E S - Engineering Studies

Engineering Studies: E S

Lower-Division Courses

E S 301. Engineering Design and Problem Solving.

Intended for non-Cockrell School of Engineering students. Introduction to the scope of engineering, foundations of engineering science, and engineering design. Three lecture hours a week for one semester.

E S 102. Spatial Visualization.

Restricted to engineering majors. Instruction in the learned ability to mentally manipulate two- and three-dimensional structures. The equivalent of one lecture hour a week for one semester. Engineering Studies 102 and General Engineering 119, 219, 319 (Topic: Spatial Visualization) may not both be counted. Offered on the letter-grade basis only.

E S 119, 219, 319. Topics in Engineering.

Restricted to engineering students. For each semester hour of credit earned, one lecture hour a week for one semester. Engineering Studies 119, 219, 319 and General Engineering 119, 219, 319 may not both be counted unless the topics vary. May be repeated for credit when the topics vary. Prerequisite: Varies with the topic.

Upper-Division Courses

E S 321G. GLUE Undergraduate Research.

Restricted to engineering majors. Research experience and seminar for undergraduate engineers. Seminar involves workshops, discussion, and oral reports. Semester long research project required. One and one-half lecture hours and six laboratory hours a week for one semester, with additional laboratory hours to be arranged. Only one of the following may be counted unless topics vary: Engineering Studies 122, 222, 322, 321G (or 322G), General Engineering 222. Offered on the letter-grade basis only. Prerequisite: Consent of instructor.

E S 122, 222, 322. Topics in Professional Development.

Restricted to engineering students. Small-group seminar involving reading, discussion, and oral reports. For each semester hour of credit earned, one lecture hour a week for one semester. Only one of the following may be counted unless topics vary: Engineering Studies 122, 222, 322, 321G (or 322G), General Engineering 222. May be repeated for credit when the topics vary. Offered on the pass/fail basis only.

Topic 1: EOE Career Development Seminar. Introduction to skills and professional practices in engineering. Engineering Studies 122, 222, 322 (Topic: EOE Career Development Seminar) and 122, 222, 322 (Topic 1) may not both be counted. Offered on the pass/fail basis only.

Topic 2: EOE Leadership Development Seminar. Introduction to professional practices that focus on self-awareness and in-depth discussion of leadership styles and skill development. Engineering Studies 122, 222, 322 (Topic: EOE Leadership Development Seminar) and 122, 222, 322 (Topic 2) may not both be counted. Offered on the pass/fail basis only.

Topic 3: WEP Leadership Seminar. Practical applications to assess leadership and communication styles. Engineering Studies 122, 222, 322 (Topic: WEP Leadership Seminar) and 122, 222, 322 (Topic 3) may not both be counted. Offered on the pass/fail basis only.

E S 225C. Humanitarian Product Design.

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. Two lecture hours and two laboratory hours a week for one semester. Engineering Studies 225C and 277 (Topic: Humanitarian Product Design) may not both be counted. Offered on the letter-grade basis only. Prerequisite: Consent of the instructor.

E S 225D. Humanitarian Product Prototyping.

Build and test prototype. Examine and apply design tools, project management methods, and other principles of product development. Present project to an advisory board. Two lecture hours and two laboratory hours a week for one semester. Engineering Studies 225D and 277 (Topic: Humanitarian Prodct Prototypng) may not both be counted. Offered on the letter-grade basis only. Prerequisite: Engineering Studies 225C with a grade of at least C- and consent of instructor.

E S 225K. Cooperative Engineering.

Restricted to Cockrell School of Engineering students. Covers the work period of engineering students in the Cooperative Engineering Program. Forty laboratory hours a week for one semester. Prerequisite: Application to become a member of the Cooperative Engineering Program, approval of the dean, and appointment for a full-time cooperative work tour.

E S 225L. Cooperative Engineering.

Restricted to Cockrell School of Engineering students. Covers the work period of engineering students in the Cooperative Engineering Program. Forty laboratory hours a week for one semester. Prerequisite: Engineering Studies 225K and appointment for a full-time cooperative work tour.

E S 125N. Cooperative Engineering.

This course covers the work period of environmental engineering students in the Cooperative Engineering Program. Forty laboratory hours a week for one semester. May be repeated for credit. Prerequisite: Application to become a member of the Cooperative Engineering Program, approval of the dean, and appointment for a full-time cooperative work tour.

