ENGR - ENGINEERING (ENGR)

ENGR 101 Energy: Resources, Utilization and Importance to Society
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Introductory course about current and potential energy sources, the link between energy and wealth, and the consequences of action or inaction concerning energy and the environment.

ENGR 111 Foundations of Engineering I
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Introduction to the engineering profession, ethics, and disciplines; development of skills in teamwork, problem solving and design; other topics depending on the major include emphasis on computer applications and programming, visualization and CAD tools, introduction to electrical circuits, semiconductor devices, digital logic, communications and their application in systems; Newton's laws, unit conversions, statistics, computers, Excel; basic graphics skills; visualization and orthographic drawings.
Prerequisites: MATH 150 or MATH 151, or concurrent enrollment; admission to the College of Engineering.

ENGR 112 Foundations of Engineering II
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Continuation of ENGR 111. Topics include, depending on the major, emphasis on computer applications and programming, visualization and solids modeling using CAD tools or other software; fundamentals of engineering science; advanced graphic skills.
Prerequisite: ENGR 111; MATH 151 or concurrent enrollment; admission to the College of Engineering.

ENGR 181 Engineering Honors Seminar I
Credit 1. 1 Lecture Hour.
Survey of interdisciplinary topics related to the professional practice of engineering; seminars with practicing professionals in industry and government. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Certificate in engineering honors membership; freshman or sophomore classification.

ENGR 250 Principles in Engineering Leadership
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamentals of engineering leadership and business; organizational dynamics; self-awareness.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 111 and ENGR 112, or equivalents.

ENGR 260 Engineering Creativity
Credits 2. 2 Lecture Hours.
Designed to provide opportunities to gain knowledge and skills in the areas of creativity, innovation and design thinking through interdisciplinary team design projects and development of rough prototypes.
Prerequisites: ENGR 111 and ENGR 112, or concurrent enrollment.

ENGR 270 Engineering Projects in Community Service
Credit 1. 1 Lecture Hour.
Project course using team approach to engage students in open-ended community service projects involving non-profit agencies; includes project management, understanding the complete design process, awareness of the customer in engineering design, and the ability to communicate effectively. May be taken six times for credit.
Prerequisites: ENGR 111 or approval of instructor; freshman or sophomore classification in an engineering major.

ENGR 281 Engineering Honors Seminar II
Credit 1. 1 Lecture Hour.
Introduction to research and development in both university and industry settings. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Certificate in engineering honors membership; ENGR 181.

ENGR 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Special problems in any area of engineering.
Prerequisites: Freshman or sophomore classification; approval of department head.

ENGR 289 Special Topics in...
Credits 0 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

ENGR 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in the college of engineering. May be repeated three times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ENGR 299 Mid-Curriculum Professional Development
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes from the National Society of Professional Engineers' Engineering Body of Knowledge; documentation and self-assessment of learning experience at mid-curriculum point.
Prerequisite: ITDE major.

ENGR 301 College of Engineering Study Abroad
Credits 0 to 18. 0 to 18 Other Hours.
For students in approved programs abroad. May be repeated for credit.
Prerequisites: Admission to approved program; approval of study abroad coordinator.

ENGR 302 Credits 0.

ENGR 333 Project Management for Engineers
Credits 3. 3 Lecture Hours.
Basic project management for engineering; project development and economic justification; estimating; scheduling; network methods; critical path analysis; earned value management; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers.
Prerequisite: Junior or senior classification in the College of Engineering or biological and agricultural engineering or approval of instructor.

ENGR 350 Engineering Leadership and Business Fundamentals
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamental leadership and business topics relevant to engineering and technical careers; business model development; business strategy; leadership theory; empathy.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 250; junior or senior classification or approval by instructor.
ENGR 351 The Role of Engineering and Business in Society
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Exploration of engineering and business contributions to society; political, cultural, societal and economic forces’ impact on engineering; using creativity and imagination to solve engineering and societal challenges.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 350; junior or senior classification or approval by instructor.

ENGR 360 Engineering Entrepreneurial Mindsets
Credits 3. 3 Lecture Hours.
Enterprising comprehension and competencies; introduction to entrepreneurial pathways as an engineering career; lean startup principles; business model canvas as applied to engineering design projects.
Prerequisites: ENGR 111 and ENGR 112.

ENGR 380 Seminar Series in Engineering Project Management
Credit 1. 1 Lecture Hour.
Presentations by practicing engineers and professionals addressing engineering project management process and practice; discussion forum to better understand the opportunities and challenges of engineering project management and the analytical tools and skills required to be successful. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: ENGR 333 or approval of instructor; junior or senior classification in the College of Engineering or biological and agricultural engineering (BAEN).

