

# Manufacturing Systems Engineering

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## College of Engineering

The Department of Mechanical Engineering at the University of Kentucky provides an intellectually challenging environment in which to pursue advanced studies and engage in research. In addition to programs of study leading to M.S. and Ph.D. Degrees in Mechanical Engineering, the Mechanical Engineering Department also offers a master's degree program in Manufacturing Systems Engineering. Students in this program are able to earn their degree entirely online or by taking a combination of courses offered online and in the face-to-face mode.

Graduate degree programs in the field of manufacturing systems engineering are important for enhancing manufacturing productivity and quality in the U.S. The Master of Science in Manufacturing Systems Engineering is designed to equip the student for opportunities in modern manufacturing processes and systems. Some of the possible areas of concentration for research and study are: Manufacturing Processes and Equipment, Design for Manufacturing, Plastic and Polymer Processing, Electronics Design and Manufacturing, Computer-aided Design and Manufacturing, Manufacturing Systems Planning and Control, Automated Assembly, and Lean Manufacturing.

The UK Center for Manufacturing, a part of the College of Engineering, conducts graduate-level academic research of the highest quality and transmits that knowledge to industry and government. Housing a 68,000-square-foot building, completed in the fall of 1989, the Center contains: R & D laboratories and offices including machining research lab, metrology lab, rapid prototyping lab, electronics assembly lab, welding lab, automation equipment lab, CAD/CAM/CAE lab, instructional TV classrooms, and TV satellite uplink and downlink equipment.

### **Admission Requirements**

Applicants normally have a bachelor's degree in engineering from an ABET accredited institution (or equivalent). For students with an undergraduate degree other than engineering, completion of a set of identified courses (or their equivalent) in an Engineering discipline will be required prior to admission to the program with full graduate standing. If a student does not meet these criteria, an evaluation of the student's overall education and experience may allow admission, subject to evaluation by the Director of Graduate Studies. GRE scores are NOT required for admission to the Manufacturing Systems Engineering MS program. However, applicants must note that, GRE scores must be submitted if they are interested in being considered for any graduate fellowships. .

### **Curriculum & Degree Requirements**

The Plan A provides for study and research leading to the degree of Master of Science in Manufacturing Systems Engineering. The thesis plan requires twenty-four credit hours of course work and a thesis. All students will be required to complete four specified core courses [MFS 606, MFS 605, MFS 505, MFS 613 (MFS 611, if enrolled prior to Spring 2016)]. The electives for each student will be developed in conjunction with an advisor to insure that the program provides breadth and depth of content for the student, and meets his or her specific needs and interests. Appropriate electives are drawn from areas of Engineering, Computer Science, Business and Economics, or Mathematics. Two electives are designated as Manufacturing Specialization electives.

The Plan B (non-thesis option) is reserved for students who have significant engineering research or development experience in a manufacturing environment, for which completion of a thesis would be less beneficial than the additional course work involved in Plan B. The Plan B requires thirty (30) credit hours of course work and the satisfactory completion of a final examination. All students will be required to

complete four specified core courses [MFS 606, MFS 605, MFS 505, MFS 613 (MFS 611, if enrolled prior to Spring 2016)], as well as MFS 784 Research Project in Manufacturing Systems Engineering, nine credit hours of Manufacturing Specialization electives, and nine credit hours of other appropriate electives. Approval of the student's advisor and of the Director of Graduate Studies is necessary for a student to pursue Plan B.

### **Graduate Courses**

MFS 501	Mechanical Design with Finite Element Methods	(3)
MFS 503	Lean Manufacturing Principles & Practices	(3)
MFS 505	Modeling Manufacturing Processes and Machines	(3)
MFS 507	Design for Manufacturing	(3)
MFS 509/609	Lean Leadership	(3)
MFS 512	Manufacturing Systems	(3)
MFS 513	Mechanical Vibrations	(3)
MFS 515	Rotordynamics of Turbomachinery	(3)
MFS 525	Organizational Learning for Lean Manufacturing	(3)
MFS 526	Lean Operations Management	(3)
MFS 541	Occupational Biomechanics	(3)
MFS 554	Chemical and Physical Processing of Polymer Systems	(3)
MFS 556	Introduction to Composite Materials	(3)
MFS 563	Simulation of Industrial Production Systems	(3)
MFS 599	Concepts, Assessment Tools and Methods in Sustainable Power and Energy	(3)
MFS 605	Modeling, Simulation and Control for Manufacturing	(3)
MFS 606	Global Issues in Manufacturing	(3)
MFS 607	Analysis of Metal Cutting Processes	(3)
MFS 608	Nontraditional Manufacturing Processes	(3)
MFS 612	Design of Lean Manufacturing Systems	(3)
MFS 613	Sustainability, Ethics, and Leadership in Manufacturing Organizations	(3)
MFS 780	Independent Study	(3)