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. For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students. 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 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 tab.
- A 3-6 month full-time internship. Instead of a thesis, at the conclusion of their internship, students must present 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. 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>EEPS 548</td>
<td>3D SEISMIC REFLECTION DATA INTERPRETATION</td>
<td>3</td>
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<tr>
<td>EEPS 579</td>
<td>HYDROCARBON SYSTEMS ANALYSIS</td>
<td>4</td>
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<tr>
<td>EEPS 583</td>
<td>DATA MANAGEMENT AND DATA GOVERNANCE</td>
<td>3</td>
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<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 (2 semesters required, 1st semester)</td>
<td>1</td>
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<tr>
<td>NSCI 501</td>
<td>PROFESSIONAL MASTER'S SEMINAR (2 semesters required, 2nd semester)</td>
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<tr>
<td>NSCI 511</td>
<td>SCIENCE POLICY, AND ETHICS</td>
<td>3</td>
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<tr>
<td>NSCI 610</td>
<td>MANAGEMENT FOR SCIENCE AND ENGINEERING</td>
<td>3</td>
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<tr>
<td>ENGI 610</td>
<td>MANAGEMENT FOR SCIENCE AND ENGINEERING</td>
<td>3</td>
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</table>

Area of Specialization

Select 1 of the following Areas of Specialization (see Areas of Specialization below): Energy Data Management Energy Transition and Sustainability Geology Geophysics

Three to Six Month Full-Time Internship

A three to six month full-time internship is required. See a faculty advisor for more information.

Footnotes

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.

2
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.

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>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CEVE 528 / ENGI 528</td>
<td>ENGINEERING ECONOMICS</td>
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<tr>
<td>CHBE 548</td>
<td>ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT</td>
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<tr>
<td>COMP 543</td>
<td>GRADUATE TOOLS AND MODELS - DATA SCIENCE</td>
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<td>COMP 556 / ELEC 556</td>
<td>INTRODUCTION TO COMPUTER NETWORKS</td>
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<tr>
<td>DSCI 535 / COMP 549</td>
<td>APPLIED MACHINE LEARNING AND DATA PROJECTS</td>
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<tr>
<td>ECON 601</td>
<td>ENERGY ECONOMICS I</td>
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<td>EEPS 634</td>
<td>CLIMATE OF THE COMMON ERA</td>
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<tr>
<td>EEPS 636</td>
<td>GIS FOR SCIENTISTS AND ENGINEERS</td>
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<tr>
<td>MGMT 610</td>
<td>FUNDAMENTALS OF THE ENERGY INDUSTRY</td>
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<tr>
<td>MGMT 611</td>
<td>GEOPOLITICS OF ENERGY</td>
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<tr>
<td>MGMT 616</td>
<td>ENERGY MARKET ORGANIZATION</td>
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<td>MGMT 661</td>
<td>INTERNATIONAL BUSINESS LAW</td>
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<td>MGMT 670</td>
<td>OPERATIONS STRATEGY</td>
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<td>MGMT 676</td>
<td>SOCIAL ENTERPRISE</td>
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<td>NSCI 515</td>
<td>FOUNDATIONS OF PROJECT AND PROGRAM MANAGEMENT</td>
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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.

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:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOS 580</td>
<td>SUSTAINABLE DEVELOPMENT AND REPORTING</td>
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<td>BIOS 559</td>
<td>SUSTAINABILITY IMPACT ASSESSMENTS</td>
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<tr>
<td>CEVE 507</td>
<td>ENERGY AND THE ENVIRONMENT</td>
<td></td>
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<tr>
<td>CHBE 548</td>
<td>ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT</td>
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<tr>
<td>EEPS 530</td>
<td>SILICICLASTIC DEPOSITIONAL SYSTEMS</td>
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<td>EEPS 584</td>
<td>DATA SCIENCE ENVIRONMENTAL AND GEOSCIENCES</td>
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<td>EEPS 585</td>
<td>COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY</td>
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<td>EEPS 615</td>
<td>GEOCHEMISTRY OF EARTH’S SURFACE</td>
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<td>EEPS 636</td>
<td>GIS FOR SCIENTISTS AND ENGINEERS</td>
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<td>EEPS 637</td>
<td>EARTH’S NATURAL RESOURCES FOR THE ENERGY TRANSITION</td>
<td></td>
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<td>EEPS 648</td>
<td>EXPLORATION GEOPHYSICS</td>
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<td>EEPS 654</td>
<td>INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY</td>
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<tr>
<td>EEPS 658</td>
<td>ENVIRONMENTAL &amp; APPLIED ROCK PHYSICS</td>
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Footnotes and Additional Information
1 COMP 533 is an acceptable substitute for EEPS 585 (previously ESCI 570). COMP 543 is an acceptable substitute for EEPS 586 (previously ESCI 571). Students should only take the accepted COMP substitute courses if the EEPS courses are not offered.
2 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.
3 Students following the Energy Data Management Area of Specialization may take departmental (EEPS) coursework listed in other Areas of Specialization for the MSEG degree with the approval of the Area of Specialization Advisor.
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.

