5.371	Continuous Flow Chemistry: Sustainable Conversion of Reclaimed Vegetable Oil into Biodiesel	4
5.372	Chemistry of Renewable Energy	4
5.373	Synthesis of Boron Heterocycles	4
5.381	Quantum Dots	4
5.382	Time- and Frequency-resolved Spectroscopy of Photosynthesis (CI-M)	5
5.383	Fast-flow Peptide and Protein Synthesis	4

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**Bachelor of Science in Chemistry (Flexible Option)****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	Subjects
Science Requirement	6
Humanities, Arts, and Social Sciences (HASS) Requirement; at least two of these subjects must be designated as communication-intensive (CI-H) to fulfill the Communication Requirement.	8
Restricted Electives in Science and Technology (REST) Requirement [two subjects can be satisfied by 5.07[J] (if taken under joint number 20.507[J]) and 5.12 in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied from among 5.351, 5.352, 5.353, and 5.363 in the Departmental Program]	1
<b>Total GIR Subjects Required for SB Degree</b>	<b>17</b>

**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.

Required Subjects	Units
5.03 Principles of Inorganic Chemistry I	12
5.07[J] Introduction to Biological Chemistry	12
5.12 Organic Chemistry I	12
5.601 Thermodynamics I	6
5.611 Introduction to Spectroscopy	6
<i>Select 24 units of the following:</i>	<b>24</b>
5.04 Principles of Inorganic Chemistry II	
5.08[J] Fundamentals of Chemical Biology	
5.13 Organic Chemistry II	
5.43 Advanced Organic Chemistry	
5.602 Thermodynamics II and Kinetics	
5.612 Electronic Structure of Molecules	
5.62 Physical Chemistry	

**Elective Focus**

Select a minimum of 36 units of coursework forming an intellectually coherent unit in some area, subject to the approval of the department <sup>1</sup>

**Departmental Laboratory Requirement**

5.351	Fundamentals of Spectroscopy	4
5.352	Synthesis of Coordination Compounds and Kinetics (CI-M)	5
5.353	Macromolecular Prodrugs	4
5.361	Recombinant DNA Technology	4
<i>Choose one of the following options:</i>		<b>20</b>

**Option 1**

Select at least 20 units from the list of Laboratory Restricted Electives <sup>2</sup>

**Option 2**

5.39 Research and Communication in Chemistry (CI-M) <sup>3</sup>

**Option 3**

A set of laboratory subjects of similar extent, subject to the approval of the department

<b>Units in Major</b>	<b>145</b>
<b>Unrestricted Electives</b>	<b>59-71</b>
Units in Major That Also Satisfy the GIRs	(24-36)
<b>Total Units Beyond the GIRs Required for SB Degree</b>	<b>180</b>

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

<sup>1</sup> With approval by the faculty advisor, subjects outside the Department of Chemistry may be used.

<sup>2</sup> Laboratory Restricted Electives cannot be double-counted within the program.

<sup>3</sup> Before enrolling in 5.39, students must have completed an approved 12-unit UROP or non-credit research experience.

**Laboratory Restricted Electives**

5.362	Cancer Drug Efficacy (CI-M)	5
5.363	Organic Structure Determination	4
5.371	Continuous Flow Chemistry: Sustainable Conversion of Reclaimed Vegetable Oil into Biodiesel	4
5.372	Chemistry of Renewable Energy	4
5.373	Synthesis of Boron Heterocycles	4
5.381	Quantum Dots	4
5.382	Time- and Frequency-resolved Spectroscopy of Photosynthesis (CI-M)	5
5.383	Fast-flow Peptide and Protein Synthesis	4