# Erik Jonsson School of Engineering and Computer Science

## Department of Mechanical Engineering

### Faculty

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**Affiliated Faculty:** Andrew J. Blanchard, Gerald O. Burnham, Cyrus D. Cantrell III, Yves J. Chabal, Kyeongjae Cho, Bruce E. Gnade, Matthew J. Goeckner, Walter Hu, Louis R. Hunt (Emeritus), Jiyour Moon J. Kim, Jeong-Bong Lee, Mark. W. Spong, Mathukumalli Vidyasagar, Robert M. Wallace, Stev Yurkovich

### Objectives

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 requ knowledge of the fundamentals of the design of mechanical and thermal systems. The program seek educate Mechanical Engineers to meet the analysis, design, and development needs of local and sta industry as well as to educate them to be innovators and policy makers. The B.S. degree program w provide the necessary training and education for future engineers who can effectively identify new pr and develop innovative solutions, including new manufacturing and fabrication technologies.

### Facilities

The Engineering and Computer Science Building and the new Natural Science and Engineering Res Laboratory provide extensive facilities for teaching and research. These include computer cluster, wi tunnels, heat exchanger, hydraulics, material test systems, split Hopkinson bars, ultra-high speed ca nanoindenter, AFM, DMA, XPS, FTIR, NMR, TGA, DSC, XRD, µ-Raman, Fluorescence Spectrometer, FIB/SEM, and HRTEM, motion and thermal control systems, 3-D printing. A Class 10 microelectronics clean room facility, including e-beam lithography, sputter deposition, PECVD, LPCV ash and evaporation, is available for student projects and research.

# Mechanical Engineering (B.S.)

## Program Educational Objectives for Mechanical Engineering

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

- Have a successful, long-lived engineering-based career path.
- Meet the needs of industry.
- Contribute to, and lead, engineering-based teams.
- Actively pursue life-long learning.

## High School Preparation

Engineering education requires a strong high school preparation. Pre-engineering students should h high school preparation of at least one-half year in trigonometry and at least one year each in eleme 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 essential that pre-engineering students have the competence of reading comprehension, and to write logically, clearly and correctly.

## Lower-Division Study

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

Although the Mechanical Engineering curricula that follow have been designed to meet these criteria students have the responsibility, in consultation with an advisor, to monitor their own choice of cours carefully to be certain that all academic requirements for graduation are being satisfied. Students are encouraged to take courses in such subjects as industrial management, finance, personnel administ and engineering economy.

# Academic Progress in Mechanical Engineering

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

# Bachelor of Science in Mechanical Engineering

*Degree Requirements (127 semester credit hours)*

## I. Core Curriculum Requirements[1]: 42 semester credit hours

**Communication (6 semester credit hours)**

- 3 semester credit hours Communication (RHET 1302)
- 3 semester credit hours Professional and Technical Communication (ECS 3390)

**Social and Behavioral Sciences (15 semester credit hours)**

- 6 semester credit hours Government (GOVT 2301 and GOVT 2302)
- 6 semester credit hours American History
- 3 semester credit hours Social and Behavioral Science elective (ECS 3361)

**Humanities and Fine Arts (6 semester credit hours)**

- 3 semester credit hours Fine Arts (ARTS 1301)
- 3 semester credit hours Humanities (HUMA 1301)

**Mathematics and Quantitative Reasoning (6 semester credit hours)**

- 6 semester credit hours Calculus (MATH 2417 and MATH 2419)[2]

**Science (9 semester credit hours)**

- 8 semester credit hours Physics (PHYS 2325, PHYS 2125, PHYS 2326 and PHYS 2126
- 4 semester credit hours Chemistry (CHEM 1311 and CHEM 1111)[3]

## II. Major Requirements: 77 semester credit hours[4]

**Major Preparatory Courses (26 semester credit hours beyond Core Curriculum Requirements**

CHEM 1111 General Chemistry Laboratory I[3, 4]

CHEM 1311 General Chemistry I[3, 4]

CS 1325 Introduction to Programming

or CS 1337 Computer Science I

ECS 1200 Introduction to Engineering and Computer Science[5]

MATH 2417 Calculus I[2]

MATH 2419 Calculus II[2]

