



Minor in Energy & Water Sustainability

RICE UNIVERSITY

Fall 2024



Developing solutions for the global environmental challenges requires an alternative to traditional engineering practice: a holistic and sustainable approach based on systems thinking incorporating the environmental, economic, and social spheres to engineering solutions. The Energy & Water Sustainability (EWSU) minor allows students to deepen their knowledge of sustainability and the science and policy issues associated with the design of sustainable energy & water strategies. EWSU graduates will be better prepared to address the challenge of meeting basic human needs today and in the future in a socially responsible manner while preserving natural systems.

Learning Outcomes

1. Apply basic economic concepts of energy and water sustainability including aspects of environmental economics and project-scale economic issues.
2. Understand basic environmental issues applicable to energy and water sustainability.
3. Conduct evaluations of social aspects from a sustainability perspective.
4. Evaluate projects and political systems from the standpoint of energy and water issues as well as more general sustainability issues.
5. Apply sustainability concepts at varying scales and viewpoints, including project level, corporate level, and municipal, state, national, and international levels.
6. Understand the role of climate change on future projects and societies.

Course Requirements¹

Total: 19 hours

- A minimum of 7 courses (19 credit hrs) to satisfy minor requirements.
- A min. of 5 courses (16 credit hrs) taken at the 300+ level.
- A Design Practicum.
- A minimum of 1 course (3 credit hrs) of the Elective Requirements should be completed for the minor only (not shared or double-counted with core major requirements).

Core Requirements²

Total: 9 credit hours

CEVE 301 or ECON 480 / ENST 480	Engineering Economics and Project Management Environmental Economics	3
CEVE 302 / ENGI 302 or CEVE 406 / ENST 406	Sustainable Design Introduction to Environmental Law	3
CEVE 307 / EEPS 307 / ENST 307	Energy and the Environment	3

Design Practicum³

At least 1 credit hour

CEVE 499	Special Topics	1
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Elective Courses⁴

Total: Minimum 9 credit hours

Select a total of 3 elective courses from at least 2 of the 3 categories:

Directed Elective: Energy

Select up to 2 courses from the following:

CHBE 421	Analysis of Energy Systems	3
ENST 250	Understanding Energy	3
ECON 437 / ENST 437	Energy Economics	3
EEPS 437	Earth's Natural Resources for Energy Transition	3

Directed Elective: Water

Select up to 2 courses from the following:

CEVE 314 / BIOE 365 / GLHT 314	Sustainable Water Purification for the Developing World	3
CEVE 315	Urban Water Systems	3
CEVE 412	Hydrology and Water Resources Engineering	3
CEVE 444	Environmental Microbiology & Microbial Ecology	3

Directed Elective: Sustainability

Select up to 2 courses from the following:

ARCH 313 / ENST 313	Case Studies in Sustainable Design	3
ARCH 322 / ENST 322	Case Studies in Sustainability	3
BIOS 280	Sustainable Development and Reporting	3
BIOS 559*	Sustainability Impact Assessments	3
CEVE 421	Climate Risk Management	3
CEVE 426	Smart Materials for the Environment	3
CEVE 492	Modeling and Analysis of Networked Systems	3
EEPS 438	Nature-Based Carbon Sequestration	3
ENST 210	Sustainable Futures	3
ENST 301	Environmental Justice	3
ENST 302 / SOC 304	Environmental Issues: Rice into the Future	3
POLI 332	Urban Politics	3
STAT 485	Environmental Statistics and Decision Making	3

*Senior and Junior undergraduate students can register to BIOS 559



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Sample Four Year CEVE Plan with Minor

Example: CEVE Typical Plan for an Environmental Focus (Area I) (GENERIC) - AY 20-21 (no transfer credits applied)

CEVE Typical Plans for an Environmental Focus (GENERIC) - AY 20-21 (no transfer credits applied)

FRESHMAN	Course	Name	Credit
Fall Semester 1			
MATH/SCI	CHEM 121	GENERAL CHEMISTRY I	3
MATH/SCI	CHEM 123	GENERAL CHEMISTRY I LAB	1
MATH/SCI	MATH 101/105	SINGLE VARIABLE CALCULUS I	3
MATH/SCI	PHYS 101	MECHANICS w/ LAB	4
MATH/SCI	PHYS 103	MECHANICS <i>Discussion</i>	0
DIST (DWD2)	D1	Distribution Elective	3
Fw/S	Fw/S	First-Year Writing-Intensive Seminar	3
Total Semester Credit Hours			17

SOPHOMORE	Course	Name	Credit
Fall Semester 3			
MATH/SCI	MATH 212	MULTIVARIABLE CALCULUS	3
CORE	CEVE 211	ENGINEERING MECHANICS	3
CORE	CEVE 310	PR. OF ENVI ENGINEERING	3
FOCUS AREA I	CEVE 302	SUSTAINABLE DESIGN	3
FOCUS AREA III	CEVE XXX	FALL OPTION	3
DIST (DWD2)	D1	Distribution Elective	3
Total Semester Credit Hours			18

