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-non-thesis-masters-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 40-42 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 (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

Code	Title	Credit Hours
Total Credit Hours Required for the MSEG Degree		40-42

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
Core Science Courses		
EEPS 548	3D SEISMIC REFLECTION DATA INTERPRETATION	3
EEPS 579	APPLIED SUBSURFACE SYSTEMS: ANALYTICAL METHODS FOR ENERGY AND SUSTAINABILITY	4
EEPS 583	DATA MANAGEMENT AND DATA GOVERNANCE	3
EEPS 659	WELL LOGGING AND PETROPHYSICS	3
Cohort Courses		
NSCI 501	PROFESSIONAL MASTER'S SEMINAR (2 semesters required, 1st semester)	1
NSCI 501	PROFESSIONAL MASTER'S SEMINAR (2 semesters required, 2nd semester)	1
NSCI 511	SCIENCE POLICY, AND ETHICS	3
NSCI 610 / ENGI 610	MANAGEMENT FOR SCIENCE AND ENGINEERING	3
Area of Specialization		
Select 1 of the following Areas of Specialization (see Areas of Specialization below):		*18-20*
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 [2]		
NSCI 512	PROFESSIONAL MASTER'S PROJECT	1
Total Credit Hours		**40-42**

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.

[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 18-20 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.

Code	Title	Credit Hours
Core Requirements (for the Area of Specialization: Energy Data Management) [1]		
EEPS 584	DATA SCIENCE ENVIRONMENTAL AND GEOSCIENCES	3
EEPS 585	COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY	3
EEPS 586	DATA SCIENCE METHODS AND DATA MANAGEMENT	3
Elective Requirements (for the Area of Specialization: Energy Data Management)		
Select a minimum of 3 courses (minimum of 9 credit hours) from the following: [2,3]		*9-11*
CEVE 528 / ENGI 528	ENGINEERING ECONOMICS	
CHBE 548	ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT	
COMP 543	GRADUATE TOOLS AND MODELS - DATA SCIENCE	
COMP 556 / ELEC 556	INTRODUCTION TO COMPUTER NETWORKS	
DSCI 535 / COMP 549	APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS	
ECON 601	ENERGY ECONOMICS I	
EEPS 634	CLIMATE OF THE COMMON ERA	
EEPS 636	GIS FOR SCIENTISTS AND ENGINEERS	
MGMT 610	FUNDAMENTALS OF THE ENERGY INDUSTRY	
MGMT 611	GEOPOLITICS OF ENERGY	
MGMT 616	ENERGY MARKET ORGANIZATION	
MGMT 661	INTERNATIONAL BUSINESS LAW	
MGMT 670	OPERATIONS STRATEGY	
MGMT 676	MISSION AND VALUES AS A LEADER IN ECONOMIC ACTIVITIES	
NSCI 515	FOUNDATIONS OF PROJECT AND PROGRAM MANAGEMENT	
STAT 518	PROBABILITY	
Total Credit Hours		**18-20**

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.

Area of Specialization: Energy Transition and Sustainability

Students must complete a minimum of 6 courses (minimum of 19-20 credit hours, depending on course selection) to satisfy the requirements for the MSEG degree program's Energy Transition and Sustainability area of specialization.

Code	Title	Credit Hours
Core Requirements (for the Area of Specialization: Energy Transition and Sustainability)		
EEPS 582	GEOSCIENCES FOR THE ENERGY TRANSITION	3
EEPS 680	ENERGY TRANSITION SEMINAR	1
EEPS 637	EARTH'S NATURAL RESOURCES FOR THE ENERGY TRANSITION	3
or EEPS 638	THE SCIENCE OF NATURE-BASED CARBON SEQUESTRATION	
Elective Requirements (for the Area of Specialization: Energy Transition and Sustainability)		
Select a minimum of 4 courses (minimum of 12 credit hours) from the following: [1]		*12-13*
BIOS 580	SUSTAINABLE DEVELOPMENT AND REPORTING	
BIOS 559	SUSTAINABILITY IMPACT ASSESSMENTS	
CEVE 507	ENERGY AND THE ENVIRONMENT	
CHBE 548	ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT	
EEPS 530	SILICICLASTIC SEDIMENTS: DEPOSITIONAL SYSTEMS AND PROCESSES	
EEPS 584	DATA SCIENCE ENVIRONMENTAL AND GEOSCIENCES	
EEPS 585	COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY	

EEPS 593	INTRODUCTION TO GEOTHERMAL ENERGY SYSTEMS
EEPS 615	GEOCHEMISTRY OF EARTH'S SURFACE
EEPS 634	CLIMATE OF THE COMMON ERA
EEPS 636	GIS FOR SCIENTISTS AND ENGINEERS
EEPS 637	EARTH'S NATURAL RESOURCES FOR THE ENERGY TRANSITION
EEPS 638	THE SCIENCE OF NATURE-BASED CARBON SEQUESTRATION
EEPS 648	EXPLORATION GEOPHYSICS
EEPS 654	INTRODUCTION TO SEISMIC INTERPRETATION: STRUCTURAL STYLES AND SEISMIC STRATIGRAPHY
EEPS 658	ENVIRONMENTAL & APPLIED ROCK PHYSICS
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	**19-20**

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 SEDIMENTS: DEPOSITIONAL SYSTEMS AND PROCESSES	
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: [1]		*12-14*
CHBE 548	ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT	
EEPS 525	APPLIED SEDIMENTOLOGY I	
EEPS 530	SILICICLASTIC SEDIMENTS: DEPOSITIONAL SYSTEMS AND PROCESSES	
EEPS 545	THEORETICAL GLOBAL SEISMOLOGY I	
EEPS 578	HYDROCARBON EXPLORATION	
EEPS 579	APPLIED SUBSURFACE SYSTEMS: ANALYTICAL METHODS FOR ENERGY AND SUSTAINABILITY	
EEPS 580	SEMINAR: QUANTITATIVE PETROLEUM SYSTEMS ANALYSIS [2]	
EEPS 582	GEOSCIENCES FOR THE ENERGY TRANSITION	
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	
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: [1]		*12-14*
CHBE 548	ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT	
EEPS 578	HYDROCARBON EXPLORATION	
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	
EEPS 648	EXPLORATION GEOPHYSICS	
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.

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/2023_24/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.

Additional Information

For additional information, please see the Energy Geoscience website: 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/