MECHANICAL ENGINEERING (B.S.)

The Bachelor of Science in Mechanical Engineering program (https://engineering.wayne.edu/mechanical/academics/bs/) at Wayne State University is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org/, under the commission's General Criteria and Program Criteria for Mechanical Engineering.

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.

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.

Mechanical Engineering Curriculum

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.

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	Introduction to University Life and College Success (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
BE 1500	Introduction to Programming and Computation for Engineers	3
PHY 2170	University Physics I for Scientists and Engineers	4
	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 2180	University Physics II for Scientists and Engineers	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	Thermodynamics	3
Any Civic Literacy (CIV) course		3
	Credits	**15**
Third Year		
First Semester		
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
ECE 3320	Introduction to Electrical Circuits	4
	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 Advanced Engineering 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
Vibrations and Acoustics		
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 5180/ BME 5370	Introduction to Biomaterials	4
Solid Mechanics and Design		
ME 5040	Finite Element Methods I	4
ME 5620	Fracture Mechanics in Engineering Design	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.

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 October 20, 2017)

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

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.

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Mechanical Engineering (ME) Honors requirements:

Mechanical Engineering undergraduate students must be either a University Honors student or participating in AGRADE (https://engineering.wayne.edu/academics/programs/undergrad-experience/agrade/) and complete a Thesis to be considered for Mechanical Engineering departmental honors. Courses and credits to satisfy the Mechanical Engineering departmental honors requirements are listed below. This information does not contain all of the degree requirements to graduate.

ME department requirements (26 credits total):

- Need a minimum GPA of 3.4 and 3.6 Honors GPA
- 23 credits must be in Engineering Honors courses including the following:
  - BE 5998 Engineering Honors Thesis (4 cr.)
  - BE 2100 Basic Engineering III: Probability and Statistics in Engineering (3 cr.)
  - ME 5330 Advanced Thermofluid Design (4 cr.)

    - ME 5500 Advanced Engineering Design (WI) (4 cr.)
    - 2 ME courses at either the 5000 or 6000 level
- At least one HON 42XX Honors seminar (3 cr.)