JUNIOR	Course	Name	Credit
Fall Semester 5			
MATH/SCI	STAT 310	PROBABILITY & STATISTICS	3
FOCUS AREA II	CEVE 418	QUANTITATIVE HYDROGEOLOGY	3
FOCUS AREA IV	CEVE XXX	FALL OPTION	3
DIST (DWD2)	D2	Distribution Elective	3
DIST (DWD2)	D2	Distribution Elective	3
OPEN ELEC	Elective	Elective	2
Total Semester Credit Hours			17

SENIOR	Course	Name	Credit
Fall Semester 7			
MATH/SCI	MATH 355	LINEAR ALGEBRA	3
CORE	CEVE 481	INTRO TO SENIOR DESIGN	1
MINOR ELEC	Non CEVE Environmental or Energy Course (See GA)		3
FOCUS AREA III	CEVE XXX	FALL OPTION	3
MINOR ELEC	CEVE 499	SPECIAL PROBLEMS	1
OPEN ELEC	Elective	Elective	3
OPEN ELEC	Elective	Elective	3
Total Semester Credit Hours			17

FAC = Focus Area Course
FASPEC = Focus Area Specialty

= EWSU Applied Course

FRESHMAN	Course	Name	Credit
Spring Semester 2			
MATH/SCI	CHEM 122	GENERAL CHEMISTRY II	3
MATH/SCI	CHEM 124	GENERAL CHEMISTRY II LAB	1
MATH/SCI	MATH 102/106	SINGLE VARIABLE CALCULUS II	3
MATH/SCI	MATH 211	ORD DIFFERENTIAL EQUATIONS	3
MATH/SCI	PHYS 102	ELECTRICITY&MAGNETISM w/LAB	4
MATH/SCI	PHYS 104	ELECTRICITY&MAGNETISM <i>Discussion</i>	0
DIST (DWD2)	D1	Distribution Elective	3
Total Semester Credit Hours			17

SOPHOMORE	Course	Name	Credit
Spring Semester 4			
MATH/SCI	CAAM 210	INTRO TO ENG COMPUTATION	3
CORE	CEVE 311	MECHANICS OF SOLIDS	3
CORE	CEVE 312	MECHANICS OF SOLIDS LAB	1
FOCUS AREA II	CEVE 412	HYDROLOGY AND WATER RESOURC	3
FOCUS AREA IV	CEVE 301	ENG ECON AND PROJECT MNGMT	3
LPAP	LPAP	Lifetime Physical Activity Program	1
OPEN ELEC	Elective	Elective	3
Total Semester Credit Hours			17

JUNIOR	Course	Name	Credit
Spring Semester 6			
MATH/SCI	ESCI 115	INTRODUCTION TO THE EARTH	4
CORE	CEVE 315	URBAN WATER SYSTEMS	3
CORE	CEVE 316	URBAN WATER SYSTEMS LAB	1
CORE	CEVE 363	APPLIED FLUID MECHANICS	3
DIST (DWD2)	D2	Distribution Elective	3
FOCUS AREA I	CEVE 307	ENERGY AND THE ENVIRONMENT	3
Total Semester Credit Hours			17

SENIOR	Course	Name	Credit
Spring Semester 8			
CORE	CEVE 401	ENVIRONMENTAL CHEMISTRY	3
CORE	CEVE 480	SENIOR DESIGN	3
FASPEC	CEVE XXX	AREA I, II, III or IV Focus Area Course	3
FASPEC	CEVE XXX	AREA I, II, III or IV Focus Area Course	3
OPEN ELEC	Elective	Elective	3
Total Semester Credit Hours			15

TOTAL CREDITS **135**

Notes

¹ Courses not on this official list may be substituted upon approval of the minor's academic advisor. Students and their academic advisors should identify and clearly document the courses to be taken.

² These courses may be taken as electives if they are not counted as part of the core requirements.

³ The Design Practicum is typically completed during the fall semester of the students' senior year. Students in engineering and architecture may fulfill this requirement by preparing a report describing the incorporation of sustainability concepts into their senior (capstone) design project in consultation with their course instructor (e.g., CEVE 480). Students may also consult with an extant design group or pursue a project related to their own area of study in consultation with the EWSU advisors.

⁴ No more than 2 electives courses can be drawn from any 1 of the 3 electives categories. At least 1 elective course must be taken from a different school than the school hosting the student's major. No more than 2 of the 3 electives can be used to also fulfill a student's major core requirements. Courses not listed here can be approved by the minor's Official Certifier.

EWSU Academic Advisor & Official Certifier

Jorge Loyo, Ph.D.

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Website

Please visit the Energy & Water Sustainability (EWSU) website for additional information.

