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; 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 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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>The program does not admit in the spring.</td>
</tr>
<tr>
<td>Summer Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>GRE (Graduate Record Examinations)</td>
<td>Required.*</td>
</tr>
<tr>
<td>English Proficiency Test</td>
<td>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>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g., GMAT, MCAT)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Letters of Recommendation Required

* 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.

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.

FUNDING

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)

**MINIMUM GRADUATE SCHOOL REQUIREMENTS**

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/policiesandrequirementstext), in addition to the program requirements listed below.

**NAMED OPTION REQUIREMENTS**

**MODE OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Mode of Instruction Definitions

**Evening/Weekend:** These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

**Online:** These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.

**Hybrid:** These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

**Accelerated:** These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

**CURRICULAR REQUIREMENTS**

**Requirements Detail**

- Minimum Credit Requirement: 30 credits
- Minimum Residence Credit Requirement: 16 credits
- 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/).
- 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**

Language: 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 9 credits of the additional coursework must be at the graduate level.
  - At most 6 credits of M S & E 699 Independent Study may be taken.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M S &amp; E 350</td>
<td>Introduction to Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 900</td>
<td>Materials Research Seminar</td>
<td>2</td>
</tr>
<tr>
<td>M S &amp; E 553</td>
<td>Nanomaterials &amp; Nanotechnology</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 401</td>
<td>Special Topics in Materials Science</td>
<td>1-3</td>
</tr>
<tr>
<td>M S &amp; E/CHEM 421</td>
<td>Polymeric Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 434</td>
<td>Introduction to Thin-Film Deposition Processes</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 448</td>
<td>Crystallography and X-Ray Diffraction</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 456</td>
<td>Electronic, Optical, and Magnetic Properties of Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 521</td>
<td>Advanced Polymeric Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 530</td>
<td>Thermodynamics of Solids</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 551</td>
<td>Structure of Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 560</td>
<td>Fundamentals of Atomicistic Modeling</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 570</td>
<td>Properties of Solid Surfaces</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 699</td>
<td>Independent Study</td>
<td>1-4</td>
</tr>
<tr>
<td>M S &amp; E 748</td>
<td>Structural Analysis of Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 752</td>
<td>Advanced Materials Science: Phase Transformations</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 756</td>
<td>Structure and Properties of Advanced Electronic Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 760</td>
<td>Molecular Dynamics and Monte Carlo Simulations in Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 803</td>
<td>Special Topics in Materials Science</td>
<td>1-3</td>
</tr>
</tbody>
</table>
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

GRADUATE PROGRAM HANDBOOK
The Graduate Program Handbook (https://www.engr.wisc.edu/app/uploads/2016/01/MSE-Graduate-Curriculum-adopted-01_26_16-corrected-7-12-17.pdf) is the repository for all of the program’s policies and requirements.

PRIOR COURSEWORK

Graduate Work from Other Institutions
With program approval, students are allowed to count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. For additional requirements, consult the program.

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 at UW-Madison 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, must be completed within one year.

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.

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, and Jiamian Hu.