MASTER OF ENERGY TRANSITION AND SUSTAINABILITY (METS) DEGREE

Program Learning Outcomes for the METS Degree

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

1. Explain the interconnections among Earth, Energy, and Environmental Systems and impacts on society.
2. Evaluate controls on global and regional energy supply and demand and the flow of energy and money across the energy value chain.
3. Develop and apply technical, quantitative, and practical skills related to energy production, storage, deployment and identify solutions to energy problems.
4. Conduct integrated, interdisciplinary team-based research on energy systems, and communicate this understanding to the general public.

Requirements for the METS Degree

The METS degree is a non-thesis master's degree. For general university requirements, 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 METS degree must complete:

- A minimum of 11 courses (minimum of 31 credit hours) to satisfy degree requirements.
- A minimum of 31 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. 2) tab.
- The requirements for one area of specialization (see below for areas of specialization). The METS degree program offers two areas of specialization:
  - Engineering (p. 1), ***or***
  - Geosciences (p. 2).
- 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 course substitutions 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 METS Degree		31

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
BIOS 580	SUSTAINABLE DEVELOPMENT AND REPORTING	3
CHBE 549 / EEPS 549	ECONOMICS AND POLICIES OF THE ENERGY TRANSITION (ECONOMICS AND POLICIES OF THE ENERGY TRANSITION)	3
CHBE 552	TRANSITIONING TO LOW CARBON ENERGIES: ENGINEERING FUNDAMENTALS	3
CHBE 680 / EEPS 680	ENERGY TRANSITION SEMINAR	1
EEPS 582	GEOSCIENCES FOR THE ENERGY TRANSITION	3
Area of Specialization		
Select 1 of the following Areas of Specialization:		*15*
Engineering		
Geosciences		
Capstone Requirement		
CEVE 507	ENERGY AND THE ENVIRONMENT	3
Total Credit Hours		**31**

Areas of Specialization

Students must complete a minimum of 5 courses (minimum of 15 credit hours) to satisfy the requirements for one area of specialization.

Area of Specialization: Engineering

Students must complete a minimum of 5 courses (minimum of 15 credit hours) to satisfy the requirements for the METS degree program's Engineering area of specialization.

Code	Title	Credit Hours
Select a minimum of 5 courses (minimum of 15 credit hours) from the following:		*15*
CEVE 505 / ENGI 505	ENGINEERING ECONOMICS AND PROJECT MANAGEMENT	
CEVE 543	STATISTICAL-PHYSICAL METHODS FOR HYDROCLIMATE EXTREMES AND CATASTROPHES	

CHBE 506	TECHNOECONOMIC ANALYSIS AND ENGINEERING DECISION TOOLS
CHBE 510	FUNDAMENTALS AND APPLICATIONS IN ELECTROCHEMICAL ENERGY CONVERSION
CHBE 515	SEPARATION TECHNOLOGIES FOR CHEMICAL AND BIOMOLECULAR PROCESSES
CHBE 517	FUNDAMENTALS OF MATERIALS IN ENERGY AND SUSTAINABILITY
CHBE 521	ANALYSIS OF ENERGY SYSTEMS
CHBE 568	INDUSTRIAL CHEMICAL PROCESSES AND THE ENERGY TRANSITION
CHBE 614	ADVANCED COMPUTATIONAL METHODS FOR ENERGY
CHBE 720	SPECIAL TOPICS IN CHEMICAL ENGINEERING I [1]
EEPS 585	COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY
EEPS 657 / CHBE 657	CARBON CAPTURE, UTILIZATION AND STORAGE
Total Credit Hours	**15**

Footnotes and Additional Information

1 CHBE 720 *Special Topics in Chemical Engineering* is a variable credit hour course and will only fulfill Area of Specialization requirements when taken for at least 3 credit hours. Students interested in taking CHBE 720 or EEPS 501 first must discuss and gain approval from the program's academic advisor or, where applicable, the department or program's Director of Graduate Studies. Instructor permission is also required. Students should enroll in at least 3 credit hours for either course. Only one of the two courses (either CHBE 720 or EEPS 501) when taken for at least 3 credit hours can be applied toward the Area of Specialization requirements.

Area of Specialization: Geosciences

Students must complete a minimum of 5 courses (minimum of 15 credit hours) to satisfy the requirements for the METS degree program's Geosciences area of specialization.

Code	Title	Credit Hours
Select a minimum of 5 courses (minimum of 15 credit hours) from the following:		*15*
EEPS 501	SPECIAL STUDIES FOR GRADUATE STUDENTS [1]	
EEPS 579	APPLIED SUBSURFACE SYSTEMS: ANALYTICAL METHODS FOR ENERGY AND SUSTAINABILITY	
EEPS 585	COMPUTATIONAL AND DATA SCIENCE IN THE ENERGY INDUSTRY	
EEPS 586	INTRODUCTION TO DATA SCIENCE & METHODS	
EEPS 593	INTRODUCTION TO GEOTHERMAL ENERGY SYSTEMS	
EEPS 637	EARTH'S NATURAL RESOURCES FOR THE ENERGY TRANSITION	
EEPS 638	THE SCIENCE OF NATURE-BASED CARBON SEQUESTRATION	
EEPS 648	EXPLORATION GEOPHYSICS	
EEPS 657 / CHBE 657	CARBON CAPTURE, UTILIZATION AND STORAGE	
EEPS 658	ENVIRONMENTAL & APPLIED ROCK PHYSICS	
EEPS 659	WELL LOGGING AND PETROPHYSICS	
EEPS 667	GEOMECHANICS	
Total Credit Hours		**15**

Footnotes and Additional Information

1 EEPS 501 *Special Studies for Graduate Students* is a variable credit hour course and will only fulfill Area of Specialization requirements when taken for at least 3 credit hours. Students interested in taking CHBE 720 or EEPS 501 first must discuss and gain approval from the program's academic advisor or, where applicable, the department or program's Director of Graduate Studies. Instructor permission is also required. Students should enroll in at least 3 credit hours for either course. Only one of the two courses (either CHBE 720 or EEPS 501) when taken for at least 3 credit hours can be applied toward the Area of Specialization requirements.

Policies for the METS Degree

Energy Transition and Sustainability Graduate Program Handbook

The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, the Energy Transition and Sustainability program publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2024_25/Master_Energy_Transition_Sustainability_Handbook.pdf/.

Admission

Admission to graduate study in Energy Transition and Sustainability is open to qualified students holding a bachelor's degree in a related science or engineering program that included coursework in general chemistry, physics, and advanced math. Scores from the general Graduate Record Examination (GRE) must be submitted. Highly qualified candidates will demonstrate good critical thinking and communication skills, and strong quantitative abilities. Department faculty evaluate the previous academic record and credentials of each applicant individually and make admission decisions.

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. Requests for transfer credit must be approved for Rice equivalency by the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content) and by the Office of Graduate and Postdoctoral Studies (GPS). Students are encouraged to meet with their academic program's advisor when considering transfer credit possibilities.

Program Transfer Credit Guidelines

Students pursuing the METS degree should be aware of the following program-specific transfer credit guideline:

- 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.

Additional Information

For additional information, please see the Energy Transition and Sustainability website: https://mets.rice.edu/.

Opportunities for the METS 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 and engineering may have the option to pursue the Master of Energy Transition and Sustainability (METS) degree. For additional information, students should contact their undergraduate major advisor and one of the Directors of Graduate Studies of the METS degree program.

Additional Information

For additional information, please see the Energy Transition and Sustainability website: https://mets.rice.edu/.