

## MATHEMATICS WITH COMPUTER SCIENCE (COURSE 18-C)

Department of Mathematics (<http://catalog.mit.edu/schools/science/mathematics/#undergraduatetext>)

### Bachelor of Science in Mathematics with Computer Science

#### 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 [can be satisfied by 18.03 or 18.06 and 18.062[]] (if taken under joint number 6.042[])] in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by 6.009 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
<b>Foundational Subjects</b>	
18.03 Differential Equations <sup>1</sup>	12
18.06 Linear Algebra <sup>2</sup>	12
<b>Discrete Mathematics</b>	
Select one of the following:	12-15
18.062[] Mathematics for Computer Science	
18.200 Principles of Discrete Applied Mathematics (15 units, CI-M)	
18.200A Principles of Discrete Applied Mathematics	
<b>Computation and Algorithms</b>	

6.0001	Introduction to Computer Science Programming in Python	6
6.006	Introduction to Algorithms	12
6.009	Fundamentals of Programming	12
18.400[]	Automata, Computability, and Complexity	12
or 18.404	Theory of Computation	
18.410[]	Design and Analysis of Algorithms	12
Select one of the following: <sup>3</sup>		12
6.031	Elements of Software Construction	
6.034	Artificial Intelligence	
6.036	Introduction to Machine Learning	

#### Restricted Electives

Select four additional 12-unit subjects from Course 18 <sup>4</sup>	48
Select one additional subject of at least 12 units from Course 6 <sup>5</sup>	12-15
<b>Units in Major</b>	162-168
<b>Unrestricted Electives</b>	48-54
Units in Major That Also Satisfy the GIRs	(24-36)
<b>Total Units Beyond the GIRs Required for SB Degree</b>	<b>180-192</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> Students may substitute one of the more advanced subjects, 18.152 Introduction to Partial Differential Equations or 18.303 Linear Partial Differential Equations: Analysis and Numerics, for 18.03. 18.032 Differential Equations, which places more emphasis on theory, is also an acceptable option.
- <sup>2</sup> Students may substitute 18.700 Linear Algebra, which places more emphasis on theory and proofs, or the more advanced subject, 18.701 Algebra I.
- <sup>3</sup> Students may substitute 6.033.
- <sup>4</sup> The overall program must consist of subjects of essentially different content, and must include at least five Course 18 subjects with a first decimal digit of 1 or higher.
- <sup>5</sup> The additional Course 6 subject may be 6.01, 6.02, 6.03, 6.170, 6.172, a Foundation or Header subject or, with the permission of the Department of Mathematics, an advanced Course 6 subject with sufficient mathematical content.

#### Communication-Intensive Subjects in the Major

To satisfy the requirements that students take two CI-M subjects, students must select one of the following options:

##### Option A

Select two subjects from the list below:

18.104	Seminar in Analysis
18.204	Undergraduate Seminar in Discrete Mathematics

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18.384	Undergraduate Seminar in Physical Mathematics
18.424	Seminar in Information Theory
18.434	Seminar in Theoretical Computer Science
18.504	Seminar in Logic
18.704	Seminar in Algebra
18.784	Seminar in Number Theory
18.821	Project Laboratory in Mathematics
18.904	Seminar in Topology
18.994	Seminar in Geometry

**Option B**

*Select one subject from Option A and one of the following:*

6.033	Computer Systems Engineering
8.06	Quantum Physics III
14.33	Research and Communication in Economics: Topics, Methods, and Implementation
18.100P	Real Analysis
18.100Q	Real Analysis
18.200	Principles of Discrete Applied Mathematics
18.642	Topics in Mathematics with Applications in Finance