

Michigan Technological University  
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**Michigan Technological University**

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Houghton, MI 49931-1295

**Graduate School**

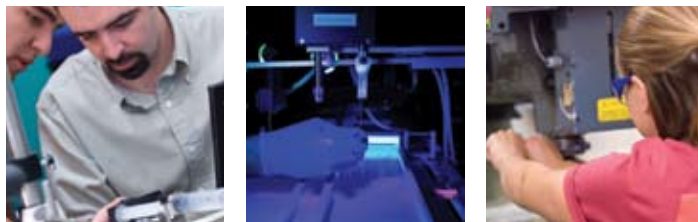
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**Department of Mechanical Engineering-  
Engineering Mechanics**

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Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

.....GRADUATE PROGRAMS IN MECHANICAL ENGINEERING  
AND ENGINEERING MECHANICS



**Admission Requirements**

Students must have a 3.0 grade point average and have satisfactory scores on the GRE and, for international students, the TOEFL.

**About Michigan Tech**

Michigan Technological University is a leading public research university of international stature, conducting research, developing new technologies, and preparing students to create the future for a prosperous and sustainable world. Michigan Tech offers more than 120 undergraduate and graduate degree programs in engineering, forestry and environmental sciences, computer sciences, technology, business and economics, natural sciences, arts, humanities, and social sciences.

**How to apply**

1. Download an application form from the Graduate School webpage.
2. Submit the completed application online, or mail or fax it to the Graduate School.
3. Track the status of your application online.

Visit the Graduate School webpage for complete details about admissions and program requirements.

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**Michigan Tech**

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**MichiganTech**



GRADUATE PROGRAMS IN MECHANICAL ENGINEERING  
AND ENGINEERING MECHANICS

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Graduate study in the Department of Mechanical Engineering-Engineering Mechanics (ME-EM) offers graduate students a wide range of challenging and rewarding courses of study.

The **PhD in Mechanical Engineering** is research-intensive. It can be funded by industry or by agencies such as the National Science Foundation, the Department of Energy, NASA, and the Department of Defense. Nationwide, 80 percent of PhD graduates go to work in industry; however the PhD also provides the avenue for a rewarding career in academia.

The master of science often has a strong application in industry or serves as the basis for the PhD. The **MS degrees in Mechanical Engineering and Engineering Mechanics** are offered with a project component (course work and thesis/report), or as the Signature Master's course work-only degree, which can be completed in one year and strengthens professional skills.



The National Science Foundation ranked the ME-EM department twenty-third in research expenditures in FY2005 among all mechanical engineering departments in the US. Our 2006-07 research expenditures exceeded \$10.25 million.



### Working to Advance Engineering Around the World

Research integrating the nano- through global scales is prevalent and embraces manufacturing, design, mechanics, materials, and energy systems. Multi-scale technologies are pervasive in engineering applications and systems, including biomedical technologies, sensing and controls, nano- and multi-functional materials, and molecular modeling.

Our department is a key contributor to achieving environmental, industrial, and societal sustainability. This includes research on lean manufacturing and design for sustainability; the enterprise-wide production of cellulose-based ethanol from forest resources; optimization of ethanol-based power systems; and alternative-energy technologies including hydrogen, wind, and micro- and macro-fuel cells. The initiative is highly interdisciplinary and involves researchers from engineering, the physical and life sciences, and business.

Multidisciplinary research projects are common. In addition to an advisor, it is not unusual to have close interactions with many other professors—a factor that greatly broadens a student's perspective. While research is often conducted in teams, the student's research experience is direct, focused, and involves significant control of the investigative process.

## GRADUATE PROGRAMS IN MECHANICAL ENGINEERING AND ENGINEERING MECHANICS

### Research Facilities

#### Advanced Power Systems

Advanced Internal Combustion Lab  
Powertrain Telemetry Lab  
Alternative Fuels Combustion Lab  
Low Temperature Environmental Testing Lab  
Heavy Duty Diesel Engine Lab  
Microfluidics and Interfacial Transport Lab  
Phase Change Heat Transfer Lab  
Torque Converter Testing Lab  
Four Wheel Chassis Dynamometer Lab

#### Multiscale Sensors and Systems

Applied Chemical Morphological Analysis Lab  
Microfabrication Facility

Mechanics of Multi-scale Materials  
Micromechanical Applications and Processes Lab  
Biochemistry and Molecular Biology Lab  
Computational Solid State Theory and Materials Science Lab

#### Multidisciplinary Engineering Dynamic Systems

Advanced Internal Combustion Lab  
Powertrain Telemetry Lab  
Alternative Fuels Combustion Lab  
Low Temperature Environmental Testing Lab  
Heavy Duty Diesel Engine Lab  
Microfluidics and Interfacial Transport Lab

Phase Change Heat Transfer Lab  
Torque Converter Testing Lab  
Four Wheel Chassis Dynamometer Lab

#### Mechanics of Multiscale Materials

Biomechanics Research Lab  
High Strain Rate Lab  
Hydroforming Lab  
Materials Testing Lab  
Nanoindentation Lab  
Photomechanics Lab

#### Space Systems

Ion Space Propulsion Lab  
Nanosatellite Fabrication Lab  
Condensable Propellant Space Simulation Vacuum Lab



### Research Areas

Research is focused in five key areas.

**Advanced Power Systems:** Critical technologies for clean, efficient, and sustainable power systems, including engines, fuel cells, wind turbines; and modeling of energy transport and conversion processes.

**Multi-scale Sensors and Systems:** Combining the best characteristics of each scale to design and develop deployable technologies. Research includes nanofabrication and characterization, microfabrication processes, and bio-nanotechnology in concert with biochemists.

**Multidisciplinary Engineering Dynamic Systems:** Collaborative research at the interface of engineering disciplines such as dynamics, vibration, acoustics, signal processing, and controls. This also facilitates emerging areas such as active nanostructures and smart materials.

**Mechanics of Multi-scale Materials:** Constitutive modeling of biomaterials, cellular materials, biological tissues, and artificial organs. Research includes experimental mechanics of composite materials, biological tissues, modeling of hierarchical materials, structures, and interfaces.

**Space Systems:** Innovative components, systems, and architectures for micro- and nanosatellite applications. This transitions research of faculty, students, and industry into practical, space-based applications and flight hardware.

The 2008 *U.S. News & World Report: America's Best Graduate Schools* ranked the ME-EM in the top third among 164 doctorate-granting mechanical engineering departments in the US.

Michigan Tech awards the seventh-highest number of BS in Mechanical Engineering degrees in the nation and has been in this elite group for twenty-four years.