Erik Jonsson School of Engineering and Computer Science

Department of Mechanical Engineering

Overview

The objective of the Bachelor of Science degree program in Mechanical Engineering is to produce Mechanical Engineering graduates who will be capable of undertaking challenging projects that require knowledge of the fundamentals and design of mechanical and thermal systems. The program seeks to build Mechanical Engineers to meet the needs of analysis, design, and development in industry, as well as to educate them to be innovators and policy makers. The BS degree program will provide the necessary training and education for future engineers who will effectively identify new problems and develop innovative solutions, including new manufacturing and fabrication technologies.

Mechanical Engineering (BS)

Program Educational Objectives for Mechanical Engineering

One broad goal for the Erik Jonsson School is to provide an excellent education for our students. Within a few years after graduation, graduates of the Mechanical Engineering Program should:

- Be on a successful career path as competent professionals in their chosen field or by pursuing advanced study.
- Serve their professional roles in a responsible and ethical manner to meet the needs of engineering and society.
- Be effective contributors or leaders in professional settings, including contributions to multidisciplinary teams.
- Actively pursue life-long learning through advanced education, self-study, professional development, etc.

High School Preparation

Engineering education requires a strong high school preparation. Pre-engineering students should have high school preparation of at least one-half year in trigonometry and at least one year in elementary algebra, intermediate and advanced algebra, geometry, pre-calculus, chemistry, and physics, thus developing their competencies to the highest possible levels and preparing to move immediately into demanding college courses in calculus, calculus-based physics, and chemistry for science majors. It is also essential that pre-engineering students have the competence of reading comprehension, and to write logically, clearly and correctly.
ABET Accreditation

The BS program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Lower-Division Study

All lower-division students in Mechanical Engineering concentrate on mathematics, science, and introductory engineering courses, building competence in these cornerstone areas for future application in upper-division engineering courses. The following requirements apply both to students seeking to transfer to UT Dallas from other institutions as well as to those currently enrolled at UT Dallas, whether in another school or in the Erik Jonsson School of Engineering and Computer Science.

Academic Progress in Mechanical Engineering

In order to make satisfactory academic progress as a Mechanical Engineering major, a student must meet all University requirements for academic progress, and must earn a grade of C- or better in each of the "major requirements" courses. No "Major Requirements" course may be taken until the student has obtained a grade of C- or better in each of the prerequisites. If a higher grade requirement is stated for a specific class, the higher requirement applies.

Bachelor of Science in Mechanical Engineering

Degree Requirements (127 semester credit hours)\(^1\)

View an Example of Degree Requirements by Semester

Faculty

**Professors:** Yaoyu Li, Hongbing Lu, Dong Qian, Mario A. Rotea, Seung M. You

**Associate Professors:** William Anderson, D. Todd Griffith, Fatemeh Hassani, Golden Kumar, Stefano Leonard, Arif Malik, Majid Min, Yonas Tadesse, Walter E. Voit

**Clinical Associate Professors:** Dani Fadda, Robert Hart, Wooram Park

**Assistant Professors:** Rodrigo Bernal Montoya, Xianming Dai, Nicholas Fey, Robert D. Gregg, Giacomo (Valerio) Iungo, Justin Koeln, Ann Majewicz Fey, Zhenpeng Qin, Justin Ruths, Ill Ryu, Tyler Summers, Jie Zhang

**Senior Lecturers:** Hui Ouyang, Oziel Rios, P.L. Stephan Thamban

**UT Dallas Affiliated Faculty:** Andrew J. Blanchard, Yves J. Chabal, Kyeongjae (KJ) Cho, Babak Fahimi, Matthew J. Goeckner, Wenchuang (Walter) Hu, Jiyoung Kim, Moon J. Kim, Jeong-Bong Lee, S.O. Reza Moheimani, Mark W. Spong, Mathukumalli Vidyasar, Robert M. Wallace, Steve Yurkovich

