

MECHANICAL ENGINEERING (B.S.)

The Bachelor of Science in Mechanical Engineering is accredited by the Accreditation Board for Engineering and Technology.

Program Goals

Mechanical engineering B.S. graduates will be able to apply basic engineering principles to identify and solve problems, and to design, specify the manufacturing of, and evaluate the performance of mechanical systems and processes.

Program Educational Objectives

Program Educational Objectives are broad in scope and describe the expected accomplishments of our graduates during the first few years after graduation, while Student Outcomes are narrower and describe what our students are expected to know and be able to do by the time of graduation. The objectives of the undergraduate program in Mechanical Engineering at Wayne State University are to provide the education and training that will enable its graduates to:

1. successfully pursue intermediate level engineering positions or additional degrees;
2. demonstrate technical competency in applying broad, fundamental-based knowledge and up-to-date skills to perform professional work in mechanical engineering related disciplines;
3. demonstrate competency in applying comprehensive design methodology pertaining to mechanical engineering, incorporating the use of the economic, environmental, and social impact of design;
4. engage in professional societies, and to always apply best practices in professional ethics; and
5. be committed to life-long learning activities through self-reliance, creativity and leadership.

ABET Student Outcomes (as revised on September 18, 2009)

It is expected that by the time of graduation, our B.S.M.E. students will have:

1. an ability to apply knowledge of mathematics, science, and engineering
2. an ability to design and conduct experiments, as well as to analyze and interpret data
3. 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
4. an ability to function on multidisciplinary teams
5. an ability to identify, formulate, and solve engineering problems
6. an understanding of professional and ethical responsibility
7. an ability to communicate effectively
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. a recognition of the need for, and an ability to engage in life-long learning
10. a knowledge of contemporary issues

11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

In support of these educational objectives, faculty members will seek outstanding levels of achievement in their research and engineering practices. To further foster professionalism, the Department encourages students to be active participants in ASME, Pi Tau Sigma, Tau Beta Pi, SAE and other student professional organizations.

Admission Requirements

For admission to the Bachelor of Science program, students must satisfy the admission criteria of the Division of Engineering, College of Engineering (<http://bulletins.wayne.edu/undergraduate/college-engineering/bs/>). The Department has an Academic Advisor and a Director of Undergraduate Studies. The former is responsible for assisting students with course selections and maintaining academic progress, and the latter is responsible for enforcing Departmental academic policy. Students are encouraged to meet with the Academic Advisor once every semester, for up-to-date feedback on their academic progress and a review of course plans for the next semester or two. The student and advisor together plan a complete program of study, including electives, which meet Departmental requirements and the interests of the individual student.

Candidates for the Bachelor of Science degree must complete 123 credits of coursework, including the University General Education (<http://bulletins.wayne.edu/undergraduate/general-information/general-education/>) requirements. All course work must be completed in accordance with the academic procedures of the University (<http://bulletins.wayne.edu/undergraduate/general-information/>) and the College of Engineering (<http://bulletins.wayne.edu/undergraduate/college-engineering/academic-regulations/>) governing undergraduate scholarship and degrees.

Evening courses and cooperative programs allow professionals working in local industry to pursue an undergraduate degree while continuing employment. The degree requirements shown in the curriculum below are in effect as of the publication date of this bulletin; however, students should consult an academic advisor for verification of current requirements.

Mechanical Engineering Curriculum

First Year		
First Semester		Credits
BE 1200	Basic Engineering I: Design in Engineering	3
CHM 1125	General Chemistry I for Engineers	3
CHM 1130	General Chemistry I Laboratory	1
ENG 1020	Introductory College Writing (BC)	3
MAT 2010	Calculus I (QE)	4
FYS 1010	Learning with the Brain in Mind (WE)	1
Credits		15

Second Semester

BE 1300	Basic Engineering II: Materials Science for Engineering Applications	3
BE 1310	Materials Science for Engineering: Laboratory	1
MAT 2020	Calculus II	4
PHY 2175	University Physics for Engineers I (NSI)	4
BE 1500	Introduction to Programmin and Computator for Engineers	3
Credits		15

