The overall objective of the Mechanical Engineering Department is to educate students so that they may become leaders in engineering, industry, government and other professions. The graduate program provides advanced level instruction emphasizing engineering practice. The department is interested in engineering systems that relate to energy, design, manufacturing, biomechanics, acoustics, and mechatronics systems. The opportunity exists in one of the following options:

- **Mechanical Engineering.** A Student can choose from the areas of Design, Manufacturing, Thermo-fluids, Acoustics, Turbomachinery and Mechatronics.

- **Practice oriented Masters program in Manufacturing Engineering.**

- **Excellence in Engineering and Management (E²M).** Receive a Master’s degree in one of the above areas and an MBA. (See enclosed sheet on the E²M program.)

**Unique Features**

- **Mechatronics Laboratory:** where research is conducted in the area of Sensors, Data Acquisition Systems, new measurement devices for production purposes, Miniaturized Telemetry Systems, Modeling, and Simulation of Industrial Case Studies.

- **NSF Funded Instructional Design Laboratory** provides state-of-the-art facilities for conducting design and simulation projects. It also has facilities for multimedia presentation and Web-based educational technology tools.

- **Intelligent Manufacturing Facilities** exist for graduate level research on factory automation including CAD/CAM interfacing, supervisory manufacturing and expert systems.

- **Acoustics Laboratory:** for projects dealing with sound intensity mapping, sound absorption tests, machine noise diagnostics, and acoustic evaluation.
Requirements for the Master of Engineering Degree

Mechanical Engineering (30 credits)

Core Courses (15 credits required)
Five courses selected from Mechanical Engineering 500-level or 600-level graduate courses

Mathematics (3 credits required)
M  515 Methods of Applied Mathematics I

Engineering Management (3 credits required)
EM 601 Engineering Program Management

Independent Studies (6 credits required)
ME 607 Independent Studies in Mechanical Engineering (3 to 9 credits) – Independent Study cannot begin until the student has completed 12 credits of course work toward the degree.

Elective Course (3 credits required)
A professional elective may be selected from the following categories:
1. Any ME graduate course not selected to fulfill core course requirements.
2. ME 607 Independent Studies in Mechanical Engineering may be increased to 9 credits.
4. EM 600 Engineering and the Corporation
5. An additional graduate management course
6. An approved engineering graduate course in another department.

Specialization in Manufacturing Engineering (30 credits)
Students in the Mechanical Engineering Specialty may concentrate their studies in Manufacturing Engineering. The following requirements apply.

Mathematics (3 credits required)
M  515 Methods of Applied Mathematics I

Engineering Management (3 credits required)
EM 601 Engineering Program Management

Manufacturing Engineering Core Courses (9 credits required)
ME 607 Independent Studies in Manufacturing Engineering (minimum 6 credits)
ME 680 Design for Manufacturing

Balance of Program (15 credits required)
ME 501 Kinematic Linkage Design
ME 504 Dynamics of Machines
ME 505 Mechatronics System Design
ME 507  Finite Element Analysis
ME 510  Advanced Mechanics of Materials
ME 511  Advanced Materials
ME 580  Designing for Process Quality and Control
ME 582  Reliability Engineering
ME 512  Precision Engineering
ME 519  Six Sigma Principles and Applications
ME 600  Computer-Aided Geometric Modeling
ME 601  Machine Vision and Robotics
ME 681  Seminar on Modern Issues in Manufacturing Engineering
ME 682  Advanced Manufacturing Processes

**Specialization in Turbomachinery (30 credits)**

*Math Course (3 credits Required)*

M 517  Applied Engineering Statistics

*Engineering Management (3 credits required)*

EM 601  Engineering Program Management

*Engineering Core Courses (18 credits required)*

ME 530  Gasdynamics
ME 531  Gas Turbine Analysis
ME 632  Aerodynamic Design of Turbines and Compressors
ME 640  Turbomachinery Dynamics and Control
ME 672  Strength, Design, and Materials in Turbomachinery
ME 607  Independent Studies in Mechanical Engineering

*Elective Courses (6 credits required)*

A second semester of ME 607 may be chosen

ME 506  Principles of Combustion
ME 606  Turbomachinery Noise Control
ME 609  High Speed Aerodynamics
ME 676  Manufacturing Issues in Turbomachinery
M 515  Methods of Applied Mathematics I
Research Topics and Projects

Research Topics:
- Advanced Mechatronics
- Design for Manufacturing and Disassembly
- Environmentally Conscious Manufacturing
- Concurrent Product and Process Design
- Design for Quality and Measurement

Student Projects:
- An Alternative Flow Metering and Control System
- Product Improvement of Elevator Safety System
- Force-Position Feedback Control in Aerospace Applications
- Study of the Ergonomic Risk Factor and Redesign of Machinery
- Rehab Walker
- New Methodology in CAD/CAM Interface and Machining
- In-process Surface Measurement Research
- Supervisory Control and Manufacturing
- Product design involving failure mode effects evaluation
- Development of precision methodology for contour inspection
- Embedded processor in precision instrumentation
- Control strategy for ambulatory rehabilitation devices
- Laser based inspection techniques for precision holes
- Real time mechatronic processes, simulation and control
- Neural network for inspection in manufacturing industries