I. Core Curriculum Requirements: 42 semester credit hours\(^2\)
Communication: 6 semester credit hours

RHET 1302 Rhetoric
ECS 3390 Professional and Technical Communication

Mathematics: 3 semester credit hours

MATH 2417 Calculus I

Life and Physical Sciences: 6 semester credit hours

PHYS 2325 Mechanics
PHYS 2326 Electromagnetism and Waves

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from Language, Philosophy and Culture core courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from Creative Arts core courses (see advisor)

American History: 6 semester credit hours

Select any 6 semester credit hours from American History core courses (see advisor)

Government / Political Science: 6 semester credit hours

GOVT 2305 American National Government
GOVT 2306 State and Local Government

Social and Behavioral Sciences: 3 semester credit hours

ECS 2361 Social Issues and Ethics in Science and Technology

Component Area Option: 6 semester credit hours

MATH 2417 Calculus I
MATH 2419 Calculus II
PHYS 2125 Physics Laboratory

II. Major Requirements: 79 semester credit hours

Major Preparatory Courses: 29 semester credit hours beyond Core Curriculum
CHEM 1111 General Chemistry Laboratory I
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1311</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CS 1325</td>
<td>Introduction to Programming</td>
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<tr>
<td>ECS 1100</td>
<td>Introduction to Engineering and Computer Science</td>
</tr>
<tr>
<td>MATH 2417</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MATH 2419</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MATH 2420</td>
<td>Differential Equations with Applications</td>
</tr>
<tr>
<td>MECH 1100</td>
<td>Introduction to Mechanical Engineering I</td>
</tr>
<tr>
<td>MECH 1208</td>
<td>Introduction to Mechanical Engineering II</td>
</tr>
<tr>
<td>MECH 2120</td>
<td>Mechanics of Materials Laboratory</td>
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<tr>
<td>ENGR 2300</td>
<td>Linear Algebra for Engineers</td>
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<tr>
<td>MECH 2310</td>
<td>Statics</td>
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<tr>
<td>MECH 2320</td>
<td>Mechanics of Materials</td>
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<tr>
<td>MECH 2330</td>
<td>Dynamics</td>
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<tr>
<td>PHYS 2125</td>
<td>Physics Laboratory I</td>
</tr>
<tr>
<td>PHYS 2126</td>
<td>Physics Laboratory II</td>
</tr>
<tr>
<td>PHYS 2325</td>
<td>Mechanics II</td>
</tr>
<tr>
<td>PHYS 2326</td>
<td>Electromagnetism and Waves</td>
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</table>

**Major Core Courses: 38 semester credit hours beyond Core Curriculum**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ECS 2361</td>
<td>Social Issues and Ethics in Science and Technology</td>
</tr>
<tr>
<td>ECS 3390</td>
<td>Professional and Technical Communication</td>
</tr>
<tr>
<td>MECH 3105</td>
<td>Computer Aided Design Laboratory</td>
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<tr>
<td>MECH 3115</td>
<td>Fluid Mechanics Laboratory</td>
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<tr>
<td>MECH 3120</td>
<td>Heat Transfer Laboratory</td>
</tr>
<tr>
<td>MECH 3150</td>
<td>Kinematics and Dynamics Laboratory</td>
</tr>
<tr>
<td>ENGR 3300</td>
<td>Advanced Engineering Mathematics</td>
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<tr>
<td>MECH 3305</td>
<td>Computer Aided Design</td>
</tr>
<tr>
<td>MECH 3310</td>
<td>Thermodynamics</td>
</tr>
<tr>
<td>MECH 3315</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>MECH 3320</td>
<td>Heat Transfer</td>
</tr>
<tr>
<td>ENGR 3341</td>
<td>Probability Theory and Statistics</td>
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Prescribed Electives: 12 semester credit hours

Students pursuing the general program take 12 semester credit hours from the list below:

