

MATERIALS SCIENCE AND ENGINEERING: RESEARCH, MS

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum degree requirements (<https://guide.wisc.edu/graduate/#requirements>) and policies (<https://guide.wisc.edu/graduate/#policies>), in addition to the program requirements listed below.

NAMED OPTION REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW-Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).

Overall	3.00 GPA required.
Graduate GPA Requirement	Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).

Other Grade Requirements n/a

Assessments and Examinations Students must prepare and defend a master's thesis covering appropriate independent science or engineering research undertaken by the student. The format and procedures must conform to the Graduate School rules for a master's thesis, currently found at <https://grad.wisc.edu/current-students/masters-guide/> (<https://grad.wisc.edu/current-students/masters-guide/>). The master's thesis should represent significant science or engineering research work and progress, but does not need to report a substantial new contribution to human knowledge. The thesis must be circulated to the committee at least two weeks before the defense.

Language Requirements None.

REQUIRED COURSES

Before registering for the second semester, students must submit an advisor approved course plan to the graduate coordinator. Students are not restricted to this plan. Students and advisors are encouraged to update the course plan. Updated versions are not required to be submitted.

Code	Title	Credits
Materials Research Seminar		
Students must complete the following course for two consecutive semesters.		2
M S & E 900	Materials Research Seminar	
Materials Core Courses		
Students must complete three core courses from the following list:		9
M S & E 521	Advanced Polymeric Materials	
M S & E 530	Thermodynamics of Solids	
M S & E 551	Structure of Materials	
M S & E 752	Advanced Materials Science: Phase Transformations	
Graduate-level Math Course		
Students may only apply one of the following as a Materials Core Course:		
E P/E M A 547	Engineering Analysis I	
CBE 660	Intermediate Problems in Chemical Engineering	
MATH 703	Methods of Applied Mathematics 1	
MATH 704	Methods of Applied Mathematics-2	
PHYSICS 721	Theoretical Physics-Electrodynamics	
Materials Elective Courses		
Students must complete 6 credits from the "Materials Elective Courses" list.		6
Research		
Students must complete 13 credits of the following course.		13

M S & E 790	Master's Research or Thesis	
Total Credits		30

Materials Elective Courses

The same course may not satisfy more than one requirement. For example, if M S & E 530 Thermodynamics of Solids is taken as a "Materials Core Course", it could not be used as a "Materials Elective Course". Only one mathematics course may fulfill a "Materials Core Course" or "Materials Elective Course". Refer to the "Policies" tab for information on how to enroll in a course outside of the list below.

Code	Title	Credits
M S & E 401	Special Topics in Materials Science and Engineering	1-3
M S & E/CHEM 421	Polymeric Materials	3
M S & E/N E 423	Nuclear Engineering Materials	3
M S & E/N E 433	Principles of Corrosion	3
M S & E 434	Introduction to Thin-Film Deposition Processes	3
M S & E 441	Deformation of Solids	3
M S & E 448	Crystallography and X-Ray Diffraction	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 461	Advanced Metal Casting	3
M S & E/M E 462	Welding Metallurgy	3
M S & E 463	Materials for Elevated Temperature Service	3
M S & E 465	Fundamentals of Heat Treatment	3
M S & E/CIV ENGR/ G L E/GEOSCI 474	Rock Mechanics	3
M S & E 521	Advanced Polymeric Materials	3
M S & E 530	Thermodynamics of Solids	3
M S & E/E M A 541	Heterogeneous and Multiphase Materials	3
M S & E 550	Materials Fundamentals	3
M S & E 551	Structure of Materials	3
M S & E 553	Nanomaterials & Nanotechnology	3
M S & E 561	Machine Learning in Materials	3
M S & E 570	Properties of Solid Surfaces	3
M S & E 648	Advanced X-ray Scattering Methods in Materials Science and Engineering	3
M S & E 660	Mesoscale Modeling of Materials	3
M S & E 748	Structural Analysis of Materials	3
M S & E 750	Imperfections and Mechanical Properties	3
M S & E 752	Advanced Materials Science: Phase Transformations	3
M S & E 756	Structure and Properties of Advanced Electronic Materials	3
M S & E 760	Molecular Modeling of Materials	3
M S & E 803	Special Topics in Materials Science	1-3

B M E/PHM SCI 430	Biological Interactions with Materials	3
B M E/M E 615	Tissue Mechanics	3
BIOCHEM/ CHEM 704	Chemical Biology	3
CBE 540	Polymer Science and Technology	3
CHEM 652	Chemistry of Inorganic Materials	3
CHEM 653	Chemistry of Nanoscale Materials	3
CHEM 654	Materials Chemistry of Polymers	2-3
CHEM 664	Physical Chemistry of Macromolecules	2-3
CHEM 721	Instrumental Analysis	3-4
E C E 745	Solid State Electronics	3
GEOSCI 765	Crystal Chemistry	3
PHYSICS 415	Thermal Physics	3
PHYSICS 551	Solid State Physics	3
PHYSICS 715	Statistical Mechanics	3
PHYSICS 751	Advanced Solid State Physics	3