

# ENGINEERING, B.S.

**Begin Campus:** Abington, Brandywine, DuBois, Hazleton

**End Campus:** Abington, Brandywine, DuBois, Hazleton

## Program Description

The Engineering program provides students with a broad foundation in engineering with specialization in a technically and professionally relevant topic. Students must choose the Multidisciplinary Engineering Design option at Abington, Brandywine and Great Valley campuses, Applied Materials option at the DuBois campus or the Alternative Energy and Power Generation option at the Hazleton campus. From this degree program, students will acquire the ability to work as members of a team toward successful attainment of a common goal, thus preparing them to work in for-profit or nonprofit organizations, or to further their studies in graduate school. Typical employment for General Engineering graduates includes positions such as engineer, product engineer, process engineer, manufacturing engineer, development engineer, and materials engineer. With employment opportunities such as these and others, graduates of the Engineering program can attain professional and economically sustaining employment in their desired regional area. This degree program develops written and oral communication skills, culminating in a two-semester senior design course sequence consisting of a project based largely on student interest and faculty input.

## You Might Like This Program If...

- You have an interest in various different engineering disciplines and would like to diversify your skill set as much as possible.
- You want to concentrate your studies on product, process, and manufacturing engineering.
- You are passionate about the design and development of products.
- You have an interest in alternative and renewable energy and power generation.

## Entrance to Major

In order to be eligible for entrance to this major, students must satisfy the following requirements by the end of the semester during which the admission to major process is carried out.

- Completed 29-55 cumulative credits (credits completed at Penn State for which a quality letter grade was earned)
- Completed with a C or better the following courses: EDSGN 100, CHEM 110, MATH 140, MATH 141, and PHYS 211
- Attained at least a 2.6 cumulative grade point average

\* In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

## 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/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
<b>Prescribed Courses</b>		
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

*Prescribed Courses: Require a grade of C or better*

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++	

*Additional Courses: Require a grade of C or better*

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

##### Alternative Energy and Power Generation Option (45 credits)

Available at the following campuses: Hazleton

Code	Title	Credits
<b>Prescribed Courses</b>		
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
<b>Additional Courses</b>		
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 or EME 301	Engineering Thermodynamics I Thermodynamics in Energy and Mineral Engineering	3
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#### 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
<b>Prescribed Courses</b>		
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
<b>Additional Courses</b>		
CHEM 112	Chemical Principles II (or any GN)	3
CHEM 113	Experimental Chemistry II (or any GN)	1
<i>Additional Courses: Require a grade of C or better</i>		
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/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.

## **Program Educational Objectives**

The Engineering program offers a broad and cross-disciplinary curriculum that prepares students in a variety of technical areas and professional skills for the practice and future development in their profession. Due to their experience in our program, within few years of graduation, we expect our graduates to have the ability to:

1. Practice engineering in their chosen area in the private industry or the government.
2. Assume an increasing level of responsibility and leadership within their respective organizations.
3. Communicate effectively and work collaboratively with internal and external stakeholders in multidisciplinary, advanced technological and multicultural work environments.
4. Maintain a strong commitment to ethical practice with sensitivity for environmental, societal, and economic contexts at local and global levels.
5. Engage in continuous learning through graduate school, professional training programs, and independent study.

## **Student Outcomes**

Student outcomes describe what students are expected to know and be able to do by the time of graduation. The B.S. Engineering program is designed to enable students to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Communicate effectively with a range of audiences
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Academic Advising**

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The

advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

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## Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2023-24 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition (*Note: the archive only contains suggested academic plans beginning with the 2018-19 edition of the Undergraduate Bulletin*).

