Engineering Management- Bachelor of Science in Engineering

For information, contact the College of Engineering and Computing Dean's Office, 513-529-0700 or visit http://miamioh.edu/cec/academics/interdisciplinary-majors/engineering-management/index.html.

Engineering Management provides an interdisciplinary approach for addressing the complexities of today's world. Highly competitive global businesses require employees with a solid technical foundation, business expertise, an entrepreneurial mindset, and the leadership skills afforded by a broad liberal education. The Engineering Management program includes courses in engineering, business/entrepreneurship, science, mathematics, and the liberal arts. It is designed to develop your engineering and business expertise, social awareness, and interpersonal communication skills. Students earn a Bachelor of Science in Engineering degree. Students who complete the Entrepreneurship concentration cannot also be awarded the Entrepreneurship minor.

Student Outcomes

Students in each of the Engineering Management concentrations – Electronics and Computing, Manufacturing Engineering, Environmental Engineering, and Paper Science and Engineering – should attain the following outcomes by the time of graduation:

1. an ability to communicate effectively with a range of audiences

2. 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

3. 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

4. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Engineering Management with Electronics and Computing Concentration

This concentration provides a foundation in electrical and computer engineering while developing the skills necessary to manage the development of products, including computers and other electronic devices. Graduates have an impact on the needs of society, where global reliance on electronics and computing is ever-increasing. The additional student outcomes for this concentration are:

- an ability to solve electrical, computer, and related problems in a business or engineering environment by applying computing, business, math, science, and engineering fundamentals.
- an ability to manage the design and creation of electrical and computer systems to meet client needs in business and engineering applications.

Engineering Management with Manufacturing Engineering Concentration

This concentration focuses on product and process design. It requires the ability to plan the practices of manufacturing; to research and develop tools, manufacturing processes, machines, equipment, and control strategies; and to integrate the facilities and systems so that quality products can be produced at a competitive cost. The additional student outcomes for this concentration are:

- an ability to design manufacturing processes, products, and the corresponding processing machinery
- an ability to create competitive advantage by manufacturing planning, strategy, and control
- an ability to analyze, synthesize, and control manufacturing operations using statistical methods and to make technical inferences about a manufacturing process by measuring process variables.

Engineering Management with Environmental Engineering Concentration

This concentration provides a foundation in environmental engineering while developing the skills necessary to achieve practical and economical solutions to environmental challenges pertaining to industry and society. Graduates have an impact on our global progress toward achieving a sustainable society. The additional student outcomes for this concentration are:

- an ability to plan, identify, design, and assess pollution prevention alternatives and pollution control processes for industry and for society
- an ability to demonstrate the organizational, leadership and general communication skills needed by an environmental professional.

Engineering Management with Paper Science and Engineering Concentration

This concentration provides a foundation in paper science and engineering while developing the technical knowledge, skills, and talents required to achieve practical solutions to challenges in the paper industry or for a company allied to the paper industry. Graduates have an impact on innovation and progress toward sustainability in the pulp and paper sector. The additional student outcomes for this concentration are:

- an ability to plan, identify, design, and assess solutions to challenges in the paper industry or for a company allied to the paper industry.
- an ability to demonstrate the organizational, leadership and general communication skills needed by professionals in the global pulp and paper industry

Credit/No Credit Policy

All courses in chemistry, physics, biology, mathematics, statistics, in the business core, and in the College of Engineering and Computing

(CEC, CPB, CSE, CYB, ECE, EGM, MME, QTM) that are used to fulfill requirements of the major, must be taken for a letter grade.

Divisional Policies

Multiple Majors: Students with two or more majors in the College of Engineering and Computing must take a minimum of 15 unique, additional credit hours in each major.

Career Foundations: The Career Foundations course sequence (CEC 190 series) is designed to equip students with the essential professional skills needed for lifelong career success. Students starting in CEC majors in fall 2025 and later are required to take CEC 190 each semester and are automatically registered. CEC 190 is zero credit hours, has a grade mode of credit/no-credit, requires 5-10 hours and awards a badge each semester. Students earn certificates for successfully completing eight badges.

