

# MECHANICAL ENGINEERING (BSME)

The Mechanical Engineering curriculum consists of two main course stems. In the thermal/fluids stem, students study fluid mechanics, heat transfer and thermodynamics. In the materials/mechanical systems stem, students study engineering materials, manufacturing processes, control systems and machine design. With these two required stems, students gain a foundation for the major areas of mechanical engineering and are prepared to enter a variety of industries. In addition to the required stems, students can further specialize by choosing electives in the areas of sustainable engineering, energy systems design, analysis and design of propulsion systems, advanced structural analysis, computational methods for thermo-fluids, biomaterials, biomechanics, aeronautics, robotics, and other topics. These electives add to the student's ability to apply fundamentals and to design machines and energy systems.

## Mechanical Engineering Mission Statement

The mission of the Mechanical Engineering undergraduate program is to educate students, within a caring Christian environment, in the discipline of mechanical engineering. Our graduates will be equipped with the fundamental technical, communication, and teamwork skills to succeed in their chosen careers. They will be empowered by innovative problem-solving creativity and an entrepreneurial mindset. They will be motivated by Christian ideals and a vocational calling to improve the quality of life worldwide.

## BSME Program Educational Objectives

Within a few years after graduation, Mechanical Engineering graduates will:

- Have a career informed by Christian ideals and a vocational calling to improve people's quality of life worldwide.
- Be recognized as competent, successful, and ethical in their profession or in advanced study, in engineering or a related field.
- Be equipped and motivated to pursue knowledge and develop skills within their profession through graduate school or by continuing education

## BSME Expected Graduate Outcomes

In support of the program objectives, graduates of the program must demonstrate that they have:

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, 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

## Degree Requirements: BSME - Mechanical Engineering

Code	Title	Hours
<b>Required Courses</b>		
Minimum 124 hours including the following:		
<i>Literature and Writing</i>		
ENG 1310	Research Writing: Writing and Academic Inquiry Seminars	3
GTX 2301	Intellectual Traditions of the Ancient World : Literature and Thought	3
or GTX 2302	Medieval Intellectual Traditions: Literature and Thought in Context	
PWR 3300	Technical Writing	3
<i>Religion</i>		
REL 1310	The Christian Scriptures	3
REL 1350	The Christian Heritage	3
<i>Foreign Language and Culture</i>		
Foreign Language and Culture Distribution List (ECS) ( <a href="https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/#EN-FLC-DL">https://catalog.baylor.edu/undergraduate/school-engineering-computer-science/#EN-FLC-DL</a> )		3
<i>Other Requirements</i>		
PSC 1387	The U.S. Constitution, Its Interpretation, and the American Political Experience	3
or ENG 2301	British Literature	
EGR 2108	Engineering Economics	1
EGR 3305	Social and Ethical Issues in Engineering	3
or EGR 3315	Ethics of International Service	
EGR 1101	Engineering New Student Experience	1
Lifetime Fitness: Any two LF 11XX courses. ECS 2101 and select leadership courses may fulfill one of the Lifetime Fitness requirements.		2
Chapel: Two Semesters		0
<i>Mathematics and Basic Sciences</i>		
CHE 1301	Basic Principles of Modern Chemistry I	3
MTH 1321	Calculus I	3
MTH 1322	Calculus II	3
MTH 2311	Linear Algebra	3
MTH 2321	Calculus III	3
MTH 3325	Ordinary Differential Equations	3
STA 3381	Probability and Statistics	3
PHY 1420	General Physics I	4
PHY 1430	General Physics II	4
<b>Mechanical Engineering Major</b>		
<i>Required Courses</i>		
EGR 1301	Introduction to Engineering	3

EGR 1302	Introduction to Engineering Analysis	3
EGR 2170	Introduction to Computer Aided Design	1
EGR 3380	Engineering Design I	3
ELC 2320	Electric Circuit Theory for non-ECE majors	3
ELC 4335	Systems Modeling and Control	3
ME 2320	Statics	3
ME 2321	Dynamics	3
ME 2345	Thermodynamics	3
ME 3122	Materials and Manufacturing Processes Lab	1
ME 3145	Thermal/Fluids Laboratory	1
ME 3320	Mechanics of Materials	3
ME 3321	Fluid Mechanics	3
ME 3322	Mechanical Engineering Materials and Manufacturing Processes	3
ME 3323	Machine Design	3
ME 3345	Thermodynamics II	3
ME 3420	Instrumentation and Measurements	4
ME 4325	Dynamic Systems	3
ME 4327	Numerical Methods for Engineers	3
ME 4345	Heat Transfer	3
ME 4390	Engineering Design II	3

*Engineering Electives*

Select three courses from the following: 9

EGR 3V95	Internship Experience
EGR 4361	Conventional & Alternative Energy Systems
EGR 4375	Elements of Nuclear Engineering
EGR 4396	Special Topics in Engineering
EGR 4V97	Special Projects in Engineering
BME 4360	Introduction to Biomedical Engineering
BME 4370	Biomaterials: Form and Function
BME 4374	Biomechanics
BME 4376	Introduction to the Design and Evaluation of Medical Devices
BME 4379	Biosensors and Nanomaterials
ME 4305	Sustainable Engineering
ME 4320	Computer-Aided Structural Analysis
ME 4322	Computer-Aided Engineering and Design
ME 4323	Mechanical Vibrations
ME 4324	Introduction to Finite Element Methods
ME 4330	Introduction to Robotics
ME 4334	Gas Dynamics
ME 4336	Thermal Systems Design
ME 4337	Introduction to Computational Fluid Dynamics
ME 4339	Tribology
ME 4343	Introduction to Computational Fluid Dynamics
ME 4344	Composite Materials
ME 4346	Introduction to Aeronautics
ME 4347	Analysis and Design of Propulsion Systems
ME 4349	Aircraft Structural Analysis
ME 4350	Aircraft Flight Dynamics and Control

ME 4354	Rocket Propulsion
ME 4355	Orbital Mechanics and Space Flight
ME 4356	Introduction to Space Flight
ME 4357	Cardiovascular Engineering and Instrumentation
ME 4360	Renewable Energy Devices
ME 4362	Principles of Process Engineering
ME 4363	Advanced Concepts of Process Engineering
ME 4364	Introduction to Additive Manufacturing
ME 4377	Solar Energy
ME 4380	Microscopy Techniques for Material Science
ME 4381	Advanced Mechanics of Materials
ME 4382	Selection of Materials and Manufacturing Processes in Design
ME 4384	Engineering with Plastics
ME 4385	Failure Analysis and Product Liability
ME 4386	Properties and Processing of Electronic Materials
ME 4388	Corrosion and Sustainable Metallurgy
ME 4396	Special Topics in Mechanical Engineering
ME 4V97	Special Projects in Mechanical Engineering

A grade of "C" or better in all the Mechanical Engineering hours counted towards the major.

**Total Hours****124**