MATERIALS SCIENCE AND ENGINEERING

http://matse.illinois.edu

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Director of Graduate Studies: Moonsub Shim
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Major: Materials Science and Engineering
Degrees Offered: M.S., Ph.D.

Major: Materials Engineering
Degrees Offered: M.Eng.

Joint Degree Program: Master of Science or Doctor of Philosophy in Materials Science and Engineering and the Master of Business Administration (http://catalog.illinois.edu/graduate/graduate-majors/bus-admin-mba)
Degrees Offered: M.S. and M.B.A. or Ph.D. and M.B.A.

Graduate Degree Programs

The Department of Materials Science and Engineering (MatSE) offers graduate study leading to master's and doctoral degrees. The department is consistently ranked in the top three programs in the nation (undergraduate and graduate) by U.S. News and World Report. It offers opportunities to specialize in Nanoscale Science and Technology, Materials for Energy and the Environment, Materials for Medicine, and Mechanical Properties and Materials for Extreme Conditions with strong research programs in all of the areas. The M.Eng degree in Materials Engineering is designed for students having obtained a B.S. degree in MatSE or a related field to enhance their experience in the engineering aspects of materials and broaden their knowledge of various types of materials beyond that possible in the standard four year curriculum. The department offers two combined degree programs, a B.S./M.S. and a B.S./M.Eng that permits current undergraduate students to broaden their materials knowledge base. The B.S./M.Eng, in addition, gives the students the opportunity to improve their communication skills, obtain a foundation in business, technology management, and/or entrepreneurship, and gain practical engineering experience.

Opportunity also exists for specializing in:
1. computational science and engineering
2. energy and sustainability engineering within the department’s graduate programs via the Computational Science and Engineering (CSE) (http://cse.illinois.edu/education/minor-and-concentration/graduate-concentration) transcriptable Concentration and the Energy and Sustainability Engineering (EaSE) Option (http://ease.illinois.edu).

Admission

Students with bachelor’s or master’s degrees in the natural sciences or engineering will be considered for admission if they have a grade point average of at least 3.00 (A = 4.00) for the last two years of undergraduate study. The general test of the Graduate Record Examination (GRE) (http://www.ets.org) is required. Admission is possible for the spring semester, but most admissions are for the fall semester. Full details of admission requirements are on the department’s graduate admissions Web site (http://www.matse.illinois.edu/admissions/graduate.html).

All applicants whose native language is not English must submit a minimum TOEFL (http://www.toefl.org) score of 104 (iBT), 257 (CBT), or 613 (PBT); or minimum International English Language Testing System (IELTS) (http://www.ielts.org) academic exam scores of 7.5 overall and 6.0 in all subsections. Applicants may be exempt from the TOEFL if certain criteria (http://grad.illinois.edu/admissions/instructions/04c) are met. Full admission status (http://grad.illinois.edu/admissions/instructions/04c) is granted for those taking the TOEFL or IELTS since the scores required for admission to MatSE are above the minimum scores demonstrating an acceptable level of English language proficiency.

For the M.Eng. degree program students must have had a B.S. degree in MatSE or a related field (e.g., B.S. degrees in Metallurgy, Polymers or Ceramics, or with concentrations in Materials Chemistry, Condensed Matter Physics, etc.). Students in the program are not expected to continue in and do not have automatic admission to the Ph.D. program in MatSE. The M.Eng. degree is a professional degree.

Applicants to the joint M.B.A. degree program must meet the admissions standards for both programs and be accepted by both programs.

Faculty Research Interests

The backgrounds of faculty members vary widely within the broad areas of Nanoscale Science and Technology, Materials for Energy and the Environment, Materials for Medicine, and Mechanical Properties and Materials for Extreme Conditions. In addition, research collaborations with other faculty outside the department are frequent. For a detailed list of faculty research interests and publications, view the MatSE department’s faculty biographies. (https://matse.illinois.edu/directory/faculty.asp)

Facilities and Resources

The MatSE department has an outstanding array of facilities available for materials research. These facilities, in addition to laboratories in the department’s buildings, include, among others, the Materials Research Laboratory, Center for Microanalysis of Materials, Beckman Institute for Advanced Science and Technology, and Micro and Nanotechnology Laboratory. The National Center for Supercomputing Applications and the MRL Center for Computation are readily available. Information about these facilities may be found at the MatSE department’s facilities information Web site (http://www.matse.illinois.edu/research/facilities.html).

Financial Aid

Financial aid is available in the form of research assistantships, teaching assistantships, and partial fellowships for students in the Ph.D. programs. Except for special circumstances, MatSE does not provide financial aid to students in the M.S. and M.Eng. programs. All applicants, regardless of U.S. citizenship, whose native language is not English and who wish to be considered for teaching assistantships must demonstrate spoken English language proficiency (http://grad.illinois.edu/admissions/taengprof.htm) by achieving a minimum score of 50 on the Test of Spoken English (TSE), 24 on the speaking subsection of the TOEFL iBT, or 8 on the speaking subsection of the
IELTS. For students who are unable to take the TSE, iBT, or IELTS, a minimum score of 4CP is required on the EPI test (http://cte.illinois.edu/testing/oral_eng/epi_overview.html), offered on campus. All new teaching assistants are required to participate in the Graduate Academy for College Teaching (http://cte.illinois.edu/programs/ta_train.html) conducted prior to the start of the semester.