- **MECH 2340** Circuits and Applied Electronics
- **MECH 3340** System Dynamics Modeling and Analysis
- **MECH 3360** Introduction to Materials Science
- **MECH 3370** Applied Thermodynamics
- **MECH 3380** Introduction to Computational Design and Analysis
- **MECH 3V95** Topics in Mechanical Engineering
- **MECH 4301** Intermediate Mechanics of Materials
- **MECH 4320** Applications of Computational Tools in Thermal Fluid Science
- **MECH 4330** Intermediate Fluid Mechanics
- **MECH 4340** Mechanical Vibrations
- **MECH 4342** Introduction to Robotics
- **MECH 4360** Introduction to Nanostructured Materials
- **MECH 4370** Introduction to MEMS
- **MECH 4380** HVAC Systems
- **MECH 4V95** Topics in Mechanical Engineering

III. Elective Requirements: 6 semester credit hours

Free Electives: 6 semester credit hours

Both lower- and upper-division courses may count as free electives but students must complete at least 51 semester credit hours of upper-division courses to qualify for graduation.

Degree programs in the Erik Jonsson School of Engineering and Computer Science are governed by various accreditation boards that place restrictions on classes used to meet the curricular requirements of degrees they certify. For this reason, not all classes offered by the University can be used to meet elective requirements. Please check with your academic advisor before enrolling in
classes you hope to use as free electives.

Fast Track Baccalaureate/Master’s Degrees

In response to the need for advanced education in Mechanical Engineering, a Fast Track program is available to well-qualified UT Dallas undergraduate students. Qualified seniors may take up to 15 graduate semester credit hours that may be used to complete the baccalaureate degree and also to satisfy the requirements for the master’s degree. This is accomplished by (1) taking courses (typically electives) during one or more summer semesters, and (2) beginning graduate coursework during the senior year. Details are available from the Associate Dean for Undergraduate Education.

Honors Program

The Department of Mechanical Engineering offers upper-division Honors for outstanding students in the BS Mechanical Engineering degree program. This program offers special sections of designated classes and other activities designed to enhance the educational experience of exceptional students. Admission to the Honors programs requires a 3.500 or better GPA (grade point average) in at least 30 semester credit hours of coursework. Graduation with Honors requires a 3.500 or better GPA and completion of at least 6 honors classes. These honors classes must include either Senior Honors in Mechanical Engineering (MECH 4399) or Undergraduate Research in Mechanical Engineering (MECH 4V98) and a Senior Honors Thesis must be completed within one of those two classes. While the topics may be related, the Senior Thesis does not replace the need for the student to complete a regular Senior Design Project. The other 5 honors classes can come from a mixture of Graduate level (up to a count of 4) classes and special honor sections of regular undergraduate MECH classes (up to a count of 2).

Departmental Honors with Distinction may be awarded to students whose Senior Honors Thesis is judged by a faculty committee to be of exemplary quality. Only students graduating with Departmental Honors are eligible. Thesis/projects must be submitted by the deadline that applies to MS Theses in the graduating semester to allow for proper evaluation. Students interested in Honors with Distinction are encouraged to start working on their thesis/project a year prior to graduation.

Minors

The Department of Mechanical Engineering does not offer minors at this time.

1. Incoming freshmen must enroll and complete requirements of UNIV 1010 and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.

2. Curriculum Requirements can be fulfilled by other approved courses. The courses listed are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

3. Semester credit hours fulfill the communication component of the Core Curriculum.

4. Three semester credit hours of Calculus are counted under Mathematics Core, and five semester credit hours of Calculus are counted as Component Area Option Core.
5. Six semester credit hours of Physics are counted under Science core, and one semester credit hour of Physics (PHYS 2125) is counted as Component Area Option Core.

6. Semester credit hours contribute to the Social and Behavioral Sciences component of the Core Curriculum.

7. Students must pass each of the "Major Requirements" courses listed in this degree plan and each of their prerequisites, with a grade of C- or better.

8. Transfer students with sufficient background may petition to substitute upper-division semester credit hours in the major for this class.