

Mechanical Engineering, B.S.

Program Educational Objectives: Graduates of the program will have the professional and scientific education that allows them to be successful as career engineers and in graduate programs. Specifically, they will be able to (1) function in professional environments in industry, government, and academia applying and building upon engineering science knowledge, problem-solving skills, and communication skills; (2) function as members of teams and in leadership roles applying ethical and inclusive standards including the ASME code of ethics within and beyond traditional Mechanical Engineering disciplines; and (3) remain current with technology and contemporary scientific, environmental and societal issues, and consequently improve skills and knowledge through a lifelong process of learning. (Program educational objectives are those aspects of engineering that help shape the curriculum; achievement of these objectives is a shared responsibility between the student and UCI.)

The undergraduate Mechanical Engineering curriculum includes a foundation of mathematics, physics, and chemistry. Engineering courses in fundamental areas constitute much of the remaining curriculum. A few technical electives allow undergraduate students to specialize in Aerospace Engineering, Energy Systems and Environmental Engineering, Flow Physics and Propulsion Systems, and Design of Mechanical Systems or to pursue broader understanding in these areas. A senior capstone design experience culminates the curriculum.

High School Students: See School Admissions (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#undergraduatestudytext>) information.

Transfer Students: Preference will be given to junior-level applicants with the highest grades overall, and who have satisfactorily completed the following required courses: two years of approved calculus, one year of calculus-based physics with laboratories (mechanics, electricity and magnetism), completion of lower-division writing, one course in general chemistry (with laboratory), and one course in introductory programming.

Students are encouraged to complete as many of the lower-division degree requirements as possible prior to transfer. Students who enroll at UCI in need of completing lower-division coursework may find that it will take longer than two years to complete their degrees. For further information, contact The Henry Samueli School of Engineering at 949-824-4334.

All students must meet the University Requirements (<http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/>).

All students must meet the School Requirements (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#schoolrequirementstext>).

Major Requirements

Mathematics and Basic Science Courses:

CHEM 1A or ENGR 1A	General Chemistry General Chemistry for Engineers
CHEM 1LE	Accelerated General Chemistry Lab
MATH 2A- 2B	Single-Variable Calculus and Single-Variable Calculus
MATH 2D	Multivariable Calculus
MATH 2E	Multivariable Calculus
MATH 3A	Introduction to Linear Algebra
MATH 3D	Elementary Differential Equations
PHYSICS 7C	Classical Physics
PHYSICS 7LC	Classical Physics Laboratory
PHYSICS 7D- 7E	Classical Physics and Classical Physics
PHYSICS 7LD	Classical Physics Laboratory
PHYSICS 52A	Fundamentals of Experimental Physics

One additional General Education Category II course offered by the Schools of Physical Sciences, Biological Sciences, or Information and Computer Sciences.

Engineering Topics Courses:

Students must complete a minimum of 24 units of engineering design.

Core Courses:

ENGR 54	Principles of Materials Science and Engineering
ENGRMAE 10	Introduction to Engineering Computations
ENGRMAE 30	Statics
ENGRMAE 52	Computer-Aided Design
ENGRMAE 60 or EECS 70A	Electric Circuits Network Analysis I

ENGRMAE 80	Dynamics
ENGRMAE 91	Introduction to Thermodynamics
ENGRMAE 106	Mechanical Systems Laboratory
ENGRMAE 107	Fluid Thermal Science Laboratory
ENGRMAE 112 or ENGRMAE 115	Propulsion Applied Engineering Thermodynamics
ENGRMAE 120	Heat and Mass Transfer
ENGRMAE 130A	Introduction to Fluid Mechanics
ENGRMAE 130B	Introduction to Viscous and Compressible Flows
ENGRMAE 145	Theory of Machines and Mechanisms
ENGRMAE 147	Vibrations
ENGRMAE 150	Mechanics of Structures
ENGRMAE 150L	Mechanics of Structures Laboratory
ENGRMAE 151	Mechanical Engineering Design
ENGRMAE 155 or ENGRMAE 156 or ENGRMAE 157	Composite Materials and Structures Mechanical Behavior and Design Principles Lightweight Structures
ENGRMAE 170	Introduction to Control Systems
ENGRMAE 189	Senior Project - Special Topics (minimum of 3 units)

Technical Elective Courses:

Students select a minimum of 16 units of technical electives. For students majoring in both Aerospace Engineering and Mechanical Engineering, a core course in one major cannot be counted as a technical elective in the other major. Any upper-division course in the department not used for the degree may be used as a technical elective. At least 8 units of the technical electives must come from ENGRMAE upper-division courses other than project-based courses ENGRMAE 188, ENGRMAE 189, and ENGRMAE 199. With approval of the Undergraduate Advisor, students may choose any remaining technical elective units from other departments' upper-division courses that have primarily technical content. Preapproved courses from other departments are listed on the MAE website: <http://engineering.uci.edu/files/mae-technical-electives.pdf>

Engineering Professional Topics Course:

ECON 20A or ECON 23	Basic Economics I Basic Economics for Engineers
ENGR 190W	Communications in the Professional World

At most an aggregate total of 4 units of 199 or H199 courses may be used to satisfy degree requirements.

