

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 (<http://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 |
| 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

Additional Courses: Require a grade of C or better

| | | |
|------------|--|---|
| 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 |
| <i>Prescribed Courses: Require a grade of C or better</i> | | |
| 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.)

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

Knowledge Domains

- **Arts (GA):** 6 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 6 credits
- **Social and Behavioral Sciences (GS):** 6 credits
- **Natural Sciences (GN):** 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- **Inter-Domain or Approved Linked Courses:** 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 (<http://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.