

Industrial and Systems Engineering



Department of Industrial and Manufacturing Systems Engineering
College of Engineering and Computer Science

The Program

The Industrial and Systems Engineering (ISE) curriculum prepares industrial engineers to design, improve, and install integrated systems, that is, systems where people, materials, information, equipment, and energy all interact to make or process a product or deliver a service. Students complete a minimum of 128 credits and receive a Bachelor of Science in Engineering (BSE) degree in Industrial and Systems Engineering.

What sets industrial and systems engineering apart from other engineering disciplines is its broader scope. ISE deals with people as well as things and relates to the total picture of productivity improvement and efficiency.

Industrial and Systems engineers are planners and designers who improve industrial and human productivity in such areas as production management, quality control, facilities design, industrial distribution, and manufacturing automation. They may be employed in almost any type of industry, business, or institution, from manufacturing plants to government offices to hospitals. Industrial and Systems Engineers

- Design production and control systems to coordinate activities and control the quality of a product
- Design and improve systems for the distribution of physical goods and of services, in the right quantities, to the right location, and at the right time while minimizing costs and maximizing quality of service
- Solve organization and production problems by designing information processing systems and applying the analytical techniques of operations research
- Develop management control systems to aid in financial planning and cost analysis
- Conduct facility location studies to look for the best location of a business or an industrial facility, based on such factors as sources of raw materials, location of customers, transportation costs, and local taxes
- Develop wage and salary administration systems and job evaluation programs
- Manage design and construction projects for a manufacturing facility
- Write performance requirements and maintenance schedules, and estimate the time and cost of projects

Many industrial engineers move into management positions because of their broader perspective in the interactions of people and systems.

Curriculum Requirements

Area	Semester Credits
CECS Distribution Requirements	24
COMP 105 English Composition I	3
COMP 270 Technical Writing	3
ECON 201 or 202 Macro- or Micro-economics	3
– Two courses in the humanities, from specified choices	6
– Two courses in the behavioral/social sciences, from the specified choices	6
– Restricted elective: one course in the humanities, the behavioral/social sciences, or a 400-level IMSE course	3
Basic Preparation Requirements	50
ENGR 100 Introduction to Engineering	2
ENGR 126 Engineering Computer Graphics	2
Mathematics	
MATH 115 Calculus I	4
MATH 116 Calculus II	4
MATH 205 Calculus III for Engineers	3
MATH 216 Differential Equations	3
MATH 217 Matrix Algebra	2
Chemistry, (Anatomy/Physiology), and Physics	
CHEM 124 General Chemistry I	4
CHEM 146 Gen'l Chem II or BIO 103, Anat/Physio I	4
PHYS 150 and 151 General Physics I and II	8
Core Engineering Courses	
IMSE 255 Computer Programming for Engineers	3
ENGR 250 Principles of Engineering Materials	3
ME 265 Applied Mechanics	4
ECE 305 Introduction to Electrical Engineering	4
Professional Requirements	54
IMSE 3005 Introduction to Operations Research	4
IMSE 317 Engineering Probability and Statistics	3
IMSE 382 Manufacturing Processes I	4
IMSE 421 Engineering Economy and Decision Analysis	3
IMSE 4425 Human Factors and Ergonomics	4
IMSE 4545 Information Systems Design	4
IMSE 4585 Simulation in Systems Design	4
IMSE 4675 Six Sigma & Statistical Process Improvement	4
IMSE 4795 Production, Inventory Control, Lean Mfctr	4
ENGR 400 Applied Business Techniques for Engr/CIS	3
IMSE 4951 Senior Design Project I	2
IMSE 4952 Senior Design Project II	2
Industrial and Systems Engineering electives	13

NOTE: Curriculum requirements may change. Students should consult an advisor for current requirements

Facilities of the College of Engineering and Computer Science

Modern computer and laboratory facilities are essential in preparing students for professional positions in the world of engineering practice and research. As part of their required undergraduate studies, CECS students make use of numerous computer and engineering laboratories to test and apply the theories learned from faculty. CECS students use the local area network of PCs and Unix computers as well as the large Sun workstation network.

The IMSE Department laboratories include the simulation/ automation laboratory, and the computer-integrated manufacturing laboratory, human performance, materials testing, metal-forming, metrology, manufacturing processes, and robotics laboratories.

The Manufacturing Systems Engineering Laboratory (MSEL) facilities and the computer vision, computer automation, 3-D imaging, precision machining, rapid prototyping and controls, supply chain and electronics commerce, and vehicle ergonomics laboratories, and the manufacturing simulation center, are also used in appropriate upper-level classes and for research.

Faculty of the IMSE Department

The program is taught primarily by Ph.D. faculty dedicated to teaching, research, and advising. Some courses are taught by local industry professionals. The active research interests of the industrial and manufacturing systems engineering faculty include such areas as precision machining and machine diagnostics; simulation modeling; quality engineering; and manufacturing, information, and health care systems.

Cooperative Education

Engineering students are eligible to participate in the College of Engineering and Computer Science's Cooperative Education Program. During co-op placements engineering juniors or seniors alternate semesters of full-time classes with semesters of full-time paid engineering work in a company or organization in their field.

Co-op students gain valuable professional work experience in engineering before they graduate, earn a salary, and also establish contacts useful for later employment.

Co-op students in industrial and systems engineering have found recent co-op placements in such companies as: Adaptive Materials, Inc., Alcoa Fujikura Ltd. (AFL), American Axle & Manufacturing, Arvin-Meritor, BodyCote USA, Bosch, Cadillac Products, Comau-Pico, CVS Manufacturing, Denso International, Detroit Diesel, DTE, E&E Manufacturing, Eplan, Fives Group-Cinetec, General Electric, Howden Buffalo, Lear, Mill Steel, NASA, Oakwood Hospital, Plastipak Packaging, SeverStal of N.A., Sumitomo, Tower Automotive, TRW, ThyssenKrupp, Unisys, Visteon, Webasto Roofing, and Yazaki.

Employment Opportunities

Nationally, the starting salaries recently reported by new graduates with a BSE in industrial and systems engineering average in the \$55,000 to \$65,000 range.

Recent graduates from the University of Michigan-Dearborn with a BSE in industrial and systems engineering have found professional employment in such companies as Accenture, Auto Alliance, Boeing, Chrysler, Ford Motor Company, General Motors, Lear Corporation, NASA, Nissan, Oakwood Hospital, Parke Davis, United Parcel Service, Visteon, and Yazaki.

Admission Requirements

From High School:

3.00 adjusted GPA or higher and ACT of 22 or higher.

From Community College or University:

2.75 adjusted GPA (cumulative, mathematics, and science—all three) in transferable courses. Courses with a grade of C- or below do not transfer.

For More Information

For Engineering and Computer Science Information:

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For Admissions Information and Applications:

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