Industrial Engineering and Management

Industrial Engineering & Management Major

Industrial Engineering and Management (IE&M) is a good choice for people with the aptitude and interest for careers that blend technology and people. First, this is an engineering program, with the traditional content of mathematics, sciences, engineering analysis and design. Graduates are traditionally very successful in nationally-normed professional engineering examinations. Beyond the basics, this program also challenges students to integrate resources with technology. In addition to scientific principles and technological systems, IE&M students study people systems, cost analysis, facilities and other elements of the business enterprise. The "engineering" and "management" pieces are blended and integrated.

Just as the profession requires a blend of scientific, technological and humanistic skills, student learning in IE&M is an integrated process. The discipline-specific courses place the student in position to experience many elements of real situations in industry and commerce. Moreover, the program has been nationally cited for integrating design across all levels, with freshmen and juniors or sophomores and seniors often working together.

Graduates of the IE&M program will be able to:

1. Apply statistical, operations research and simulation tools to solve problems relevant to modern manufacturing, healthcare, production, commercial, social and/or governmental organizations, with principal emphasis on quality, productivity, continuous improvement, and enterprise integration.
2. Design processes and systems to effectively and economically employ and integrate technology and people in organizational environments in industrial, healthcare, logistics, service and/or governmental settings, with appropriate consideration for environmental factors, health and safety, manufacturability and ethical, economic, social and political issues.
3. Engage in effective learning in topics and areas relevant to professional advancement and to enhancing the quality of personal life.
4. Participate effectively in multidisciplinary teams in both leadership and followership roles.
5. Effectively communicate complex technological concepts, issues and professional details to a variety of audiences.

IE&M graduates are in high demand across a wide spectrum of industries. In recent years, the most active employers have represented manufacturing, transportation, warehousing and distribution, healthcare, information systems, software, facilities development and consulting industries, as well as many of the production sectors that have been the traditional concentration for industrial engineers. IE&M graduates are sought after for responsible positions in project and organizational management, financial modeling, technological training, logistics, and design of processes, procedures, facilities, and systems.

Industrial Engineering & Management Areas of Emphasis

Students majoring in Industrial Engineering and Management may prepare for specific career choices by careful use of the technical electives included in the IE&M major. It is suggested that students confer with their academic adviser for assistance in choosing the most appropriate optional courses. Particular areas of emphasis may be selected in the following special interests: Management of people systems; Advanced manufacturing engineering; Healthcare management engineering; Production operations & management, Quality Engineering & Management; Reliability Engineering; and Lean manufacturing.

These topical areas are also available for post-graduate study, leading to the Master of Science in Industrial Engineering and Management and the Doctor of Philosophy in Industrial and Manufacturing Engineering degrees. For complete details, see the Graduate Bulletin (http://bulletin.ndsu.edu/past-bulletin-archive/2014-15/graduate) online.

Industrial Engineering and Management Minor

Students majoring in any engineering discipline may elect a minor in Industrial Engineering and Management. These optional studies offer engineering students the opportunity to add important career-enhancing skills to their technological competencies. The elected courses in an IE&M minor add skills for integrating technology and resources within the complex of people, technology, machinery and information that make up the successful modern business enterprise. Students completing this minor will achieve better understanding of organizational and management processes and will be better prepared to work in the multifunctional teams crucial to success in industry.

Minors at NDSU require a minimum of 16 credits. The foundation requirements for the IE&M minor are:

- IME 111 Introduction to Industrial and Manufacturing Engineering
- IME 311 Work/Station Design and Measurement

The remaining 10 credits may be selected from any IME 300- and 400-level courses for which prerequisites are in place. The only exception is IME 460 Evaluation of Engineering Data, which does not count toward this minor.

Interested students are encouraged to visit with relevant faculty in the IME Department for advice on course selection to best suit their career interests. Students must complete the graduation requirements for another engineering major before the designation of the IE&M minor will be placed on their transcripts.

Industrial Engineering & Management Sequence for Non-Majors

The practices and procedures learned in the Industrial Engineering & Management major are universally applied in public and private organizations of all kinds. IE&M courses are available as electives for students majoring in computer science, mathematics, sciences, business administration, cereal science, agricultural economics, and facility management. Courses recommended for non-majors are:

IME 311	Work/Station Design and Measurement	3
IME 440	Engineering Economy	2-4
IME 450	Systems Engineering and Management	3

IME 451	Logistics Engineering and Management	3
IME 453	Hospital Management Engineering	3
IME 456	Program and Project Management	3
IME 460	Evaluation of Engineering Data	3
IME 461	Quality Assurance and Control	3-4
IME 462	Total Quality In Industrial Management	3
IME 463	Reliability Engineering	3
IME 470	Operations Research I	3
IME 480	Production and Inventory Control	3
IME 485	Industrial and Manufacturing Facility Design	3

