MATHEMATICS WITH COMPUTER SCIENCE (COURSE 18-C)

Department of Mathematics (*https://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[J] (if taken under joint number 6.1200[J]) in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by 6.1010 in the Departmental Program]	1
Total GIR Subjects Required for SB Degree	**17**

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
Foundational Subjects	
18.03 Differential Equations [1]	12
Select one of the following:	12
18.06 Linear Algebra [2]	
18.C06[J] Linear Algebra and Optimization	
Discrete Mathematics	
Select one of the following:	12-15
18.062[J] Mathematics for Computer Science	
18.200 Principles of Discrete Applied Mathematics (15 units, CI-M)	
18.200A Principles of Discrete Applied Mathematics	

Computation and Algorithms	
6.100A Introduction to Computer Science Programming in Python	6
6.1010 Fundamentals of Programming	12
6.1210 Introduction to Algorithms	12
18.400[J] Computability and Complexity Theory	12
or 18.404 Theory of Computation	
18.410[J] Design and Analysis of Algorithms	12
Select one of the following:	12
6.1020 Software Construction	
6.1800 Computer Systems Engineering	
6.3900 Introduction to Machine Learning	
6.4100 Artificial Intelligence	
6.4110 Representation, Inference, and Reasoning in AI	
Restricted Electives	
Select four additional 12-unit subjects from Course 18 [3]	48
Select one additional subject of at least 12 units from Course 6 [4]	12-15
Units in Major	**162-168**
Unrestricted Electives	**48-54**
Units in Major That Also Satisfy the GIRs	(24-36)
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] 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.

[2] Students may substitute 18.700 Linear Algebra, which places more emphasis on theory and proofs, or the more advanced subject, 18.701 Algebra I.

[3] 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.

[4] The additional Course 6 subject can be a second subject from 6.1020, 6.1800, 6.3900, 6.4100, 6.4110; it can also be 6.1040, 6.1600, 6.1910, 6.3800, 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
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:

6.1800	Computer Systems Engineering
8.06	Quantum Physics III
14.18	Mathematical Economic Modeling
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