

# INDUSTRIAL ENGINEERING, B.S. (ENGINEERING)

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

## Degree Requirements

For the Bachelor of Science degree in Industrial Engineering, a minimum of 129 credits is required:

| Requirement                | Credits |
|----------------------------|---------|
| General Education          | 45      |
| Requirements for the Major | 111     |

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>).

| Code  | Title  | Credits |
|---|--|---------|
| <b>Prescribed Courses</b>                                 |  |         |
| CHEM 111  | Experimental Chemistry I                           | 1       |
| IE 425  | Stochastic Models in Operations Research           | 3       |
| IE 453  | Simulation Modeling for Decision Support           | 3       |
| IE 460  | Service Systems Engineering                        | 3       |
| IE 470  | Manufacturing System Design and Analysis           | 3       |
| IE 480W   | Capstone Design Project                            | 3       |
| MATH 220  | Matrices   | 2       |
| MATH 231  | Calculus of Several Variables                      | 2       |
| MATH 250  | Ordinary Differential Equations                    | 3       |
| MATSE 259   | Properties and Processing of Engineering Materials | 3       |
| PHYS 212  | General Physics: Electricity and Magnetism         | 4       |
| <i>Prescribed Courses: Require a grade of C or better</i> |  |         |
| CHEM 110  | Chemical Principles I                              | 3       |
| EDSGN 100   | Cornerstone Engineering Design                     | 3       |
| EMCH 210  | Statics and Strength of Materials                  | 5       |
| ENGL 202C   | Effective Writing: Technical Writing               | 3       |
| IE 302  | Engineering Economy                                | 3       |
| IE 305  | Product Design, Specification and Measurement      | 3       |
| IE 322  | Probabilistic Models in Industrial Engineering     | 3       |
| IE 323  | Statistical Methods in Industrial Engineering      | 3       |
| IE 327  | Introduction to Work Design                        | 3       |
| IE 330  | Engineering Analytics                              | 3       |
| IE 405  | Deterministic Models in Operations Research        | 3       |
| MATH 140  | Calculus With Analytic Geometry I                  | 4       |
| MATH 141  | Calculus with Analytic Geometry II                 | 4       |
| PHYS 211  | General Physics: Mechanics                         | 4       |

| Additional Courses  |  |   |
|---|--|---|
| Select 1 credit of First-Year Seminar                     |  | 1 |
| CMPSC 200   | Programming for Engineers with MATLAB          | 3 |
| or CMPSC 201  | Programming for Engineers with C++             |   |
| ECON 102  | Introductory Microeconomic Analysis and Policy | 3 |
| or ECON 104   | Introductory Macroeconomic Analysis and Policy |   |
| Select one of the following: <sup>1</sup>                 |  | 3 |
| IE 408  | Cognitive Work Design                          |   |
| IE 418  | Human/Computer Interface Design                |   |
| IE 419  | Work Design - Productivity and Safety          |   |
| <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                |   |

## Supporting Courses and Related Areas

|  |   |
|--|---|
| Select 3 credits as a science selection from department list                                       | 3 |
| Select 6 credits as non-major electives from department list <sup>2</sup>                          | 6 |
| Select 3 credits in manufacturing processes from department list <sup>1</sup>                      | 3 |
| Select 6 credits of technical electives from the department list; all 6 credits must be IE credits | 6 |

<sup>1</sup> The course not taken to satisfy this requirement can be taken as a technical elective. Please see the department list.

<sup>2</sup> Please see the department list.

## 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.