

## BACHELOR OF SCIENCE AS RECOMMENDED BY THE DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING (COURSE 3-A)

Department of Materials Science and Engineering (<https://catalog.mit.edu/schools/engineering/materials-science-engineering/#undergraduatetext>)

### Bachelor of Science as Recommended by the Department of Materials Science and Engineering

Students must submit a plan of study (the Course 3-A Program Proposal, available from the DMSE Academic Office) no later than the beginning of their junior year.

#### 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 or 18.Co6[J] and 3.020 in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied by 3.010 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
18.03 Differential Equations <sup>1</sup>	12
or 18.06 Linear Algebra	
or 18.Co6[J] Linear Algebra and Optimization	
3.010 Structure of Materials (partial CI-M)	12
3.020 Thermodynamics of Materials (partial CI-M)	12
<b>Select three of the following subjects:</b>	<b>36</b>

3.013	Mechanics of Materials
3.023	Synthesis and Design of Materials
3.029	Mathematics and Computational Thinking for Materials Scientists and Engineers I
3.030	Microstructural Evolution in Materials
3.033	Electronic, Optical and Magnetic Properties of Materials
3.044	Materials Processing
3.042	Materials Project Laboratory (CI-M)

#### Restricted Electives

Select 33-36 units from the list of Restricted Electives in Course 3/3-A 33-36

#### Program Electives

Select 66 units from a proposal of study approved by the department <sup>2</sup> 66

**Units in Major 171-177**

**Unrestricted Electives 48**

Units in Major That Also Satisfy the GIRs (36)

**Total Units Beyond the GIRs Required for SB Degree 183-186**

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> 18.032 Differential Equations, CC.1803 Differential Equations, or ES.1803 Differential Equations are also acceptable options.

<sup>2</sup> Students must develop a program of elective subjects totaling 66 units appropriate to their stated goals in their Course 3-A Program Proposal as approved by the DMSE Undergraduate Committee.

#### Restricted Electives

3.004	Small Planet Engineering: Climate, Energy, and Sustainability	12
3.017	Modelling, Problem Solving, Computing, and Visualization	12
3.021	Introduction to Modeling and Simulation	12
3.039	Mathematics and Computational Thinking for Materials Scientists and Engineers II	9
3.041	Computational Materials Design	12
3.046	Advanced Thermodynamics of Materials	12
3.052	Nanomechanics of Materials and Biomaterials	12
3.053[J]	Molecular, Cellular, and Tissue Biomechanics	12
3.054	Cellular Solids: Structure, Properties, Applications	12

3.055[[]]	Biomaterials Science and Engineering	12
3.056[[]]	Materials Physics of Neural Interfaces	12
3.063	Polymer Physics	12
3.064	Polymer Engineering	12
3.07	Introduction to Ceramics	12
3.071	Amorphous Materials	12
3.074	Imaging of Materials	12
3.080	Strategic Materials Selection	12
3.081	Industrial Ecology of Materials	12
3.086	Innovation and Commercialization of Materials Technology	12
3.087	Materials, Societal Impact, and Social Innovation	12
3.088	The Social Life of Materials	12
3.14	Modern Physical Metallurgy	12
3.15	Electrical, Optical, and Magnetic Materials and Devices	12
3.152	Magnetic Materials	12
3.154[[]]	Materials Performance in Extreme Environments	12
3.155[[]]	Micro/Nano Processing Technology (CI-M)	12
3.156	Photonic Materials and Devices	12
3.16	Industrial Challenges in Metallic Materials Selection	12
3.17	Principles of Manufacturing	12
3.171	Structural Materials and Manufacturing	12
3.173	Computing Fabrics	12
3.18	Materials Science and Engineering of Clean Energy	12
3.19	Sustainable Chemical Metallurgy	12

10.26	Chemical Engineering Projects Laboratory
10.28	Chemical-Biological Engineering Laboratory
10.29	Biological Engineering Projects Laboratory
10.467	Polymer Science Laboratory

<sup>1</sup> The combination of 3.010 and 3.020 is equivalent to one communication-intensive subject (CI-M) in fulfillment of the Communication Requirement.

<sup>2</sup> Subjects listed, except 3.042 and 3.155[[]], have prerequisites that are outside the program.

**Examples of a 3-A Program**

Examples of 3-A programs may be obtained from the DMSE Academic Office, Room 6-107, 617-258-5816.

*Pre-Health*

A student planning a career in medicine might select the following subjects, which may be integrated into the 66 units from a proposal of study approved by the department specified above, in order to satisfy the medical school requirements recommended by Career Advising and Professional Development.

7.002	Fundamentals of Experimental Molecular Biology	6
5.12	Organic Chemistry I	12
5.13	Organic Chemistry II	12
5.310	Laboratory Chemistry	12
7.05	General Biochemistry	12

**Communication-Intensive Subjects in the Major**

Required subjects (see degree chart above):

3.010 & 3.020	Structure of Materials and Thermodynamics of Materials (CI-M) <sup>1</sup>	24
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Choose one of the following as the second CI-M subject: <sup>2</sup>

2.009	The Product Engineering Process
2.671	Measurement and Instrumentation
3.042	Materials Project Laboratory
3.155[[]]	Micro/Nano Processing Technology
7.003[[]]	Applied Molecular Biology Laboratory