Major: Materials Science and Engineering

Accredited by ABET (see inside front cover.)
Offered by: **Department of Materials Science and Engineering**
214 Bard Hall, 255-9159, www.mse.cornell.edu

Program Objectives

Our undergraduate Major is based on the following educational objectives:

- Preparation: To prepare students to excel in graduate school or technical careers through a world-class, rigorous, and competitive program.
- Core Competence: To train students across the spectrum of basic and applied materials science, recognizing and exploiting common descriptions in disparate systems.
- Breadth: To train students with sufficient scientific and engineering breadth to design and create novel solutions to materials problems in engineering systems.
- Professionalism: To develop in students professional and ethical attitudes, effective communication and teamwork skills, and an ability to place science and engineering issues and solutions within the broader societal context.
- Learning Environment: To provide students with an academic environment committed to excellence and innovation that contributes to developing leadership, professionalism, and life-long learning for students' professional careers.

Common Curriculum Recommendations

CHEM 211	Chemistry for the Applied Sciences

Engineering Distributions

ENGRD 261	Mechanical Properties of Materials: From Nanodevices to Superstructures
ENGRD 262	Electronic Materials for the Information Age

Either course (ENGRD 261 or 262) satisfies the major entry requirement.

Other Relevant Engineering Distributions

ENGRD 210	Introduction to Circuits for Electrical and Computer Engineers
ENGRD 264	Computer-Instrumentation Design
ENGRD 241	Engineering Computation
ENGRD 219	Mass and Energy Balances

Required Major Courses

MS&E 204	Materials Chemistry
MS&E 206	Atomic and Molecular Structure of Matter
MS&E 302	Mechanical Properties of Materials, Processing, and Design
MS&E 303	Thermodynamics of Condensed Systems
MS&E 304	Kinetics, Diffusion, and Phased Transformations
MS&E 305	Electronic, Magnetic, and Dielectric Properties of Materials
MS&E 307	Materials Design Concepts [1]
MS&E 311–312	Junior Lab I and II
MS&E 403–404	Senior Materials Laboratory I and II[1]
MS&E 407	Materials Design Concepts II

Electives[5]

Two materials-related electives covering two groups of different materials
Three application-related electives in at least two different types of applications3
Two applications-related electives must be taken from outside MS&E4
One additional technical elective outside of MS&E2

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1 Satisfies technical communications/writing requirement. Research-oriented students may replace senior lab with a senior thesis (MS&E 405/406).

2 The outside technical elective must be an upper level (200 or above) technical course and may be selected from engineering or other colleges subject to advisor approval.

3 A three-credit applications-related elective may be replaced with Research Involvement (MSE 391/392).

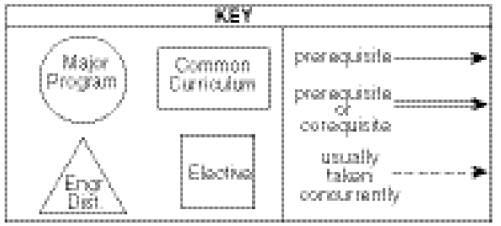
4 A list of approved materials-related and application-related courses is available in the MS&E office or on-line at www.mse.cornell.edu