Major Requirements

Major: Industrial Engineering & Management

Degree Type: B.S.I.E.Mgt.
Required Degree Credits to Graduate: 131

General Education Requirements

First Year Experience (F):		
UNIV 189	Skills For Academic Success (Students transferring in 24 or more credits do not need to take UNIV 189.)	1
Communication (C):		
ENGL 110	College Composition I	3
ENGL 120	College Composition II	3
ENGL 321	Writing in the Technical Professions	3
COMM 110	Fundamentals of Public Speaking	3
Quantitative Reasoning (R):		
MATH 165	Calculus I	4
Science & Technology (S):		
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory	4
CHEM 122	General Chemistry II	3
PHYS 252	University Physics II	4
Humanities & Fine Arts (A): Select from current general education list		6
Social & Behavioral Sciences (B): Select from current general education list		6
Wellness (W): Select from current general education list		2
Cultural Diversity (D): Select from current general education list		
Global Perspectives (G): Select from current general education list		
Total Credits		42

Major Requirements

General Education Requirements		40
Industrial Engineering & Management Core Requirements		
IME 111	Introduction to Industrial and Manufacturing Engineering	3
IME 311	Work/Station Design and Measurement	3
IME 330	Manufacturing Processes	3
IME 440	Engineering Economy	3
IME 450	Systems Engineering and Management	3
IME 456	Program and Project Management	3
IME 460	Evaluation of Engineering Data	3
IME 461	Quality Assurance and Control	3
IME 462	Total Quality In Industrial Management	3
IME 470	Operations Research I	3
IME 472	Simulation of Business and Industrial Systems	3
IME 480	Production and Inventory Control	3
IME 482	Automated Manufacturing Systems	3
IME 485	Industrial and Manufacturing Facility Design	3
MATH Courses Required:		
MATH 129	Basic Linear Algebra	2
MATH 166	Calculus II	4
MATH 259	Multivariate Calculus	3
MATH 266	Introduction to Differential Equations	3
ME Courses Required:		
ME 212	Fundamentals of Visual Communication for Engineers	3
ME 221	Engineering Mechanics I	3
ME 222	Engineering Mechanics II	3
Other Required Courses:		
ENGR 402	Engineering Ethics and Social Responsibility	1
PHYS 252L	University Physics II Laboratory	1
Industrial Engineering and Management Electives		
Computer Science Electives: Select one of the following:		3
CSCI 122	Visual BASIC	
CSCI 126	Beginning FORTRAN	
CSCI 160	Computer Science I	
ECE 173	Introduction to Computing	
Programming Language	Any programming language course must be approved by your adviser.	
Engineering Science Requirements:		
CE 309	Fluid Mechanics	3
ME 223	Mechanics of Materials	3
ME 350	Thermodynamics and Heat Transfer	3
Select one of the following:		3-4
EE 206	Circuit Analysis I	
ECE 275	Digital Design	
ECE 301	Electrical Engineering I	
Technical Electives: Select 9 credits from the following:		9
IME 335	Welding Technology	
IME 380	CAD/CAM for Manufacturing	
IME 411	Human Factors Engineering	
IME 427	Packaging for Electronics	
IME 430	Process Engineering	
IME 431	Production Engineering	
IME 432	Composite Materials Manufacturing	
IME 437	Methods for Precision Manufacturing	
IME 451	Logistics Engineering and Management	
IME 452	Integrated Industrial Information Systems	
IME 453	Hospital Management Engineering	
IME 463	Reliability Engineering	
IME 494	Individual Study	
Only one of the following 5 courses may be counted as a technical elective.		

BUSN 340	International Business	
MGMT 320	Foundations of Management	
MRKT 320	Foundations of Marketing	
BUSN 431	Business Law I-Contracts, Property and Torts	
MIS 320	Management Information Systems	
Other Technical Elective Courses by Approval *		
Total Credits		131-132

* Students may request approval for other 300-400 level engineering or related courses to be approved as technical electives. To request approval, a student should submit a memo to their academic adviser indicating the course of interest and why the course should be approved as a technical elective. This memo will be reviewed by the academic adviser and the IME Department for approval

Degree Requirements and Notes

- A student must complete at least 60 semester credits of professional level course work in his/her program while in residence and enrolled in the college. Students transferring into the college from programs with professional accreditation are exempt from this residency requirement but are subject to the residency requirement of NDSU.
- Grades less than 'C' will not be accepted for CHEM, MATH, and PHYS.
- 300-400 level BUSN courses require at least junior standing and a minimum 2.50 cumulative GPA.

Minor Requirements

Industrial Engineering & Management Minor

Minor Requirements

Required Credits: 16

Required Courses		
IME 111	Introduction to Industrial and Manufacturing Engineering	3
IME 311	Work/Station Design and Measurement	3
Electives		10
Complete any 300-400 level IME course for which prerequisites are in place (does not include IME 460)		
Total Credits		16

Minor Requirements and Notes

- A minimum of 8 credits must be taken at NDSU.
- Only students majoring in engineering and construction management may declare this minor.