

## CHEMISTRY (COURSE 5)

Department of Chemistry (<http://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
<i>Select two of the following:</i>	24
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	Expression and Purification of Enzyme Mutants	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
Option 1		
Select all remaining URIECA Modules from the list of Laboratory Restricted Electives <sup>1</sup>		
Option 2		
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	Kinetics of Enzyme Inhibition (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	Dinitrogen Cleavage	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[]] (if taken under joint number 20.507[])] 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[] 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[] 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	Expression and Purification of Enzyme Mutants	4

*Choose one of the following options:* 20

**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

**Units in Major** 145

**Unrestricted Electives** 59-71

Units in Major That Also Satisfy the GIRs (24-36)

Total Units Beyond the GIRs Required for SB Degree 180

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	Kinetics of Enzyme Inhibition (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	Dinitrogen Cleavage	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