## Multi-Disciplinary Engineering Design Option: Engineering, B.S. at Abington Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**If you are starting at a campus other than the one this plan is ending at, please refer to:** <http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx>

### First Year

Fall	Credits Spring	Credits
CHEM 110 (GN)*#	3 CAS 100A or 100B (GWS) <sup>††</sup>	3
CHEM 111	1 CHEM 112 (or any GN)	3
EDSGN 100*#	3 CHEM 113 (or any GN)	1
ENGL 15, 30H, or ESL 15 (GWS) <sup>††</sup>	3 General Education Course (GHW)	1.5
First Year Seminar	1 MATH 141 (GQ)*#†	4
MATH 140 (GQ)*#†	4 PHYS 211*#	4
15		16.5

### Second Year

Fall	Credits Spring	Credits
CMPEN 271	3 EMCH 212*	3
CMPSC 121, 201, or 200	3 EMCH 213	3
EMCH 211*	3 MATH 251*	4
MATH 231	2 PHYS 214	2
PHYS 212*	4 General Education Course	3
15		15

### Third Year

Fall	Credits Spring	Credits Summer	Credits
EE 210*	4 EE 316	3 EDSGN 495	1
ECON 102 or 104 <sup>†</sup>	3 EE 310*	4	
EDSGN 401	3 ENGL 202C (GWS) <sup>†</sup>	3	
ME 201, 300, or EME 301*	3 EDSGN 402	4	
General Education Course	3 General Education Course	3	
16		17	1

**Fourth Year**

<b>Fall</b>	<b>Credits Spring</b>	<b>Credits</b>
EDSGN 410*	4 Engr. Tech. Elective (ETE) EDSGN 420 or ME 480	3
ENGR 350*	3 ENGR 407	3
ENGR 490W	1 ENGR 491W	3
EDSGN 403	3 General Education Course	3
General Education Course (GHW)	1.5 General Education Course	3
General Technical Elective(s) (GTE)	4	
	<b>16.5</b>	<b>15</b>

**Total Credits 127**

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

**University Requirements and General Education Notes:**

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

**College Notes:**

- General Technical Electives (GTE) are four credits of engineering, science or mathematics at a similar or higher level required for the major. Choose at least four credits from the program approved list of courses: BIOL 141 (3), BIOL 142 (1), CHEM 202 (3), CHEM 210 (3), CMPEN 270 (4), CMPEN 275 (1), EDSGN 110 (2), EDSGN 210 (2), EMCH 315 (2), EMCH 316 (1), MATH 220 GQ (2-3), MATH 232 (2) and PHYS 213 (2). Other GTE credits will be considered through the petition process.
- Upper division engineering courses will be offered in combination at both Penn State Abington and Penn State Great Valley
- EDSGN 495 (1) requires 300 hours of work and may be scheduled during the summer semester after the second or third year

**Course Lists:**

General Technical Electives (GTE) are 4 credits of engineering, science, or mathematics at a similar or higher level required for the major. Choose from:

- BIOL 141 Introduction to Human Physiology (3 cr.)
- BIOL 142 Physiology Laboratory (1 cr.)
- CHEM 202 Fundamentals of Organic Chemistry I (3 cr.) or CHEM 210 Organic Chemistry I (3 cr.)
- CMPEN 270 Digital Design: Theory and Practice (4 cr.)
- CMPEN 275 Digital Design Laboratory (1 cr.)
- EDSGN 110 Spatial Analysis in Engineering Design (2 cr.)
- EDSGN 210 Tolerancing and Spatial Models (2 cr.)
- EMCH 212 Dynamics (3 cr.) (Alternative Energy and Power Distribution Option only)
- EMCH 315 Mechanical Response of Engineering Materials (2 cr.)
- EMCH 316 Experimental Determination of Mechanical Response of Materials (1 cr.)
- MATH 220 Matrices (2-3 cr.)
- MATH 232 Integral Vector Calculus (2 cr.)
- MATH 310 Elementary Combinatorics (3 cr.)
- PHYS 213 General Physics: Fluids and Thermal Physics (2 cr.)

Other GTE credits will be considered through the petition process.

