MASTER OF SCIENCE IN ENERGY GEOSCIENCE (MSEG) DEGREE

Program Learning Outcomes for the MSEG Degree

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

1. Become proficient in applying geological and geophysical knowledge and data management methods.
2. Develop business and management skills, and obtain practical skills valuable to the energy industry.
3. Develop written, oral, and visual communication skills to bridge the gap between science and business.

Requirements for the MSEG Degree

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

- A minimum of 14 courses (minimum of 38-42 credit hours, depending on course selection) to satisfy degree requirements.
- A minimum of 30 credit hours of graduate-level study (graduate semester credit hours, coursework at the 500-level or above).
- A minimum of 24 graduate semester credit hours must be taken at Rice University.
- A minimum of 24 graduate semester credit hours must be taken in a 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. 4) tab.
- A 3-6 month full-time internship. Instead of a thesis, at the conclusion of their internship, students must present their internship project in both oral and written form as part of the Professional Master’s Project (NSCI 512). Part-time students who already work in their area of study may request approval to fulfill the internship requirement by working on a specific, pre-approved project with their current employer.
- The requirements for one area of specialization (see below for areas of specialization). The MSEG degree program offers four areas of specialization:
  - Energy Data Management (p. 2), or
  - Energy Transition and Sustainability (p. 2), or
  - Geology (p. 3) or
  - Geophysics (p. 3).
- A minimum overall GPA of 2.67 or higher in all Rice coursework.
- A minimum program GPA of 2.67 or higher in all Rice coursework that satisfies requirements for the non-thesis master’s degree.

Note: Some of the listed courses are not offered every year, and some may also have prerequisites or require instructor permission.

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 MSEG Degree</td>
<td>38-42</td>
</tr>
</tbody>
</table>

Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Core Requirements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Core Science Courses</strong></td>
<td></td>
</tr>
<tr>
<td>EEPS 548</td>
<td>3D SEISMIC REFLECTION DATA INTERPRETATION</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 579</td>
<td>HYDROCARBON SYSTEMS ANALYSIS</td>
<td>4</td>
</tr>
<tr>
<td>EEPS 583</td>
<td>DATA MANAGEMENT AND DATA GOVERNANCE</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 659</td>
<td>WELL LOGGING AND PETROPHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 501</td>
<td>PROFESSIONAL MASTER’S SEMINAR (1st semester)</td>
<td>1</td>
</tr>
<tr>
<td>NSCI 501</td>
<td>PROFESSIONAL MASTER’S SEMINAR (2nd semester)</td>
<td>1</td>
</tr>
<tr>
<td>NSCI 511</td>
<td>SCIENCE POLICY, AND ETHICS</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 610 / ENGI 610</td>
<td>MANAGEMENT FOR SCIENCE AND ENGINEERING</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area of Specialization</th>
<th>Select 1 of the following Areas of Specialization (see Areas of Specialization below):</th>
<th>16-20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Energy Data Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Energy Transition and Sustainability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Geology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Geophysics</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Three to Six Month Full-Time Internship</th>
<th>A three to six month full-time internship is required</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSCI 512</td>
<td>PROFESSIONAL MASTER’S PROJECT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total Credit Hours</td>
<td>38-42</td>
</tr>
</tbody>
</table>

Footnotes and Additional Information

1. EEPS 548 requires a prerequisite of EEPS 448 (previously ESCI 442) or EEPS 648 (previously ESCI 642) that may be taken concurrently. See a faculty advisor for more information.
Three to Six Month Full-Time Internship: Practical experience is offered via a three to six month full-time internship. The internship will be under the guidance of a host company, government agency, or non-profit organization. At the conclusion of the internship, students must present a summary of their internship project in both oral and written form for the cohort course Professional Master’s Project (NSCI 512). Part-time students who already work in their area of study may fulfill the internship requirements by working on an approved project with their current employer.

Areas of Specialization

Students must complete a minimum of 6 courses (minimum of 16-20 credit hours, depending on course selection) to satisfy the requirements for one area of specialization.