Program Requirements

The number of hours needed to graduate depends on your choice of concentration and mathematical preparation. Course requirements for the Miami Plan are listed separately in that chapter. Many of the courses taken to fulfill the Miami Plan can be used to fill other requirements of this program. Additional hours beyond the minimum required for a bachelor's degree at Miami may be needed based on concentration.

Code	Title	Credit Hours
Core Requirements		
CHM 141	College Chemistry	3
ECO 201	Principles of Microeconomics	3
ENG 313	Technical Writing	3
MTH 151	Calculus I	4
MTH 251	Calculus II	4-5
or MTH 249	Calculus II	
General Engineering		
CEC 111	Imagination, Ingenuity and Impact I	2
CEC 112	Imagination, Ingenuity, and Impact II	2
MME/CPB 341	Engineering Economics	3
EGM 411	Leading and Managing Projects	3
BUSINESS CONCENTRATION		**21**
Complete either the General Business Concentration or the Entrepreneurship Concentration		
GENERAL BUSINESS CONCENTRATION		
ACC 221	Introduction to Financial Accounting	
ECO 202	Principles of Macroeconomics	
MKT 291	Principles of Marketing	
MGT 291	Introduction to Management & Leadership	
MGT 295	Introduction to Operations and Supply Chain Management	
Management Track -- Complete one of the following Management Tracks in the General Business concentration: Entrepreneurship, Human Resources, Materials Management, or Operations Management		
Entrepreneurship		
ESP 341	Corporate Entrepreneurship	
ESP 401	Entrepreneurship: New Ventures	
Human Resources - select two of the following:		
MGT 303	Human Resource Management	
MGT 404	Compensation Management	
MGT 405	Negotiations and Conflict Management	
MGT 406	Talent Acquisition and Development	
Materials Management - select two of the following:		
ISA 303	Enterprise Systems	
MGT 431	Logistics Management	
MGT 432	Global Strategic Sourcing	
Operations Management		
MGT 451	Operations Planning and Scheduling	
MGT 453	Quality Management Systems	
ENTREPRENEURSHIP CONCENTRATION		
ESP 101	Entrepreneurship Foundations	
Take both Startup and Innovation Weekends of ESP 102		
ESP 102	Entrepreneurial Immersion: From Idea to Opportunity (Startup Weekend)	
ESP 102	Entrepreneurial Immersion: From Idea to Opportunity (Innovation Weekend)	
ESP 201	Introduction to Entrepreneurship and Business Models	
ESP 251	Entrepreneurial Value Creation and Capture	
ESP 252	Entrepreneurial Mindset: Creativity and Organization	
ESP 331	Social Entrepreneurship	
Choose one:		
ESP 321	Startup Entrepreneurship	
ESP 341	Corporate Entrepreneurship	
ESP 351	Creativity in Entrepreneurship	
Choose one:		
ESP 401	Entrepreneurship: New Ventures	
ESP 461	Entrepreneurial Consulting	
ENGINEERING CONCENTRATION		**55-60**
Complete one Engineering Concentration		
MANUFACTURING (59-60 credit hours)		
PHY 181 & PHY 183	General Physics I and General Physics Laboratory I	
PHY 182	General Physics II	
CSE 372	Stochastic Modeling	
or STA 401	Probability	
ECE 205	Electric Circuit Analysis I	
MTH 246	Linear Algebra and Differential Equations for Engineers	
STA 301	Applied Statistics	
or STA 261	Statistics	
MME 201	Modeling and Design in Engineering	
MME 211	Static Modeling of Mechanical Systems	
MME 223	Engineering Materials	
MME 231	Manufacturing Processes	
MME 301	Product Design and Development	

