

# ET - ENGINEERING TECHNOLOGY (ET)

## \*Course Fees are Per Credit Hour

### ET 1XX. Eng Tech Elective. (1-3 Credits)

#### ET 100. Introduction to Engineering and Technology. (3 Credits)

Introduction to Engineering and Technology provides an introduction to the careers, philosophies, and industries related to engineering.

This course is used to administratively advise students entering the Engineering Technology program. (Spring)

Course Fees: \$60

#### ET 100CH. Introduction to Engineering and Technology - China Onsite. (3 Credits)

Introduction to Engineering and Technology provides an introduction to the careers, philosophies, and industries related to engineering.

This course is used to administratively advise students entering the Engineering Technology program.

#### ET 150. Computer Aided Drafting and Design. (3 Credits)

This course facilitates student learning of the graphic language of technical drawing and communications, multi-view and pictorial technical drawings using freehand, manual, and computer aided drafting techniques using AutoCAD. Areas of focus include layer management, line-types, and colors, selection sets, object snap modes, Auto-Snap, polar tracking, object snap tracking, construction techniques, crafting and managing text objects, editing geometry, display control, and drawing inquiry methods. (Spring)

Course Fees: \$60

#### ET 150CH. Computer Aided Drafting and Design - China Onsite. (3 Credits)

This course facilitates student learning of the graphic language of technical drawing and communications, multi-view and pictorial technical drawings using freehand, manual, and computer aided drafting techniques using AutoCAD. Areas of focus include layer management, line-types, and colors, selection sets, object snap modes, Auto-Snap, polar tracking, object snap tracking, construction techniques, crafting and managing text objects, editing geometry, display control, and drawing inquiry methods. Corequisite: ET 150LC.

#### ET 150L. Computer Aided Drafting and Design - Lab. (1 Credit)

Laboratory for ET 150 provides hands-on computer aided drafting and design skills and experience using AutoCAD, including basic drawing and modify techniques, orthographic projection, layer management, line-types and colors, dimensioning, tracking, object snap tracking, construction techniques, text objects, and creating pictorial drawings. Corequisite: ET 150.

Course Fees: \$60

#### ET 150LC. Computer Aided Drafting and Design Lab - China Onsite. (1 Credit)

Laboratory for ET 150 provides hands-on computer aided drafting and design skills and experience using AutoCAD, including basic drawing and modify techniques, orthographic projection, layer management, line-types and colors, dimensioning, tracking, object snap tracking, construction techniques, text objects, and creating pictorial drawings. Corequisite: ET 150CH.

#### ET 200. Manufacturing Processes. (3 Credits)

A study of the manufacturing processes used to fabricate and form engineering materials into useful products. Includes laboratory experiences using common materials and basic processes. Prerequisites: MA 113 or MA 115, PH 241. (Fall)

Course Fees: \$60

#### ET 201. Polymer Engineering. (4 Credits)

Polymer chemical structure, physics of polymers, and laboratory processing of polymers. Three class periods; one two-hour laboratory per week. Prerequisites: MA 112 and MA 113 or MA 115, Concurrent CH 311 CH 311L. (Spring)

Course Fees: \$60

#### ET 202. Introduction to Bio-Engineering and Computational Tools. (2 Credits)

An introduction to Bio-Engineering and the tools and techniques of bioinformatics from a user's view. Prerequisites: BI 111, MA 115 or BI 111, MA 112, MA 113. (Fall)

Course Fees: \$60

#### ET 210. Electricity/Electronics Fundamentals and Green Energy. (4 Credits)

This class provides a basic understanding of electricity, electrical components, electrical circuits, electrical measurements and calculations, and basic digital operations. Basic skills will also be obtained in the use of electrical tools, test instruments, and hands on soldering. Laboratory experiences using simplified circuitry and computer aided drafting/simulation software will enhance the understanding of major active device concepts. Experiments in green energy highlight emerging technology applications. Three class periods; one two-hour laboratory per week. Prerequisite: MA 112 or 113 or 115. (Fall)

Course Fees: \$60

#### ET 214. Introduction to Electric Power Generation. (3 Credits)

This course reviews the history of electric power generation, introduces the technical basics of modern power generation methods (including fossil fuel, hydroelectric, solar, wind, and geothermal), and explores the various roles that engineering-related professionals play in power generation industries. Prerequisite or Corequisite: MA 113 or MA 115.

