

# Manufacturing Engineering



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

## The Program

The Manufacturing Engineering curriculum prepares manufacturing engineers to plan for, design, build, improve, install, and operate competitive production systems for discrete manufacturing. Students complete a minimum of **128 credits** and receive a **Bachelor of Science in Engineering (BSE) degree in Manufacturing Engineering**. The manufacturing engineering degree program at UM-D's College of Engineering and Computer Science is offered late-afternoon and evening.

Manufacturing engineers not only direct their attention to production systems, they also work together with design engineers to assure soundness of design and the consequent manufacturability of products. Manufacturing engineers thus add their expertise in manufacturing processes, systems, and technology to their understanding of engineering design. In the same way, they evaluate the capabilities of manufacturing processes and tools (including computer-aided tools) and interact with design engineers during the development of product specifications and tolerances.

Since so much of today's manufacturing is computer-aided, the manufacturing engineering program at the University of Michigan-Dearborn includes course work in programming, hardware controls, the multilayered control architecture of the integrated factory, and computer-based technologies. Also included are advanced courses in manufacturing processes, assembly, and product engineering; manufacturing productivity and quality; and manufacturing integration methods and systems design.

In the capstone senior design course students complete a project dealing with the design of a manufacturing system to manufacture a product. In their project students address practical manufacturing issues related to cost, esthetics, feasibility, reliability, safety, ethics, and human factors engineering.

## Curriculum Requirements

Area	Semester Credits
<b>Area I: CECS Distribution Requirements</b>	<b>24</b>
COMP 105 English Composition I	3
COMP 270 Technical Writing	3
ECON 201 Macroeconomics	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 humanites, the behavioral/social sciences, or a 400-level IMSE course	3
<b>Area II Basic Preparation Requirements</b>	<b>54</b>
ENGR 100 Introduction to Engineering	2
ENGR 126 Engineering Computer Graphics	2
<b>Mathematics</b>	
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
<b>Chemistry and Physics</b>	
CHEM 124 General Chemistry I	4
CHEM 146 General Chemistry II	4
PHYS 150 General Physics I	4
PHYS 151 General Physics II	4
<b>Core Engineering Courses</b>	
IMSE 255 Computer Programming	3
ENGR 250 Principles of Engineering Materials	3
ME 230 Thermodynamics	4
ME 265 Applied Mechanics	4
ECE 305 Introduction to Electrical Engineering	4
<b>Area III Professional Requirements</b>	<b>50</b>
IMSE 3005 Introduction to Operations Research	4
IMSE 317 Engineering Probability & Statistics	3
IMSE 382 Manufacturing Processes I	4
IMSE 421 Engineering Economy & Decision Analysis	3
IMSE 4425 Human Factors & Ergonomics	4
IMSE 4675 Six Sigma & Statistical Process Improvement	4
IMSE 4795 Production/Inventory Control & Lean Mfge	4
IMSE 4815 Manufacturing Processes II	4
IMSE 4825 Control, Instrumentation, & Metrology	4
IMSE 4835 Computer-Aided Process Design & Mfge	4
ENGR 400 Applied Business Techniques for Engrs	3
IMSE 4951 Senior Design Project I	2
IMSE 4952 Senior Design Project II	2
– One technical elective, from specified choices	3-4
– General electives	1-2

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

## Facilities of the College of Engineering and Computer Science (CECS)

CECS students use the local area network of PCs and Unix computers as well as the large Sun workstation network and the computer-aided design laboratories. The software available includes advanced computer-assisted engineering tools, expert systems building tools, and a large number of operating systems, programming languages, and solid modeling tools.

In addition, the IMSE Department has its own laboratories used by undergraduate students. These include the simulation/automation laboratory, and the computer-integrated manufacturing, human performance, materials testing, manufacturing processes, metrology, metal-forming, and robotics laboratories.

The facilities of the Manufacturing Systems Engineering Laboratory (MSEL) building, 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 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; they earn a salary and also establish contacts useful for later employment.

Students in the IMSE department have found recent co-operative education placements in such companies as : Alcoa Fujikura Ltd. (AFL), American Axle & Manufacturing, Arvin-Meritor, BodyCote USA, Bosch, Cadillac Products, Calsonic, Comau-Pico, Comerica, CMJ Designs, CVS Manufacturing, Detroit Diesel, E&E Manufacturing, Fives Group-Cinetic, Freescale, General Electric, Harman Becker, Lear, Marathon Ashland, MichCon, NASA, Plastipak Packaging, SeverStal N.A., Tower Automotive, Toyota, TRW, ThyssenKrupp, Unisys, Visteon, Webasto Roofing, and Yazaki.

## Employment Opportunities

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

Recent graduates from the University of Michigan-Dearborn with a BSE degree in Manufacturing Engineering have found professional employment in such companies as Lear Corporation, NASA, the Ford Motor Company, and Visteon.

## 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:

College of Engineering and Computer Science  
Student Records and Advising  
2000 Heinz Prechter Engineering Complex  
4901 Evergreen Road  
Dearborn, MI 48128-2406  
313-593-5510  
uginfo@engin.umd.umich.edu  
www.engin.umd.umich.edu

### For Admissions Information and Applications:

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University of Michigan-Dearborn  
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