MME 305	Measurements and Instrumentation
MME 312	Mechanics of Materials
MME 331	Advanced Manufacturing and Design
MME 334	Quality Planning and Control
MME 337	Manufacturing Automation
MME 411	Machine and Tool Design
MME/ECE 448	Senior Design Project
MME/ECE 449	Senior Design Project
PAPER SCIENCE AND ENGINEERING (56-58 credit hours)	
CHM 144	College Chemistry Laboratory
PHY 181	General Physics I
PHY 182	General Physics II
CHM 142 & CHM 145	College Chemistry and College Chemistry Laboratory
CHM 231	Fundamentals of Organic Chemistry
MTH 245	Differential Equations for Engineers
or MTH 246	Linear Algebra and Differential Equations for Engineers
or MTH 347	Differential Equations
STA 301	Applied Statistics
or STA 261	Statistics
CPB 201	Principles of Paper Science and Engineering
CPB 202	Pulp and Paper Physics
CPB 204	Mass and Energy Balances I
CPB 219	Statics and Mechanics of Materials
or MME 211	Static Modeling of Mechanical Systems
CPB 301	Pulp and Paper Chemistry
CPB 311	Transport Phenomena Laboratory
CPB 318	Transport Phenomena I
CPB/MME 314	Engineering Thermodynamics
CPB 404	Papermaking
CPB 471	Engineering Product Design I
CPB 472	Engineering Product Design II
CPB 490	Special Topics in Paper and Chemical Engineering
ENVIRONMENTAL ENGINEERING (55-57 credit hours)	
CHM 144	College Chemistry Laboratory
PHY 181	General Physics I
PHY 182	General Physics II
CHM 142 & CHM 145	College Chemistry and College Chemistry Laboratory
CHM 231	Fundamentals of Organic Chemistry
MTH 245	Differential Equations for Engineers
or MTH 246	Linear Algebra and Differential Equations for Engineers
or MTH 347	Differential Equations
CPB 204	Mass and Energy Balances I
CPB 219	Statics and Mechanics of Materials
or MME 211	Static Modeling of Mechanical Systems
CPB 244	Introduction to Environmental Engineering
CPB 311	Transport Phenomena Laboratory
CPB 318	Transport Phenomena I
CPB/MME 314	Engineering Thermodynamics
CPB 471	Engineering Product Design I
CPB 472	Engineering Product Design II
STA 301	Applied Statistics
or STA 261	Statistics
Select three of the following:	
CPB 405	Industrial Environmental Control
CPB 441	Pollution Prevention in Environmental Management
CPB 442	Air Pollution Control
MME 451	Sustainability Considerations in Design and Development
ELECTRONICS AND COMPUTING (55-58 credit hours)	
PHY 181 & PHY 183	General Physics I and General Physics Laboratory I
PHY 182 & PHY 184	General Physics II and General Physics Laboratory II
CSE 174	Fundamentals of Problem Solving and Programming
ECE 205	Electric Circuit Analysis I
ECE 287	Digital Systems Design
ECE 304	Electronics
ECE 306	Signals and Systems
ECE 345	Introduction to Probability, Statistics, and Random Processes
or STA 301	Applied Statistics
or STA 261	Statistics
ECE/MME 448	Senior Design Project
or CSE 448	Senior Design Project I
ECE/MME 449	Senior Design Project
or CSE 449	Senior Design Project II
ECE 484	Embedded Systems Design
MTH 222	Introduction to Linear Algebra
or MTH 231	Elements of Discrete Mathematics
MTH 245	Differential Equations for Engineers
or MTH 246	Linear Algebra and Differential Equations for Engineers
or MTH 347	Differential Equations
Select at least 12 hours of electives from:	
Any 200-level or higher ECE course.	
CSE 201	Introduction to Software Engineering
CSE 212	Software Engineering for User Interface and User Experience Design
CSE 252	Web Application Programming
CSE 271	Object-Oriented Programming
CSE 273	Optimization Modeling
CSE 274	Data Abstraction and Data Structures
CSE 278	Systems I: Introduction to Systems Programming
Any 300-level or higher CSE course	
MTH 252	Calculus III
Total Credit Hours	**103-109**