

MANUFACTURING SYSTEMS ENGINEERING: MANUFACTURING SYSTEMS ENGINEERING, M.S.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

NAMED OPTION REQUIREMENTS MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW–Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum Credit Requirement 30 credits

Minimum Residence Credit Requirement 16 credits

Minimum Graduate Coursework Requirement 15 credits must be graduate-level coursework. Details can be found in the Graduate School’s Minimum Graduate Coursework (50%) policy (<https://policy.wisc.edu/library/UW-1244> (<https://policy.wisc.edu/library/UW-1244/>)). The department recommends taking coursework in College of Engineering, the School of Business, the Department of Statistics, the Department of Biological Systems Engineering, or the Department of Computer Sciences.

Overall Graduate GPA Requirement 3.00 GPA required. This program follows the Graduate School’s policy: <https://policy.wisc.edu/library/UW-1203> (<https://policy.wisc.edu/library/UW-1203/>).

Other Grade Requirements Grades of C or lower do not count toward the degree.

Assessments and Examinations The research-thesis track requires student to submit a thesis and defend to a committee of faculty. The industry-thesis track requires students to submit an industry thesis and defend it to a committee of faculty. The course-only track does not require a thesis.

Language Requirements No language requirements.

REQUIRED COURSES

The on-campus Manufacturing Systems Engineering M.S. program has three tracks: course only, industrial thesis, and research thesis. Students must take four courses from the core course areas with at least one course from each of the core course areas. All students are required to take the capstone course I SY E/M E 641 Design and Analysis of Manufacturing Systems. The remaining course requirements vary depending on the program track that is chosen and are described in the table below.

Course Only Track¹

Code	Title	Credits
Four courses selected from the Core Course Areas²		12
I SY E/M E 641	Design and Analysis of Manufacturing Systems (Offered in spring semester)	3
Elective Courses (400 level and above)³		15
Total Credits		30

1

These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

2

At least one course must be selected from each of the three core areas.

3

Up to one credit of I SY E 702 or M E 702 for an internship may count as elective credit toward the degree. A written report must be approved by the advisor. This credit cannot be used toward fulfillment of the Thesis Requirement in the Industry Thesis or Research Thesis tracks.

Industry Thesis Track¹

Code	Title	Credits
Four courses selected from the Core Course Areas²		12
ISY E/M E 641	Design and Analysis of Manufacturing Systems (Offered in spring semester)	3
Industry Thesis		3
Elective Courses (400 level and above)³		12
Total Credits		30

1

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2

At least one course must be selected from each of the three core areas.

3

Up to one credit of ISY E 702 or M E 702 for an internship may count as elective credit toward the degree. A written report must be approved by the advisor. This credit cannot be used toward fulfillment of the Thesis Requirement in the Industry Thesis or Research Thesis tracks.

Research Thesis Track¹

Code	Title	Credits
Four courses selected from the Core Course Areas²		12
ISY E/M E 641	Design and Analysis of Manufacturing Systems (Offered in spring semester)	3
Research Thesis		12
Elective Courses (400 level and above)³		3
Total Credits		30

1

These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

2

At least one course must be selected from each of the three core areas.

3

Up to one credit of ISY E 702 or M E 702 for an internship may count as elective credit toward the degree. A written report must be approved by the advisor. This credit cannot be used toward fulfillment of the Thesis Requirement in the Industry Thesis or Research Thesis tracks.

Core Course Areas

Code	Title	Credits
Fundamentals of Process and Technology		
CBE 450	Process Design	3
CBE 470	Process Dynamics and Control	3
CBE 540	Polymer Science and Technology	3
CBE 541	Plastics and High Polymer Laboratory	1-3
CBE 770	Advanced Process Dynamics and Control ¹	3
E C E 412	Power Electronic Circuits	3

