B.S. IN INDUSTRIAL ENGINEERING

BSIE Curriculum Requirements

Code	Title	Credit Hours
Core Requirement Courses		
IEN 111	Introduction to Engineering I	3
IEN 112	Introduction to Engineering II	2
IEN 201	Methods Analysis and Work Measurement	3
IEN 312	Applied Statistical Methods	3
IEN 351	Industrial Safety Engineering	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 380	Engineering Economy	3
IEN 406	Computer-Aided Manufacturing	3
IEN 441	Deterministic Models in Operations Research	3
IEN 442	Stochastic Models in Operations Research	3
IEN 465	Production and Inventory Control	3
IEN 494	Senior Project	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
IEN Elective Courses		
Select 9 credit hours of IEN Electives		9
Engineering and Technical Elective Courses		
Additional Engineering Credit Hours		3
Additional Technical Elective Credit Hours		3
Other Courses		
Total Math & Basic Sciences Credit Hours		33
Total General Education Credit Hours		24
Other Credit Hours		3
Total Credit Hours		**128**

BSIE Curriculum Requirements:

Engineering Management Concentration

Code	Title	Credit Hours
Core Requirement Courses		
IEN 111	Introduction to Engineering I	3
IEN 112	Introduction to Engineering II	2
IEN 201	Methods Analysis and Work Measurement	3
IEN 312	Applied Statistical Methods	3
IEN 351	Industrial Safety Engineering	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 380	Engineering Economy	3
IEN 406	Computer-Aided Manufacturing	3
IEN 441	Deterministic Models in Operations Research	3
IEN 442	Stochastic Models in Operations Research	3
IEN 465	Production and Inventory Control	3
IEN 494	Senior Project	3

IEN 512	Statistical Quality Control and Quality Management	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
Other IEN Courses		
IEN 570	Engineering Management	3
IEN 571	Engineering Entrepreneurship	3
IEN 572	Management of Technological Innovation	3
Other Courses		
Additional Engineering Credit Hours		3
Total Math & Basic Sciences Credit Hours		33
Total General Education Credit Hours		24
Other Credit Hours		6
Total Credit Hours		**128**

BSIE Curriculum Requirements:

Manufacturing Concentration

Code	Title	Credit Hours
Core Requirement Courses		
IEN 111	Introduction to Engineering I	3
IEN 112	Introduction to Engineering II	2
IEN 201	Methods Analysis and Work Measurement	3
IEN 312	Applied Statistical Methods	3
IEN 351	Industrial Safety Engineering	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 380	Engineering Economy	3
IEN 406	Computer-Aided Manufacturing	3
IEN 441	Deterministic Models in Operations Research	3
IEN 442	Stochastic Models in Operations Research	3
IEN 465	Production and Inventory Control	3
IEN 494	Senior Project	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
Other IEN Courses		
IEN 407	Product Design for Manufacturing	3
IEN 505	Robotics	3
IEN 507	Design of Manufacturing Systems	3
IEN 509	Automated Assembly	3
Other Courses		
Additional Engineering Credit Hours		3
Total Math & Basic Sciences Credit Hours		33
Total General Education Credit Hours		24
Other Credit Hours		3
Total Credit Hours		**128**

BSIE Curriculum Requirements:

Pre-Medical Concentration

Code	Title	Credit Hours
Core Requirement Courses		
IEN 111	Introduction to Engineering I	3
IEN 112	Introduction to Engineering II	2
IEN 201	Methods Analysis and Work Measurement	3
IEN 312	Applied Statistical Methods	3
IEN 351	Industrial Safety Engineering	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 380	Engineering Economy	3
IEN 406	Computer-Aided Manufacturing	3
IEN 441	Deterministic Models in Operations Research	3
IEN 442	Stochastic Models in Operations Research	3
IEN 465	Production and Inventory Control	3
IEN 494	Senior Project	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
Other Courses		
Total Math & Basic Sciences Credit Hours		58
Total General Education Credit Hours		24
Other Credit Hours		3
Total Credit Hours		**138**

