

MSME in Manufacturing

Research is conducted in the analytical and numerical tools for Design and Manufacturing including manufacturing processes, optimization, micro-machining, composites manufacturing, and laser cutting and material processing.

MS Track for Manufacturing

The MSME degree program for manufacturing is based on the fundamental course work offered through the Department of Mechanical Engineering (ME). This sequence of courses includes

ME 820	Continuum Mechanics	Fall (every year)
ME 821	Linear Elasticity	Spring (every year)
ME 861	Advanced Dynamics	Fall (every year)

Students should augment these courses with courses in manufacturing processes, materials science, transport phenomena, computer aided manufacturing, robotics, controls, as well as full filling breadth requirements in Fluid Mechanics or Thermal Sciences.

Graduate Course and Research Topics

(Profs. Ki, Kwon, Loos and Pourboghrat)

Manufacturing Processes

Laser materials interaction/processing, laser hybrid manufacturing, laser micromachining, sheet metal forming, polymeric composite manufacturing and manufacturing processes

Mechanics and Materials

Mechanical behavior of materials, plasticity, constitutive modeling, advanced materials, characterization and testing, and mechanics of heterogeneous and anisotropic materials

Modeling and Simulation

Multiphysics and multiphase flow simulation, modeling of plasma processing, fluid-structure interactions (FSI), Lattice Boltzmann method, computational electrodynamics, computational mechanics, heat transfer and flow phenomena in materials processing, mathematical modeling of manufacturing processes, finite element analysis

Design and Manufacturing

Materials issues in design and manufacturing, materials by design, design and manufacturing automation, and manufacturing process design

Typical M.S. Thesis Program

in

Manufacturing

Fall Semester: 9 cr

ME 820	Continuum Mechanics	3 cr
ME 8xx	Breadth Course (see list below)	3 cr
ME 477	Manufacturing Processes	3 cr

Spring Semester: 9cr

ME 821	Linear Elasticity	3 cr
(2) courses from the list of courses below		3 cr
ME 426	Introduction to Composite Materials (3 cr.)	
ME 825	Experimental Mechanics (3 cr.)	
ME 823	Fracture Mechanics and Fatigue (even years, 3 cr.)	
ME 828	Advance Strength of Materials (odd years, 3cr.)	
ME 855	Digital Data Acquisition and Control (odd years, 3cr.)	
ME 874	Analysis of Metal Form. & Manuf. Process (Even years, 3 cr)	
or other 400, 800 or 900 level courses inside or outside Mechanical Engineering		

Summer: 6 cr

ME 899	Master's Thesis Research	6 cr
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Fall Semester: 6 cr

ME 861	Advanced Dynamics	3 cr
One course from the list of courses below		3 cr
ME 826	Laminated Composite Materials (even years, 3 cr.)	
ME 872	Finite Element Method (3 cr)	
or other 400, 800 or 900 level courses inside or outside Mechanical Engineering		

TOTAL 30 credits

Breadth Course Requirement:

In addition to ME 820, ME 821 and ME 861 each student must take a course from at least one (1) of the two (2) areas below.

Fluid Mechanics:

ME 830

Thermal Sciences:

ME 802, ME 812, ME 814