Engineering Technical Electives are 3 credits of engineering courses at the 300 or 400 level. Choose from:

- EDSGN 420 Advanced Robotics Design and Applications (3 cr.)
- ME 380 Machine Dynamics (3 cr.)
- ME 345 Instrumentation, Measurements, and Statistics (4 cr.)
- ME 357 System Dynamics (3 cr.)
- ME 480 Mechanism Design and Analysis (3 cr.)

Students are expected to complete the version of CMPSC that is required for their intended major. The requirement varies across College of Engineering majors. Students should plan the CMPSC course requirement carefully with the assistance of an academic adviser.

**These courses offered at Abington in fall semester only:**

- CMPEN 271 Introduction to Digital Systems (3 cr.)
- EMCH 211 Statics (3 cr.)

**These courses offered at Abington in spring semester only:**

- CHEM 112 Chemical Principles II (3 cr.)
- CHEM 113 Experimental Chemistry II (1 cr.)
- EE 210 Circuits and Devices (4 cr.)
- EMCH 212 Dynamics (3 cr.)
- EMCH 213 Strength of Materials (3 cr.)
- MATH 251 Ordinary and Partial Differential Equations (4 cr.)
- PHYS 214 General Physics: Wave Motion and Quantum Physics (2 cr.)

## Multi-Disciplinary Engineering Design Option: Engineering, B.S. at Brandywine Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**If you are starting at a campus other than the one this plan is ending at, please refer to:** <http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx>

### First Year

Fall	CreditsSpring	Credits
CHEM 110 (GN) <sup>*#</sup>	3 CAS 100A or 100B (GWS) <sup>‡</sup>	3
CHEM 111	1 CHEM 112 (or any GN)	3
EDSGN 100 <sup>*#</sup>	3 CHEM 113 (or any GN)	1
ENGL 15, 30H, or ESL 15 (GWS) <sup>††</sup>	3 General Education Course (GHW)	1.5
First Year Seminar	1 MATH 141 (GQ) <sup>*†#</sup>	4
MATH 140 (GQ) <sup>*†#</sup>	4 PHYS 211 (GN) <sup>*#</sup>	4
	<b>15</b>	<b>16.5</b>

### Second Year

Fall	CreditsSpring	Credits
CMPEN 271	3 EMCH 212 <sup>*</sup>	3
CMPSC 121, 200, or 201	3 EMCH 213	3
EMCH 211 <sup>*</sup>	3 MATH 251 <sup>*</sup>	4
MATH 231	2 PHYS 214	2
PHYS 212 <sup>*</sup>	4 General Education Course	3
	<b>15</b>	<b>15</b>

### Third Year

Fall	CreditsSpring	CreditsSummer	Credits
EE 210 <sup>*</sup>	4 EE 316	3 EDSGN 495	1
ECON 102 or 104 <sup>†</sup>	3 EE 310 <sup>*</sup>	4	
EDSGN 401	3 ENGL 202C <sup>‡</sup>	3	
ME 201, 300, or EME 301 <sup>*</sup>	3 EDSGN 402	4	
General Education Course	3 General Education Course	3	
	<b>16</b>	<b>17</b>	<b>1</b>

### Fourth Year

Fall	CreditsSpring	Credits
EDSGN 410 <sup>*</sup>	4 Engr. Tech. Elective (ETE) EDSGN 420 or ME 480	3
ENGR 350 <sup>*</sup>	3 ENGR 407	3
ENGR 490W	1 ENGR 491W	3
EDSGN 403	3 General Education Course	3
General Education Course (GHW)	1.5 General Education Course	3
General Technical Elective(s) (GTE)	4	
	<b>16.5</b>	<b>15</b>

### Total Credits 127

\* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

### College Notes:

- General Technical Electives (GTE) are four credits of engineering, science or mathematics at a similar or higher level required for the major. Choose at least four credits from the program approved list of courses: BIOL 141 (3), BIOL 142 (1), CHEM 202 (3), CHEM 210 (3), CMPEN 270 (4), CMPEN 275 (1), EDSGN 110 (2), EDSGN 210 (2), EMCH 315 (2), EMCH 316 (1), MATH 220 GQ (2-3), MATH 232 (2) and PHYS 213 (2). Other GTE credits will be considered through the petition process.
- Upper division engineering courses will be offered at Penn State Great Valley.
- EDSGN 495 (1) requires 300 hours of work and may be scheduled during the summer semester after the second or third year.

