

# Engineering Studies (E S)

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## E S 301 Engineering Design and Problem Solving 3 Hours

Intended for non-Cockrell School of Engineering students. Introduction to the scope of engineering, foundations of engineering science, and engineering design.

## E S 102 Spatial Visualization 1 Hour

Instruction in the learned ability to mentally manipulate two- and three-dimensional structures.

## E S 119, 219, 319 Topics in Engineering 1-3 Hours

### E S 119S, 219S, 319S, 419S, 519S, 619S, 719S, 819S, 919S Topics in Engineering Studies 1-9 Hours

This course is used to record credit the student earns while enrolled at another institution in a program administered by the University's Study Abroad Office. Credit is recorded as assigned by the study abroad adviser in the School of Engineering. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. Transfer credit is awarded for work in an affiliated studies program.

## E S 321G GLUE Undergraduate Research 3 Hours

Research experience and seminar for undergraduate engineers. Seminar involves workshops, discussion, and oral reports. Semester long research project required.

## E S 122, 222, 322 Topics in Professional Development 1-3 Hours

Small-group seminar involving reading, discussion, and oral reports.

## E S 122.1, 222.1, 322.1 EOE Career Development Seminar 1-3 Hours

Introduction to skills and professional practices in engineering.

## E S 122.2, 222.2, 322.2 EOE Leadership Development Seminar 1-3 Hours

Introduction to professional practices that focus on self-awareness and in-depth discussion of leadership styles and skill development.

## E S 122.3, 222.3, 322.3 WEP Leadership Seminar 1-3 Hours

Practical applications to assess leadership and communication styles.

## E S 225C Humanitarian Product Design 2 Hours

Design a product that addresses the needs of people in marginalized communities such as those living in refugee camps or in other severely resource-limited environments. Examine and apply design tools, project management methods, and other principles of product development. Present project to an advisory board.

## E S 225D Humanitarian Product Prototyping 2 Hours

Build and test prototype. Examine and apply design tools, project management methods, and other principles of product development. Present project to an advisory board.

## E S 225K Cooperative Engineering 2 Hours

Covers the work period of engineering students in the Cooperative Engineering Program.

## E S 225L Cooperative Engineering 2 Hours

Covers the work period of engineering students in the Cooperative Engineering Program.

## E S 125N Cooperative Engineering 1 Hour

Covers the work period of engineering students in the Cooperative Engineering Program.

## E S 129S, 229S, 329S, 429S, 529S, 629S, 729S, 829S, 929S Topics in Engineering Studies 1-9 Hours

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## E S 333T Engineering Communication 3 Hours

Explore technical communication skills for engineers, especially researching and writing technical documents for many kinds of readers, managing and documenting sources of information, using and explaining graphics, delivering oral presentations, working collaboratively, and eliciting information from experts and stakeholders.

## E S 358C Industrial Design I 3 Hours

Explore methods and techniques for industrial design.

## E S 160, 260, 360 Service Learning for Engineers 1-3 Hours

Supervised participation in a service-learning project that helps meet a community need.

## E S 360M Experiments in Materials Science and Engineering 3 Hours

Hands-on lab-based course designed to teach practical techniques in the synthesis and characterization of materials and their properties, and to use experiments to explore fundamental and potentially abstract materials concepts.

## E S 369N Sustainability Issues in Energy 3 Hours

Introduction to sustainable energy in the context of sustainable development goals and the technologies that can help achieve them. Discuss carbon capture and sequestration; geothermal energy; hydrogen storage and distribution; solar, wind, and biomass power generation; and batteries and distribution networks.

## E S 370H Engineering Entrepreneurship 3 Hours

Principles of engineering entrepreneurship, including legal aspects and the ethics of practice.

## E S 370L Nanofabrication and Nanomaterials 3 Hours

Covers the basic tools and materials involved in the fabrication processes needed to create nano-scale structures and functional nanomaterials.

## E S 370M Nanodevices 3 Hours

Covers the basic theory behind nano-scale devices used in the electronics, display, and energy industries.

## E S 370N Nanotechnology Innovation 3 Hours

Provides a framework for innovation with a specific focus on applications of nanotechnology.

## E S 370O Nanometrology and Big Data 3 Hours

Explore key concepts of metrology and data analytics in nanomanufacturing systems. Discuss the key steps in big data analytics which enable transformation of metrology and sensing data into optimal decisions. Examine key enabling methodologies and examples for statistical and dynamic modeling of big data in nanomanufacturing systems, as well as how those models are used for system-wide optimal decisions in terms of process control and system operations.

## E S 177, 277, 377 Topics in Engineering 1-3 Hours

## E S 177.1, 277.1, 377.1 Longhorn Startup Seminar 1-3 Hours

Overview of entrepreneurship using real-world examples.

## E S 177.2, 277.2, 377.2 21st Century Grand Challenges 1-3 Hours

Explore the five components of the NAE Grand Challenges Scholars Program: grand challenges research and design, interdisciplinary curriculum, entrepreneurship, global perspectives, and service learning.

E S 377E Interdisciplinary Entrepreneurship: Elective 3 Hours

Projects must differ significantly from those developed for Electrical Engineering 364D and 364E. Focus on skill development and mentoring in start-up formation, technology development, market validation, marketing, sales, operations, human resources, program management, and finance. Includes discussion of intellectual property, social issues in design, as well as ethical and safety considerations. Emphasis on written and oral presentation of start-up activities.

E S 277K Project Development with Underserved Communities 2 Hours

Focus on skills to initiate, evaluate, and plan an international engineering service project with an underserved community.

E S 277L Project Design with Underserved Communities 2 Hours

Focuses on design of basic infrastructure systems in developing countries.

E S 177M Project Implementation with Underserved Communities 1 Hour

Taught on location in international locations such as India, Tanzania, and Guatemala. Entails implementation of project, collecting information for future projects, and checking on previously completed PUC projects if applicable.

E S 279K Undergraduate Research Experience 2 Hours

Directed study or research in a selected area of engineering.

E S 279L Women in Engineering Leadership Seminar 2 Hours

Lectures, discussions, and exercises related to various leadership issues.

E S 079M Undergraduate Research Experience 0 Hours

E S 380L Nanofabrication and Nanomaterials 3 Hours

Provides an understanding of the basic tools and materials involved in the fabrication processes needed to create nano-scale structures and functional nanomaterials.

E S 380M Nanodevices 3 Hours

Provides an understanding of the basic theory behind important nano-scale devices used in the electronics, display, and energy industries.

E S 380N Nanotechnology Innovation 3 Hours

Provides a framework for innovation with a specific focus on applications of nanotechnology.

E S 380O Nanometrology and Big Data 3 Hours

Explore key concepts of metrology and data analytics in nanomanufacturing systems. Discuss the key steps in big data analytics which enable transformation of metrology and sensing data into optimal decisions. Examine key enabling methodologies and examples for statistical and dynamic modeling of big data in nanomanufacturing systems, as well as how those models are used for system-wide optimal decisions in terms of process control and system operations.

E S 197, 297, 397 Special Subjects in Engineering 1-3 Hours