MECHANICAL ENGINEERING MAJOR

Program Director: Nikhil Chopra, Ph.D.

The Bachelor of Science in Mechanical Engineering degree program at the University of Maryland is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and the Mechanical Engineering Program Criteria.

Mechanical engineering is the broadest of the engineering disciplines. It is concerned with the design, manufacture, and operation of a wide range of components, devices, or systems. The field comfortably encompasses applications ranging from micro-mechanical surgical systems to internal combustion engines for Formula One racecars or giant turbines for renewable energy wind farms. A fitting adage for the discipline would be ***turning ideas into reality.***

Graduates of the program will possess the skills and the knowledge base critical for success in today's marketplace, with the problem solving expertise and flexibility necessary to adapt as technology and society evolve. Students must be proficient in the traditional fundamentals of mechanical engineering such as solid and fluid mechanics, thermodynamics, transfer processes, materials engineering, electronic instrumentation and measurements, controls, and design. However, they will also explore new/emerging areas through a variety of electives such as smart structures, machine learning, additive manufacturing, Lean Six Sigma, and medical robotics.

Attributes such as teamwork, ethics, and leadership are emphasized in the curriculum. The program is designed to integrate out-of-classroom experiences, helping students explore career options and apply what they are learning in the real world. Students can work with faculty on research projects, serve as teaching fellows, pursue leadership opportunities through clubs, and participate in national competitions such as the Formula SAE/Baja SAE teams or the DOE Solar Decathlon. The flexibility of the curriculum, and frequent offering of required courses, allows many of our students to participate in study abroad or cooperative education opportunities.

Courses offered by this department may be found under the following acronym: ENME

Program Educational Objectives

1. The mission of the Department of Mechanical Engineering at the University of Maryland is to provide a quality education, to conduct strong research programs, to foster a close partnership with industry and government, and to provide related service to the campus community and the community at large. The mission shall be guided by a commitment to continuous improvement in the overall quality of teaching, research, and service in a diverse, equitable, and inclusive environment.
2. A major focus of the Department's activities is to provide quality engineering education with sufficient scope to include the basic and specialized engineering training necessary for the current and emerging needs of a more diverse and inclusive society.
3. The Department has related responsibility to contribute to the advancement of knowledge by conducting research at the cutting edge of science and technology. Since science and technology are rapidly advancing, the Department also has a professional responsibility to provide continuing education so the practicing engineer can remain effective.
4. The Department faculty and administration also see as part of the mission, an obligation to serve the needs of the campus community and the community at large in the spirit of collegial cooperation.
5. Graduates will provide value in their chosen career path, whether for mastery of the disciplines central to mechanical engineering or for the broader analytical skills, critical thinking, innovation and/or creative abilities provided by their engineering education.
6. Graduates will utilize skills in teamwork, leadership, and communication gained in their program of study, and act in a professional, equitable, inclusive, and ethical manner in the area in which they apply their degree.
7. Graduates will show a commitment to on-going professional development, whether through graduate study, research programs, training courses, or leadership opportunities thereby adapting to an evolving, competitive, diverse global work environment.
8. Graduates will utilize the skills developed in their program of study to engender a diverse and inclusive work environment in the area in which they apply their degree, and to be sensitive to issues of social and environmental responsibility in the conduct of their work.

Student Learning 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, 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

REQUIREMENTS

Freshman Year

First Semester	Credits	Second Semester	Credits
MATH140	4	MATH141	4
CHEM135	3	PHYS161	3
ENGL101	3	ENES102[1]	3
ENES100[1]	3	ENME272	2
General Education Requirements	3	General Education Requirements	3
	16		**15**

Sophomore Year

First Semester	Credits	Second Semester	Credits
ENME202	3	MATH246	3
MATH241	4	PHYS270 & PHYS271	4
PHYS260 & PHYS261	4	ENES220	3
ENES221	3	ENES232	3
ENES200 or ENEE 200	3	General Education Requirements	3
	17		**16**

Junior Year

First Semester	Credits	Second Semester	Credits
ENME331	3	ENME332	3
ENME350	3	ENME351	3
ENME382	3	ENME361	3
ENME392	3	ENME371	3
General Education Requirements	3	Professional Writing Requirement	3
	15		**15**

Senior Year

First Semester	Credits	Second Semester	Credits
ENME472	3	ENME462	3
ENME400	3	Electives: Technical Electives	9
Electives: Technical Electives	6	General Education Requirements	3
General Education Requirements	3		
	15		**15**

Total Credits 124

[1] Can be taken 1st or 2nd semester

A minimum of 120 credits are required for a degree.

Sample Elective Topics

- Waste Technology
- Bio-Inspired Robotics
- Computer-Aided Design & Manufacturing
- Packaging of Electronic Systems
- Energy Conversion
- Engineering Management
- Environmental Engineering
- Flexible Macro-electronics
- Automotive Design
- Micro-nano Robotics
- Manufacturing
- Medical Robotics
- Fiber Optics
- Micro-Electro-Mechanical Systems
- Nuclear Reactor Engineering

GRADUATION PLANS

Click here (https://eng.umd.edu/advising/four-year-plans/) for roadmaps for graduation plans in the A. James Clark School of Engineering.

Additional information on developing a graduation plan can be found on the following pages:

- http://4yearplans.umd.edu
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success) section of this catalog