E C E 453	Embedded Microprocessor System Design	4
E C E/B M E 462	Medical Instrumentation	3
E C E/N E 528	Plasma Processing and Technology	3
E C E 549	Integrated Circuit Fabrication Laboratory	3
ISY E 415	Introduction to Manufacturing Systems, Design and Analysis	3
ISY E 605	Computer Integrated Manufacturing	3
M E 417	Transport Phenomena in Polymer Processing	3
M E 418	Engineering Design with Polymers	3
M E 419	Fundamentals of Injection Molding	3
M E 429	Metal Cutting	3
M E 437	Advanced Materials Selection	3
M E/E C E 439	Introduction to Robotics	3
M E 445	Mechatronics in Control & Product Realization	3
M E 446	Automatic Controls	3
M E 447	Computer Control of Machines and Processes	3
M E 449	Redesign and Prototype Fabrication	3
M E 469	Internal Combustion Engines	3
M E 514	Polymer Additive Manufacturing	3
M E/N E 565	Power Plant Technology	3
M E/CBE 567	Solar Energy Technology	3
M E/E C E 577	Automatic Controls Laboratory	4
M E 717	Advanced Polymer Processing ¹	3
M E/E C E 739	Kinematics, Dynamics, and Control of Robotic Manipulators ¹	3
M E 747	Advanced Computer Control of Machines and Processes ¹	3
M S & E 434	Introduction to Thin-Film Deposition Processes	3
M S & E 461	Advanced Metal Casting	3
M S & E/M E 462	Welding Metallurgy	3
M S & E 465	Fundamentals of Heat Treatment	3
N E 405	Nuclear Reactor Theory	3
Fundamentals of Systems Engineering and Design		
CBE 430	Chemical Kinetics and Reactor Design	3
CIV ENGR 370	Transportation Engineering	3
CIV ENGR 498	Construction Project Management ²	3
COMP SCI/ E C E 755	VLSI Systems Design	3
COMP SCI/E C E 756	Computer-Aided Design for VLSI ¹	3
E C E 427	Electric Power Systems	3
M E 418	Engineering Design with Polymers	3
M E 444	Design Problems in Elasticity	3
M E 535	Computer-Aided Geometric Design	3
M E 549	Product Design	3
M E 748	Optimum Design of Mechanical Elements and Systems ¹	3

MARKETNG/ OTM 427	Information Technology in Supply Chains	3
MARKETNG/ OTM 727	Information Technology in Supply Chains	3
ISY E 412	Fundamentals of Industrial Data Analytics	3
ISY E/M E 510	Facilities Planning	3
ISY E/M E 512	Inspection, Quality Control and Reliability	3
ISY E 515	Engineering Management of Continuous Process Improvement	3
ISY E 516	Introduction to Decision Analysis	3
ISY E 520	Quality Assurance Systems	3
ISY E/COMP SCI/ E C E 524	Introduction to Optimization	3
ISY E/B M E 564	Occupational Ergonomics and Biomechanics	3
ISY E 575	Introduction to Quality Engineering	3
ISY E 601	Special Topics in Industrial Engineering ²	1-3
ISY E 602	Special Topics in Human Factors ²	3
ISY E 603	Special Topics in Engineering Analytics and Operations Research ²	1-3
ISY E 612	Information Sensing and Analysis for Manufacturing Processes	3
ISY E 620	Simulation Modeling and Analysis	3
ISY E/M E 643	Performance Analysis of Manufacturing Systems	3
ISY E 645	Engineering Models for Supply Chains	3
OTM 654	Production Planning and Control ³	3
STAT/M E 424	Statistical Experimental Design	3
Fundamentals of Business and Management		
ACCT I S 300	Accounting Principles	3
ACCT I S 710	Managerial Accounting	3
FINANCE/ ECON 300	Introduction to Finance	3
FINANCE 720	Investment Theory and Practice	3
FINANCE 757	Entrepreneurial Finance ^{1,3}	3
ISY E/PSYCH 653	Organization and Job Design	3
M H R 700	Leading People and Organizations	3
M H R 710	Challenges & Solutions in Business Sustainability	3
M H R 715	Strategic Management of Innovation ^{1,3}	3
M H R 722	Entrepreneurial Management ^{1,3}	3
M H R 723	Business Strategy ³	3
M H R 734	Venture Creation	3
M H R 741	Technology Entrepreneurship	3
MARKETNG 300	Marketing Management	3
MARKETNG/ OTM 421	Fundamentals of Supply Chain Management	3
MARKETNG/ OTM 722	Logistics Management ³	3

MARKETNG/ OTM 724	Strategic Global Sourcing	3
OTM 752	Project Management ³	3
OTM 758	Managing Technological and Organizational Change ¹	3

1

Most 700-level courses are only taught every three or four semesters. Please check with instructor about the next offering before completing study plan.

2

This course number is used for multiple seminar classes. Please talk to your advisor to confirm a specific topic will count.

3

This course is offered in variable credit versions. Manufacturing Systems Engineering students must register for a 3-credit section.