MATERIALS ENGINEERING, PH.D.

Admissions to the Materials Engineering Ph.D. have been suspended as of spring 2016 and will be discontinued as of fall 2019. If you have any questions, please contact the department (msaedep@engr.wisc.edu).

The requirements for the Ph.D. in materials engineering have been merged with Materials Science. See the Materials Science and Engineering Ph.D. (http://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-phd). The information that appears in this entry is provided for the benefit of students currently admitted to the program.

The department mission is to provide local, national, and international leadership in materials research and education. Graduate research in materials science and engineering covers a full range of cutting-edge technologies.

Department faculty run internationally recognized research programs which span the field to include computational materials science, biomaterials, nanomaterials, energy related materials, metals, polymers, electronic materials, ceramics, and composites. Of the 17 full-time faculty in the Department of Materials Science and Engineering, five senior faculty belong to the National Academy of Engineering and five assistant professors introduce expertise in exciting new areas. Faculty at all levels bring leadership in research and education.

The creation of advanced materials and devices requires the application of increasingly sophisticated concepts and tools. Tailored materials with desired properties can be engineered through control of the structure of solids at all length scales ranging from centimeters down to the atomic level. Students of materials are engaged in creating and understanding new materials and new materials phenomena. After they leave Wisconsin, materials graduates find careers in private industry, national laboratories, academia.

The UW offers two graduate programs in materials: Materials Engineering (MS&E) and the Materials Science Program (MSP). Students who apply to one are usually considered by the other. Department faculty supervise the thesis work of students from both MS&E and MSP.

The vast majority of students receive financial aid in the form of fellowships, research or teaching assistantships, or advanced opportunity grants.

ADMISSIONS

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The requirements for the M.S. in Materials Engineering have been merged with Materials Science. See "Materials Science & Engineering Ph.D. (http://guide.wisc.edu/graduate/materials-science-engineering/materials-science-engineering-phd/#text)". The information that appears in this entry is provided for the benefit of students currently admitted to the program.

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 processes related to funding.

REQUIREMENTS

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.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Mode of Instruction Definitions</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>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.</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>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.</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>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.</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

CURRICULAR REQUIREMENTS

Minimum Credit Requirement

| Minimum Residence Credit Requirement | 32 credits |
Minimum Graduate Coursework Requirement: Half of degree coursework (26 credits out of 51 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 (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

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: Doctoral students are required to take a comprehensive preliminary/oral examination after they have cleared their record of all Incomplete and Progress grades (other than research and thesis). Deposit of the doctoral dissertation in the Graduate School is required.

Language Requirements: Contact the program for information on any language requirements.

Minor/ Breadth Requirement: All doctoral students are required to complete a minor.

REQUIRED COURSES

Contact the program for information on any additional required courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBE 660</td>
<td>Intermediate Problems in Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>E P/E M A 547</td>
<td>Engineering Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>E P/E M A 548</td>
<td>Engineering Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 703</td>
<td>Methods of Applied Mathematics 1</td>
<td>3</td>
</tr>
<tr>
<td>MATH 704</td>
<td>Methods of Applied Mathematics-2</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 721</td>
<td>Theoretical Physics-Electrodynamics</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 900</td>
<td>Materials Research Seminar</td>
<td>1</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 570</td>
<td>Properties of Solid Surfaces</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 445</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CBE 540</td>
<td>Polymer Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>CBE/E C E/ M S &amp; E 544</td>
<td>Processing of Electronic Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

The courses must span two or more Departments, meeting the objective of an interdisciplinary education in materials.

Also within the first year, each student must select and declare to the MSP office three core courses that are fundamental to their research specialization. These courses must be approved by the student's MSP advisor. In the Research Report and Research Readiness exam, the student will be examined orally on these subjects in additions to questions on their research presentation.

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.

MAJOR-SPECIFIC POLICIES

GRADUATE PROGRAM HANDBOOK

A Graduate Program Handbook containing all of the program's policies and requirements is forthcoming from the program.

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. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW–Madison Undergraduate

Up to 7 credits numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to 7 credits of MS&E courses numbered 700 or above can be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW–Madison University Special

With program approval and payment of the difference in tuition (between Special and graduate tuition), 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. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

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. An advisor generally serves as the thesis advisor. In many cases, an advisor is assigned to incoming students. Students can be suspended from the Graduate School if they do not have an advisor.

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.

A committee often accomplishes advising for the students in the early stages of their studies.

**CREDITS PER TERM ALLOWED**

15 credits

**TIME CONSTRAINTS**

Doctoral degree students who have been absent for ten 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.

A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five years after passing the preliminary examination may be required to take another preliminary examination and to be admitted to candidacy a second time.

**OTHER**

n/a

**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.

**PEOPLE**

**FACULTY:**

Professors:

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

Assistant Professors:

Jason Kawasaki and Jamian Hu.

**AFFILIATE FACULTY:**