

DEPARTMENT OF MECHANICAL ENGINEERING

The Department of Mechanical Engineering offers a Bachelor of Science degree in Mechanical Engineering. The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Individuals enrolling in this degree program are given an opportunity to develop a strong background in the engineering sciences and to learn the analysis, design, and synthesis tools necessary to function well as active participants in many traditional, new, and emerging areas of technology.

The department has excellent laboratory facilities where students receive hands-on instruction by faculty. Computer-aided design (CAD) facilities, including state-of-the-art workstations, are routinely used. Some classes are taught by adjunct faculty from local industries, giving students the opportunity to interact with engineering professionals engaged in relevant engineering practice.

Because of the broad engineering training in this program, graduates may find employment in nearly all industries, including companies or government agencies associated with aerospace, automotive, energy, petroleum, manufacturing, and research.

Bachelor of Science Degree in Mechanical Engineering (BSME)

The Bachelor of Science degree in Mechanical Engineering (BSME) offers students the opportunity to prepare for careers in traditional, new, and emerging technologies of mechanical engineering. Mechanical engineering is a versatile and broadly-based engineering discipline. Basic sciences and mathematics form the foundation of mechanical engineering, which requires an understanding of such subject areas as solid and fluid mechanics, thermal sciences, mechanical design, structures, material selection, manufacturing processes and systems, mechanical systems and control, and instrumentation.

The five main concentrations within mechanical engineering are: (1) general mechanical engineering; (2) manufacturing engineering and systems; (3) mechanical systems and design; (4) mechanics and materials; and (5) thermal and fluid systems. Through required coursework, the mechanical engineering curriculum provides educational training in all specializations. Through the selection of technical elective courses to augment required courses, students may develop a degree of specialization and depth in one of the specialized areas of study. Design experience is integrated throughout the program. Development of open-ended problem solving skills is a part of many mechanical engineering courses. Design projects with formal report writing are included in many courses. A substantial portion of each technical elective course is devoted to design of systems and components. A capstone design sequence at the senior level provides an opportunity to apply and integrate the knowledge gained throughout the curriculum to the development of an instructor-approved project.

The laboratory requirements are designed to provide the hands-on experience of application of classroom theory. The required laboratories expose undergraduate students to modern measurements and instrumentation techniques. The design of experiments is integrated in both the mechanical systems and control, thermal, and fluid laboratories. Students may receive additional hands-on experiences by selecting technical elective courses with laboratory components.

In addition, opportunities exist for students to participate in research and design projects. Those students eligible for honors may work on more individualized projects. Students also have an opportunity to participate in an approved co-op program and may receive up to 3 semester credit hours for their experience.

The educational objectives of the Bachelor of Science degree in the Mechanical Engineering program are to provide students with opportunities to:

- acquire the ability to apply the fundamentals of mathematics, sciences, and engineering to quantitatively analyze problems
- develop innovative design skills, including the students' ability to formulate problems, to think creatively, to synthesize information, and to communicate effectively
- develop the ability to use modern experimental techniques; collect, analyze, and interpret experimental data; and effectively communicate the results
- develop diverse skills needed to be successful engineers.

The minimum number of semester credit hours required for this degree is 129, at least 39 of which must be at the upper-division level. All candidates for this degree must fulfill the Core Curriculum requirements, the general engineering requirements, and the degree requirements, which are listed below.

Core Curriculum requirements: Students seeking the Bachelor of Science degree in Mechanical Engineering must fulfill University Core Curriculum requirements in the same manner as other students. The courses listed in the table below satisfy both major requirements and Core Curriculum requirements; however, if these courses are taken to satisfy both requirements, then students will need to take additional courses in order to meet the minimum number of semester credit hours required for this degree. For a complete listing of courses that satisfy the Core Curriculum requirements see pages 5–9 of this catalog.

Core Curriculum Component Area	Courses that Satisfy Core Curriculum and Degree Requirements
Communications	English Rhetoric/Composition (6 semester credit hours) All students must take the following six hours to meet this core requirement: WRC 1013, Freshman Composition I WRC 1023, Freshman Composition II
Mathematics	Mathematics (3 semester credit hours) Any three hours listed under this section in the list of core courses will satisfy this core requirement. Note: MAT 1214, Calculus I, may be used to satisfy the Core Curriculum requirement for mathematics, as well as for one of the General Engineering requirements.
Natural Sciences	Science (6 semester credit hours) Three hours from Level One and three hours from Level Two will satisfy this core requirement. Note: CHE 1103, General Chemistry I, and PHY 1903, Engineering Physics I, may be used to satisfy the Core Curriculum requirements for science, as well as two of the General Engineering requirements.
Social and Behavioral Sciences	United States History and Diversity (6 semester credit hours) Any six hours listed under this section in the list of core courses will satisfy this core requirement. Political Science (6 semester credit hours)