## Applied Materials Option: Engineering, B.S. at DuBois Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**If you are starting at a campus other than the one this plan is ending at, please refer to:** <http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx>

First Year		
Fall	Credits Spring	Credits
CHEM 110 (GN) <sup>**</sup>	3 CAS 100 (GWS) <sup>††</sup>	3
CHEM 111	1 CHEM 112 (GN)	3
EDSGN 100 <sup>*#</sup>	3 CHEM 202	3
ENGL 15, 30H, or ESL 15 (GWS) <sup>††</sup>	3 MATH 141 (GQ) <sup>**†</sup>	4
First Year Seminar	1 PHYS 211 (GN) <sup>*#</sup>	4
MATH 140 (GQ) <sup>*†#</sup>	4	
	<b>15</b>	<b>17</b>
Second Year		
Fall	Credits Spring	Credits
ECON 102 or 104 <sup>†</sup>	3 CMPSC 121, 200, or 201	3
EMCH 211 <sup>*</sup>	3 EMCH 213	3
General Education Course	3 MATH 251 <sup>*†</sup>	4
General Education Course (GHW)	1.5 ME 300 or EME 301 <sup>*</sup>	3
MATH 231	2 PHYS 214 <sup>*</sup>	2
PHYS 212 <sup>*</sup>	4 General Education Course (GHW)	1.5
	<b>16.5</b>	<b>16.5</b>
Third Year		
Fall	Credits Spring	Credits
General Education Course	3 ENGR 320	3
General Technical Elective	4 ENGR 350 <sup>*</sup>	3
MATH 220	2 MATSE 400	3
MATSE 201 <sup>*</sup>	3 MATSE 413	3
MATSE 202	3 ENGL 202C <sup>††</sup>	3
	<b>15</b>	<b>15</b>
Fourth Year		
Fall	Credits Spring	Credits
ENGR 421 <sup>*</sup>	4 ENGR 450	3
ENGR 490W	1 ENGR 491W	3
General Education Course	3 General Education Course	3
General Education Course	3 MATSE 411	3
MATSE 402	3 MATSE 417 or ESC 417	3
MATSE 430	3	
	<b>17</b>	<b>15</b>
<b>Total Credits 127</b>		

‡ Course requires a grade of C or better for General Education

# Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

### College Notes:

- General Technical Electives are 4 credits of engineering, science or mathematics at a similar or higher level required for the major.
- **Choose from:** BIOL 141 GN (3), BIOL 142 (1), CHEM 113 (1), CMPEN 270 (4), CMPEN 271 (3), CMPEN 275 (1), EDSGN 110 (2), EDSGN 210 (2), EMCH 212 (3) (Applied Materials and Alternative Energy & Power Generation Options only), EMCH 315 (2), EMCH 316 (1), MATH 232 (2), MATH 310 (3), and PHYS 213 GN (2).
- Other GTE credits will be considered through the petition process.

