MATERIALS SCIENCE AND ENGINEERING, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education

- Breadth—Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth—Social Studies: 3 credits
- Communication Part A Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

SUMMARY OF REQUIREMENTS

The following curriculum applies to students admitted to the materials science and engineering degree program.

Code	Title	Credits
Mathematics and Statistics		19
General Science and Engineering Foundations		25-26
MSE Required Courses		45
Materials Emphasis Elective Requirements		12
Communication Skills		6
Liberal Studies		16
Free Electives		4-5
Total Credits		**At least 128**

MATHEMATICS AND STATISTICS

Code	Title	Credits
MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
MATH 222	Calculus and Analytic Geometry 2	4
MATH 234	Calculus--Functions of Several Variables	4
MATH 319	Techniques in Ordinary Differential Equations	3
or MATH 320	Linear Algebra and Differential Equations	
STAT 324	Introductory Applied Statistics for Engineers	3
Total Credits		**19**

GENERAL SCIENCE AND ENGINEERING FOUNDATIONS

Code	Title	Credits
Science		
Physics		
PHYSICS 201	General Physics	5
or PHYSICS 207	General Physics	
or PHYSICS 247	A Modern Introduction to Physics	
PHYSICS 202	General Physics	5
or PHYSICS 208	General Physics	
or PHYSICS 248	A Modern Introduction to Physics	
Chemistry		
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	5
or CHEM 109	Advanced General Chemistry	
CHEM 343	Organic Chemistry I	3
or CHEM 341	Elementary Organic Chemistry	
Science Elective		
Select one of the following:		3
CHEM 311	Chemistry Across the Periodic Table	
CHEM 327	Fundamentals of Analytical Science	
CHEM 329	Fundamentals of Analytical Science	
CHEM 345	Organic Chemistry II	
PHYSICS 205	Modern Physics for Engineers	
PHYSICS/ E C E 235	Introduction to Solid State Electronics	
PHYSICS 241	Introduction to Modern Physics	
ZOOLOGY/ BIOLOGY 101	Animal Biology	
ZOOLOGY/ BIOLOGY/ BOTANY 151	Introductory Biology	
ZOOLOGY 153	Introductory Biology	
Engineering Foundation		
Introduction to Engineering		
M S & E 260	Materials Experience (or another CoE Intro to Engineering course)	2
Computer Sciences		
Select one of the following (COMP SCI 220 preferred):		3-4
COMP SCI 220	Data Science Programming I	
COMP SCI 200	Programming I	
COMP SCI 300	Programming II	
COMP SCI 320	Data Science Programming II	

COMP SCI 400	Programming III	
Total Credits		**25-26**

MATERIALS SCIENCE AND ENGINEERING REQUIRED COURSES

Code	Title	Credits
M S & E 330	Thermodynamics of Materials	4
M S & E 331	Transport Phenomena in Materials	3
M S & E 332	Macroprocessing of Materials	3
M S & E 333	Microprocessing of Materials	3
M S & E 351	Materials Science-Structure and Property Relations in Solids	3
M S & E 352	Materials Science-Transformation of Solids	3
M S & E 360	Structures & Phases Lab	2
M S & E 361	Kinetics & Thermodynamics Lab	2
M S & E 362	Synthesis & Characterization Lab	3
M S & E/CHEM 421	Polymeric Materials	3
M S & E 441	Deformation of Solids	3
M S & E 451	Introduction to Ceramic Materials	3
M S & E 456	Electronic, Optical, and Magnetic Properties of Materials	3
M S & E 460	Introduction to Computational Materials Science and Engineering	3
M S & E 470	Capstone Project I	1
M S & E 471	Capstone Project II	3
Total Credits		**45**

MATERIALS SCIENCE AND ENGINEERING EMPHASIS ELECTIVES

Code	Title	Credits
Select 6 credits from: M S E courses numbered 400 or above, B M E/PHM SCI 430, M E 417, M E 418, or M E 419 [1]		6
Select 6 credits of select engineering, science and math/statistics coursework in consultation with an M S E faculty advisor [2]		6
Total Credits		**12**

[1] M S & E 699 Independent Study cannot be used to fulfill this requirement.

[2] Select 6 credits of coursework from M S & E courses numbered 400 or above, other engineering, Biochemistry, Chemistry, Computer Sciences, Math, Physics, Statistics, or Zoology courses numbered 300 or above, or up to 3 credits of combined M S & E 1 Cooperative Education Program and/or M S & E 699 Independent Study research credit (or from another engineering department). M S & E advisor approval of the set of selections is required. Course sets may be broad-based or concentrated in a subfield of materials science and engineering.

COMMUNICATION SKILLS

Code	Title	Credits
ENGL 100	Introduction to College Composition	3
or COM ARTS 100	Introduction to Speech Composition	
or LSC 100	Science and Storytelling	
or ESL 118	Academic Writing II	
INTEREGR 397	Engineering Communication	3
Total Credits		**6**

LIBERAL STUDIES

Complete 16 credits of liberal studies requirements (http://guide.wisc.edu/undergraduate/engineering/#requirementstext).

- Students must take 16 credits that carry H, S, L, or Z breadth designators. These credits must fulfill the following sub-requirements:

1. A minimum of two courses from the same subject area (https://registrar.wisc.edu/subjectareas/) (the description before the course number). At least one of these two courses must be designated as above the elementary level (I, A, or D).
2. A minimum of 6 credits designated as humanities (H, L, or Z in the course listing), and an additional minimum of 3 credits designated as social science (S or Z in the course listing). Foreign language courses count as H credits. Retroactive credits for language courses may not be used to meet the Liberal Studies credit requirement (they can be used for sub-requirement 1 above).
3. At least 3 credits in courses designated as ethnic studies (lower case “e” in the course listing). These courses may help satisfy sub-requirements 1 and 2 above, but they count only once toward the total required. Note: Some courses may have “e” designation but not have H, S, L, or Z designation; these courses do not count toward the Liberal Studies requirement.

FREE ELECTIVES

Select 4-5 elective credits.

- The above subject requirements can be met with 123 credits of UW courses. Students must complete 128 credits of coursework to earn the B.S. in materials science and engineering. The 4-5 elective credits may be earned by choosing elective courses that carry more credits than the requirement’s minimum credit load or by taking any additional coursework of the student’s choice.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. “In residence” credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.