MATERIALS SCIENCE AND ENGINEERING, MS

The Department of Materials Science and Engineering offers two distinct master of science (MS) degree programs:

- Materials Science and Engineering MS, Research (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-research-ms/): traditional master's program culminating in a thesis for students wishing to conduct research during their program
- Materials Science and Engineering MS, Materials Engineering (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-materials-science-ms/): accelerated, course-based master's program

ABOUT MATERIALS SCIENCE AND ENGINEERING

Meeting many of the most critical challenges facing modern society requires advances in the materials that underpin new technologies. Examples include providing carbon-free and renewable energy, clean water, advanced medical treatments and devices, and sustainable materials manufacturing. New materials are also required for continued economic growth in areas as diverse as aerospace, computing, and sensors.

Materials scientists and engineers at UW–Madison work toward solutions to these problems via research in a wide variety of areas. Research areas include ceramics, computational material science; composites; corrosion; electrical, optical, magnetic materials; growth and synthesis; joining; materials for energy; metals; materials characterization and microscopy; nanomaterials; phase transformations; photonics; polymers and biomaterials; materials for nuclear energy; quantum computing; self-assembly; semiconductors; structural materials and mechanical properties; surfaces and interfaces; sustainability; thin films; and wear.

More broadly, the field of materials science and engineering is in the middle of a revolution in how we design and deploy new materials. The old way is by trial and error, which involves laboratory testing of hundreds or thousands of candidate materials, which is costly and can take decades to develop new materials and deploy them in practical technologies. The emerging new method leverages advances in computational materials science; materials databases, data science, and machine learning; and high throughput materials synthesis and characterization to achieve true design of materials. The goal is to develop and deploy new materials much more quickly and at a much lower cost than ever before. Materials design is a major theme of materials research on campus, organized around the areas of materials design via atomically controlled thin film systems, modular design of nanomaterials, and integrated experimental and computational materials engineering. Materials design and these themes cut across the research and application areas listed above.

Materials research extends across campus, well beyond the boundaries of the Department of Materials Science and Engineering, so graduate students in materials can pursue research with a large number of affiliate faculty. Faculty emphasize the cross-cutting, interdisciplinary nature of materials research, which is also reflected by the diverse undergraduate backgrounds of the student body, many of whom do not have undergraduate degrees in materials.

Materials research benefits from major campus facilities, including the Materials Science Center, the Wisconsin Microscopy and Characterization Center, Wisconsin Center for Applied Microelectronics, and the Soft Materials Laboratory. Research is supported by major centers, including the National Science Foundation Materials Research Science and Engineering Center and the Grainger Institute for Engineering.

Materials graduates from Wisconsin find long-term success in careers in private industry, national laboratories, and academia in the U.S. and around the world.

ADMISSIONS

ADMISSIONS

Students apply to the Master of Science in Materials Science and Engineering through one of the named options:

- Materials Engineering (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-materials-science-ms/)
- Research (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-research-ms/)

FUNDING

FUNDING

GRADUATE SCHOOL RESOURCES

The Bursar's Office provides information about tuition and fees associated with being a graduate student. Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM RESOURCES

Financial Assistance

Please note that most funding is available for PhD students and there are limited resources for MS students. Financial assistance is not available for students enrolled in the named option in Materials Engineering (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-materials-science-ms/).

Various types of financial assistance are available for graduate students, including research assistantships, teaching assistantships, fellowships, and special grants. Decisions regarding financial support are made on the basis of your graduate school application, and, for research assistantships, the matching of the interests or experience of the applicant to the research programs of individual faculty members.

Research and Teaching Assistantships

Research assistantships (RAs) are available in any materials science area. These appointments are under the supervision of the major professor directing the research. Students interested in research assistantships in a particular area are encouraged to contact professors whose work is of special interest. The faculty's research interests are given in the

Department of Materials Science and Engineering faculty directory. An RA permits the most rapid progress toward a degree. Research assistantships in materials science graduate students are comparable to similar stipends from other institutions. Information about stipends can be obtained from the Associate Chair of Graduate Studies.

Teaching assistantships involve teaching rather than research experience. They pay approximately the same as research assistantships. Teaching experience is especially desirable for students considering an academic career. The Department of Materials Science and Engineering supports a limited number of teaching assistantships.

Fellowships

Fellowships supporting graduate education are also offered on a competitive basis by organizations such as the National Science Foundation (http://www.nsf.gov/), the Hertz Foundation (http://www.hertzfndn.org/), UW-Madison Graduate School (http://www.wisc.edu/grad/), the U.S. Department of Defense, and a number of industries and foundations. Because some of these fellowships have fall application deadlines, early application is necessary.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

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

MAJOR REQUIREMENTS

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 Graduate GPA Requirement	3.00 GPA required. 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	See Named Options for policy information.
Language Requirements	None.

REQUIRED COURSES

Select a Named Option (p. 2) for courses required.

NAMED OPTIONS

A named option is a formally documented sub-major within an academic major program. Named options appear on the transcript with degree conferral. Students pursuing the Master of Science in Materials Science and Engineering must select one of the following named options:

View as listView as grid

- **MATERIALS SCIENCE AND ENGINEERING: MATERIALS ENGINEERING, MS (HTTPS://GUIDE.WISC.EDU/GRADUATE/MATERIALS-SCIENCE-ENGINEERING/MATERIALS-SCIENCE-ENGINEERING-MS/MATERIALS-SCIENCE-ENGINEERING-MATERIALS-SCIENCE-MS/)**
- **MATERIALS SCIENCE AND ENGINEERING: RESEARCH, MS (HTTPS://GUIDE.WISC.EDU/GRADUATE/MATERIALS-SCIENCE-ENGINEERING/MATERIALS-SCIENCE-ENGINEERING-MS/MATERIALS-SCIENCE-ENGINEERING-RESEARCH-MS/)**

POLICIES

POLICIES

Students should refer to one of the named options for policy information:

- Materials Engineering (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-materials-science-ms/)
- Research (https://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/materials-science-engineering-research-ms/)

PROFESSIONAL DEVELOPMENT

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (https://grad.wisc.edu/pd/) to build skills, thrive academically, and launch your career.

PROGRAM RESOURCES

Engineering Career Services

The Engineering Career Services (https://ecs.wisc.edu/) staff offer assistance to students searching or preparing for internships, co-ops, and jobs with well-recognized organizations.

The Writing Center

The Writing Center (https://writing.wisc.edu/) is a campus-wide organization that provides free of charge, face-to-face and online

consultations for students writing papers, reports, resumes, and applications.

LEARNING OUTCOMES

LEARNING OUTCOMES

1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field.
2. Demonstrate an ability to formulate, analyze, and solve advanced engineering problems.
3. Demonstrate creative, independent problem solving skills.
4. Apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools to these problems.
5. Recognize and apply principles of ethical and professional conduct.