

# INDUSTRIAL ENGINEERING, B.S.

## Overview

Industrial engineers create efficient systems that integrate people, resources, and information. Industrial engineering applications range from manufacturing to healthcare systems to business administration.

## Program GPA

Program GPA requirement policies are described in the College of Engineering and Computing section of this bulletin. For the purpose of these policies the Program GPA for the Industrial Engineering B.S. program is determined by all major course requirements used to satisfy the Industrial Engineering Major.

## Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to 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. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
4. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
5. An ability to communicate effectively with a range of audiences
6. An ability to 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
7. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

## Admissions

Admission requirements for freshman are established by the Office of Undergraduate Admissions ([http://sc.edu/about/offices\\_and\\_divisions/undergraduate\\_admissions/](http://sc.edu/about/offices_and_divisions/undergraduate_admissions/)). Admissions requirements for transfer, major change and readmitted students are established by the College of Engineering and Computing. For the BS Industrial Engineering program, transfer applicants from regionally accredited colleges and universities must have a cumulative 2.75 GPA on a 4.00 scale, and have completed a four-semester Calculus course equivalent to MATH 141 with a grade of C or better. Current University of South Carolina students who wish to enter the College of Engineering and Computing, and former students seeking readmission, must have an institutional GPA of 2.50 or better on at least 15 hours earned at USC, and have completed a four-semester Calculus course equivalent to MATH 141 with a grade of C or better.

## Degree Requirements (120 hours)

See College of Engineering and Computing (<https://academicbulletins.sc.edu/undergraduate/engineering-computing/>) for progression requirements and special academic opportunities.

## Program of Study

Requirements	Credit Hours
1. Carolina Core	34-43
2. College Requirements	0
3. Program Requirements	44-53
4. Major Requirements	33

## Founding Documents Requirement

All undergraduate students must take a 3-credit course or its equivalent with a passing grade in the subject areas of History, Political Science, or African American Studies that covers the founding documents including the United State Constitution, the Declaration of Independence, the Emancipation Proclamation and one or more documents that are foundational to the African American Freedom struggle, and a minimum of five essays from the Federalist papers. This course may count as a requirement in any part of the program of study including the Carolina Core, the major, minor or cognate, or as a general elective. Courses that meet this requirement are listed here (<https://academicbulletins.sc.edu/undergraduate/founding-document-courses/>).

## 1. Carolina Core Requirements (34-43 hours)

### CMW – Effective, Engaged, and Persuasive Communication: Written (6 hours)

- ENGL 101 - *must be passed with a grade of C or higher.*
- ENGL 102

### ARP – Analytical Reasoning and Problem Solving (8 hours)

*Must be passed with a grade of C or higher.*

- MATH 141
- MATH 142

### SCI – Scientific Literacy (8 hours)

- Any CC-SCI course including two laboratories.

### GFL – Global Citizenship and Multicultural Understanding: Foreign Language (0-6 hours)

Score two or better on foreign language placement test; or complete the 109 and 110 courses in FREN, GERM, LATN or SPAN; or complete the 121 course in another foreign language.

- CC-GFL courses (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

### GHS – Global Citizenship and Multicultural Understanding: Historical Thinking (3 hours)

- any CC-GHS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## GSS – Global Citizenship and Multicultural Understanding: Social Sciences (3 hours)

- any CC-GSS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## AIU – Aesthetic and Interpretive Understanding (3 hours)

- any CC-AIU course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## CMS – Effective, Engaged, and Persuasive Communication: Spoken Component <sup>1</sup> (0-3 hours)

- any overlay or stand-alone CC-CMS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## INF – Information Literacy <sup>1</sup> (0 hours)

- ENGL 102 (CMW/INF overlay)

## VSR – Values, Ethics, and Social Responsibility <sup>1</sup> (0-3 hours)

- any overlay or stand-alone CC-VSR course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

<sup>1</sup> **Carolina Core Stand Alone or Overlay Eligible Requirements** – Overlay-approved courses offer students the option of meeting two Carolina Core components in a single course. A maximum of two overlays is allowed. The total Carolina Core credit hours must add up to a minimum of 34 for the BS in Industrial Engineering.

## 2. College Requirements (0 hours)

*No college-required courses for this program.*

## 3. Program Requirements (44-53 hours)

### Supporting Courses (30-35 hours)

Course	Title	Credits
<b>Foundational Courses (12)</b>		<b>12</b>
Take all of the following with a minimum of 12 hours:		
INDE 190	Introduction to Industrial Engineering or ENCP 101 Introduction to Engineering	
ECON 421	Engineering Economics	
MATH 344	Applied Linear Algebra	
STAT 509	Statistics for Engineers	
<b>CAD Electives (3)</b>		<b>3</b>
Select at least three hours from the following:		
ENCP 102	Introduction to Computer-Aided Design	
ECIV 111	Introduction to Engineering Graphics and Visualization	
EMCH 111	Introduction to Computer-Aided Design	
<b>Computing Electives (6-8)</b>		<b>6-8</b>
Select at least six hours from the following:		
CSCE 102	General Applications Programming	
CSCE 106	Scientific Applications Programming	
CSCE 145	Algorithmic Design I	
CSCE 146	Algorithmic Design II	
ENCP 201	Introduction to Applied Numerical Methods	

or ECIV 201 Computational Methods for Civil Engineering or EMCH 201 Introduction to Applied Numerical Methods	
ITEC 104 Program Design and Development or CSCE 104 Program Design and Development	
ITEC 352 Software Design	
<b>Math and Science Electives (9-12)</b>	<b>9</b>
Select at least nine hours from the following:	
MATH 151 – MATH 599	
STAT 506 – STAT 650	
ASTR 101 – ASTR 599	
BIOL 110 – BIOL 690	
CHEM 101 – CHEM 659	
ENVR 101 – ENVR 572	
GEOL 101 – GEOL 699	
MSCI 101 – MSCI 627	
PHYS 101 – PHYS 599	
<b>Total Credit Hours</b>	<b>30-32</b>

## Electives (9-23 hours)

The program requires a minimum of 120 total credit hours. The number of electives depends upon how a student fulfills other program requirements. UNIV 101 is recommended.

## 4. Major Requirements (33 hours)

Course	Title	Credits
Take all of:		
INDE 291	Materials & Manufacturing	3
INDE 292	Work Design & Ergonomics	3
INDE 391	Production Engineering & Management	3
INDE 392	Operations Research in Engineering	3
INDE 397	Computer Control of Manufacturing Systems	3
INDE 490	Quality Engineering	3
INDE 496	Facilities Planning & Material Handling	3
INDE 497	Industrial Engineering Capstone Project	3
INDE 591	Smart Manufacturing	3
INDE 593	Supply Chain Engineering	3
INDE 595	Systems Simulation	3
<b>Total Credit Hours</b>		<b>33</b>

## Major Map

A major map is a layout of required courses in a given program of study, including critical courses and suggested course sequences to ensure a clear path to graduation.

Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.

Industrial Engineering, B.S. ([https://sc.edu/about/offices\\_and\\_divisions/advising/documents/major\\_maps/2024-2025/2024\\_industrial-engr\\_map.pdf](https://sc.edu/about/offices_and_divisions/advising/documents/major_maps/2024-2025/2024_industrial-engr_map.pdf))