

Loyola Marymount University Loyola Marymount University Bulletin 2023-2024

Mechanical Engineering, B.S.E.

The Bachelor of Science program in Mechanical Engineering is designed to prepare the student for immediate entry into the mechanical engineering profession or graduate study toward advanced degrees. Engineering design is a major emphasis of the curriculum, and students work on various aspects of design projects throughout, culminating in a comprehensive capstone design project.

Accreditation

The Mechanical Engineering undergraduate program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>, under the General Criteria and the Mechanical Engineering Program Criteria.

Program Educational Objectives

The mechanical engineering undergraduate program has established the following program educational objectives that are consistent with the University's mission and the program's student outcomes. During the first 3-5 years after graduation, mechanical engineering students will:

1. Demonstrate competency and leadership in professional engineering activities.
2. Advance in their professional careers and pursue continuous learning in areas relevant to their long-term goals.
3. Contribute productively to cross-functional teams, communicate effectively, and demonstrate professional and ethical responsibility.

These program educational objectives are accomplished through the major requirements, the core curriculum, design competition experiences, internships, research opportunities, professional society involvement, and extracurricular activities.

Student Outcomes

The mechanical engineering undergraduate program has established the following student outcomes that support the program educational objectives. Attainment of these outcomes prepares graduates to enter the professional practice of engineering.

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

Transfer Requirements

Students who are currently enrolled in another major at LMU, but are interested in changing their major to MECH must complete [CHEM 111](#), [CHEM 114](#); [ENGR 2001](#) ; [MATH 131](#), [MATH 132](#); and [PHYS 1100](#) with a minimum grade of C (2.0) in each course before being considered. Final approval of the transfer request resides with the Chair of the Mechanical Engineering Department.

Graduation Requirements for the Mechanical Engineering B.S.E.

Department criteria for graduation include: (1) completion of a minimum of 30 semester hours of mathematics and basic sciences and a minimum of 45 semester hours of engineering topics, (2) a minimum grade point average of C (2.0) in all lower division major courses (excluding University core), and (3) all upper division MECH courses must be completed in residence.

Major Requirements

Lower Division Requirements:

- [BIOL 114 Biology for Engineers](#) 3 semester hours
- [CHEM 111 General Chemistry I Lab](#) 1 semester hours
- [CHEM 114 General Chemistry for Engineers](#) 3 semester hours
- [EECE 2112 Electric Sensors and Measurements](#) 2 semester hours
- [ENGR 100 Introduction to Engineering Analysis, Problem Solving, and Design](#) 3 semester hours
- [ENGR 190 Engineering Seminar](#) 1 semester hours
- [ENGR 1200 Computational Engineering](#) 2 semester hours
- [ENGR 1300 Engineering Visualization](#) 2 semester hours
- [ENGR 2001 Statics](#) 2 semester hours
- [MATH 131 Calculus I](#) 4 semester hours
- [MATH 132 Calculus II](#) 4 semester hours
- [MATH 234 Calculus III](#) 4 semester hours
- [MATH 246 Differential Equations and Linear Algebra](#) 4 semester hours
- [MECH 211 Computer Aided Design](#) 2 semester hours
- [MECH 212 Mechanics of Materials](#) 3 semester hours
- [MECH 213 Dynamics](#) 3 semester hours
- [MECH 214 Materials Science](#) 3 semester hours
- [MECH 223 Thermodynamics](#) 3 semester hours
- [PHYS 1100 Introduction to Mechanics](#) 4 semester hours
- [PHYS 2100 Introduction to Electricity and Magnetism](#) 4 semester hours

Upper Division Requirements:

- [CIVL 395 Engineering Economics and Decision Theory](#) 3 semester hours
- [MATH 356 Methods of Applied Mathematics](#) 4 semester hours
- [MECH 302 Thermal Science and Energy Lab](#) 2 semester hours
- [MECH 303 Solid Mechanics and Materials Laboratory](#) 2 semester hours
- [MECH 310 Machine Design](#) 3 semester hours
- [MECH 312 Vibrations](#) 3 semester hours
- [MECH 321 Energy Systems](#) 3 semester hours

- [MECH 322 Fluid Mechanics](#) 3 semester hours
 - [MECH 323 Heat Transfer](#) 3 semester hours
 - [MECH 401 Design Capstone Project I](#) 3 semester hours
 - [MECH 402 Design Capstone Project II](#) 3 semester hours
 - [MECH 410 Design and Manufacturing Laboratory](#) 2 semester hours
 - [MECH 412 Control Systems](#) 3 semester hours
- AND
- Four 500-level MECH elective courses 12 semester hours

