

# MANUFACTURING ENGINEERING (M.S.)

The M.S. degree program in manufacturing engineering is built on a core designed to provide a firm foundation in the various elements of manufacturing and systems engineering. Building on this preparation, the student constructs a concentration in one of five areas.

## Program objectives

Graduates will be able to:

1. Understand and integrate the design, test and build product life cycle
2. Model, analyze and control design and production activities
3. Understand the impact of quality, cost and timeliness metrics on manufacturing performance
4. Demonstrate a basic understanding of manufacturing processes and technologies
5. Perform data analysis and optimization for decision making
6. Develop business cases for justifying process, organizational and technological projects
7. Support for systems engineering and project management
8. Communicate effectively (written, verbal and presentation) across all levels in the enterprise
9. Develop an ability to grow through life long acquisition of knowledge

Students must achieve at least a 'B' (3.0) grade point average and achieve 'B' or greater in MS ME core courses. A limited number of grades below 'B' and 'B-', though unsatisfactory for graduate level work, may be applied toward a graduate degree provided they are offset by a sufficient number of higher grades to maintain a grade point average of 3.0. Unsatisfactory grades can constitute reason for dismissal from the MS ME program at the department or program's discretion.

## Admission Requirements

Admission to this program is contingent upon admission to the Graduate School (<http://bulletins.wayne.edu/graduate/general-information/admission/>). Applicants with a baccalaureate degree in engineering from an institution accredited by the Accreditation Board for Engineering and Technology (ABET) and who have earned a grade point average of at least 2.8 in the upper division of their undergraduate program are eligible for admission. GRE Exam is not required for applicants. However, a high GRE score will be considered as an incentive for the evaluation process. Additionally, applicants with an undergraduate degree in mathematics, physics, computer science, or another discipline with a strong analytical base may be considered for admission.

Applicants whose undergraduate education is deficient in prerequisites for graduate classes may be required to take background courses that will NOT count toward the 30-credit degree requirement.

Applicants can provide supplemental materials such as resume, personal statement, GRE scores, and letters of recommendation to support their application.

Prospective students should contact M.S. Manufacturing Engineering Program Chair, Dr. Kyoung-Yun Kim ([ay4142@wayne.edu](mailto:ay4142@wayne.edu)), for program information or Graduate Program Coordinator, Eric Scimeca ([fy7597@wayne.edu](mailto:fy7597@wayne.edu)), for admissions and application concerns.

The Master of Science in Manufacturing Engineering is offered under the following options: Plan A (thesis option) and Plan C (coursework option).

## Plan A - Thesis

Requires a minimum of thirty credits including six to eight thesis credits. If a thesis option (Plan A) is selected, six to eight credits of Master's Thesis Research and Direction (IE 8999) is required. Student pursuing Plan A must take nine credits of IE core courses and design an individual program of study that must be approved by both the thesis research advisor and the appropriate M.S. program chair or graduate advisor. To register for ISE thesis credits, students must submit the thesis credit registration approval form to their appropriate M.S. program chair or graduate advisor. Up to two courses (six to eight credits) may be earned in courses outside the Industrial and Systems Engineering Department, but require approval by the appropriate M.S. program chair or graduate advisor. All course work must be completed in accordance with the regulations of the Graduate School (<http://bulletins.wayne.edu/graduate/general-information/academic-regulations/>) and the College of Engineering (<http://bulletins.wayne.edu/graduate/college-engineering/academic-regulations/>).

**Note:** M.S. student pursuing IE 6991 Industrial Internship for curriculum practical training (CPT) may use a maximum of two IE 6991 credits towards the M.S. in Manufacturing Engineering degree requirements (M.S. students may apply for more than two IE 6991 credits during their course of study but only two IE 6991 credits may count towards degree requirements).