E S 333T. Engineering Communication.

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. Two lecture hours and one-and-one-half laboratory hours a week for one semester. Only one of the following may be counted: Aerospace Engineering 333T, Biomedical Engineering 333T, Communication 333T, Civil Engineering 333T, Chemical Engineering 333T, Electrical and Computer Engineering 333T, Electrical Engineering 333T, Engineering Studies 333T, Mechanical Engineering 333T, Petroleum and Geosystems Engineering 333T. Prerequisite: Rhetoric and Writing 306 with a grade of at least C-

E S 358C. Industrial Design I.

Same as Design 358C. Restricted to design majors. Explore methods and techniques for industrial design. Six studio hours a week for one semester. Design 358C and Engineering Studies 358C may not both be counted. Offered on the letter-grade basis only. Prerequisite: Design 314 or Engineering Studies 319.

E S 160, 260, 360. Service Learning for Engineers.

Supervised participation in a service-learning project that helps meet a community need. May be repeated for credit when the projects vary. With approval of the student's major department, may be counted toward an engineering degree. Prerequisite: Consent of instructor.

E S 360M. Experiments in Materials Science and Engineering.

Same as Materials Science and Engineering 360M. 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. Four-and-one-half laboratory hours a week for one semester. Only one of the following may be counted: Engineering Studies 360M, 377 (Topic: Experiments in Materials Science and Engineering), Materials Science and Engineering 360M. Prerequisite: Chemistry 301, Math 408C, 408D and 427J, and Physics 303K and 303L. For students in majors that offer an introductory materials science and engineering course, it is advised to take it prior to taking this course.

E S 369N. Sustainability Issues in Energy.

Restricted to engineering, chemistry, or geological sciences majors. 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. Three lecture hours a week for one semester.

E S 370H. Engineering Entrepreneurship.

Principles of engineering entrepreneurship, including legal aspects and the ethics of practice. Three lecture hours a week for one semester. Engineering Studies 370H and General Engineering 370H may not both be counted. Prerequisite: Admission to an appropriate major sequence in engineering and to the Engineering Honors Program.

E S 370L. Nanofabrication and Nanomaterials.

Covers the basic tools and materials involved in the fabrication processes needed to create nano-scale structures and functional nanomaterials. Three lecture hours a week for one semester. Prerequisite: Upper-division standing and consent of instructor.

E S 370M. Nanodevices.

Covers the basic theory behind nano-scale devices used in the electronics, display, and energy industries. Three lecture hours a week for one semester. Prerequisite: Upper-division standing, Engineering Studies 370L, and consent of instructor.

E S 370N. Nanotechnology Innovation.

Provides a framework for innovation with a specific focus on applications of nanotechnology. Three lecture hours a week for one semester. Prerequisite: Upper-division standing, Engineering Studies 370L and 370M, and consent of instructor.

E S 370O. Nanometrology and Big Data.

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. Three lecture hours a week for one semester. Prerequisite: Engineering Studies 370M, upper-division standing, and consent of instructor.

E S 177, 277, 377. Topics in Engineering.

For each semester hour of credit earned, one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Varies with the topic.

Topic 1: Longhorn Startup Seminar. Overview of entrepreneurship using real-world examples. Only one of the following may be counted: Biomedical Engineering 177T, 277T, 377T (Topic: Longhorn Startup Seminar), Computer Science 178, 378 (Topic: Longhorn Startup Seminar), Engineering Studies 177, 277, 377 (Topic: Longhorn Startup Seminar), 177, 277, 377 (Topic 1), Fine Arts 160, 260, 360 (Topic: Longhorn Startup Seminar), 170, 270, 370, Management 137, 237, 337 (Topic: Longhorn Startup Seminar), Communication 125, 225, 325 (Topic: Longhorn Startup Seminar).

Topic 2: 21st Century Grand Challenges. Restricted to Cockrell School of Engineering students. Explore the five components of the NAE Grand Challenges Scholars Program: grand challenges research and design, interdisciplinary curriculum, entrepreneurship, global perspectives, and service learning. Engineering Studies 377 (Topic: Grand Challenges-21st Century) and 177, 277, 377 (Topic 2) may not both be counted.

