

# Industrial Engineering, B.S.I.E.

## Degree Requirements

Students must meet the following criteria to qualify for a Bachelor of Science in Industrial Engineering degree:

- Complete a minimum of 129 credit hours
- Satisfy WVU's undergraduate degree requirements
- Satisfy Statler College's undergraduate degree requirements (<http://catalog.wvu.edu/undergraduate/collegeofengineeringandmineralresources/#policies>)
- Complete all courses listed in the curriculum requirements with the required minimum grades
- Attain an overall grade point average of 2.00 or better
- Attain a WVU grade point average of 2.00 or better
- Attain a Statler grade point average of 2.00 or better
- A maximum of one math or science courses with a grade of D+, D, or D- may apply towards a Statler College degree
- Complete a survey regarding their academic and professional experiences at WVU, as well as post-graduation job placement or continuing education plans.

The Statler GPA is computed based on all work taken at WVU with a subject code within Statler College (BIOM, BMEG, CE, CHE, CPE, CS, CSEE, CYBE, EE, ENGR, ENVE, ETEC, IENG, IH&S, MAE, MINE, PDA, PNGE, SAFM, SENG) excluding ENGR 140, ENGR 150, and CS 101. The WVU GPA is computed based on all work taken at WVU. The Overall GPA is computed based on all work taken at WVU and transfer work.

## Curriculum Requirements

Code	Title	Hours
	University Requirements	16
	Fundamentals of Engineering Requirements	5
	Math and Science Requirements	28
	Industrial Engineering Program Requirements	80
	Total Hours	129

## University Requirements

Code	Title	Hours
	General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)	
	Outstanding GEF Requirements 1, 5, 6, and 7	15
ENGR 191	First-Year Seminar	1
	Total Hours	16

## Fundamentals of Engineering Requirements

Code	Title	Hours
	A minimum grade of C- is required in all Fundamentals of Engineering courses.	
ENGR 101	Engineering Problem Solving 1	2
	Engineering Problem Solving (Select one of the following):	3
CHE 102	Introduction to Chemical Engineering	
ENGR 102	Engineering Problem-Solving 2	
ENGR 103	Introduction to Nanotechnology Design	
MAE 102	Introduction to Mechanical and Aerospace Engineering Design	
	Total Hours	5

## Math and Science Requirements

Code	Title	Hours
	A minimum grade of C- is required in all Math and Science courses.	
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory (GEF 2B)	4

Calculus I (GEF 3):		4
MATH 155	Calculus 1	
MATH 153 & MATH 154	Calculus 1a with Precalculus and Calculus 1b with Precalculus	
MATH 156	Calculus 2 (GEF 8)	4
MATH 251	Multivariable Calculus	4
MATH 261	Elementary Differential Equations	4
PHYS 111 & 111L	General Physics 1 and General Physics 1 Laboratory (GEF 8)	4
Required Science Elective (Select one of the following) (GEF 8):		4
BIOL 115 & 115L	Principles of Biology and Principles of Biology Laboratory	
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	
PHYS 112 & 112L	General Physics 2 and General Physics 2 Laboratory	
Total Hours		28

## Industrial Engineering Program Requirements

Code	Title	Hours
ECON 201	Principles of Microeconomics (GEF 4)	3
ECON 202	Principles of Macroeconomics	3
EE 221	Introduction to Electrical Engineering	3
EE 221L	Introduction to Electrical Engineering Laboratory	1
MAE 241	Statics	3
MAE Elective (Select one of the following):		3
MAE 242	Dynamics	
MAE 243	Mechanics of Materials	
MAE 320	Thermodynamics	
MAE 331	Fluid Mechanics	
IENG 200	Fundamentals of Industrial Engineering	1
IENG 213	Engineering Statistics	3
IENG 220 & 220L	Re-Engineering Management Systems and Re-Engineering Management Systems Laboratory	3
IENG 301	Materials and Costing	3
IENG 302	Manufacturing Processes	2
IENG 302L	Manufacturing Processes Laboratory	1
IENG 305	Introduction to Systems Engineering	3
IENG 314	Advanced Analysis of Engineering Data	3
IENG 316	Industrial Quality Control	3
IENG 331	Computer Applications in Industrial Engineering	3
IENG 343	Production Planning and Control	3
IENG 350	Introduction to Operations Research	3
IENG 360	Human Factors Engineering	3
IENG 377	Engineering Economy	3
IENG 445	Project Management for Engineers	3
IENG 446	Plant Layout/Material Handling	3
IENG 455	Simulation by Digital Methods	3
IENG 471	Design of Productive Systems 1 (Fulfills Writing and Communications Skills Requirement)	3
IENG 472	Design of Productive Systems 2	3
IENG Technical Electives (Any 400 and 500 level IENG courses)		6
Additional Technical Electives (Select two of the following):		6

CE 347 & 347L	Introduction to Environmental Engineering and Introduction to Environmental Engineering Laboratory
CE 414	Construction Engineering
CS 430	Advanced Software Engineering
CS 440	Database Design and Theory
BIOM 425	Bioengineering
GEOG 350 & 350L	Geospatial Problem Solving and Geospatial Problem Solving Lab
IENG 400 level courses	
IENG 500 level courses	
MAE 242	Dynamics
MAE 320	Thermodynamics
MAE 331	Fluid Mechanics
MAE 427	Heating, Ventilating, and Air Conditioning
MATH 343	Introduction to Linear Algebra
MATH 420	Numerical Analysis 1
MATH 441	Applied Linear Algebra
SAFM 470	Managing Construction Safety
STAT 421	Statistical Analysis System (SAS)
STAT 541	Applied Multivariate Analysis

Total Hours

80

## Suggested Plan of Study

It is important for students to take courses in the order specified as much as possible; all prerequisites and concurrent requirements must be observed. A typical B.S.I.E. degree program that completes degree requirements in four years is as follows.

### First Year

Fall	Hours	Spring	Hours
MATH 155 (GEF 3)		4 MATH 156 (GEF 8)	4
ENGR 101		2 ENGR 102	3
ENGR 191		1 PHYS 111 & 111L (GEF 8)	4
CHEM 115 & 115L (GEF 2B)		4 GEF 6	3
ENGL 101 (GEF 1)		3 GEF 7	3
GEF 5		3	
		17	17

### Second Year

Fall	Hours	Spring	Hours
MATH 251		4 MATH 261	4
Select one of the following (GEF 8):		4 IENG 213	3
BIOL 115 & 115L		IENG 377	3
CHEM 116 & 116L		EE 221	3
PHYS 112 & 112L		EE 221L	1
MAE 241		3 ECON 201 (GEF 4)	3
ENGL 102 (GEF 1)		3	
IENG 200		1	
IENG 220 & 220L		3	
		18	17

**Third Year**

<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
IENG 314		3 ECON 202	3
IENG 301		3 IENG 302	2
IENG 305		3 IENG 302L	1
IENG 350		3 IENG 316	3
IENG 360		3 IENG 331	3
		IENG 343	3
		<b>15</b>	<b>15</b>

**Fourth Year**

<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
IENG Technical Elective		3 IENG 472	3
IENG 445		3 IENG Technical Elective	3
IENG 455		3 IENG 446	3
IENG 471		3 MAE Elective	3
Technical Elective		3 Technical Elective	3
		<b>15</b>	<b>15</b>

Total credit hours: 129

**Major Learning Outcomes****INDUSTRIAL ENGINEERING**

Upon graduation, all Bachelor of Science students in Industrial Engineering will have acquired the:

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 communicate effectively with a range of audiences
4. 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
5. 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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.