Second Year

First Semester

MAT 2030	Calculus III	4
ME 2410	Statics	3
BE 2100	Basic Engineering III: Probability and Statistics in Engineering	3
PHY 2185	University Physics for Engineers II	4
Credits		14

Second Semester

MAT 2150	Differential Equations and Matrix Algebra	4
ME 2500	Numerical Methods Using MATLAB	2
ME 2420	Elementary Mechanics of Materials	3
ME 2200	Thermodyna	3
Any Civic Literacy (CIV) course		3
Credits		15

Third Year

First Semester

ECE 3300	Introduction to Electrical Circuits	4
ME 3300	Fluid Mechanics: Theory and Laboratory	4
ENG 3050	Technical Communication I: Reports (IC)	3
ME 3400	Dynamics	3
ME 3450	Manufacturing Processes I	3
Credits		17

Second Semester

ME 4210	Heat Transfer: Theory and Laboratory	4
ME 4150	Design of Machine Elements	4
ME 4410	Vibrations: Theory and Laboratory	4
PHI 1120	Professional Ethics (CI)	3
ENG 3060	Technical Communication II: Presentations (OC)	3
Credits		18

Fourth Year

First Semester

ME 4300 or ME 5330	Thermal Fluid Systems Design (ME 5330 AGRADE) ¹ or Advanced Thermal Fluid System Design	4
ME 4420	Dynamic Modeling and Control of Engineering System	4
ME Technical Elective (ME 5XXX)		4
Any Diversity, Equity, and Inclusion (DEI) course		3
Credits		15

Second Semester

ME 4500 or ME 5500	Mechanical Engineering Design II (ME 5500 AGRADE) ² or Advance Engineer Design	4
ME Technical Elective (ME 5XXX)		4
Any Social Inquiry (SI) course		3
Any Global Learning (GL) course		3
Credits		14
Total Credits		123

¹ may not be taken concurrently with ME 4500 or ME 5500

² May not be taken concurrently with ME 4300 or ME 5330.

Coherent Technical Electives

Two technical electives must be chosen from among the 5000-level courses offered by the Mechanical Engineering Department. Coherent Technical Electives are as follows:

Code	Title	Credits
ME 5425	Vibrations and Acoustics Analysis of Vibration Movements and Instrumentation	4

ME 5440	Industrial Noise Control	4
ME 5460	Fundamentals in Acoustics and Noise Control	4
Control and Dynamics		
ME 5115	Fundamentals of Electric-drive Vehicle Modeling	4
ME 5400	Dynamics II	4
ME 6550	Modeling and Control of Dynamic Systems	4
Biomedical Engineering		
ME 5100	Quantitative Physiology	4
ME 5160/ BME 5210	Musculoskeletal Biomechanics	4
ME 5170	Design of Human Rehabilitation Systems	4
ME 5180/ BME 5370	Introduction to Biomaterials	4
ME 6180/ BME 6480/ ECE 6180	Biomedical Instrumentation	4
Solid Mechanics and Design		
ME 5040	Finite Element Methods I	4
ME 5620	Fracture Mechanics in Engineering Design	4
ME 5700	Fundamentals of Mechanics	4
ME 5720	Mechanics of Composite Materials	4
Design and Manufacturing		
ME 5453	Product and Manufacturing Systems and Processes	4
ME 5580	Computer-Aided Mechanical Design	4
Thermal/Fluid Science		
ME 5110/ EVE 5130/ AET 5110/CHE 5110	Fundamental Fuel Cell Systems	4
ME 5115/ EVE 5110	Fundamentals of Electric-drive Vehicle Modeling	4
ME 5215/ EVE 5120/ AET 5310/ CHE 5120	Fundamentals of Battery Systems for Electric and Hybrid Vehicles	4
ME 5300	Intermediate Fluid Mechanics	4
ME 5800	Combustion Engines	4
ME 5810	Combustion and Emissions	4

In addition, students may choose to do directed study and research in an area of mutual interest to the student and a faculty member.