Core Curriculum Component Area

Courses that Satisfy Core Curriculum and Degree Requirements

	<p>POL 1013, Introduction to American Politics, plus three additional hours listed under this section in the list of core courses will satisfy this core requirement.</p> <p>Social and Behavioral Sciences (3 semester credit hours) COR 1203, Freshman Seminar</p> <p>Economics (3 semester credit hours) Any three hours listed under this section in the list of core courses will satisfy this core requirement.</p>
<p>Humanities & Visual and Performing Arts</p>	<p>Literature (3 semester credit hours) Any three hours listed under this section in the list of core courses will satisfy this core requirement.</p> <p>The Arts (3 semester credit hours) Any three hours listed under this section in the list of core courses will satisfy this core requirement.</p>
<p>World Society and Issues</p>	<p>(3 semester credit hours) Any three hours listed under this section in the list of core courses will satisfy this core requirement.</p>

General Engineering Requirements

All degree-seeking candidates in engineering must complete the following 21 semester credit hours, as well as the Core Curriculum requirements and major requirements:

CHE	1103	General Chemistry I
EGR	2323	Applied Engineering Analysis I
MAT	1214	Calculus I
MAT	1223	Calculus II
PHY	1903, 1911	Engineering Physics I and Laboratory
PHY	1923, 1931	Engineering Physics II and Laboratory

Degree Requirements

All degree-seeking candidates in Mechanical Engineering must complete the following semester credit hours, as well as the Core Curriculum requirements and General Engineering requirements:

A. 66 semester credit hours of required foundation and general mechanical engineering courses:

EE	2213	Electric Circuits and Electronics
EGR	2103	Statics
EGR	2513	Dynamics
EGR	3323	Applied Engineering Analysis II
MAT	2213	Calculus III
ME	1301	Introduction to Engineering Design
ME	1402	Engineering Graphics

ME	3113	Measurements and Instrumentation
ME	3173	Numerical Methods
ME	3293	Thermodynamics I
ME	3241	Materials Engineering Laboratory
ME	3243	Materials Engineering
ME	3263	Manufacturing Engineering
ME	3513	Mechanism Design
ME	3663	Fluid Mechanics
ME	3813	Mechanics of Solids
ME	3823	Machine Element Design
ME	4293	Thermodynamics II
ME	4313	Heat Transfer
ME	4523	Dynamic Systems and Control
ME	4702	Mechanical Systems and Control Laboratory
ME	4802	Thermal and Fluid Laboratory
ME	4811	Senior Design I
ME	4813	Senior Design II

3 semester credit hours of approved mathematics or science electives. A list of acceptable courses is available in the College of Engineering Undergraduate Advising Center.

- B. 9 semester credit hours of mechanical engineering elective courses. Students are encouraged to choose courses from a specific concentration.

Concentration: Thermal and Fluid Systems

ME	3593	Alternative Energy Sources
ME	4183	Compressible Flow and Propulsion Systems
ME	4323	Thermal Systems Design
ME	4343	Heating, Air Conditioning, and Refrigeration Design
ME	4613	Power Plant System Design
ME	4623	Internal Combustion Engines
ME	4663	Fluid Systems Design

Concentration: Mechanical Systems and Design

ME	3323	Mechanical Vibration
ME	4133	CAD/CAE
ME	4553	Automotive Vehicle Dynamics
ME	4673	Mechanical Systems Design
ME	4723	Reliability and Quality Control in Engineering Design
ME	4773	Fundamentals of Robotics

Concentration: Mechanics and Materials

ME	4243	Intermediate Materials Engineering
ME	4603	Finite Element Analysis
ME	4963	Bioengineering

Concentration: Manufacturing Engineering and Systems

ME	4563	Computer Integrated Manufacturing
ME	4573	Facilities Planning and Design
ME	4583	Enterprise Process Engineering

Concentration: General Mechanical Engineering

		Courses selected from any of the previous areas
*EGR	4993	Honors Research
*ME	4953	Special Studies in Mechanical Engineering
		†Graduate Courses in Mechanical Engineering

*With prior approval, these courses may be used as a technical elective.

†Graduate courses require approval and forms are available in the College of Engineering Undergraduate Advising Center.