MATHEMATICS (COURSE 18)

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

Bachelor of Science in Mathematics (General Mathematics 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 [one subject can be satisfied by 18.03 in the Departmental Program]	2
Laboratory Requirement (12 units)	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
18.03	Differential Equations	12
Restricted Electives		
Select eight 12-unit subjects of essentially different content, including at least six advanced subjects (first decimal digit one or higher). One of these eight subjects must be one of the following:		96
18.06	Linear Algebra	
18.700	Linear Algebra	
18.701	Algebra I	
Units in Major		108
Unrestricted Electives		84
Units in Major That Also Satisfy the GIRs		(12)
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.

[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.*

Communication-Intensive Subjects in the Major

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

Option A	
Select two of the following:	
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:	
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

Bachelor of Science in Mathematics (Applied Mathematics 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 [one subject can be satisfied by 18.03 in the Departmental Program]	2
Laboratory Requirement (12 units)	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
18.03	Differential Equations [1]	12
18.04	Complex Variables with Applications	12
or 18.112	Functions of a Complex Variable	
18.06	Linear Algebra [2]	12
Select one of the following:		12-15
18.200	Principles of Discrete Applied Mathematics (15 units, CI-M)	
18.200A	Principles of Discrete Applied Mathematics (12 units)	
18.300	Principles of Continuum Applied Mathematics (12 units)	
Restricted Electives		
Select four additional 12-unit Course 18 subjects from the following two groups with at least one subject from each group: [3]		48
Group I—Probability and statistics, combinatorics, computer science		
Group II—Numerical analysis, physical mathematics, nonlinear dynamics		
Units in Major		96-99
Unrestricted Electives		81-84
Units in Major That Also Satisfy the GIRs		(12)
Total Units Beyond the GIRs Required for SB Degree		168

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. *A list of acceptable subjects is available from Math Academic Services and on the department's website (http://math.mit.edu).*

Communication-Intensive Subjects in the Major

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

Option A	
Select two of the following:	
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:	
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

Bachelor of Science in Mathematics (Pure Mathematics 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 [one subject can be satisfied by 18.03 in the Departmental Program]	2
Laboratory Requirement (12 units)	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
18.03	Differential Equations [1]	12
18.100B	Real Analysis [2]	12
18.701	Algebra I	12
18.702	Algebra II	12
18.901	Introduction to Topology	12
Restricted Electives		
Select one of the following:		12
18.101	Analysis and Manifolds	
18.102	Introduction to Functional Analysis	
18.103	Fourier Analysis: Theory and Applications	
Select one undergraduate seminar from the following:		12
18.104	Seminar in Analysis (CI-M)	
18.504	Seminar in Logic (CI-M)	
18.704	Seminar in Algebra (CI-M)	
18.784	Seminar in Number Theory (CI-M)	
18.904	Seminar in Topology (CI-M)	
18.994	Seminar in Geometry (CI-M)	
Select two additional 12-unit Course 18 subjects of essentially different content, with the first decimal digit one or higher		24
Units in Major		108
Unrestricted Electives		84
Units in Major That Also Satisfy the GIRs		(12)
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.

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. *Alternate versions of this subject, 18.100A, 18.100P and 18.100Q, also satisfy this requirement.*

Communication-Intensive Subjects in the Major

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

Option A	
Select two of the following:	
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:	
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