MASTER OF MATERIALS SCIENCE AND NANOENGINEERING (MMSNE) DEGREE

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.

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 (https://qa.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 (https://qa.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/). Students pursuing the MMSNE degree must complete:

- A minimum of 12 courses (32 credit hours) to satisfy degree requirements.
- A minimum of 32 credit hours of graduate-level study (graduate semester credit hours, coursework at the 500-level or above).
- A minimum of 26 graduate semester credit hours must be taken at Rice University.
- A minimum of 26 graduate semester credit hours must be taken in standard or traditional courses (with a course type of lecture, seminar, laboratory, lecture/laboratory).
- A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
- A maximum of 2 courses (6 graduate semester credit hours) from transfer credit. For additional departmental guidelines regarding transfer credit, see the Policies (p. 2) tab.
- 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 or higher in all Rice coursework.
- A minimum program GPA of 3.00 or higher in all Rice coursework that satisfies requirements for the non-thesis master's degree 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/). Additionally, these must be approved by the Office of Graduate and Postdoctoral Studies. 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>32</td>
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### Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td><strong>Core Requirements</strong></td>
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<tr>
<td>Select 3 courses from the following: 1</td>
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<tr>
<td>MSNE 502</td>
<td>MECH PROPERTIES OF MATERIALS</td>
<td>3</td>
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<tr>
<td>MSNE 503</td>
<td>THERMODYNAMICS IN MATERIALS SCIENCE</td>
<td>3</td>
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<tr>
<td>MSNE 505</td>
<td>MICROSTRUCTURE AND NANOSTRUCTURE EVOLUTION</td>
<td>3</td>
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<tr>
<td>MSNE 506</td>
<td>PHYSICAL PROPERTIES OF SOLIDS</td>
<td>3</td>
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<tr>
<td>MSNE 517</td>
<td>ELECTRONIC, OPTICAL AND MAGNETIC</td>
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<tr>
<td>MSNE 535</td>
<td>PROPERTIES OF POLYMERS</td>
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<td>MSNE 535</td>
<td>CRYSTALLOGRAPHY &amp; DIFFRACTION</td>
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<tr>
<td>MSNE 553</td>
<td>PHYSICAL PROPERTIES OF POLYMERS</td>
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<tr>
<td>MSNE 553</td>
<td>SCALING CONCEPTS IN 2D MATERIALS AND</td>
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<td>MSNE 553</td>
<td>POLYMER PHYSICS</td>
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<tr>
<td>MSNE 511</td>
<td>MATERIALS CHARACTERIZATION FROM</td>
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<td>MSNE 511</td>
<td>NANO TO MACRO</td>
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<td>MSNE 512</td>
<td>QUANTUM MATERIALS ENGINEERING</td>
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<td>MSNE 513</td>
<td>3D PRINTING AND ADDITIVE MANUFACTURING:</td>
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<td>MSNE 513</td>
<td>THEORY AND APPLICATIONS</td>
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<tr>
<td>MSNE 523</td>
<td>PROPERTIES, SYNTHESIS AND DESIGN OF</td>
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<tr>
<td>MSNE 523</td>
<td>COMPOSITE MATERIALS</td>
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<td>MSNE 533</td>
<td>COMPUTATIONAL MATERIALS MODELING</td>
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<td>MSNE 555</td>
<td>MATERIALS IN NATURE AND BIO-MIMETIC STRATEGIES</td>
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<td>MSNE 569</td>
<td>SCIENCE AND APPLICATIONS OF CORROSION</td>
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<tr>
<td>MSNE 569</td>
<td>SCIENCE AND ENGINEERING</td>
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<tr>
<td>MSNE 580</td>
<td>MICROSCOPY METHODS IN MATERIALS</td>
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<tr>
<td>MSNE 580</td>
<td>SCIENCE</td>
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<tr>
<td>MSNE 613</td>
<td>SPECIAL TOPICS I</td>
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MSNE 614  SPECIAL TOPICS II
MSNE 615  SPECIAL TOPICS III
MSNE 650  NANOMATERIALS AND NANOMECHANICS

Non-Coursework
MSNE 501  GRADUATE STUDENT SEMINAR 3
MSNE 589  ETHICS & SAFETY FOR MATERIALS ENGINEERS 3

Research Project
MSNE 621  M.M.S. RESEARCH PROJECT I 4
MSNE 622  M.M.S. RESEARCH PROJECT II 4

Professional Development
Select at least 1 course from the following: 3
BIOE 513  STRATEGIC CAREER PREPAREDNESS FOR INDUSTRY JOBS
ENGI 501  WORKPLACE COMMUNICATION FOR PROFESSIONAL MASTER’S STUDENTS IN ENGINEERING
ENGI 510  TECHNICAL AND MANAGERIAL COMMUNICATIONS
ENGI 515  LEADING TEAMS AND INNOVATION
ENGI 528 / CEVE 528  ENGINEERING ECONOMICS
ENGI 529 / CEVE 529  ETHICS AND ENGINEERING LEADERSHIP
ENGI 530  ENGINEERING PRACTICUM
ENGI 610 / NSCI 610  MANAGEMENT FOR SCIENCE AND 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 32 total credit hours 4

Total Credit Hours 32

Footnotes and Additional Information
1 If MSNE 502, MSNE 503, MSNE 505, MSNE 506, 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 is not considered a Technical Elective.
3 MSNE 501 and MSNE 589 are taken for a Satisfactory/Unsatisfactory grade and must be completed with a Satisfactory grade. As S/U courses, they do not apply to the requirement of a minimum grade of B-(2.67 grade points) in each required course.
4 Students can repeat MSNE 621, MSNE 622, or work with their advisor to receive approval for courses according to their interests and field of study.

Policies for the MMSNE Degree
Department of Materials Science and NanoEngineering Graduate Program Handbook
The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, the department of Materials Science and NanoEngineering publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2022_23/Materials_Science_NanoEngineering_Graduate_Handbook.pdf

Transfer Credit
For Rice University’s policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#transfer). Some departments and programs have additional restrictions on transfer credit. Students are encouraged to meet with their academic program’s advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines
Students pursuing the MMSNE degree should be aware of the following departmental transfer credit guidelines:

• No more than 2 courses (6 credit hours) of transfer credit from U.S. or international universities of similar standing as Rice may apply towards the degree.
• Requests for transfer credit will be considered by the program director on an individual case-by-case basis.

Academic Standards
Students are expected to earn letter grades of at least B- (2.67 grade points) in all courses taken, and maintain a minimum overall GPA of 3.00 to graduate. If a student’s semester GPA is below 3.00, the student will be placed on departmental probation, and if the student’s semester GPA is below 3.00 for two consecutive semesters, the student’s performance will be reviewed by the Graduate Committee in consultation with the Department Chair, and the student may be dismissed from the program.

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
In certain situations and with some terminal master’s degree programs, Rice students have an option to pursue a master’s degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master’s 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 major advisor and the master’s degree 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 (https://ga.rice.edu/)
Rice undergraduate students completing studies in science and engineering may have the option to pursue the Master of Materials Science and NanoEngineering (MMSNE) degree. For additional information, students should contact their undergraduate major advisor and the MMSNE program director.

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