ENGR 381 Engineering Honors Seminar III
Credit 1. 1 Lecture Hour.
Exploration of research and development opportunities; university and industry research; research commercialization. To be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Certificate in engineering honors membership; ENGR 281.

ENGR 385 Problems for Co-Op Students
Credits 1 to 3. 1 to 3 Other Hours.
Special problems in engineering for cooperative education students. Problems related to student’s work assignment culminating in a research paper. Three hours may be used as technical elective, and one additional hour may be used as free elective. A total of 4 hours may be used toward graduation.
Prerequisite: Approval of department head.

ENGR 401 Interdisciplinary Design
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Instruction and practice in the design process applied to an interdisciplinary design project including establish the customer need; determine requirements in terms of function (what) and performance (how well); develop alternative design concepts; perform trade-off studies among performance, cost and schedule; embodiment and detail design; iterate the above steps; major interdisciplinary design project.
Prerequisites: Senior classification and approval of instructor.

ENGR 402 Interdisciplinary Design II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Product detail and design development process including case studies; may include project management, marketing considerations, manufacturing detailed design specifications; failure modes, applications of codes and standards, selection of design margins; product (component) development guidelines; intellectual property, product liability and ethical responsibility.
Prerequisites: ENGR 401; junior or senior classification.

ENGR 410 Global Engineering Design
Credits 0 to 3. 0 to 3 Lecture Hours.
Intercultural models and their application to engineering design in diverse, multinational and multidisciplinary settings; engineering design project working in international teams of students, faculty and industry experts; applying engineering skills to the project; includes the study and application of intercultural models, global enterprise fundamentals and remote collaboration technologies; required for the International Engineering Certificate.
Prerequisite: Junior or senior classification or approval of instructor.

ENGR 430 Fundamentals of Subsea Engineering
Credits 3. 3 Lecture Hours.
Orientation to subsea engineering fundamentals, including SURF (Subsea, Umbilicals/Controls, Risers, Flowlines) equipment and configurations; exposure to practical, industry focused problems; subsea equipment components; design considerations and design drivers; subsea production operations; integrity critical maintenance activities.
Prerequisite: Junior or senior classification; enrolled in the College of Engineering or approval of instructor.

ENGR 450 Exploring Your Engineering Leadership Qualities and Perspective
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Exploration of personal leadership qualities and perspective; case studies in leadership in engineering enterprises; business etiquette and personal marketing.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 351; junior or senior classification or approval by instructor.

ENGR 451 Engineering Leadership Capstone
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Intersection of engineering, business, citizenship and leadership.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 450; junior or senior classification or approval by instructor.

ENGR 461 Engineering Product Lean Launch
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Exercises in the creation of an engineering-centric business using lean startup principles; customer and market validation; value proposition creation; minimum viable product (MVP) development; customer value chain discovery; communication skill training; development of a business model canvas for a student-developed engineering product business idea.
Prerequisite: Junior or senior classification in the College of Engineering.

ENGR 462 Engineering Entrepreneurship Hour
Credit 1. 1 Lecture Hour.
Designed to engage with successful technology entrepreneurs from across the nation; learn about the characteristics of successful entrepreneurs and their strategies in launching and sustaining businesses on technology innovation; network with highly successful entrepreneurs and develop relations valuable to professional careers.
Prerequisites: Junior or senior classification or approval of instructor.

ENGR 470 Engineering Projects in Community Service
Credits 1 to 2. 1 to 2 Other Hours.
Project course using team approach to engage students in open-ended community service projects involving non-profit agencies; includes project management, understanding the complete design process, awareness of the customer in engineering design, and the ability to communicate effectively. May be taken six times for credit.
Prerequisites: ENGR 111 or approval of instructor; junior or senior classification in an engineering major.
ENGR 482/PHIL 482 Ethics and Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Develops techniques of moral analysis and their application to ethical problems encountered by engineers, such as professional employee rights and whistle blowing; environmental issues; ethical aspects of safety, risk and liability and conflicts of interest; emphasis on developing the capacity for independent ethical analysis of real and hypothetical cases.
Prerequisite: Junior classification.
Cross Listing: PHIL 482/ENGR 482.

ENGR 484 International Engineering Internship
Credits 0 to 6. 0 to 6 Lecture Hours.
International Engineering Internship.
Prerequisite: Junior or senior classification.

ENGR 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of problems in any area of engineering. May be taken 3 times for credit.
Prerequisites: Junior or senior classification; approval of the college.

ENGR 489 Special Topics in...
Credits 0 to 4. 0 to 4 Lecture Hours. 0 to 6 Lab Hours.
Selected topics in an identified field of engineering. May be repeated for credit.

ENGR 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in the College of Engineering. May be repeated 3 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.