B.S. IN INDUSTRIAL ENGINEERING AND B.S.B.A. IN MANAGEMENT DUAL DEGREE

Overview

The Department of Industrial and Systems Engineering and the Department of Management offers a dual-degree program that culminates with students receiving both Bachelor of Science in Industrial Engineering (BSIE) and a Bachelor of Science in Business Administration with a Major in Management (B.S.B.A in Management) concurrently.

Industrial and Systems Engineering combines science and technical knowledge with human sciences to design, plan, and analyze systems that involve people, materials, money, energy, equipment, and other resources. Industrial engineers work with personnel in research and development, accounting, engineers in other disciplines, maintenance, human resources, and production to increase organizational productivity, improve quality, reduce health care costs, conserve energy, develop public transportation systems, and improve industrial safety conditions. Industrial and Systems engineering distinguishes itself from other engineering professions because it has applications in manufacturing, service, commercial, and governmental activities. It is the major branch of engineering concerned not only with technology, but with people, making industrial engineers a prime source of management talent.

The Management major will prepare students for future careers in all areas of management, including small business and corporate levels. The study of Management also provides a solid preparation for the pursuit of other graduate degree programs, particularly in law and business.

Students are required to satisfy all the requirements of the College of Engineering BSIE degree and all of the requirements of the Herbert School of Business for the BSBA in Management degree. The dual degree fulfills both the People & Society area of knowledge (through the Management major) and the STEM area of knowledge (through the Industrial Engineering major).

Advanced Writing and Communication Skills: The dual degree program will satisfy the University's Advance Writing and Communication Skills within the two degrees. For the Industrial and Systems Engineering degree, the Advanced Writing and Communication Skills requirement is satisfied by completing a set of classroom courses, laboratory courses and design courses where they learn effective oral, graphical and technical writing skills. Industrial Engineering students acquire Advanced Writing and Communication skills in the following core courses:

- ISE 201 (https://bulletin.miami.edu/search/?P=ISE%20201) Work Design Systems
- ISE 363 (https://bulletin.miami.edu/search/?P=ISE%20363) Project Management for Engineers
- ISE 380 (https://bulletin.miami.edu/search/?P=ISE%20380) Engineering Economic Analysis
- ISE 493
- ISE 494 (https://bulletin.miami.edu/search/?P=ISE%20494) Senior Design Project
- ISE 512 (https://bulletin.miami.edu/search/?P=ISE%20512) Quality Management Systems
- ISE 547 (https://bulletin.miami.edu/search/?P=ISE%20547) Simulation Modeling and Systems Analysis
- ISE 557 (https://bulletin.miami.edu/search/?P=ISE%20557) Ergonomics and Human Factors Engineering
- ISE 568 (https://bulletin.miami.edu/search/?P=ISE%20568) Facilities Planning and Logistics

For the BSBA in Management degree, the advanced writing and Communications Skills requirement is satisfied by completing the following core courses:

- BSL 212 (https://bulletin.miami.edu/search/?P=BSL%20212)
- BUS 300 (https://bulletin.miami.edu/search/?P=BUS%20300)

Admission Requirements

Incoming first year students must meet the requirements of the College of Engineering and the Herbert School of Business admission requirements. Students will apply either to the College of Engineering or the Herbert School of Business. Once they have completed their first semester with a GPA of 3.0 and MTH 161 (or equivalent) with a B or more, they will be officially admitted into the Dual Degree Program. Current students wanting to transfer into the program with less than 30 credits need to have a 3.0 GPA and have completed Calculus 1 with an A or B. Students with more than 30 credits need to have a 3.0 GPA and have completed Calculus 1 and 2.

Students need to be aware the program is over 150 credits and entails a rigorous curriculum. Students who come in with credits (either AP or Dual Enrollment) will be able to finish the dual degree in 4-years. Students who do no have credits may need to do the program over 5-years. All students should consult with Financial Aid to understand the financial implications of choosing a 4 or 5-year plan.

