

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 128 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	110

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/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>).

Code	Title	Credits
Prescribed Courses		
CHEM 111	Experimental Chemistry I	1
CHEM 112	Chemical Principles II	3
EGEE 470	Air Pollutants from Combustion Sources	3
EMCH 211	Statics	3
EMCH 212	Dynamics	3
EME 210	Data Analytics for Energy Systems	3
EME 460	Geo-resource Evaluation and Investment Analysis	3
ENVSE 400	Safety Engineering	3
ENVSE 404W	Surface and Interfacial Phenomena in Environmental Systems	4
ENVSE 406	Sampling and Monitoring of the Geo-Environment	3
ENVSE 408	Contaminant Hydrology	3
ENVSE 412	Environmental Systems Engineering Laboratory	1
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
MICRB 106	Elementary Microbiology	3
<i>Prescribed Courses: Require a grade of C or better</i>		
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
EMSC 100S	Earth and Mineral Sciences First-Year Seminar ¹	3

ENGL 202C	Effective Writing: Technical Writing	3
ENVSE 427	Pollution Control in the Process Industries	3
GEOSC 1	Physical Geology	3
MATH 251	Ordinary and Partial Differential Equations	4
MNPR 301	Elements of Mineral Processing	3
PHYS 211	General Physics: Mechanics	4
PHYS 212	General Physics: Electricity and Magnetism	4

Additional Courses		
CHEM 202	Fundamentals of Organic Chemistry I	3
or CHEM 210	Organic Chemistry I	
GEOG 160	Mapping Our Changing World	3
or GEOG 260	Geographic Information in a Changing World: Introduction to GIScience	

Additional Courses: Require a grade of C or better

ESL 15	ESL Composition for American Academic Communication II	3
or ENGL 30H	Honors Rhetoric and Composition	
or ENGL 15	Rhetoric and Composition	
MATH 140	Calculus With Analytic Geometry I	4
or MATH 140G	Calculus with Earth and Mineral Sciences Applications I	
MATH 141	Calculus with Analytic Geometry II	4
or MATH 141G	Calculus with Earth and Mineral Sciences Applications II	

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

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.

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

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

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/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>)). For more information, check the Suggested Academic Plan for your intended program.