Mechanical Engineering (MS)

Degree Requirements

Admission and MS Degree requirements in Mechanical Engineering as well as three plans of study (thesis option, project option, course work only option) are stated at the beginning under College of Engineering section. Some graduate courses in Mechanical Engineering are offered at night for the benefit of full-time employed engineers within commuting distance of the campus.

The program leading to the degree of Master of Science in Mechanical Engineering has several possible specializations: biomechanics, materials engineering, heat transfer, fluid mechanics, computational mechanics, vibrations, dynamics, simulation and controls.

Admission To The MSME Program

The following criteria supplement the College of Engineering admission criteria (see Admission To Graduate Programs):

I. Regular Admission
   A. A grade-point average of 3.0 or greater (A=4.0) on all undergraduate work is required.
   B. A minimum of 151 on the quantitative GRE and a minimum score of 138 on the verbal GRE are required.
   C. For foreign students, a minimum score of 79 on the internet-based TOEFL or a minimum IELTS band score of 6.5 is required.

II. Provisional Admission
   A. A minimum grade-point average of 2.5 (A=4.0) on all undergraduate work is required.
   B. A minimum score of 151 on the quantitative GRE and a minimum score of 138 on the verbal GRE are required.
   C. For foreign students, a minimum score of 79 on the internet-based TOEFL or a minimum IELTS band score of 6.5 is required.

Applicants to the MSME program must submit official scores on the Graduate Record Exam (GRE). This requirement is waived for students who received the BSME degree from USA. Those students may need to present GRE scores to be eligible for some assistantships or fellowships however.

Degree Requirements For MSME

The minimum credit hour requirements for the different options pertaining to the MSME degree are:

- Thesis Option: 31 credit hours
- Project Option: 34 credit hours
- Course Option: 33 credit hours

Master of Science students in Mechanical Engineering must complete at least three approved core courses, including one in solid mechanics, one in fluid mechanics, and one in thermal sciences. Students in the Course Work or Project Option must take a fourth core course which may be selected from any of the three areas mentioned above. All candidates for the MSME degree also must complete MA 507 and MA 508.

Department Information

<table>
<thead>
<tr>
<th>Department of Mechanical Engineering</th>
<th>(251) 460-6168</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair</td>
<td>David A. Nelson</td>
</tr>
<tr>
<td>Professors</td>
<td>Hsiao, Nelson, Phan</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>Cauley</td>
</tr>
<tr>
<td>Assistant Professors</td>
<td>Kar, Kim, Lillian, Montalvo, Poole, Richardson, Tambe, Yazdani</td>
</tr>
</tbody>
</table>
Mechanical Engineering is one of the broadest engineering disciplines. Mechanical engineers invent, analyze and design systems that produce power or convert energy. This encompasses such diverse applications as designing next-generation aircraft and automobiles, inventing novel methods of generating energy from renewable sources, and developing sophisticated new medical devices and systems. Mechanical engineers are in the forefront of exciting new technological fields, including nano-engineering, biomedical engineering, and energy research.

The basic fields of study for mechanical engineers include:

- Materials science, which is the study of the relationship between structure, properties, and processing of materials.
- Thermodynamics and heat transfer deal with basic concepts and applications of work, energy, and power. Applications include power generation from fossil fuels, from renewable sources (solar, wind energy) and fuel cells.
- Engineering mechanics is the study of static and dynamic effects of forces applied to rigid and flexible solid bodies.
- Fluid mechanics, the study of the forces and motions of liquids and gases. Included in this area of study are hydraulics, gas dynamics, aerodynamics, and design and application of pumps, compressors, and turbines.
- Control systems including studies of transient and steady-state response of systems to external inputs.
- Design synthesis which integrates all fields of engineering in the production of safe, practical, efficient, and economically feasible solutions to real problems.

All BSME students complete a senior-year "capstone" design project, in which a team of students defines and solves a unique, real-world engineering problem.

The curriculum leading to the Bachelor of Science in Mechanical Engineering (BSME) is designed so that graduates can work in any Mechanical Engineering field, or continue their educations at the graduate level.

BSME Program Educational Objectives:

Alumni of the Bachelor of Science in Mechanical Engineering (BSME) program should demonstrate the following traits and accomplishments within five years following graduation:

1. Graduates will achieve professional advancements or promotions with progressively higher levels of responsibility, competency, professional and ethical judgment and analysis. They will apply creative and innovative techniques to solve significant problems. They will apply team assimilation skills to successfully manage cross-disciplinary, collaborative projects that require global and multicultural perspectives.

2. Graduates will demonstrate effective written and oral communication skills in presenting, documenting and conveying their work. They will use these skills in creating and supporting new or improved designs, inventions, and intellectual property, thereby contributing to the social, economic, and environmental well-being of local and global communications.

3. Graduates will demonstrate commitment to lifelong and continuous professional development through activities such as mentoring, participating in professional societies, completing advanced degrees and achieving professional registration or other certifications.

Mechanical Engineering graduates will accomplish these objectives in the course of professional employment, entrepreneurship, military or public service and postgraduate education.

BSME Student Outcomes:

By the time of graduation from the BSME program, a student will have demonstrated attainment of the following outcomes:

a. An ability to apply knowledge of mathematics, science, and engineering.

b. An ability to design and conduct experiments, as well as to analyze and interpret data.

c. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

d. An ability to function on multidisciplinary teams.

e. An ability to identify, formulate, and solve engineering problems.

f. An understanding of professional and ethical responsibility.
An ability to communicate effectively.

h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

i. A recognition of the need for, and an ability to engage in life-long learning.

j. A knowledge of contemporary issues.

k. An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

The BSME curriculum is designed to ensure the attainment of the student outcomes.

The Bachelor of Science in Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Exam-Compliant Calculator Policy

Every Mechanical Engineering (ME) student must have an exam-compliant calculator for use in those ME courses which allow calculator usage. Only those calculators which are acceptable for use in the Fundamentals of Engineering (FE) exam are considered to be exam-compliant and may be used in those Mechanical Engineering classes which allow calculator usage. Use of a calculator which is NOT exam compliant in an ME test, quiz, or exam will be considered academic misconduct. For a list of exam-compliant calculator models, see http://ncees.org.exams.calculator/.