Code Title Credit Hours
Core Requirements (for the Area of Specialization: Geology)
EEPS 630 SEQUENCE STRATIGRAPHY 3
or EEPS 530 SILICICLASTIC DEPOSITIONAL SYSTEMS 3
EEPS 654 INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY 3
or EEPS 661 STRUCTURE AND EVOLUTION OF TECTONIC SYSTEMS

Elective Requirements (for the Area of Specialization: Geology)
Select a minimum of 4 courses (minimum of 12 credit hours) from the following:
CHBE 548 ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT
EEPS 525 APPLIED SEDIMENTOLOGY I
EEPS 530 SILICICLASTIC DEPOSITIONAL SYSTEMS
EEPS 545 THEORETICAL GLOBAL SEISMOLOGY I
EEPS 578 HYDROCARBON EXPLORATION
EEPS 579 HYDROCARBON SYSTEMS ANALYSIS
EEPS 580 SEMINAR: QUANTITATIVE PETROLEUM SYSTEMS ANALYSIS 2
EEPS 592 SPECIAL TOPICS IN EARTH, ENVIRONMENTAL & PLANETARY SCIENCES
EEPS 615 GEOCHEMISTRY OF EARTH’S SURFACE
EEPS 630 SEQUENCE STRATIGRAPHY
EEPS 633 CLIMATE DYNAMICS
EEPS 634 CLIMATE OF THE COMMON ERA
EEPS 636 GIS FOR SCIENTISTS AND ENGINEERS

Total Credit Hours 12-14

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 FOUNDATIONS OF PROJECT AND PROGRAM MANAGEMENT

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.

Code Title Credit Hours
Core Requirements (for the Area of Specialization: Geophysics)
EEPS 650 GEOPHYSICAL DATA ANALYSIS: DIGITAL SIGNAL PROCESSING 3
EEPS 651 GEOPHYSICAL DATA ANALYSIS: INVERSE METHODS 3

Elective Requirements (for the Area of Specialization: Geophysics)
Select a minimum of 4 courses (minimum of 12 credit hours) from the following:
CHBE 548 ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT
EEPS 525 APPLIED SEDIMENTOLOGY I
EEPS 530 SILICICLASTIC DEPOSITIONAL SYSTEMS
EEPS 545 THEORETICAL GLOBAL SEISMOLOGY I
EEPS 578 HYDROCARBON EXPLORATION
EEPS 579 HYDROCARBON SYSTEMS ANALYSIS
EEPS 580 SEMINAR: QUANTITATIVE PETROLEUM SYSTEMS ANALYSIS 2
EEPS 592 SPECIAL TOPICS IN EARTH, ENVIRONMENTAL & PLANETARY SCIENCES
EEPS 615 GEOCHEMISTRY OF EARTH’S SURFACE
EEPS 630 SEQUENCE STRATIGRAPHY
EEPS 633 CLIMATE DYNAMICS
EEPS 634 CLIMATE OF THE COMMON ERA

Total Credit Hours 12-14
### 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: [Natural_Sciences_Professional_Masters_Graduate_Handbook.pdf](https://gradhandbooks.rice.edu/2022_23/)

#### 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.

### Additional Information

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

#### 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/](https://profms.rice.edu/)