

ENGINEERING, B.S.

Begin Campus: Abington, Brandywine, DuBois, Hazleton

End Campus: Abington, Brandywine, DuBois, Hazleton

Degree Requirements

For the Bachelor of Science degree in General Engineering, a minimum of 127 credits are required:

Requirement	Credits
General Education	45
Requirements for the Major	109

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

Common Requirements for the Major (All Options)

Code	Title	Credits
Prescribed Courses		
CHEM 111	Experimental Chemistry I	1
EMCH 213	Strength of Materials	3
ENGR 490W	Senior Design I	1
ENGR 491W	Senior Design II	3
MATH 231	Calculus of Several Variables	2
PHYS 214	General Physics: Wave Motion and Quantum Physics	2
<i>Prescribed Courses: Require a grade of C or better</i>		
CHEM 110	Chemical Principles I	3
EDSGN 100	Cornerstone Engineering Design	3
EMCH 211	Statics	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
MATH 251	Ordinary and Partial Differential Equations	4
PHYS 211	General Physics: Mechanics	4
PHYS 212	General Physics: Electricity and Magnetism	4

Additional Courses

Select 1 credit of First-Year Seminar		1
ECON 102	Introductory Microeconomic Analysis and Policy	3
or ECON 104	Introductory Macroeconomic Analysis and Policy	
Select one of the following:		3
CMPSC 121	Introduction to Programming Techniques	
CMPSC 200	Programming for Engineers with MATLAB	
CMPSC 201	Programming for Engineers with C++	
<i>Additional Courses: Require a grade of C or better</i>		
CAS 100A	Effective Speech	3
or CAS 100B	Effective Speech	
ENGL 15	Rhetoric and Composition	3

or ENGL 30H	Honors Rhetoric and Composition	
ENGL 202C	Effective Writing: Technical Writing	3
or ENGL 202D	Effective Writing: Business Writing	
Select one of the following:		3
EMCH 407	Computer Methods in Engineering Design	
EMCH 461	Finite Elements in Engineering	
ENGR 350	Computational Modeling Methods	

Supporting Courses and Related Areas

Select 4 credits in General Technical Electives, in consultation with an adviser, from the program approved list. 4

Requirements for the Option

Select an option 45

Requirements for the Option Applied Materials Option (45 credits)

Available at the following campuses: DuBois

Code	Title	Credits
Prescribed Courses		
CHEM 112	Chemical Principles II	3
CHEM 202	Fundamentals of Organic Chemistry I	3
ENGR 320	Materials Properties Measurement I	3
ENGR 421	Materials Properties Measurements II	4
ENGR 450	Materials Design and Applications	3
MATSE 202	Introduction to Polymer Materials	3
MATSE 400	Crystal Chemistry	3
MATSE 402	Materials Process Kinetics	3
MATSE 411	Processing of Ceramics	3
MATSE 413	Solid-State Materials	3
MATSE 417	Electrical and Magnetic Properties	3
MATSE 430	Materials Characterization	3
<i>Prescribed Courses: Require a grade of C or better</i>		
MATH 220	Matrices	2
MATSE 201	Introduction to Materials Science	3

Additional Courses

<i>Additional Courses: Require a grade of C or better</i>		
ME 300	Engineering Thermodynamics I	3
or EME 301	Thermodynamics in Energy and Mineral Engineering	

Alternative Energy and Power Generation Option (45 credits)

Available at the following campuses: Hazleton

Code	Title	Credits
Prescribed Courses		
CHEM 112	Chemical Principles II	3
CHEM 113	Experimental Chemistry II	1
EE 314	Signals and Circuits II	3
EE 485	Energy Systems and Conversion	3
EGEE 302	Principles of Energy Engineering	3
EGEE 420	Hydrogen and Fuel Cells	3
EME 303	Fluid Mechanics in Energy and Mineral Engineering	3
ME 345	Instrumentation, Measurements, and Statistics	4
<i>Prescribed Courses: Require a grade of C or better</i>		
EE 210	Circuits and Devices	4

Additional Courses

Select 9 credits from the following:	9
EE 488	Power Systems Analysis I
EGEE 437	Design of Solar Energy Conversion Systems
EGEE 438	Wind and Hydropower Energy Conversion
EGEE 441	Electrochemical Engineering Fundamentals
NUCE 401	Introduction to Nuclear Engineering

Additional Courses: Require a grade of C or better

ME 300	Engineering Thermodynamics I	3
or EME 301	Thermodynamics in Energy and Mineral Engineering	

Supporting Courses and Related Areas

Select 6 credits in Engineering Technical Elective courses, any 400-level courses in the College of Engineering or any 400-level courses with the Energy and Geoenvironmental Engineering (EGEE) abbreviation. Other substitutions outside the approved list must be approved by petition.	6
--	---

Multidisciplinary Engineering Design Option (45 credits)

Available at the following campuses: Abington, Brandywine

Code	Title	Credits
------	-------	---------

Prescribed Courses

CMPEN 271	Introduction to Digital Systems	3
EDSGN 401	Engineering Systems Design	3
EDSGN 402	Materials and Manufacturing	4
EDSGN 403	Product Realization	3
EDSGN 495	Internship	1
EE 316	Introduction to Embedded Microcontrollers	3
ENGR 407	Technology-Based Entrepreneurship	3

Prescribed Courses: Require a grade of C or better

EDSGN 410	Robotics Design and Applications	4
EE 210	Circuits and Devices	4
EE 310	Electronic Circuit Design I	4
EMCH 212	Dynamics	3

Additional Courses

CHEM 112	Chemical Principles II (or any GN)	3
CHEM 113	Experimental Chemistry II (or any GN)	1

Additional Courses: Require a grade of C or better

Select one of the following:	3
EME 301	Thermodynamics in Energy and Mineral Engineering
ME 201	Introduction to Thermal Science
ME 300	Engineering Thermodynamics I

Supporting Courses and Related Areas

Select 3 credits in Engineering Technical Elective courses, in consultation with an adviser, from department list.	3
--	---

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.