

ENVIRONMENTAL SYSTEMS ENGINEERING, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements

For the Bachelor of Science degree in Environmental Systems Engineering, a minimum of 131 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	113-114

27 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GWS courses; 6 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44>).

Common Requirements for the Major (All Options)

Code	Title	Credits
Prescribed Courses		
CHEM 111	Experimental Chemistry I	1
CHEM 112	Chemical Principles II	3
CHEM 202	Fundamentals of Organic Chemistry I	3
EMSC 100S	Earth and Mineral Sciences First-Year Seminar ¹	3
EMCH 211	Statics	3
EMCH 212	Dynamics	3
EME 460	Geo-resource Evaluation and Investment Analysis	3
ENVSE 404W	Surface and Interfacial Phenomena in Environmental Systems	3
ENVSE 406	Sampling and Monitoring of the Geo-Environment	3
ENVSE 450	Environmental Health and Safety	3
ENVSE 470	Engineering Risk Analysis	3
ENVSE 480	Environmental Systems Engineering Process Design	3
GEOSC 452	Hydrogeology	3
MATH 251	Ordinary and Partial Differential Equations	4
MNG 401	Introduction to Mining Operations	1
PHYS 212	General Physics: Electricity and Magnetism	4
PNG 411	Introduction to Petroleum and Natural Gas Extraction	1

Prescribed Courses: Require a grade of C or better

CE 370	Introduction to Environmental Engineering	3
CHEM 110	Chemical Principles I	3
EME 301	Thermodynamics in Energy and Mineral Engineering	3

EME 303	Fluid Mechanics in Energy and Mineral Engineering	3
ENGL 202C	Effective Writing: Technical Writing	3
ENVSE 427	Pollution Control in the Process Industries	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MNPR 301	Elements of Mineral Processing	3
PHYS 211	General Physics: Mechanics	4

Additional Courses

ENGL 15	Rhetoric and Composition	3
or ENGL 30H	Honors Rhetoric and Composition	
MATH 220	Matrices	2
or MATH 231	Calculus of Several Variables	
Select 3-4 credits of the following:		3-4
CMPSC 201	Programming for Engineers with C++	
CMPSC 203	Introduction to Spreadsheets and Databases	

Additional Courses: Require a grade of C or better

GEOSC 1	Physical Geology	3
or GEOSC 71		

Supporting Courses and Related Areas

Select 6 credits in consultation with adviser. Students who complete Basic ROTC may substitute 6 credits of ROTC for 3 credits of GHW courses and 3 credits of Supporting Courses and Related Areas.	6
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Requirements for the Option

Select an option	16
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¹ The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 can be substituted for EMSC 100S.

Requirements for the Option

Environmental Systems Engineering Option (16 credits)

Code	Title	Credits
Prescribed Courses		
EGEE 470	Air Pollutants from Combustion Sources	3
ENVSE 412	Environmental Systems Engineering Laboratory	1
GEOG 30N	Environment and Society in a Changing World	3
MICRB 106	Elementary Microbiology	3

Additional Courses

Select one of the following:		3
ENVSE 408	Contaminant Hydrology	
METEO 455	Atmospheric Dispersion	
SOILS 401	Soil Composition and Physical Properties	
Select one of the following:		3
METEO 454	Introduction to Micrometeorology	
MNPR 401	Mineral Process Engineering	
MNPR 426	Aqueous Processing	

Environmental Health and Safety Engineering Option (16 credits)

Code	Title	Credits
Prescribed Courses		
BIOL 141	Introduction to Human Physiology	3
ENVSE 400	Safety Engineering	3
ENVSE 440	Industrial Ventilation for Contaminant Control	3

ENVSE 457	Industrial Hygiene Measurements	3
ENVSE 458	Industrial Hygiene Measurements Laboratory	1
PSYCH 100	Introductory Psychology	3

- United States Cultures: 3 credits
- International Cultures: 3 credits

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80>)). For more information, check the Suggested Academic Plan for your intended program.