

## MSME in Solid Mechanics

Research is conducted in analytical, computational and experimental solid mechanics including theory of elasticity, fastening and joining, experimental mechanics and optical strain measurement, impact and crashworthiness.

### MS Track for Solid Mechanics

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

ME820	Continuum Mechanics	Fall (every year)
ME821	Linear Elasticity	Spring (every year)
ME825	Experimental Mechanics	Spring (every year)

Students should augment these courses with courses in energy methods, materials science, plasticity as well as fulfilling breadth requirements in Dynamical Systems, Fluid Mechanics and Thermal Sciences.

### Graduate Course and Research Topics

**(Prof. Averill, Cloud, Diaz, Liu, Patterson and Pence)**

#### Computational Mechanics

Multi-level design of complex systems, crashworthiness, coupled fluid, thermal, structural and electro-magnetic fields. Uncertainty in design. Optimization of structures and materials.

#### Experimental Mechanics

Development and improvement of methods including digital laser speckle, digital photoelasticity, moiré fringe methods, thermoelastic stress analysis for applications in automotive, aerospace and biomechanics. Decision tools for non-destructive evaluation.

#### Fastening and joining

Adhesive and bolted assemblies, computational and experimental approaches, thick composite sections for heavy duty vehicles.

#### High performance materials

Design of composite materials for absorbing high impact energy and high resistance to penetration. Simulation of blast, crash testing and plastic wave propagation. Analytical modeling of mechanical behavior under extreme strain conditions.

**Typical M.S. Thesis Program  
in  
Solid Mechanics**

Fall Semester: 9cr

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ME 820	Continuum Mechanics	3cr
ME 8xx	Breadth Course (see list below)	3cr
ME 860	Theory of Vibrations	3cr

Spring Semester: 9cr

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ME 821	Linear Elasticity	3cr
ME 825	Experimental Mechanics	3cr
One course from the list of courses below		3cr
ME 426	Introduction to Composite Materials (3 cr)	
ME 823	Fracture Mechanics and Fatigue (even years, 3cr)	
ME 827	Energy Methods in Mechanics (even years, 3cr)	
ME 824	Plasticity (odd years, 3cr)	
ME 828	Advanced Strength of Materials (odd years, 3cr)	
ME 875	Optimal Design of Mechanical Systems (odd years, 3cr)	

Summer Semester: 6cr

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

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ME 872	Finite Element Method ( <i>current Spring Semester</i> )	3cr
One course from list of courses below		3cr
ME 826	Laminated Composite Materials (even years, 3cr)	
ME 829	Micromechanics of Materials (odd years, 3cr)	
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 ME825 each student will be required to take at least a course from one of the two areas below.

Fluid Mechanics	ME 830
Thermal Sciences	ME802, ME812, ME814