BSIE Plan of Study

Freshman Year		
Fall		**Credit Hours**
IEN 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
	Credit Hours	**14**
Spring		
IEN 112	Introduction to Engineering II	2
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
ECO 211 or 212	Principles of Microeconomics or Principles of Macroeconomics	3
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
	Credit Hours	**16**
Sophomore Year		
Fall		
AH Cognate (AH Elective) [1]		3
IEN 201	Methods Analysis and Work Measurement	3
MTH 210	Introduction to Linear Algebra	3
PS Cognate (PS Elective) [1]		3

PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1
	Credit Hours	**16**
Spring		
AH Cognate (AH Elective) [1]		3
CAE 210, ECE 205, or MAE 303	Mechanics of Solids I or Principles of Electrical Engineering--I or Thermodynamics	3
CHM 151	Chemistry for Engineers	3
CHM 153	Chemistry Laboratory for Engineers	1
MTH 311	Introduction to Ordinary Differential Equations	3
PS Cognate (PS Elective) [1]		3
	Credit Hours	**16**
Junior Year		
Fall		
AH Cognate (Advanced AH Elective) [1]		3
IEN 310	Introduction to Engineering Probability	3
IEN 351	Industrial Safety Engineering	3
IEN 380	Engineering Economy	3
IEN 441	Deterministic Models in Operations Research	3
PS Cognate (Advanced PS Elective) [1]		3
	Credit Hours	**18**
Spring		
IEN 312	Applied Statistical Methods	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 406	Computer-Aided Manufacturing	3
IEN 442	Stochastic Models in Operations Research	3
Technical Elective [2]		3
	Credit Hours	**18**
Senior Year		
Fall		
IEN 465	Production and Inventory Control	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
IEN Elective [3]		3
	Credit Hours	**15**
Spring		
IEN 494	Senior Project	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
IEN Elective [3]		3
IEN Elective [3]		3
	Credit Hours	**15**
	Total Credit Hours	**128**

1 To be selected from lists of approved People and Society (PS)/Humanities and Arts (HA) (or applicable cognates). Students take a minimum of 3 courses (9 credit hours) in HA cognate and 3 courses in PS Cognate (9 credit hours).

2 The Technical Elective is selected from courses at the 300 level or above, offered by one of the following departments: MTH, BTE (except BTE 417), BME (except BME 320), CAE, ECO, EEN, IEN, MEN, ACC, FIN, MGT (Except MGT 303), MAS, MKT.

3 IEN Electives are selected from courses at the 300 level or above, offered by the Department of Industrial Engineering.

Note: Failure to follow the plan of study may result in a delay of your graduation.

BSIE Plan of Study:

Engineering Management Concentration

Freshman Year		
Fall		**Credit Hours**
IEN 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
	Credit Hours	**14**
Spring		
IEN 112	Introduction to Engineering II	2
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
ECO 211 or 212	Principles of Microeconomics or Principles of Macroeconomics	3
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
	Credit Hours	**16**
Sophomore Year		
Fall		
BSL 212 or BUS 202	Introduction to Business Law and Ethics or Introduction to the Legal Environment of Business	3
AH Cognate (AH Elective) [1]		3
IEN 201	Methods Analysis and Work Measurement	3
MTH 210	Introduction to Linear Algebra	3
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1
	Credit Hours	**16**
Spring		
AH Cognate (AH Elective) [1]		3
CHM 151	Chemistry for Engineers	3
CHM 153	Chemistry Laboratory for Engineers	1
CAE 210, ECE 205, or MAE 303	Mechanics of Solids I or Principles of Electrical Engineering--I or Thermodynamics	3
PS Cognate (PS Elective) [1]		3
MTH 311	Introduction to Ordinary Differential Equations	3
	Credit Hours	**16**
Junior Year		
Fall		
AH Cognate (Advanced AH Elective) [1]		3
IEN 310	Introduction to Engineering Probability	3
IEN 351	Industrial Safety Engineering	3
IEN 380	Engineering Economy	3
IEN 441	Deterministic Models in Operations Research	3
PS Cognate (PS Elective) [1]		3
	Credit Hours	**18**
Spring		
PS Cognate (Advanced PS Elective) [1]		3
IEN 312	Applied Statistical Methods	3

IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 406	Computer-Aided Manufacturing	3
IEN 442	Stochastic Models in Operations Research	3
	Credit Hours	**18**
Senior Year		
Fall		
IEN 465	Production and Inventory Control	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
IEN 571	Engineering Entrepreneurship	3
	Credit Hours	**15**
Spring		
IEN 494	Senior Project	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
IEN 570	Engineering Management	3
IEN 572	Management of Technological Innovation	3
	Credit Hours	**15**
	Total Credit Hours	**128**

[1] To be selected from lists approved People and Society (PS)/Arts and Humanities (AH) (or applicable cognates). Students take a minimum of 3 courses (9 credit hours) in AH cognate and 3 courses in PS cognate (9 credit hours).

Note: Failure to follow the plan of study may result in a delay in your graduation.

BSIE Plan of Study:

Manufacturing Concentration

Freshman Year		
Fall		**Credit Hours**
IEN 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
	Credit Hours	**14**
Spring		
IEN 112	Introduction to Engineering II	2
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
ECO 211 or 212	Principles of Microeconomics or Principles of Macroeconomics	3
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
	Credit Hours	**16**
Sophomore Year		
Fall		
AH Cognate (AH Elective) [1]		3
IEN 201	Methods Analysis and Work Measurement	3
MTH 210	Introduction to Linear Algebra	3
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1

PS Cognate (PS Elective) [1]		3
	Credit Hours	**16**
Spring		
AH Cognate (AH Elective) [1]		3
CAE 210, ECE 205, or MAE 303	Mechanics of Solids I or Principles of Electrical Engineering--I or Thermodynamics	3
CHM 151	Chemistry for Engineers	3
CHM 153	Chemistry Laboratory for Engineers	1
PS Cognate (PS Elective) [1]		3
MTH 311	Introduction to Ordinary Differential Equations	3
	Credit Hours	**16**
Junior Year		
Fall		
AH Cognate (Advanced AH Elective) [1]		3
IEN 310	Introduction to Engineering Probability	3
IEN 351	Industrial Safety Engineering	3
IEN 380	Engineering Economy	3
IEN 441	Deterministic Models in Operations Research	3
PS Cognate (Advanced PS Elective) [1]		3
	Credit Hours	**18**
Spring		
IEN 312	Applied Statistical Methods	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 406	Computer-Aided Manufacturing	3
IEN 407	Product Design for Manufacturing	3
IEN 442	Stochastic Models in Operations Research	3
	Credit Hours	**18**
Senior Year		
Fall		
IEN 465	Production and Inventory Control	3
IEN 505	Robotics	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
	Credit Hours	**15**
Spring		
IEN 494	Senior Project	3
IEN 507	Design of Manufacturing Systems	3
IEN 509	Automated Assembly	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
	Credit Hours	**15**
	Total Credit Hours	**128**

[1] To be selected from lists approved People and Society (PS)/Arts and Humanities (AH) (or applicable cognates). Students take a minimum of 3 courses (9 credit hours) in AH cognate and 3 courses in PS cognate (9 credit hours).

Note: Failure to follow the plan of study may result in a delay in your graduation.

BSIE Plan of Study:

Pre-Medical Concentration

Freshman Year		
Fall		**Credit Hours**
IEN 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
ECO 211 or 212	Principles of Microeconomics or Principles of Macroeconomics	3
	Credit Hours	**17**
Spring		
IEN 112	Introduction to Engineering II	2
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
	Credit Hours	**18**
Sophomore Year		
Fall		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
IEN 201	Methods Analysis and Work Measurement	3
CHM 221	Introduction to Structure and Dynamics	4
CHM 205	Chemical Dynamics Laboratory	1
MTH 210	Introduction to Linear Algebra	3
PHY 223	University Physics III	3
	Credit Hours	**19**
Spring		
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
AH Cognate (AH Elective) [1]		3
AH Cognate (AH Elective)		3
MTH 311	Introduction to Ordinary Differential Equations	3
PS Cognate (PS Elective) [1]		3
PHY 225	University Physics III Lab	1
	Credit Hours	**18**
Junior Year		
Fall		
IEN 310	Introduction to Engineering Probability	3
CHM 222	Organic Reactions and Synthesis	4
CHM 206	Organic Reactions and Synthesis Laboratory	2
IEN 351	Industrial Safety Engineering	3
IEN 380	Engineering Economy	3
IEN 441	Deterministic Models in Operations Research	3
	Credit Hours	**18**
Spring		
Advanced Bioscience Elective [2*]		3