University Core Requirements for Mechanical Engineering Majors

Mechanical Engineering majors are required to complete a minimum of 30 semester hours as defined in the “Core Curriculum for Students in the Frank R. Seaver College of Science and Engineering.” The proper sequence of the University Core courses should be discussed with the student’s advisor. There are a few important notes specific to Mechanical Engineering majors:

[CIVL 395 Engineering Economics and Decision Theory](#) fulfills the Understanding Human Behavior core area of the Explorations requirement and is applied toward the 30-semester hour minimum. Note that no additional courses from the Explorations Core requirement are required and that taking additional courses from the Explorations Core areas might not help fulfill overall core requirements.

The Mechanical Engineering Curriculum listed below assumes that at least 6 of the core area requirements will be fulfilled by courses that are 4 semester hours. Combined with the 3 semester hours from [CIVL 395](#), this 4-year plan most efficiently satisfies the core requirements.

All required Flagged Courses are fulfilled by the Mechanical Engineering major requirements. Therefore, these flags do not need to be considered when selecting core courses.

Mechanical Engineering Curriculum

First Year

Fall Semester

- [CHEM 111 General Chemistry I Lab](#) 1 semester hours
- [CHEM 114 General Chemistry for Engineers](#) 3 semester hours
- [ENGR 100 Introduction to Engineering Analysis, Problem Solving, and Design](#) 3 semester hours
- [ENGR 190 Engineering Seminar](#) 1 semester hours
- [MATH 131 Calculus I](#) 4 semester hours
- [FFYS 1000 First Year Seminar](#) 4 semester hours
- [ORNT 1000 First Year Forum](#) 0 semester hours

Total: 16 semester hours

Spring Semester

- [BIOL 114 Biology for Engineers](#) 3 semester hours
- [ENGR 1200 Computational Engineering](#) 2 semester hours
- [ENGR 1300 Engineering Visualization](#) 2 semester hours
- [MATH 132 Calculus II](#) 4 semester hours
- [PHYS 1100 Introduction to Mechanics](#) 4 semester hours

- [RHET 1000 Rhetorical Arts](#) 3 or 4 semester hours

Total: 18 semester hours

Sophomore Year

Fall Semester

- [EECE 2112 Electric Sensors and Measurements](#) 2 semester hours
- [ENGR 2001 Statics](#) 2 semester hours
- [MATH 234 Calculus III](#) 4 semester hours
- [PHYS 2100 Introduction to Electricity and Magnetism](#) 4 semester hours
- University Core 4 semester hours

Total: 16 semester hours

Spring Semester

- [MATH 246 Differential Equations and Linear Algebra](#) 4 semester hours
- [MECH 211 Computer Aided Design](#) 2 semester hours
- [MECH 212 Mechanics of Materials](#) 3 semester hours
- [MECH 213 Dynamics](#) 3 semester hours
- [MECH 214 Materials Science](#) 3 semester hours
- University Core 4 semester hours

Total: 19 semester hours

Junior Year

Fall Semester

- [MATH 356 Methods of Applied Mathematics](#) 4 semester hours
- [MECH 223 Thermodynamics](#) 3 semester hours
- [MECH 303 Solid Mechanics and Materials Laboratory](#) 2 semester hours
- [MECH 312 Vibrations](#) 3 semester hours
- [MECH 322 Fluid Mechanics](#) 3 semester hours

Total: 15 semester hours

Spring Semester

- [MECH 302 Thermal Science and Energy Lab](#) 2 semester hours
- [MECH 310 Machine Design](#) 3 semester hours
- [MECH 321 Energy Systems](#) 3 semester hours
- [MECH 323 Heat Transfer](#) 3 semester hours
- University Core 4 semester hours

Total: 15 semester hours

Senior Year

Fall Semester

- [MECH 401 Design Capstone Project I](#) 3 semester hours
- [MECH 410 Design and Manufacturing Laboratory](#) 2 semester hours
- [MECH 412 Control Systems](#) 3 semester hours
- MECH 5xx Elective 3 semester hours
- MECH 5xx Elective 3 semester hours
- University Core 4 semester hours

Total: 18 semester hours

Spring Semester

- [CIVL 395 Engineering Economics and Decision Theory](#) 3 semester hours
- [MECH 402 Design Capstone Project II](#) 3 semester hours
- MECH 5xx Elective 3 semester hours
- MECH 5xx Elective 3 semester hours
- University Core 4 semester hours

Total: 16 semester hours

Total Semester Hours: 133