Course Fees: \$60

#### ET 220. Digital Electronics. (3 Credits)

Fundamentals of digital electronics, including basic logic gates and boolean algebra and programmable digital device application. Prerequisite: MA 112 or 113 or 115 (Spring)

Course Fees: \$60

#### ET 224. Power Plant Equipment and Instrumentation. (4 Credits)

This course examines the systems, equipment, and instrumentation commonly encountered in electric power generation industries. Equipment and instrumentation for thermal, fluid, electrical, mechanical, control, and safety systems are covered. Hands-on laboratory experiences are required and included in the 2 laboratory hours per week. Prerequisites: ET 214, MA 113 or MA 115.

Course Fees: \$60

#### ET 275. Engineering and Technology Professions Seminar. (1 Credit)

This course includes a survey of career options in engineering and technology fields, as well as strategies for career readiness. This course features guest speakers representing a variety of engineering and technology professions. Prerequisite: ET 100.

Course Fees: \$60

**ET 300. Materials Science. (3 Credits)**

The purpose of this course is to provide students an opportunity to become familiar with the properties of metallic, ceramic, organic, and composite materials. The knowledge and understanding of these properties will help them design safe products and structures. They will be able to follow standard procedures in determining the properties of materials and will be able to interpret the results of tests conducted in the laboratory. The knowledge, skills, and understanding developed during the course of study will influence their skills in material selection, production methods and inspection techniques. Prerequisites: CH 111, MA 113 or 115. (Spring)

Course Fees: \$60

**ET 301. Mass and Energy Balance. (3 Credits)**

Covers the fundamental and applied principles of stoichiometry, material and energy balances, thermophysics, thermochemistry and related topics. Prerequisites: MA 121 or MA 125, CH 112, CH 112L.

Course Fees: \$60

**ET 302. Bioprocess Engineering, Manufacturing, and Environmental Technology. (5 Credits)**

Introduction to the functions of microbial cells and their cultivation and utilization in bioprocess engineering. Topics may include, fermentation systems and downstream processing methods, enzyme kinetics, production and application, bio manufacturing of fuels, industrial chemicals, pharmaceuticals, food additives and food products such as beer, wine, cheese and yogurt, and microbial biomass production. Introduction to environmental biotechnology including waste water treatment, bio-remediation, bio-mining, and bio-deterioration and its control. Analysis of biological processes and molecules. Three class periods; two 2 hour laboratories per week. Prerequisites: ET 301, MA 122, CH 112, CH 112L, BI 307. (Spring)

Course Fees: \$60

**ET 304. Bioreactor Design. (3 Credits)**

Design and Engineering of bioreactor processes: enzyme kinetics, mass transfer limitations, microbial growth, and product formation kinetics. Fermentation reactor selection, design, scale-up, control. Quantitative bioengineering analysis and design of biochemical processes. Prerequisites: ET 301, MA 122 or MA 126, CH 112, CH 112L, BI 307. (Spring)

Course Fees: \$60

**ET 310. Introduction to Solid Modeling. (3 Credits)**

This course introduces students to manufacturing techniques using Computer Aided Design (CAD) and SolidWorks software to design and create drawings for parts, sub-assemblies, assemblies, and products.

Prerequisites: ET 150, Concurrent MA 121 or MA 125. (Fall)

Course Fees: \$60

**ET 314. Transmission, Distribution, and Grid Systems. (3 Credits)**

This course examines the processes, functions, operations, and newest developments related to electric transmission, distribution, and grid systems. Topics include power loads, modeling, analysis, controls, power quality, cable systems, reactive power, and protection systems. Prerequisites: ET 214, ET 224, MA 122 or MA 126, PH 242 or PH 252.