\* Course requires a grade of C or better for the major

## Alternative Energy and Power Generation Option: Engineering, B.S. at Hazleton Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

**If you are starting at a campus other than the one this plan is ending at, please refer to:** <http://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx>

### First Year

Fall	Credits Spring	Credits
MATH 140 <sup>*†‡</sup>	4 MATH 141 <sup>*†‡</sup>	4
CHEM 110 <sup>*#†</sup>	3 PHYS 211 <sup>*#†</sup>	4
CHEM 111 <sup>†</sup>	1 CHEM 112 <sup>†</sup>	3
ENGL 15 or 30H <sup>††</sup>	3 CHEM 113 <sup>†</sup>	1
EDSGN 100 <sup>*#</sup>	3 ECON 102 or 104 <sup>†</sup>	3
PSU 8	1 CAS 100A or 100B <sup>††</sup>	3
	<b>15</b>	<b>18</b>

### Second Year

Fall	Credits Spring	Credits
MATH 251 <sup>*</sup>	4 MATH 231	2
PHYS 212 <sup>*†</sup>	4 EE 210 <sup>*</sup>	4
EMCH 211 <sup>*</sup>	3 EMCH 213	3
CMPSC 200 <sup>2</sup>	3 ME 300 <sup>*</sup>	3
GTE - General Tech Elective <sup>1</sup>	3 General Education Course	3
	<b>17</b>	<b>15</b>

### Third Year

Fall	Credits Spring	Credits
EE 314	3 ENGR 350 <sup>*</sup>	3
EME 303	3 PHYS 214 <sup>†</sup>	2
ME 345	4 ENGL 202C or 202D <sup>††</sup>	3
General Education Course	3 General Education Course (GHW)	1.5
GTE - General Tech Elective <sup>1</sup>	1 EGEE 302	3
General Education Course (GHW)	1.5 NUCE 401 (Engrg. Tech. Elective) <sup>3</sup>	3
	<b>15.5</b>	<b>15.5</b>

### Fourth Year

Fall	Credits Spring	Credits
EE 485	3 EE 488 (Engrg. Tech. Elective) <sup>3</sup>	3
EGEE 437 (Engrg. Tech. Elective) <sup>3</sup>	3 EGEE 420	3
EGEE 438 (Engrg. Tech. Elective) <sup>3</sup>	3 ENGR 491W	3
EGEE 441 (Engrg. Tech. Elective) <sup>3</sup>	3 General Education Course	3
ENGR 490W	1 General Education Course	3

General Education Course	3
	<b>16</b>
	<b>15</b>

### Total Credits 127

- \* Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

- <sup>1</sup> General Technical Electives (GTE) are 4 credits of engineering, science, or mathematics at a similar or higher level required for the major. Consultation with adviser is recommended to select the proper course.
- <sup>2</sup> Students can take CMPSC 200, CMPSC 201 or CMPSC 121. Consultation with adviser is recommended to select the proper course.
- <sup>3</sup> Select 9 credits from NUCE 401, EE 488, EGEE 437, EGEE 438, EGEE 441 and 6 Engineering Technical Elective credits from any 400 level Engineering or EMS course. See adviser for details.

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

## Career Paths

Graduates from the engineering program have built successful careers in a variety of fields including systems engineering, design, process engineering, product development, manufacturing, materials, and energy and power.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE ENGINEERING PROGRAM (<http://career.engr.psu.edu/>)

## Opportunities for Graduate Studies

Graduates from the engineering program may advance their education with a graduate degree in a multitude of science, engineering, and technology fields.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (<http://www.engr.psu.edu/students/grad-prospective/default.aspx>)

## Accreditation

The Bachelor of Science in Engineering at Penn State Abington, Penn State Brandywine, Penn State DuBois and Penn State Great Valley is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the General Criteria and the Engineering, General Engineering, Engineering Physics, and Engineering Science Program Criteria.

## Professional Licensure/Certification

Many U.S. states and territories require professional licensure/certification to be employed. If you plan to pursue employment in a licensed profession after completing this program, please visit the Professional Licensure/Certification Disclosures by State (<https://www.psu.edu/state-licensure-disclosures/>) interactive map.

## Contact

### University Park

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213 Hammond Building  
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<https://www.sedi.psu.edu/>

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<http://hazleton.psu.edu/bachelor-science-general-engineering> (<http://hazleton.psu.edu/bachelor-science-general-engineering/>)