Area of Specialization: Energy Data Management

Students must complete a minimum of 6 courses (minimum of 18-20 credit hours, depending on course selection) to satisfy the requirements for the MSEG degree program’s Energy Data Management area of specialization.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPS 584</td>
<td>DATA SCIENCE ENVIRONMENTAL AND GEOSCIENCES</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 585</td>
<td>COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 586</td>
<td>DATA SCIENCE METHODS AND DATA MANAGEMENT</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Requirements (for the Area of Specialization: Energy Data Management)

Select a minimum of 3 courses (minimum of 9 credit hours) from the following:

<table>
<thead>
<tr>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINEERING ECONOMICS</td>
<td>3</td>
</tr>
<tr>
<td>ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT</td>
<td>3</td>
</tr>
<tr>
<td>GRADUATE TOOLS AND MODELS - DATA SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION TO COMPUTER</td>
<td>3</td>
</tr>
<tr>
<td>APPLIED MACHINE LEARNING AND DATA PROJECTS</td>
<td>3</td>
</tr>
<tr>
<td>ENERGY ECONOMICS I</td>
<td>3</td>
</tr>
<tr>
<td>CLIMATE OF THE COMMON ERA</td>
<td>3</td>
</tr>
<tr>
<td>GIS FOR SCIENTISTS AND ENGINEERS</td>
<td>3</td>
</tr>
<tr>
<td>FUNDAMENTALS OF THE ENERGY INDUSTRY</td>
<td>3</td>
</tr>
<tr>
<td>GEOPOLITICS OF ENERGY</td>
<td>3</td>
</tr>
<tr>
<td>ENERGY MARKET ORGANIZATION</td>
<td>3</td>
</tr>
<tr>
<td>INTERNATIONAL BUSINESS LAW</td>
<td>3</td>
</tr>
<tr>
<td>OPERATIONS STRATEGY</td>
<td>3</td>
</tr>
<tr>
<td>SOCIAL ENTERPRISE</td>
<td>3</td>
</tr>
<tr>
<td>FOUNDATIONS OF PROJECT AND PROGRAM MANAGEMENT</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: Some of the listed courses are not offered every year, and other coursework may be offered that satisfies the stated requirements upon approval. Depending on the student’s background or interest, course substitutions for any required or elective course may be approved by the program’s academic advisor. Students should consult with their academic advisors before enrolling.

Area of Specialization: Energy Transition and Sustainability

Students must complete a minimum of 6 courses (minimum of 16-20 credit hours, depending on course selection) to satisfy the requirements for the MSEG degree program’s Energy Transition and Sustainability area of specialization.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPS 592</td>
<td>SPECIAL TOPICS IN EARTH, ENVIRONMENTAL &amp; PLANETARY SCIENCES</td>
<td>1-2</td>
</tr>
<tr>
<td>EEPS 634</td>
<td>CLIMATE OF THE COMMON ERA</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Requirements (for the Area of Specialization: Energy Transition and Sustainability)

Select a minimum of 4-5 courses (minimum of 12-15 credit hours) from the following:

<table>
<thead>
<tr>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUSTAINABLE DEVELOPMENT AND REPORTING</td>
<td>3</td>
</tr>
<tr>
<td>SUSTAINABILITY IMPACT ASSESSMENTS</td>
<td>3</td>
</tr>
<tr>
<td>ENERGY AND THE ENVIRONMENT</td>
<td>3</td>
</tr>
<tr>
<td>ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT</td>
<td>3</td>
</tr>
<tr>
<td>SILICICLASTIC DEPOSITIONAL SYSTEMS</td>
<td>3</td>
</tr>
<tr>
<td>DATA SCIENCE ENVIRONMENTAL AND GEOSCIENCES</td>
<td>3</td>
</tr>
<tr>
<td>COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY</td>
<td>3</td>
</tr>
<tr>
<td>GEOCHEMISTRY OF EARTH’S SURFACE</td>
<td>3</td>
</tr>
<tr>
<td>GIS FOR SCIENTISTS AND ENGINEERS</td>
<td>3</td>
</tr>
<tr>
<td>EARTH’S NATURAL RESOURCES FOR THE ENERGY TRANSITION</td>
<td>3</td>
</tr>
<tr>
<td>EXPLORATION GEOPHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td>ENVIRONMENTAL &amp; APPLIED ROCK PHYSICS</td>
<td>3</td>
</tr>
</tbody>
</table>
### Master of Science in Energy Geoscience (MSEG) Degree