Curriculum Requirements

Code	Title	Credit Hours
BSIE Core Courses		
EGN 114	Global Challenges Addressed by Engineering and Technology	3
EGN 123	Computing and Digital Solutions for the future	3
or BUS 150	Business Analytics	
ISE 224	Python for Engineers	3
ISE 201	Work Design Systems [3]	3
ISE 312	Foundations of Data Analysis	3
or MAS 312	Statistical Methods and Quality Control	
ISE 363	Project Management for Engineers	3
ISE 380	Engineering Economic Analysis	3
ISE 406	Computer-Aided Manufacturing	3
ISE 441	Operations Research and Optimization Methods	3
ISE 442	Stochastic Modeling and Decision Making	3
ISE 465	Inventory and Supply Chain Management	3
ISE 494	Senior Design Project	3
ISE 493	Industrial and Systems Engineering Capstone Planning	1
ISE 512	Quality Management Systems	3
ISE 516	Introduction to Applied Data Analytics	3
ISE 524	Systems Intelligence with Software Applications	3
ISE 547	Simulation Modeling and Systems Analysis	3
ISE 557	Ergonomics and Human Factors Engineering	3
ISE 568	Facilities Planning and Logistics	3
ISE Undergraduate Electives (9 credits)		
Satisfied through the Management major courses - MGT 302, MGT 304, MGT 307		
Choose one of the following:		**3**
CAE 210	Mechanics of Solids I	
ECE 205	Principles of Electrical Engineering--I	
MAE 303	Thermodynamics	
Technical Elective (3 credits)		
Satisfied by Management Major Requirements		
BSBA Business Core Requirements		
ACC 211	Principles of Financial Accounting	3
or ACC 221	Accelerated Principles of Financial Accounting	
ACC 212	Managerial Accounting	3
or ACC 222	Accelerated Managerial Accounting	
BSL 212	Introduction to Business Law and Ethics	3
BTE 320	Python Programming: Fundamentals and Algorithms (Satisfied by Engineering Core Course ISE 224))	
BUS 150	Business Analytics (Satisfied by Engineering Core Course EGN 123)	
BUS 211	Professional Development for Finance and Accounting	1
BUS 300	Critical Thinking and Persuasion for Business [2]	3
ECO 211	Principles of Microeconomics	3
ECO 212	Principles of Macroeconomics	3
FIN 302	Fundamentals of Finance (Satisfied by Engineering Core Course ISE 380)	
MAS 311	Applied Probability and Statistics (Satisfied by ISE 310)	
MAS 312	Statistical Methods and Quality Control (Satisfied by Engineering Core Course ISE 312)	
BTE 210	Fundamentals of Business Technology and Innovation	3

MGT 100	Managing for Success in the Global Environment (Satisfied by Engineering Core Course EGN 114)	
MGT 303	Operations Management (Satisfied by Engineering Core ISE 201)	
MGT 304	Organizational Behavior [3]	3
MGT 401	Strategic Management (Taken in Final Semester) [3]	3
MKT 301	Marketing Foundations	3
Quantitative Course (3 credits)		
Satisfied by Engineering Core Course ISE 442		
Major Area of Specialization in Management [3, 4]		
MGT 303	Operations Management (Replaced with Engineering Core Course ISE 201)	
MGT 304	Organizational Behavior (Taken as part of the Business Core)	
MGT 302	Human Resource Management	3
MGT 307	Advanced Organizational Behavior	3
Major Choice Courses [3, 4]		**9**
Select three courses (9 credit hours) from the Department of Management		
Other Courses		
Math & Basic Sciences Credit Hours		
ISE 310	Introduction to Engineering Probability	3
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
EGN 318	Engineering Mathematics I	3
EGN 319	Engineering Mathematics II	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 106	Physics Laboratory 1	1
EGN 233	Electromagnetics and Its Engineering Applications	3
Basic Science Elective		3
Basic Science Lab Elective		1
General Education Requirements		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 107	First-Year Writing II: STEM [2]	3
Quantitative Skills:		
MTH 151	Calculus I for Engineers (fulfilled through the major)	
Areas of Knowledge:		
Arts and Humanities Cognate [1]		9
People and Society Cognate (9 credits) (fulfilled through Management major)		
STEM Cognate (9 credits) (fulfilled through the ISE major)		
Other Credit Hours		
ECO 211	Principles of Microeconomics (Fulfilled through the Business Core)	
or ECO 212	Principles of Macroeconomics	
Total Credit Hours		**151**

1 To be selected from lists of approved Arts (HA) (or applicable cognates) in the cognate search engine. Students take a minimum of 3 courses (9 credit hours) in HA cognate.