## Course Requirements

Code	Title	Credits
IE 6210	Applied Engineering Statistics	3
IE 6315	Production and Service Systems	3
One course from the two courses listed below		3
IE 6405	Integrated Product Development	
IE 6420	CAD/CAM	
Thesis credit requirement		6-8
IE 8999	Master's Thesis Research and Direction	
Electives		13-15
<b>Total Credits</b>		<b>30</b>

## Plan C - Coursework

Requires a minimum of thirty credits of course work. Plan C requires nine credits of IE core for the general option and nine credits of IE core if a concentration is pursue. While ISE core courses provide fundamental IE knowledge, depth within a specific IE field can be acquired by completing a M.S. in Manufacturing Engineering concentration in Advanced Manufacturing Systems, Quality Engineering, or SMART Manufacturing Systems. Students interested in an area not among the concentrations listed should elect the general option. Up to two courses (six to eight credits) may be earned in courses outside the Industrial and Systems Engineering Department, but require approval by the appropriate M.S. program chair or graduate advisor. All course work must be completed in accordance with the regulations of the Graduate School (<http://bulletins.wayne.edu/graduate/general-information/academic-regulations/>) and the College of Engineering (<http://bulletins.wayne.edu/graduate/college-engineering/academic-regulations/>).

**Note:** M.S. student pursuing IE 6991 Industrial Internship for curriculum practical training (CPT) may use a maximum of two IE 6991 credits towards the M.S. in Manufacturing Engineering degree requirements (M.S. students may apply for more than two IE 6991 credits during their course of study but only two IE 6991 credits may count towards degree requirements).

## General Option

Code	Title	Credits
IE 6210	Applied Engineering Statistics	3
IE 6315	Production and Service Systems	3
One course from the two courses listed below:		3
IE 6240	Quality Management Systems	
IE 6611	Fundamentals of Six Sigma	
One course from the two courses listed below		3
IE 6405	Integrated Product Development	
IE 6420	CAD/CAM	
Electives		18
<b>Total Credits</b>		<b>30</b>

## Advanced Manufacturing Systems Concentration

Code	Title	Credits
<b>Core Courses:</b>		
IE 6210	Applied Engineering Statistics	3
IE 6315	Production and Service Systems	3
One course from the two courses listed below		3
IE 6405	Integrated Product Development	
IE 6420	CAD/CAM	
<b>Required Concentration Course:</b>		
IE 7445	Manufacturing Analytics	3
<b>Additional Concentration Courses (Choose 2):</b> <b>6</b>		
IE 6000	Digital Automation	
IE 6425	Product Lifecycle Management and Sustainable Design	
IE 6442	Facilities Design and Materials Flow	
IE 6422	Flexible Manufacturing Systems	
ME 5995	Special Topics in Mechanical Engineering I ((Additive Manufacturing - Principles and Automation))	
Electives		12
<b>Total Credits</b>		<b>30</b>

## Quality Engineering Concentration&

Code	Title	Credits
IE 6210	Applied Engineering Statistics	3
IE 6315	Production and Service Systems	3
One course from the two courses listed below		3
IE 6405	Integrated Product Development	
IE 6420	CAD/CAM	
<b>Concentration Courses:</b>		
IE 6611	Fundamentals of Six Sigma	3
IE 6270	Engineering Experimental Design	3
IE 6310	Lean Operations and Manufacturing	3
Electives		12
<b>Total Credits</b>		<b>30</b>

## SMART Manufacturing Concentration

Code	Title	Credits
<b>Core Courses</b>		
IE 6210	Applied Engineering Statistics	3
IE 6315	Production and Service Systems	3
One course from the two courses listed below		3

IE 6405	Integrated Product Development	
IE 6420	CAD/CAM	
<b>Required Concentration Course</b>		
IE 6000	Digital Automation	3
<b>Additional Concentration Courses</b>		
Select two from the following:		6
IE 6425	Product Lifecycle Management and Sustainable Design	
IE 6430	Computer Simulation Methods	
IE 6435	Fundamentals of Sustainable Manufacturing	
IE 6510	Information Systems for the Manufacturing Enterprise	
Electives		12
<b>Total Credits</b>		<b>30</b>