**EEPS 667**  
GEOMECHANICS

**EEPS 671**  
EARTH SYSTEMS MODELING I: PHILOSOPHY AND FUNDAMENTALS

**EEPS 672**  
EARTH SYSTEMS MODELING: NUMERICAL TECHNIQUES AND APPLICATIONS

**MGMT 610**  
FUNDAMENTALS OF THE ENERGY INDUSTRY

**MGMT 611**  
GEOPOLITICS OF ENERGY

**MGMT 616**  
ENERGY MARKET ORGANIZATION

**MGMT 758**  
ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) ISSUES IN STRATEGY

**Total Credit Hours**  
16-20

**Footnotes and Additional Information**

1. **Note:** Some of the listed courses are not offered every year, and other coursework may be offered that satisfies the stated requirements upon approval. Depending on the student's background or interest, course substitutions for any required or elective course may be approved by the program's academic advisor. Students should consult with their academic advisors before enrolling.

### Area of Specialization: Geology

Students must complete a minimum of 6 courses (minimum of 18-20 credit hours, depending on course selection) to satisfy the requirements for the MSEG degree program's Geology area of specialization.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEPS 630</td>
<td>SEQUENCE STRATIGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td>or EEPS 530</td>
<td>SILICICLASTIC DEPOSITIONAL SYSTEMS</td>
<td></td>
</tr>
<tr>
<td>EEPS 654</td>
<td>INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td>or EEPS 661</td>
<td>STRUCTURE AND EVOLUTION OF TECTONIC SYSTEMS</td>
<td></td>
</tr>
</tbody>
</table>

**Elective Requirements (for the Area of Specialization: Geology)**

Select a minimum of 4 courses (minimum of 12 credit hours) from the following:

1. **CHBE 548**  
ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT

2. **EEPS 525**  
APPLIED SEDIMENTOLOGY I

3. **EEPS 530**  
SILICICLASTIC DEPOSITIONAL SYSTEMS

4. **EEPS 545**  
THEORETICAL GLOBAL SEISMOLOGY I

5. **EEPS 578**  
HYDROCARBON EXPLORATION

6. **EEPS 579**  
HYDROCARBON SYSTEMS ANALYSIS

7. **EEPS 580**  
SEMINAR: QUANTITATIVE PETROLEUM SYSTEMS ANALYSIS

8. **EEPS 592**  
SPECIAL TOPICS IN EARTH, ENVIRONMENTAL & PLANETARY SCIENCES

9. **EEPS 615**  
GEOCHEMISTRY OF EARTH’S SURFACE

10. **EEPS 630**  
SEQUENCE STRATIGRAPHY

11. **EEPS 633**  
CLIMATE DYNAMICS

12. **EEPS 634**  
CLIMATE OF THE COMMON ERA

13. **EEPS 636**  
GIS FOR SCIENTISTS AND ENGINEERS

**EEPS 648**  
EXPLORATION GEOPHYSICS

**EEPS 654**  
INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY

**EEPS 658**  
environmental & applied rock physics

**EEPS 660**  
GLOBAL TECTONICS

**EEPS 661**  
STRUCTURE AND EVOLUTION OF TECTONIC SYSTEMS

**EEPS 662**  
TECTONOPHYSICS

**EEPS 667**  
GEOMECHANICS

**EEPS 671**  
EARTH SYSTEMS MODELING I: PHILOSOPHY AND FUNDAMENTALS

**MGMT 610**  
FUNDAMENTALS OF THE ENERGY INDUSTRY

**MGMT 611**  
GEOPOLITICS OF ENERGY

**NSCI 515**  
GEOPOLITICS OF ENERGY

**Total Credit Hours**  
18-20

**Footnotes and Additional Information**

1. **Note:** Some of the listed courses are not offered every year, and other coursework may be offered that satisfies the stated requirements upon approval. Depending on the student's background or interest, course substitutions for any required or elective course may be approved by the program's academic advisor. Students should consult with their academic advisors before enrolling.

2. **EEPS 580** (previously ESCI 527) is taught at the University of Houston campus.