2 Students who do not earn at least a C- in WRS 107 must either repeat WRS 107 and earn at least a C- or complete WRS 230 with at least a C- before enrolling in BUS 300.

3 All specific coursework for the major area of specialization in Management must be completed with a grade of "C" or higher. A minimum cumulative GPA of 2.5 is required for all courses taken in the major area of specialization.

4 Select three courses (9 credit hours) from the Department of Management. Excluding any 100-level Management courses and MGT 401

Plan of Study: 4 Years

Freshman Year		
Fall		**Credit Hours**
EGN 114	Global Challenges Addressed by Engineering and Technology	3
WRS 105	First-Year Writing I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
ECO 211	Principles of Microeconomics	3
EGN 123 or BUS 150	Computing and Digital Solutions for the future or Business Analytics	3
	Credit Hours	**20**
Spring		
BTE 210	Fundamentals of Business Technology and Innovation	3
WRS 107	First-Year Writing II: STEM [2]	3
MTH 162	Calculus II	4
ECO 212	Principles of Macroeconomics	3
BSL 212	Introduction to Business Law and Ethics	3
Arts & Humanities Cognate [1]		3
	Credit Hours	**19**
Sophomore Year		
Fall		
ISE 201	Work Design Systems [3]	3
EGN 318 or MTH 210	Engineering Mathematics I or Introduction to Linear Algebra	3
ISE 380	Engineering Economic Analysis	3
ACC 211	Principles of Financial Accounting	3
PHY 222	University Physics II	3
PHY 106	Physics Laboratory 1	1
MGT 199	Professional Development and Success in the Workplace	1
MGT 304	Organizational Behavior [3]	3
	Credit Hours	**20**
Spring		
ISE 224	Python for Engineers	3
CAE 210, ECE 205, or MAE 303	Mechanics of Solids I or Principles of Electrical Engineering--I or Thermodynamics	3
ACC 212	Managerial Accounting	3
BUS 300	Critical Thinking and Persuasion for Business [2]	3
EGN 319 or MTH 311	Engineering Mathematics II or Introduction to Ordinary Differential Equations	3
EGN 233	Electromagnetics and Its Engineering Applications	3
	Credit Hours	**18**
Junior Year		
Fall		
ISE 310	Introduction to Engineering Probability	3
ISE 441	Operations Research and Optimization Methods	3
MKT 301 or 201	Marketing Foundations or Foundations of Marketing	3
MGT 302	Human Resource Management [3]	3
MGT 307	Advanced Organizational Behavior [3]	3
HA Cognate (HA Elective) [1]		3
	Credit Hours	**18**

Spring		
ISE 312 or MAS 312	Foundations of Data Analysis or Statistical Methods and Quality Control	3
ISE 363	Project Management for Engineers	3
ISE 406	Computer-Aided Manufacturing	3
ISE 442	Stochastic Modeling and Decision Making	3
Basic Science Elective		3
Basic Science Elective Lab		1
Arts & Humanities Cognate [1]		3
	Credit Hours	**19**
Senior Year		
Fall		
ISE 465	Inventory and Supply Chain Management	3
ISE 493	Industrial and Systems Engineering Capstone Planning	1
ISE 512	Quality Management Systems	3
ISE 547	Simulation Modeling and Systems Analysis	3
ISE 557	Ergonomics and Human Factors Engineering	3
Management Elective [3, 4]		3
Management Elective [3, 4]		3
	Credit Hours	**19**
Spring		
ISE 494	Senior Design Project	3
ISE 516	Introduction to Applied Data Analytics	3
ISE 524	Systems Intelligence with Software Applications	3
ISE 568	Facilities Planning and Logistics	3
Management Elective [3, 4]		3
MGT 401	Strategic Management [3]	3
	Credit Hours	**18**
	Total Credit Hours	**151**

1 Arts and Humanities (AH) (or applicable cognates) selected from the Cognate Search Engine. Students take a minimum of 3 courses (9 credit hours) in AH cognate.

