

# 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

Department of Mechanical Engineering	(251) 460-6168
Chair	David A. Nelson
Professors	Hsiao, Nelson, Phan
Associate Professors	Cauley, Yazdani
Assistant Professors	Kar, Kim, Lillian, Montalvo, Poole, Richardson, Tambe, Dizbay-Onat

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Professors Emeritus	Donovan, Engin
Instructors	Kramer, Roberts

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Department of Mechanical Engineering website  
<https://www.southalabama.edu/colleges/engineering/me/index.html>

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:**

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, and environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

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

### **BSME Accelerated Bachelors – Masters Degree Option**

Qualified students may have the opportunity to apply a limited number of graduate course credits to the BSME degree and to the MSME degree. Students interested in this option should consult their ME advisor.

### **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/>.

### **Aerospace Engineering Track**

Students who plan to enter careers or graduate studies in aerospace, aeronautics, astronautics, or a related field may pursue the specialized track in Aerospace Engineering with the BSME program. Students in this track must complete AE 361 Introduction to Aerodynamics, in addition to two other approved aerospace engineering electives.

Students interested in the Aerospace Engineering track within the BSME program should consult their academic advisor.

### **Biomedical Engineering Track**

Students who plan to enter careers or graduate studies in biomedical engineering may pursue the specialized track in Biomedical Engineering within the BSME program. This track may also be appropriate for students planning to pursue a career in the health sciences (medical school, dental school, or other health profession programs).

Students in the Biomedical Engineering track must complete General Biology I & II w/ labs (BL 121, 121L, 122, 122L), General Chemistry II w/ lab (CH 132, 132L) and Me 467, Introduction to Biomedical Engineering.

Students interested in the Biomedical Engineering track within the BSME program should consult their academic advisor. Students planning to apply for a health profession program should also consult with a Pre-Health Profession Advisor to identify any additional courses that may be required.