

# MATERIALS SCIENCE AND ENGINEERING: NANOMATERIALS AND NANOENGINEERING, M.S.

This is a non-thesis named option within the Materials Science and Engineering M.S. (<http://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-ms/>)

Nanomaterials and nanoengineering are part of a rapidly expanding industrial segment. According to the NSF-funded National Nanotechnology Initiative, up to 1 million jobs in nanotechnology are expected to be available in the United States.

## IS THIS PROGRAM RIGHT FOR YOU?

The demand for engineers who specialize in nanotechnology and nanoengineering is growing rapidly. The Nanomaterials and Nanoengineering program provides students with the opportunity to build a comprehensive fundamental and applied knowledge base for nanomaterials processing, characterization, and nanodevice development.

If questions, please contact CoE Grad Admissions at [msaegradadmission@engr.wisc.edu](mailto:msaegradadmission@engr.wisc.edu); Subject Line: MSE Grad Admissions. *Please see admission requirements on the Admissions tab.*

## ADMISSIONS

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website. Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet** the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) **of the Graduate School as well as the program(s)**. Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

Requirements	Detail
Fall Deadline	December 15
Spring Deadline	The program does not admit in the spring.
Summer Deadline	December 15
GRE (Graduate Record Examinations)	Required.*
English Proficiency Test	Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements ( <a href="https://grad.wisc.edu/apply/requirements/#english-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a> ).
Other Test(s) (e.g., GMAT, MCAT)	n/a

Letters of Recommendation Required 3

\* Not required for continuing UW-Madison MS&E BS students.

Applicants normally are expected to have a B.S. in the physical sciences or engineering. Undergraduate studies normally would include mathematics through differential equations, at least one year each of general physics and chemistry, a course in physical chemistry or modern physics, and an elementary course in properties of materials. Applicants may be admitted with deficiencies. These must be made up as soon as possible after entering the program.

## IMPORTANT APPLICATION INFORMATION

Admission to the University of Wisconsin–Madison Graduate School (<http://grad.wisc.edu/>) is a prerequisite for admission to study materials science. A minimum GPA of 3.0/4.0 is required. Graduate Record Examinations (<http://www.ets.org/gre/>) scores on the General Test are required. Admission is highly selective. Most admitted students have an undergraduate GPA above 3.5. Mean GRE scores in the most recent admission cycle were quantitative: 166, verbal: 163, and analytical writing: 3.5. However, full consideration will be given to all students meeting the UW–Madison graduate school requirements. Please use institution code: 1846; no department code is necessary.

Foreign students must submit satisfactory results on the TOEFL (<http://www.ets.org/toefl/>) or another acceptable English Language Test. Please use institution code: 1846; no department code is necessary. Information about these exams can be obtained from the Educational Testing Service, Princeton, New Jersey 08540 or Berkeley, California 94704.

Please use the online application (<https://apply.grad.wisc.edu/Account/Login/?ReturnUrl=%2f>) to begin your application. If you have questions about the application or admissions process, please do not hesitate to e-mail [msaegradadmission@engr.wisc.edu](mailto:msaegradadmission@engr.wisc.edu).

The graduate school offers a limited number of application fee grants (waivers of all or part of the application fee) that are available in a few specific circumstances. Further information is available here. (<https://grad.wisc.edu/admissions/feegrants/>)

*#Submit only the documents requested.*

**NOTE: PLEASE DO NOT SEND DOCUMENTS TO THE GRADUATE SCHOOL. ALL DOCUMENTS SHOULD BE UPLOADED WITH YOUR APPLICATION.**

## QUESTIONS?

Check out the Admissions FAQ or contact us at [msaegradadmission@engr.wisc.edu](mailto:msaegradadmission@engr.wisc.edu).

## FUNDING

### GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

## PROGRAM INFORMATION

Financial assistance from the University or the Department is not available for the Master of Science named option program in Nanomaterials and Nanoengineering.