### Area of Specialization: Geophysics

Students must complete a minimum of 6 courses (minimum of 18-20 credit hours, depending on course selection) to satisfy the requirements for the MSEG degree program's Geophysics area of specialization.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>EEPS 650</td>
<td>GEOPHYSICAL DATA ANALYSIS: DIGITAL SIGNAL PROCESSING</td>
<td>3</td>
</tr>
<tr>
<td>EEPS 651</td>
<td>GEOPHYSICAL DATA ANALYSIS: INVERSE METHODS</td>
<td>3</td>
</tr>
</tbody>
</table>

**Elective Requirements (for the Area of Specialization: Geophysics)**

Select a minimum of 4 courses (minimum of 12 credit hours) from the following:

1. **CHBE 548**  
ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT

2. **EEPS 525**  
APPLIED SEDIMENTOLOGY I

3. **EEPS 530**  
SILICICLASTIC DEPOSITIONAL SYSTEMS

4. **EEPS 545**  
THEORETICAL GLOBAL SEISMOLOGY I

5. **EEPS 578**  
HYDROCARBON EXPLORATION

6. **EEPS 579**  
HYDROCARBON SYSTEMS ANALYSIS

7. **EEPS 580**  
SEMINAR: QUANTITATIVE PETROLEUM SYSTEMS ANALYSIS

8. **EEPS 592**  
SPECIAL TOPICS IN EARTH, ENVIRONMENTAL & PLANETARY SCIENCES

9. **EEPS 615**  
GEOCHEMISTRY OF EARTH’S SURFACE

10. **EEPS 630**  
SEQUENCE STRATIGRAPHY

11. **EEPS 633**  
CLIMATE DYNAMICS

12. **EEPS 634**  
CLIMATE OF THE COMMON ERA

**EEPS 648**  
EXPLORATION GEOPHYSICS

**EEPS 654**  
INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY

**EEPS 658**  
environmental & applied rock physics

**EEPS 660**  
GLOBAL TECTONICS

**EEPS 661**  
STRUCTURE AND EVOLUTION OF TECTONIC SYSTEMS

**EEPS 662**  
TECTONOPHYSICS

**EEPS 667**  
GEOMECHANICS

**EEPS 671**  
EARTH SYSTEMS MODELING I: PHILOSOPHY AND FUNDAMENTALS

**MGMT 610**  
FUNDAMENTALS OF THE ENERGY INDUSTRY

**MGMT 611**  
GEOPOLITICS OF ENERGY

**NSCI 515**  
GEOPOLITICS OF ENERGY

**Total Credit Hours**  
18-20

**Footnotes and Additional Information**

1. **Note:** Some of the listed courses are not offered every year, and other coursework may be offered that satisfies the stated requirements upon approval. Depending on the student's background or interest, course substitutions for any required or elective course may be approved by the program's academic advisor. Students should consult with their academic advisors before enrolling.

2. **EEPS 580** (previously ESCI 527) is taught at the University of Houston campus.
program-specific transfer credit guidelines:

Students pursuing the MSEG degree should be aware of the following Program Transfer Credit Guidelines considering transfer credit possibilities. They are encouraged to meet with their academic program's advisor when reviewing potential courses for transfer.

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.

Opportunities for the MSEG 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/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science may have the option to pursue the Master of Science in Energy Geoscience (MSEG) degree. For additional information, students should contact their undergraduate major advisor, the faculty MSEG program director, and the Professional Science Master's (PSM) program director.

Additional Information

For additional information, please see the Energy Geoscience website: https://profms.rice.edu/

Policies for the MSEG Degree

Professional Science Master's Graduate Program Handbook

The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, the Professional Science Master's Program publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2022-23/Natural_Sciences_Professional_Masters_Graduate_Handbook.pdf

Admission

Admission to graduate study in energy geoscience is open to qualified students holding a bachelor's degree (BA or BS degree) in a related science or engineering program that included coursework in general chemistry, general physics, calculus, linear algebra, and differential equations. Completed coursework in geology and/or geophysics is preferred, as well as completed coursework in computer skills and some programming. Scores from the general Graduate Record Examination (GRE) are required. Department faculty evaluate the previous academic record and credentials of each applicant individually.

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.

Program Transfer Credit Guidelines

Students pursuing the MSEG degree should be aware of the following program-specific 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.

Footnotes and Additional Information

1 Note: Some of the listed courses are not offered every year, and other coursework may be offered that satisfies the stated requirements upon approval. Depending on the student's background or interest, course substitutions for any required or elective course may be approved by the program's academic advisor. Students should consult with their academic advisors before enrolling.