E S 377E. Interdisciplinary Entrepreneurship: Elective.

Restricted to engineering students. 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. The equivalent of three lecture hours a week for one semester. Only one of the following may be counted: Computer Science 374L, 378 (Topic: Longhorn Startup), Electrical and Computer Engineering 364E, Electrical Engineering 377E, Engineering Studies 377E, Management 337 (Topic 2), 372T (Topic 2). Prerequisite: Consent of instructor.

E S 277K. Project Development with Underserved Communities.

Restricted to engineering and social work majors. Focus on skills to initiate, evaluate, and plan an international engineering service project with an underserved community. Two lecture hours and two lab hours a week for one semester. Only one of the following may be counted: Engineering Studies 277K, Civil Engineering 277K (Topic: Project Development for Underserved Communities), Mechanical Engineering 279M (Topic: Project Development for Underserved Communities). Offered on the letter-grade basis only. Prerequisite: Consent of the instructor.

E S 277L. Project Design with Underserved Communities.

Restricted to students in the Projects for Underserved Communities program. Focuses on design of basic infrastructure systems in developing countries. Two lecture hours and two lab hours a week for one semester. Only one of the following may be counted: Engineering Studies 277L, Civil Engineering 277K (Topic: Project Design for Underserved Communities), Mechanical Engineering 279M (Topic: Project Design for Underserved Communities). Offered on the letter-grade basis only. Prerequisite: Consent of instructor.

E S 177M. Project Implementation with Underserved Communities.

Restricted to students in the Projects for Underserved Communities program. 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. The equivalent of one lecture hour a week for

one semester. Only one of the following may be counted: Engineering Studies 177M, 177 (Topic: Proj Impl Undersrvd Comms-Gua), 177 (Topic: Proj Implm Undersrvd Comms-Ind), 177 (Topic: Proj Implm Undersrvd Comms-Tan), 177 (Topic: Proj Implm Undersrvd Comms-Tha), Mechanical Engineering 179M (Topic: Project Imp Underserved Commun), 179M (Topic: PUC Implementation-Intl). Offered on the letter-grade basis only.

E S 279K. Undergraduate Research Experience.

Restricted to undergraduate students in the Graduates Linking with Undergraduates in Engineering (GLUE) program. Directed study or research in a selected area of engineering. One lecture hour and three laboratory hours a week for one semester. Engineering Studies 279K and General Engineering 279K may not both be counted. May be repeated for credit. Offered on the pass/fail basis only. Prerequisite: A major in engineering and a University grade point average of at least 3.00.

E S 279L. Women in Engineering Leadership Seminar.

Restricted to engineering students. Lectures, discussions, and exercises related to various leadership issues. Two lecture hours a week for one semester. Engineering Studies 279L and General Engineering 279L may not both be counted. Offered on the pass/fail basis only.

E S 079M. Undergraduate Research Experience.

Restricted to undergraduate students in the Equal Opportunity in Engineering Program. One lecture hour a week for one semester. Prerequisite: A major in engineering and a University grade point average of at least 3.00.

Graduate Courses

E S 380L. Nanofabrication and Nanomaterials.

Provides an understanding of the basic tools and materials involved in the fabrication processes needed to create nano-scale structures and functional nanomaterials. Three lecture hours a week for one semester. Engineering Studies 377 (Topic: Nanofabrication/Nanomatls-WB) and 380L may not both be counted. Prerequisite: Consent of graduate adviser and consent of instructor.

E S 380M. Nanodevices.

Provides an understanding of the basic theory behind important nano-scale devices used in the electronics, display, and energy industries. Three lecture hours a week for one semester. Prerequisite: Consent of graduate adviser and consent of instructor.

E S 380N. Nanotechnology Innovation.

Provides a framework for innovation with a specific focus on applications of nanotechnology. Three lecture hours a week for one semester. Prerequisite: Engineering Studies 380L and 380M. Consent of graduate adviser and consent of instructor.

E S 380O. Nanometrology and Big Data.

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. Three lecture hours a week for one semester. Prerequisite: Graduate standing, Engineering Studies 380M, consent of graduate advisor, and consent of instructor.

E S 197, 297, 397. Special Subjects in Engineering.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. With consent of instructor, may be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

Professional Courses