If you would like to pursue funding on your own, the following sites could be helpful:

- Graduate School Funding Resources (<https://grad.wisc.edu/studentfunding/prospective/>)
- Graduate School Costs and Funding (<https://grad.wisc.edu/studentfunding/currentstudents/>)
- Tuition & Fees ([https://registrar.wisc.edu/tuition\\_&\\_fees.htm](https://registrar.wisc.edu/tuition_&_fees.htm))

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), 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	Yes

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students are able to complete a program with minimal disruptions to careers and other commitments.

**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

#### Requirements Detail

Minimum  
Credit  
Requirement

Minimum  
Residence  
Credit  
Requirement

Minimum Graduate Coursework Requirement Half of degree coursework (15 credits out of 30 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide (<https://registrar.wisc.edu/course-guide> (<https://registrar.wisc.edu/course-guide/>)).

Overall Graduate GPA Requirement	3.00 GPA required.
Other Grade Requirements	The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.
Assessments and Examinations	No formal examination is required.
Language Requirements	None.

### REQUIRED COURSES

- M S & E 350 Introduction to Materials Science: must be taken during the first semester of enrollment (3 credits).
- M S & E 900 Materials Research Seminar: must be taken in both the Fall and Spring semester (1 credit each, 2 credits total).
- M S & E 553 Nanomaterials & Nanotechnology
- A minimum of 22 additional credits from the courses listed below.
  - At least 10 credits of the additional coursework must be at the graduate level.
  - At most 4 credits of M S & E 699 Independent Study may be taken.

Code	Title	Credits
M S & E 900	Materials Research Seminar <sup>1, 2</sup>	2
M S & E 350	Introduction to Materials Science <sup>1</sup>	3
M S & E 553	Nanomaterials & Nanotechnology <sup>1</sup>	3
M S & E 401	Special Topics in Materials Science and Engineering (by instructor consent) <sup>3</sup>	1-3
M S & E/CHEM 421	Polymeric Materials <sup>3</sup>	3
M S & E 434	Introduction to Thin-Film Deposition Processes <sup>3</sup>	3
M S & E 448	Crystallography and X-Ray Diffraction <sup>3</sup>	3
M S & E 456	Electronic, Optical, and Magnetic Properties of Materials <sup>3</sup>	3
M S & E 521	Advanced Polymeric Materials <sup>3</sup>	3
M S & E 530	Thermodynamics of Solids <sup>3</sup>	3
M S & E 551	Structure of Materials <sup>3</sup>	3
M S & E 560	Fundamentals of Atomistic Modeling <sup>3</sup>	3
M S & E 570	Properties of Solid Surfaces <sup>3</sup>	3
M S & E 748	Structural Analysis of Materials <sup>3</sup>	3
M S & E 752	Advanced Materials Science: Phase Transformations <sup>3</sup>	3

M S & E 756	Structure and Properties of Advanced Electronic Materials <sup>3</sup>	3
M S & E 760	Molecular Dynamics and Monte Carlo Simulations in Materials Science <sup>3</sup>	3
M S & E 803	Special Topics in Materials Science (by instructor consent) <sup>3</sup>	1-3
M S & E 699	Independent Study <sup>3,4</sup>	1-4

<sup>1</sup> Required course.

<sup>2</sup> Must be enrolled in both fall and spring semesters.

<sup>3</sup> Electives adding to at minimum 22 credits chosen from this list.

<sup>4</sup> At most 4 credits may be taken.

## POLICIES

### GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

### NAMED OPTION-SPECIFIC POLICIES

#### PRIOR COURSEWORK

##### Graduate Work from Other Institutions

Typically, no graduate work from other institutions may count toward graduate program requirements.