MATH 2420 Differential Equations with Applications

MECH 1208 Introduction to Mechanical Engineering[5]

MECH 2120 Mechanical Measurements Laboratory

ENGR 2300 Linear Algebra for Engineers

MECH 2310 Statics and Introductory Dynamics

MECH 2320 Strength of Materials

PHYS 2125 Physics Laboratory I

PHYS 2126 Physics Laboratory II

PHYS 2325 Mechanics

PHYS 2326 Electromagnetism and Waves

Major Core Courses (31 semester credit hours beyond Core Curriculum Requirements)

ECS 3361 Social Issues and Ethics in Computer Science and Engineering[6]

ECS 3390 Professional and Technical Communication[7]

MECH 3105 Computer Aided Design Laboratory

MECH 3115 Fluid Mechanics Laboratory

MECH 3150 Mechanical Engineering Laboratory

ENGR 3300 Advanced Engineering Mathematics

MECH 3305 Computer Aided Design

MECH 3310 Thermodynamics

MECH 3315 Introduction to Fluid Mechanics

ENGR 3341 Probability Theory and Statistics

MECH 3350 Design of Mechanical Components

MECH 4110 Systems Laboratory

MECH 4310 Systems and Controls

MECH 4381 Senior Design Project I

MECH 4382 Senior Design Project II

**Prescribed Electives (20 semester credit hours)**

Students pursuing the general program take 20 semester credit hours from the list below:

MECH 3120 Heat Transfer Laboratory

MECH 3151 Mechanical Systems Laboratory

MECH 3301 Mechanics of Materials

MECH 3302 Intermediate Dynamics

MECH 3320 Heat Transfer

MECH 3351 Design of Mechanical Systems

MECH 4330 Intermediate Fluid Mechanics

MECH 4340 Mechanical Vibrations

MECH 4350 Applied Heat Transfer

MECH 4360 Introduction to Nanostructured Materials

MECH 4370 Introduction to MEMS

### III. Elective Requirements: 8 semester credit hours

**Advanced Electives (6 semester credit hours)**

All students are required to take at least six semester credit hours of advanced electives outs
major field of study. These must be either upper-division classes or lower-division classes tha
prerequisites. Four of these semester credit hours may be satisfied with MATH 2420 counted
Major Preparatory courses.

**Free Electives (6 semester credit hours)**

Both lower- and upper-division courses may count as free electives but students must comple
least 51 semester credit hours of upper-division credit to qualify for graduation. Degree progr
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 requiremen
degrees they certify. For this reason, not all classes offered by the University can be used to
elective requirements. Please check with your academic advisor before enrolling in classes y
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 exceptionally well-qualified UT Dallas undergraduate students who meet the requiremen

admission to the graduate school. The Fast Track program is designed to accelerate a student's edu so that both a B.S. and an M.S. degree can be earned in five years of full-time study. This is accomp by (1) taking courses (typically electives) during one or more summer semesters, and (2) beginning graduate course work during the senior year. Details of the requirements for admission to this progra available from the Associate Dean for Undergraduate Education.

## Honors Program

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

Departmental Honors with Distinction may be awarded to students whose Senior Honors Thesis is ju by a faculty committee to be of exemplary quality. Only students graduating with Departmental Hono eligible. Thesis/projects must be submitted by the deadline that applies to M.S. Theses in the gradua semester to allow for proper evaluation. Students interested in Honors with Distinction are encourag 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. Curriculum Requirements can be fulfilled by other approved courses from accredited institutions of higher education. The courses listed in parentheses are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.
2. Six semester credit hours of Calculus are counted under Mathematics Core, and two semester credit hours of Calculus are counted as Major Preparatory Courses.
3. One semester credit hour of Chemistry is counted under Science core, and three semester credit hours are counted as Major Preparatory Courses.
4. Students must pass each of the EE, CS, Math and Science courses listed in this degree plan and each of thei prerequisites, with a grade of C- or better.
5. Transfer students with sufficient background may petition to substitute upper level semester credit hours in the major for this class.
6. Hours contribute to the Social and Behavioral Sciences component of the Core Curriculum.
7. Hours fulfill the communication component of the Core Curriculum.

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