2 Students who do not earn at least a C- in WRS 107 must either repeat WRS 107 and earn at least a C- or complete WRS 230 with at least a C- before enrolling in BUS 300.

3 All specific coursework for the major area of specialization in Management must be completed with a grade of "C" or higher. A minimum cumulative GPA of 2.5 is required for all courses taken in the major area of specialization.

4 Select three courses (9 credit hours) from the Department of Management. Excluding any 100-level Management courses and MGT 401

Plan of Study: 5 Years

Freshman Year		
Fall		**Credit Hours**
EGN 114	Global Challenges Addressed by Engineering and Technology	3
WRS 105	First-Year Writing I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
	Credit Hours	**14**
Spring		
EGN 123 or BUS 150	Computing and Digital Solutions for the future or Business Analytics	3
WRS 107	First-Year Writing II: STEM [2]	3
MTH 162	Calculus II	4
ECO 212	Principles of Macroeconomics	3

BSL 212	Introduction to Business Law and Ethics	3
	Credit Hours	**16**
Sophomore Year		
Fall		
ISE 201	Work Design Systems [3]	3
EGN 318	Engineering Mathematics I	3
ECO 211	Principles of Microeconomics	3
ACC 211	Principles of Financial Accounting	3
PHY 222	University Physics II	3
MGT 199	Professional Development and Success in the Workplace	1
	Credit Hours	**16**
Spring		
ISE 224	Python for Engineers	3
EGN 319	Engineering Mathematics II	3
ACC 212	Managerial Accounting	3
BUS 300	Critical Thinking and Persuasion for Business [2]	3
BTE 210	Fundamentals of Business Technology and Innovation	3
PHY 106	Physics Laboratory 1	1
	Credit Hours	**16**
Junior Year		
Fall		
ISE 310	Introduction to Engineering Probability	3
ISE 380	Engineering Economic Analysis	3
ISE 441	Operations Research and Optimization Methods	3
MGT 304	Organizational Behavior [3]	3
AH Cognate (AH Elective) [1]		3
	Credit Hours	**15**
Spring		
ISE 312 or MAS 312	Foundations of Data Analysis or Statistical Methods and Quality Control	3
ISE 363	Project Management for Engineers	3
EGN 233	Electromagnetics and Its Engineering Applications	3
ISE 442	Stochastic Modeling and Decision Making	3
Basic Science Elective		3
Basic Science Elective Lab		1
	Credit Hours	**16**
Senior Year		
Fall		
ISE 465	Inventory and Supply Chain Management	3
ISE 512	Quality Management Systems	3
MKT 301	Marketing Foundations	3
MGT 302	Human Resource Management [3]	3
MGT 307	Advanced Organizational Behavior [3]	3
	Credit Hours	**15**
Spring		
ISE 406	Computer-Aided Manufacturing	3
ISE 516	Introduction to Applied Data Analytics	3
ISE 524	Systems Intelligence with Software Applications	3
CAE 210 or MAE 303	Mechanics of Solids I or Thermodynamics	3
Management Elective [3, 4]		3
	Credit Hours	**15**

Fifth Year		
Fall		
ISE 493	Industrial and Systems Engineering Capstone Planning	1
ISE 547	Simulation Modeling and Systems Analysis	3
ISE 557	Ergonomics and Human Factors Engineering	3
Management Elective [3, 4]		3
AH Cognate (AH Elective) [1]		3
	Credit Hours	**13**
Spring		
ISE 494	Senior Design Project	3
ISE 568	Facilities Planning and Logistics	3
MGT 401	Strategic Management [3]	3
Management Elective [3, 4]		3
AH Elective [1]		3
	Credit Hours	**15**
	Total Credit Hours	**151**

1 To be selected from the Cognate Search Engine, Arts & Humanities (AH) (or applicable cognates). Students take a minimum of 3 courses (9 credit hours) in AH.

2 Students who do not earn at least a C- in WRS 107 must either repeat WRS 107 and earn at least a C- or complete WRS 230 with at least a C- before enrolling in BUS 300.

3 All specific coursework for the major area of specialization in Management must be completed with a grade of "C" or higher. A minimum cumulative GPA of 2.5 is required for all courses taken in the major area of specialization.

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