MANUFACTURING ANALYTICS ENGINEERING

The program may be completed entirely on campus, entirely online, or through a combination of on-campus and online courses.

Admission

Admission to the program requires a Bachelor of Science degree in engineering or a physical science from an accredited program with an average of B or better (GPA of 3.0 on a 4-point scale).

Students who do not meet BS degree requirements of the program should speak to the program advisor regarding the additional requirements to be met.

Degree Requirements

The MSE in Manufacturing Analytics Engineering requires a minimum of 30 credit hours.

Minimum Grade Requirement in addition to maintaining a minimum cumulative GPA of 3.0 or higher every semester.

- Courses in which grades of C- or below are earned cannot be used to fulfill degree requirements.
- A minimum of a 3.0 cumulative GPA or higher is required at the time of graduation.

Please see Graduate Academic Policies (https://catalog.umd.umich.edu/academic-policies-graduate/) for additional information.

Requirements

Students in the MSE-MAE program will have the option to declare one of 3 concentration areas, namely, Digital and Smart Manufacturing, Manufacturing and Quality Analytics, and Manufacturing Enterprise Management or to not declare a concentration. Each student is advised to declare a concentration according to their interest and take 4 courses in the selected concentration area. A student may also choose not to declare a concentration and take 4 courses from any concentration areas. A thesis may be submitted in lieu of six hours of concentration courses, on approval by the program director.

Code	Title	Credit Hours
Core Courses		
The core courses will provide an introduction to smart manufacturing based on AI, product and process design, and data analytics and visualization. The following courses are required:		
IMSE 586	Big Data Aanal & Visuliztn	3
IMSE 568	AI for Smart Manufacturing	3
EMGT 580	Mgt of Prod and Proc Design	3
Concentration Options		
Students have the option to declare one of the following concentrations according to her/his interest and take 12 credits in the selected concentration: Digital and Smart Manufacturing, Manufacturing and Quality Analytics, or Manufacturing Enterprise Management. A student may also choose not to declare a concentration and take 4 courses from any concentration areas. A thesis may be submitted in lieu of six hours of concentration courses, on approval by the program director. See Concentration section for requirement details.		12
No Concentration Option		
Select 12 credits from the following:		
ACC 505	Devel & Interp Financial Info	
CIS 545	Data Security and Privacy	
CIS 569	Internet of Things and Smart Cities	
CIS 5570	Introduction to Big Data	
ESE 510	Sustainability Science and Engineering	
IMSE 502	Computer-Integrated Mfg	
IMSE 507	Industrial Robots	
IMSE 511	Design and Analysis of Exp	
IMSE 514	Multivariate Statistics	
IMSE 516	Project Management and Control	
IMSE 517	Managing Global Programs	
IMSE 519	Quan Meth in Quality Engin	
IMSE 538	Intelligent Manufacturing	
IMSE 561	Tot Qual Mgmt and Six Sigma	
IMSE 564	Applied Data Analytics and Modeling for Enterprise Systems (* see note)	
IMSE 567	Reliability Analysis	
IMSE 570	Enterprise Information Systems (*see note)	
IMSE 580	Prod & Oper Engineering I	
IMSE 5205	Eng Risk-Benefit Analysis	
IMSE 5215	Program Budget, Cost Est & Con	
IMSE 5655	Supply Chain Management	
IMSE 5755	Bus Proc Int using Entrpr Tech (*See note)	
ME 559	Battery Materials, Manufacturing and Recycling	
ME 595	Digital Manufacturing	
OB 510	Organization Behavior	
OM 664	Strategic Sourcing (requires IMSE 580 as a prerequisite, which can be completed as an elective)	
* Note: Completion of IMSE 564, IMSE 570, and IMSE 5755 leads to an SAP certification diploma.		
Professional Electives		
9 credits of any 500-level CECS graduate level courses will count toward satisfying the Professional Electives requirement, excluding ENGR 500 and ENGR 501. Note a student who lacks IMSE 510: Probability and Statistical Models or equivalent must choose IMSE 510 as a required elective course.		9
Total Credit Hours		**30**

Concentration Options

The student is required to take 4 courses (12 credits) to satisfy the concentration requirement. A thesis may be submitted in lieu of six hours of concentration courses, on approval by the program director.

Code	Title	Credit Hours
Digital and Smart Manufacturing Concentration		
Required Course:		
ME 595	Digital Manufacturing	3
Select three courses from the following:		9
IMSE 502	Computer-Integrated Mfg	
IMSE 507	Industrial Robots	
IMSE 538	Intelligent Manufacturing	
IMSE 580	Prod & Oper Engineering I	
CIS 545	Data Security and Privacy	
CIS 569	Internet of Things and Smart Cities	
ME 559	Battery Materials, Manufacturing and Recycling	
ESE 510	Sustainability Science and Engineering	
Total Credit Hours		**12**

The student is required to take 4 courses (12 credits) to satisfy the concentration requirement. A thesis may be submitted in lieu of six hours of concentration courses, on approval by the program director.

Code	Title	Credit Hours
Manufacturing Enterprise Management Concentration		
Select one of the following:		3
IMSE 5655	Supply Chain Management	3
OM 664	Strategic Sourcing (requires IMSE 580 as a prerequisite, which can be completed as an elective)	3
Select three courses from the following:		9
IMSE 516	Project Management and Control	3
IMSE 517	Managing Global Programs	3
IMSE 5205	Eng Risk-Benefit Analysis	3
IMSE 5215	Program Budget, Cost Est & Con	3
IMSE 564	Applied Data Analytics and Modeling for Enterprise Systems [1]	3
IMSE 570	Enterprise Information Systems [1]	3
IMSE 5755	Bus Proc Int using Entrpr Tech [1]	3
ACC 505	Devel & Interp Financial Info	3
OB 510	Organization Behavior	3

[1] Completion of IMSE 564, IMSE 570, and IMSE 5755 leads to an SAP certification diploma.

The student is required to take 4 courses (12 credits) to satisfy the concentration requirement. A thesis may be submitted in lieu of six hours of concentration courses, on approval by the program director.

Code	Title	Credit Hours
Manufacturing and Quality Analytics Concentration		
Required Course:		
IMSE 561	Tot Qual Mgmt and Six Sigma	3
Select three courses from the following:		9
IMSE 511	Design and Analysis of Exp	
IMSE 514	Multivariate Statistics	
IMSE 519	Quan Meth in Quality Engin	
IMSE 567	Reliability Analysis	
IMSE 580	Prod & Oper Engineering I	
CIS 5570	Introduction to Big Data	
Total Credit Hours		**12**