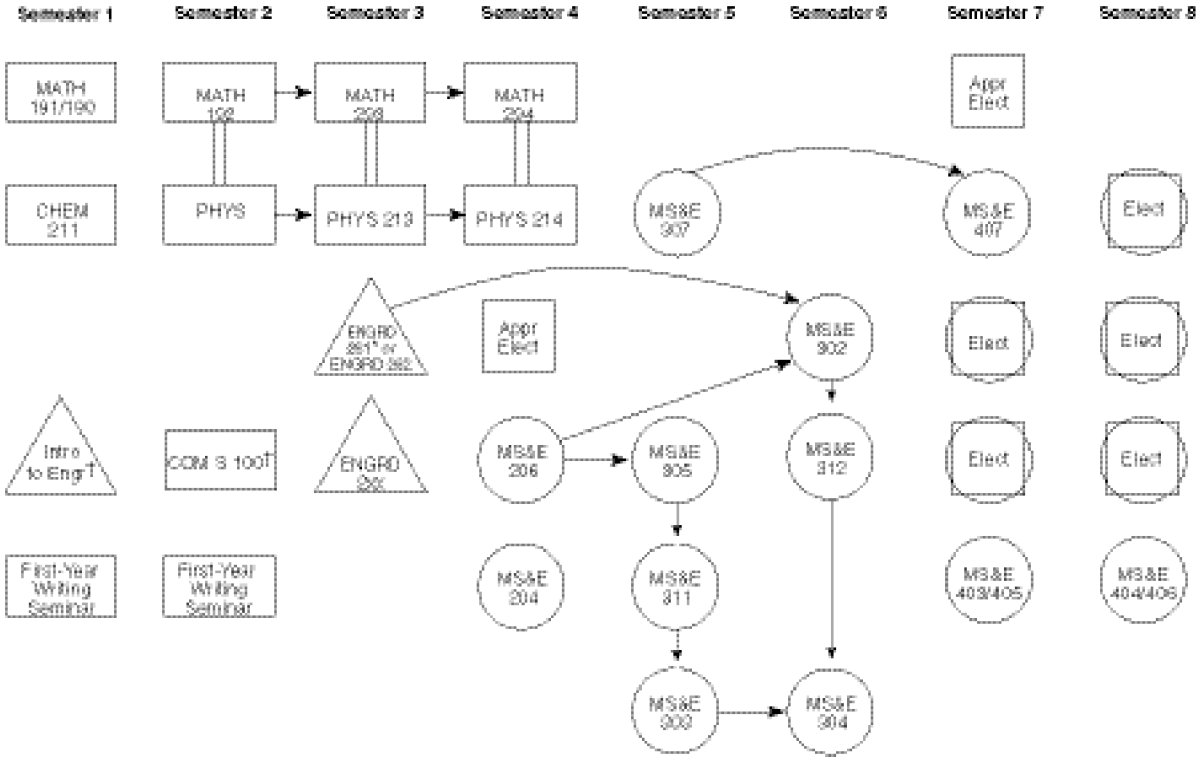
5 In addition to other Major requirements, a course involving significant computational or mathematical modeling or advanced mathematics is required. This requirement is typically fulfilled by one of the engineering distribution, approved elective, or outside technical elective courses.

MATERIALS SCIENCE AND ENGINEERING MAJOR

* ENGRD 251 or ENGRD 252 satisfies the field entry requirement

† May be taken in semester 1 or 2





Materials Science and Engineering Major Checklist

	Min. Credit Hours	*✓ When Done*
MATH 191 (or 190)	4	☐
MATH 192	4	☐
MATH 293	4	☐
MATH 294	4	☐
CHEM 211 (or 207 or 215)	4	☐
PHYS 112 (or 116)	4	☐
PHYS 213 (or 217)	4	☐
PHYS 214 (or 218)	4	☐
COM S 100	4	☐
Intro. to Engr. (ENGRI 1XX)	3	☐
Engr. Dist. 1: ENGRD 261 or ENGRD 262	3	☐
Engr. Dist. 2: ENGRD 2XX#	3	☐
First-Year Writing Seminar 1†	3	☐
First-Year Writing Seminar 2	3	☐
Liberal Studies Distribution—6 courses (18-credit minimum)‡		
Lib. Studies 1		☐
Lib. Studies 2		☐
Lib. Studies 3		☐
Lib. Studies 4		☐
Lib. Studies 5		☐
Lib. Studies 6		☐
Approved Elective (2 courses; 6-credit minimum)		☐
Approved Elective		☐
Physical Education (2 semesters) and swim test		
Required Major Courses (53-credit minimum)		
MS&E 204	4	☐
MS&E 206	4	☐
MS&E 302	4	☐
MS&E 303	4	☐
MS&E 304	4	☐
MS&E 305	4	☐
MS&E 307	2	☐
MS&E 311	1	☐
MS&E 312	1	☐
MS&E 403/405	3	☐
MS&E 404/406	2	☐
MS&E 407	2	☐
Materials-related elective I	3	☐
Materials-related elective II	3	☐
Applications-related elective I§	3	☐
Applications-related elective II	3	☐
Applications-related elective III	3	☐
Outside Technical Elective#	3	☐
Total Required Credits	128 min.	_____
Additional Elective Courses (0 credits min., no max.)		☐
†Technical Writing Requirement:		☐

†In addition to the first-year writing seminars, a technical writing course must be taken as an engineering distribution, liberal studies, approved elective, or major course. (MS&E 403/404 and the senior thesis option satisfy this requirement.)

‡Approved courses must be chosen from at least three of the following six groups: (1) Cultural Analysis (CA), (2) Historical Analysis (HA), (3) Literature and the Arts (LA), (4) Knowledge, Cognition, and Moral Reasoning (KCM), (5) Social and Behavioral Analysis (SBA), (6) Foreign Languages (not literature courses). At least two courses must be from the first three groups (CA, HA, LA). At least two of the six courses must be at 200-level or higher.

§Six credits of the Major applications-related electives must be taken from outside of MS&E. The 9 credits of outside electives are satisfied by the outside technical elective and the 6-credit outside applications-related electives.

#In addition to other Major requirements, a course involving significant computational or mathematical modeling or advanced mathematics is required. This requirement is typically fulfilled by one of the engineering distribution, approved elective, or outside technical elective courses.