##### UW–Madison Undergraduate

Typically, no credits from undergraduate coursework may be counted toward graduate program requirements. However, with program approval, students who received a Materials Science and Engineering B.S. at UW–Madison are allowed to count up to 7 credits from the Department of Materials Science and Engineering numbered 300 or above toward the minimum graduate degree credit requirement. These credits must be taken in excess of the undergraduate degree requirements. If that coursework is numbered 700 or above it may be used to satisfy the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement.

##### UW–Madison University Special

Typically, no UW–Madison University Special student credits may be counted toward graduate program requirements. However, with program approval, students are allowed to count up to 15 credits of coursework numbered 300 or above taken as a UW–Madison Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. If that coursework is numbered 700 or above it may satisfy the minimum graduate coursework (50%) requirement.

#### PROBATION

The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

### ADVISOR / COMMITTEE

Every graduate student is required to have an advisor. An advisor is a faculty member, or sometimes a committee, from the major department responsible for providing advice regarding graduate studies. In many cases, an advisor is assigned to incoming students. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.

### CREDITS PER TERM ALLOWED

15 credits; Suggested course credit allocation:

- Summer session: 4 credits
- Fall semester: 13 credits
- Spring semester: 13 credits

### TIME CONSTRAINTS

The Master of Science in Nanomaterials and Nanoengineering, which is a named option program within the Department of Materials Science and Engineering, can be completed within 12 months and must be completed within 16 months.

Master's degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

### GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
  - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employeedisabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)

- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

### MS&E Grievance Procedures

Students who feel they have been unfairly treated or otherwise have a grievance related to the policies and procedures for graduate study in the Materials Science and Engineering Department may choose to submit a formal grievance to the department. Before taking this step, however, students are encouraged to discuss their grievance directly with the person or persons involved. Respectful, professional, direct communication can often reach a more satisfactory resolution to an issue more quickly than a formal grievance procedure.

To pursue a formal grievance, the student should submit a letter describing the issue in detail to the department Associate Chair of Graduate Studies within 60 days of the precipitating incident. (Should the grievance involve the Director of Graduate Studies, the letter should be submitted to the department Chair.) The Director (or Chair) will convene a committee of not fewer than three department faculty. The committee will obtain a written response from the person or persons who are the subject of the complaint. The committee will then decide a course of action in response to the grievance. The response from the subject of the complaint and the committee course of action will be communicated in writing to the student within 15 working days of submission of the grievance. The course of action will be implemented no later than 10 working days of the communication.

If the departmental procedure does not resolve the grievance, the student may appeal to the College of Engineering or the Graduate School. The College grievance procedures are currently available at <http://www.engr.wisc.edu/current/current-students-how-to-file-a-grievance.html>, (<http://www.engr.wisc.edu/current/current-students-how-to-file-a-grievance.html>) and the Graduate School procedures are available at <http://grad.wisc.edu/acadpolicy/>. (<http://grad.wisc.edu/acadpolicy/>)

The Assistant Dean for Graduate Affairs ([engr-dean-graduateaffairs@engr.wisc.edu](mailto:engr-dean-graduateaffairs@engr.wisc.edu)) provides overall leadership for graduate education in the College of Engineering (CoE), and is a point of contact for graduate students who have concerns about education, mentoring, research, or other difficulties.

### OTHER

Students enrolled in this program are not permitted to accept teaching assistantships, project assistantships, research assistantships or other appointments that would result in a tuition waiver. Students in this program cannot enroll in other graduate programs nor take courses outside the prescribed curriculum.

## 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

Find information about professional development from the College of Engineering at the following webpage: <https://epd.wisc.edu/>.

## PEOPLE

### Professors:

Mike Arnold, Sue Babcock, Chang-Beom Eom, Paul Evans, Padma Gopalan, Sindo Kou, Rod Lakes, Dane Morgan, John Perepezko, Ian Robertson, Don Stone, Izabela Szlufarska, Paul Voyles, and Xudong Wang.

### Assistant Professors:

Dawei Feng, Jason Kawasaki, Jiamian Hu, and Dan Rhodes.