- Master of Science in Materials Science and Engineering (http://catalog.illinois.edu/graduate/graduate-majors/matse/ms-materials-science-eng)
- Master of Engineering in Materials Engineering (http://catalog.illinois.edu/graduate/graduate-majors/matse/master-eng-materials-eng)

### Doctor of Philosophy in Materials Science and Engineering

#### Entering with approved M.S. degree

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 599</td>
<td>Thesis Research (min-max applied toward the degree)</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>One of CHEM 544, MSE 500, PHYS 504 with a grade of B or higher</td>
<td>4</td>
</tr>
<tr>
<td>MSE 492</td>
<td>Lab Safety Fundamentals (credit does not apply toward the degree)</td>
<td>0</td>
</tr>
<tr>
<td>MSE 595</td>
<td>Materials Colloquium</td>
<td>0-2</td>
</tr>
<tr>
<td>Advisor group meetings (MSE 590) and area seminars (MSE 529, MSE 559) (subject to Other Requirements and Conditions below)</td>
<td>0-4</td>
<td></td>
</tr>
<tr>
<td>Elective courses (subject to Other Requirements and Conditions below)</td>
<td>10-16</td>
<td></td>
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<tr>
<td>Total Hours</td>
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<td>64</td>
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**Other Requirements and Conditions**

Other Requirements and Conditions may overlap

- MSE course work hours 10
- 500-level credit hours applied toward the degree 10
- MSE 595 (0 or 1 hour) must be taken every semester in the first two years of residence. A maximum of 2 hours may be applied toward the degree.
- MSE 529 or MSE 559 (0 or 1 hours) must be taken every semester. A maximum of 4 hours may be applied toward the degree.

Ph.D. exam and dissertation requirements:

- Qualifying exam: 2
- Preliminary exam
- Final exam or dissertation defense
- Dissertation deposit
- Minimum GPA: 3.0

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1. For additional details and requirements, please refer to the department’s Graduate Degree Requirements Handbook (https://matse.illinois.edu/academics/graduate/handbook.html) and the Graduate College Handbook (http://grad.illinois.edu/gradhandbook).

2. Qualifying Exam Information (https://matse.illinois.edu/academics/graduate/exams)

**Entering with approved B.S. degree**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 599</td>
<td>Thesis Research (min-max applied toward the degree)</td>
<td>52</td>
</tr>
<tr>
<td>One of CHEM 544, MSE 500, PHYS 504 with a grade of B or higher</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MSE 492</td>
<td>Lab Safety Fundamentals (credit does not apply toward the degree)</td>
<td>0</td>
</tr>
<tr>
<td>MSE 595</td>
<td>Materials Colloquium</td>
<td>0-4</td>
</tr>
<tr>
<td>Advisor group meetings (MSE 590) and area seminars (MSE 529, MSE 559) (subject to Other Requirements and Conditions below)</td>
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<tr>
<td>Elective courses (subject to Other Requirements and Conditions below) (28-40 hours)</td>
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<tr>
<td>Total Hours</td>
<td></td>
<td>96</td>
</tr>
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</table>

**Other Requirements and Conditions**

Other Requirements and Conditions may overlap

- MSE course work hours 10
- 500-level credit hours applied toward the degree 10
- MSE 595 (0 or 1 hour) must be taken every semester in the first two years of residence. A maximum of 4 hours may be applied toward the degree.
- MSE 529 or MSE 559 (0 or 1 hours) must be taken every semester. A maximum of 8 hours may be applied toward the degree.

These students may earn a Master of Science degree during the Ph.D. program.

Ph.D. exam and dissertation requirements:

- Qualifying exam: 2
- Preliminary exam
- Final exam or dissertation defense
- Dissertation deposit
- Minimum GPA: 3.0

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1. For additional details and requirements, please refer to the department’s Graduate Degree Requirements Handbook (https://matse.illinois.edu/academics/graduate/handbook.html) and the Graduate College Handbook (http://grad.illinois.edu/gradhandbook).

2. Qualifying Exam Information (https://matse.illinois.edu/academics/graduate/exams)
Joint M.B.A. Program

Students in this unit may choose to earn their major degree and simultaneously complete an M.B.A., with 12 fewer required hours than when pursuing both degrees independently. Students must be enrolled in the M.B.A. program for three terms and complete all the requirements of their primary degree. Interested students should see the joint program requirements (http://catalog.illinois.edu/graduate/graduate-majors/bus-admin-mba/master-ba-fulltime) and contact the M.B.A. program and their major department office for more information.