(The nominal Mechanical Engineering program will require 188 units of courses to satisfy all university and major requirements. Because each student comes to UCI with a different level of preparation, the actual number of units will vary.)

Specialization in Aerospace Engineering:

Completion of a Senior Design Project in this area, and

select two of the following:

ENGRMAE 112	Propulsion
ENGRMAE 135	Compressible Flow
ENGRMAE 136	Aerodynamics
ENGRMAE 158	Aircraft Performance
ENGRMAE 159	Aircraft Design
ENGRMAE 175	Dynamics and Control of Aerospace Vehicles

Specialization in Energy Systems and Environmental Engineering:

Completion of a Senior Design Project in this area, and

select two of the following:

ENGRMAE 110	Combustion and Fuel Cell Systems
ENGRMAE 112	Propulsion
ENGRMAE 114	Fuel Cell Fundamentals and Technology
ENGRMAE 115	Applied Engineering Thermodynamics
ENGRMAE 117	Solar and Renewable Energy Systems
ENGRMAE 118	Sustainable Energy Systems
ENGRMAE 164	Air Pollution and Control

Specialization in Flow Physics and Propulsion Systems:

Completion of a Senior Design Project in this area, and

select two of the following:

ENGRMAE 110	Combustion and Fuel Cell Systems
ENGRMAE 112	Propulsion
ENGRMAE 113	Electric Propulsion
ENGRMAE 132	Computational Fluid Dynamics
ENGRMAE 135	Compressible Flow

Specialization in Design of Mechanical Systems:

Completion of a Senior Design Project in this area, and

select two of the following:

ENGR 165	Advanced Manufacturing
ENGRMAE 152	Introduction to Computer-Aided Engineering
ENGRMAE 171	Digital Control Systems
ENGRMAE 172	Design of Computer-Controlled Robots
ENGRMAE 183	Computer-Aided Mechanism Design
ENGRMAE 188	Engineering Design in Industry

Design unit values are indicated at the end of each course description. The faculty advisors and the Student Affairs Office can provide necessary guidance for satisfying the design requirements. Selection of elective courses must be approved by the student's faculty advisor and the departmental undergraduate advisor.

Freshman

Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
ENGRMAE 10	PHYSICS 7C	PHYSICS 7D
CHEM 1A or ENGR 1A	PHYSICS 7LC	PHYSICS 7LD
ENGR 7A*	CHEM 1LE	Basic Science
General Education	ENGR 7B*	
	General Education	

Sophomore

Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E
PHYSICS 7E	ENGR 54	ENGRMAE 52
PHYSICS 52A	ENGRMAE 60	ENGRMAE 91
ENGRMAE 30	ENGRMAE 80	ECON 23 or 20A
General Education		

Junior

Fall	Winter	Spring
ENGRMAE 115 or 112	ENGRMAE 130B	ENGRMAE 106
ENGRMAE 130A	ENGRMAE 147	ENGRMAE 120
ENGRMAE 150	General Education	ENGRMAE 145
ENGRMAE 150L	ENGRMAE 155, 156, or 157	General Education
ENGR 190W		

Senior

Fall	Winter	Spring
ENGRMAE 107	ENGRMAE 151	Technical Elective
ENGRMAE 170	Technical Elective*	Technical Elective
ENGRMAE 189	Technical Elective	General Education
General Education	General Education	

*ENGR 7A-ENGR 7B is a technical elective, available only to lower-division students in Fall and Winter quarters. Both ENGR 7A & ENGR 7B must be taken to count as a technical elective. If ENGR 7A-ENGR 7B is taken, this will replace one technical elective course in the senior year.

The sample program of study chart shown is typical for the accredited major in Mechanical Engineering. Students should keep in mind that this program is based upon a rigid set of prerequisites, beginning with adequate preparation in high school mathematics, physics, and chemistry. Students should consult with their academic counselor to structure their program of study. Mechanical Engineering majors are encouraged to consult with academic counselors as needed, and students who are academically at risk are mandated to see a counselor as frequently as deemed necessary by the advising staff.

Students can dual major in Mechanical Engineering and Aerospace Engineering by satisfying the degree requirements for both majors.