IEN 312	Applied Statistical Methods	3
IEN 361	Industrial Cost Analysis	3
IEN 363	Project Management for Engineers	3
IEN 442	Stochastic Models in Operations Research [2]	3
	Credit Hours	**15**
Senior Year		
Fall		
IEN 465	Production and Inventory Control	3
IEN 512	Statistical Quality Control and Quality Management	3
IEN 547	Computer Simulation Systems	3
IEN 557	Ergonomics and Human Factors Engineering	3
AH Cognate (Advanced AH Elective) [1]		3
PS Cognate (PS Elective) [1]		3
	Credit Hours	**18**
Spring		
IEN 406	Computer-Aided Manufacturing	3
IEN 494	Senior Project	3
IEN 524	Decision Support Systems in Industrial Engineering	3
IEN 568	Materials Handling and Facilities Planning	3
PS Cognate (Advanced PS Elective) [1]		3
	Credit Hours	**15**
	Total Credit Hours	**138**

[1] To be selected from lists approved People and Society (PS)/Arts and Humanities (AH) (or applicable cognates). Students take a minimum of 3 courses (9 credit hours) in AH cognate and 3 courses in PS cognate (9 credit hours).

[2] Advanced Bioscience Elective is to be chosen from BIL 250 (https://bulletin.miami.edu/search/?P=BIL%20250), BIL 255 (https://bulletin.miami.edu/search/?P=BIL%20255), BIL 268 (https://bulletin.miami.edu/search/?P=BIL%20268), MIC 301 (https://bulletin.miami.edu/search/?P=MIC%20301), CHM 202 (https://bulletin.miami.edu/search/?P=CHM%20202), BMB 401 (https://bulletin.miami.edu/search/?P=BMB%20401) or BMB 402. **Students should verify admission requirements of their medical school of interest to verify Adv. Bioscience requirements, e.g. organic chemistry II, biochemistry, or both.**

[3] Technical or Science Elective Lab is selected from a science lab complementing the Adv Bioscience Elective (e.g., CHM or BIL lab).

* Students planning on taking the MCAT should take BMB 401 Biochemistry for the Biomedical Sciences as their first Adv. Bioscience Elective.

Note: Failure to follow the plan of study may result in a delay in your graduation.

Mission

The Department of Industrial Engineering's mission is to provide contemporary and relevant industrial and systems engineering education and research; impart knowledge and skills necessary to design and to improve a variety of manufacturing and service processes; promote life-long learning; and contribute to emerging societal needs.

Goals

The major goal of the Industrial Engineering program at the University of Miami is to prepare graduates to contribute to the economy by virtue of employment in a variety of industries: manufacturing (heavy and light, traditional and high technology) and service (health care, retail, transportation, logistics, government, consulting, banking, and insurance). In striving to achieve this goal, the objective of the faculty is to provide all graduates with the mathematical, scientific, and design tools required to formulate problems accurately, generate alternative solutions, evaluate those alternatives, and present the best solutions to clients or decision makers in a fashion that facilitates decision-making processes. In addition, superior students are prepared for graduate studies and research. Within the first several years following graduation from the Industrial Engineering program, graduates are expected to be:

1. Working as professionals by adding value in any one of the following sectors:
    - Service
    - Government
    - Consulting
    - Retail
    - Manufacturing

2. Pursuing or holding a graduate degree and/or developing professionally through continuing education, licensure, certification and seminars in a new area or their chosen areas of expertise.

Student 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 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.