Program Learning Outcomes for the MMSNE Degree

Upon completing the MMSNE degree, students will be able to:

1. Acquire broad, advanced knowledge within either Materials Science or NanoEngineering, which is also in-depth in one major sub-discipline of the field.
2. Conduct research at an advanced level in at least one area of Materials Science and Nanoengineering.
3. Communicate scientific ideas effectively in writing and when speaking.
4. Demonstrate the ability to gain admission to a graduate or professional program, if interested in pursuing further education.
5. Demonstrate the ability to gain employment or advancement in a technical field related to Materials Science and NanoEngineering, if pursuing non-academic careers.

Requirements for the MMSNE Degree in Materials Science and NanoEngineering

The MMSNE degree is a non-thesis master’s degree. For general university requirements, please see Non-Thesis Master’s Degrees (ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-non-thesis-masters-degrees). For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students (ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees).

Students pursuing the MMSNE degree must complete:

• A minimum of 10 courses (30 credit hours) to satisfy degree requirements.
• A minimum of 30 credit hours of graduate-level study (coursework at the 500-level or above).
• A minimum of 24 credit hours must be taken at Rice University.
• A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
• The requirements for one area of specialization. The MMSNE degree program offers two areas of specialization:
  • Materials Science, or
  • NanoEngineering.
• A minimum overall GPA of 2.67.
• A minimum GPA of 3.00 in required coursework with a minimum grade of B- (2.67 grade points) in each course.

The MMSNE degree program is open to students who have shown academic excellence in their undergraduate studies. This non-thesis degree option is designed for engineers who have attained a bachelor’s degree and are looking to further their careers in industry. They combine engineering coursework with professional development and communications. A list of required and suggested courses are available on the MSNE website (https://msne.rice.edu). Students should develop a specific plan of study based on their particular interests and discussions with their advisor.

The courses listed below satisfy the requirements for this degree program. In certain instances, courses not on this official list may be substituted upon approval of the program’s academic advisor, or where applicable, the department or program’s Director of Graduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the department or program’s Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the MMSNE Degree</td>
<td>30</td>
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Degree Requirements

Core Requirements

Select 3 from the following: 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MSNE 502</td>
<td>MECH PROPERTIES OF MATERIALS</td>
<td></td>
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<tr>
<td>MSNE 503</td>
<td>THERMODYNAMICS IN MATERIALS SCIENCE</td>
<td></td>
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<tr>
<td>MSNE 505</td>
<td>MICROSTRUCTURE AND NANOSTRUCTURE EVOLUTION</td>
<td></td>
</tr>
<tr>
<td>MSNE 506</td>
<td>PHYSICAL PROPERTIES OF SOLIDS</td>
<td></td>
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<tr>
<td>MSNE 509</td>
<td>PHYSICAL METALLURGY</td>
<td></td>
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<tr>
<td>MSNE 517</td>
<td>ELECTRONIC, OPTICAL AND MAGNETIC PROPERTIES OF POLYMERS</td>
<td></td>
</tr>
<tr>
<td>MSNE 535 / PHYS 535</td>
<td>CRYSTALLOGRAPHY &amp; DIFFRACTION</td>
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</table>

Technical Electives

Select 9 credit hours from the following: 1,2

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MSNE 510</td>
<td>SCALING CONCEPTS IN 2D MATERIALS AND POLYMER PHYSICS</td>
<td></td>
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<tr>
<td>MSNE 516 / CHBE 516</td>
<td>STRUCTURE AND PROPERTIES OF POLYMERS AND SOFT MATERIALS</td>
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<tr>
<td>MSNE 523</td>
<td>PROPERTIES, SYNTHESIS AND DESIGN OF COMPOSITE MATERIALS</td>
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<tr>
<td>MSNE 533</td>
<td>COMPUTATIONAL MATERIALS MODELING</td>
<td></td>
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<tr>
<td>MSNE 545 / ELEC 545</td>
<td>THIN FILMS</td>
<td></td>
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<tr>
<td>MSNE 555</td>
<td>MATERIALS IN NATURE AND BIO-MIMETIC STRATEGIES</td>
<td></td>
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<tr>
<td>MSNE 569</td>
<td>SCIENCE AND APPLICATIONS OF CORROSION SCIENCE AND ENGINEERING</td>
<td></td>
</tr>
<tr>
<td>MSNE 580 / CHEM 580</td>
<td>MICROSCOPY METHODS IN MATERIALS SCIENCE</td>
<td></td>
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<tr>
<td>MSNE 613</td>
<td>SPECIAL TOPICS I</td>
<td></td>
</tr>
<tr>
<td>MSNE 614</td>
<td>SPECIAL TOPICS II</td>
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<tr>
<td>MSNE 615</td>
<td>SPECIAL TOPICS III</td>
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</tr>
<tr>
<td>MSNE 650</td>
<td>NANOMATERIALS AND NANOMECHANICS</td>
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Research Project
MSNE 621 M.M.S. RESEARCH PROJECT I 3
MSNE 622 M.M.S. RESEARCH PROJECT II 3

Professional Development
Select at least 1 from the following: 3

ENGI 510 TECHNICAL AND MANAGERIAL COMMUNICATIONS
ENGI 528 / CEVE 528 ENGINEERING ECONOMICS
ENGI 529 / CEVE 529 ETHICS AND ENGINEERING LEADERSHIP
ENGI 530 ENGINEERING PRACTICUM
ENGI 542 COMMUNICATION FOR ENGINEERS: BUILDING A PRACTICAL TOOLBOX
ENGI 545 / LEAD 545 STRATEGIC THINKING FOR COMPLEX PROBLEM SOLVING
ENGI 610 / NSCI 610 ENGINEERING
ENGI 615 LEADERSHIP COACHING FOR ENGINEERS
NSCI 511 SCIENCE POLICY, AND ETHICS

Elective Requirements
Select 3 credit hours of remaining coursework from approved electives at the 500-level or above to reach 30 total credit hours 3

Total Credit Hours 30

Footnotes and Additional Information
1 If MSNE 502, MSNE 503, MSNE 505, MSNE 506, MSNE 509, MSNE 517, and/or MSNE 535/PHYS 535 are not taken to satisfy the Core Requirements, they can be taken as Technical Electives.
2 MSNE 500 and MSNE 501 are not considered Technical Electives.
3 Students can repeat MSNE 622 or work with their advisor to receive approval for courses according to their interests and field of study.
4 ENGI 530 is taken for a Satisfactory/Unsatisfactory grade and must be completed with a Satisfactory grade, however, this course does not apply to the requirement of a minimum grade of B- (2.67 grade points) in each required course.

Additional Information
For additional information, please see the Materials Science and Nanoengineering website: https://msne.rice.edu/

Opportunities for the MMSNE Degree
Fifth-Year Master's Degree Option for Rice Undergraduate Students
Rice undergraduate students have an option to pursue the Master of Materials Science and NanoEngineering (MMSNE) degree by adding an additional fifth year to their four undergraduate years of science and engineering studies.

Advanced Rice undergraduate students in good academic standing may apply to the MMSNE degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate advisor and the MMSNE program director.

As part of this option and opportunity, Rice undergraduate students:
- must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this Undergraduate · Graduate Concurrent Enrollment opportunity including specific information on the registration process can be found here (ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment).

Additional Information
For additional information, please see the Materials Science and Nanoengineering website: https://msne.rice.edu/