Course Fees: \$60

**ET 320. Statics and Strength of Materials. (4 Credits)**

This course explores the basic concepts of statics and the applied strength of materials on basic structural systems. The course opens with the study of coplanar force systems, moments, and the free body diagram. Next, the design properties of common materials (wood, steel, concrete) are mathematically discussed and applied to the design of a common truss, beams, columns, and complex trusses. Based on these analyses, materials are selected that are adequate to resist the applied loads. An emphasis is placed on selecting the most economical material member that meets all design requirements. Three class periods; one two-hour laboratory per week. Prerequisites: MA 122 or MA 126, PH 241. (Fall)

Course Fees: \$60

**ET 320X. Statics and Strength of Materials. (3 Credits)**

This course explores the basic concepts of statics and the applied strength of materials on basic structural systems. The course opens with the study of coplanar force systems, moments, and the free body diagram. Next, the design properties of common materials (wood, steel, concrete) are mathematically discussed and applied to the design of a common truss, beams, columns, and complex trusses. Based on these analyses, materials are selected that are adequate to resist the applied loads. An emphasis is placed on selecting the most economical material member that meets all design requirements. Not open to Engineering Technology Majors. Three class periods per week. Prerequisites: MA 122 or MA 126, PH 241. (Fall)

Course Fees: \$60

**ET 324. Power Plant Process Safety. (3 Credits)**

This course examines the systems, procedures, hazards, mitigation techniques, and best practices of process safety in the electric power generation industries. Topics will include laws/regulations/standards, hazard identification and control, and management systems related to safety. Prerequisites: CH 111, CH 111L, MA 122 or MA 126, PH 241 or PH 251.

Course Fees: \$60

**ET 330. Thermodynamics. (3 Credits)**

This course explores the principles of thermal and mechanical energy. Focus areas include the study of energy transformations and thermodynamic relationship. Application of thermodynamic principles is studied in relation to engineering systems, basic principles, properties of substances, mass, energy, and entropy balances. Prerequisites: MA 122 or MA 126, CH 111, PH 241. (Fall)

Course Fees: \$60

**ET 340. Power Transfer Technology. (3 Credits)**

This course explores the principles of compressible and incompressible fluid statics and dynamics as applied to hydraulic and pneumatic pumps, motors, transmissions and controls. Includes laboratory experience.

Prerequisites: MA 121 or MA 125, PH 241, Concurrent MA 122. (Spring)

Course Fees: \$60

**ET 350. Robotics and Automated Manufacturing. (4 Credits)**

This course provides a basic understanding of robotics, automated manufacturing equipment, computer integrated manufacturing systems, and the use of industrial robots. Computer programming background recommended. Three class periods; one two-hour laboratory per week. Prerequisites: ET 210, ET 220 and ET 320. Prerequisite or Corequisite: CS 155.

Course Fees: \$60

**ET 360. Electrical Circuits and Devices. (3 Credits)**

Electrical engineering circuit-analysis and devices. AC, DC, and transient circuit analysis techniques. Laboratory experience includes instrumentation. Prerequisites: ET 210, ET 220, PH 242, MA 122 or MA 126.

Course Fees: \$60

**ET 370. Engineering Economics. (3 Credits)**

The purpose of this course is to expose students to elements that influence the cost of manufactured products, the process of determining manufacturing costs, cost justification, value analysis, cost reduction analysis, the time value of money, equivalence, measures of worth, economic selection rule for alternatives, income taxes, equipment depreciation, inflation, and uncertainty. Prerequisite: MA 121 or MA 125. (Spring)

Course Fees: \$60

**ET 380. Special Topics in Engineering Technology. (1-3 Credits)**

A detailed study of a particular topic of special interest in engineering and technology professions. Topics will vary, but will be listed in the schedule of classes when offered, and on the students' transcripts. Prerequisite: Departmental approval required.

Course Fees: \$60

**ET 401. Fluid Flow and Heat Transfer. (4 Credits)**

Theory and application of mass and heat transfer and fluid flow.

A comprehensive treatment of transport processes for chemical operations. Prerequisite: PH 241 or PH 251; MA 122 or MA 126. (SPRING)

Course Fees: \$60

**ET 403. Chemical Reactors and Separators. (5 Credits)**

Plant design including reactors, separations, and controls. Three class periods, 2 two-hour laboratories per week. Prerequisites: ET 301, ET 330 or CH 341, and MA 122 or MA 126. (Fall)

Course Fees: \$60

**ET 411. Process Modeling and Simulations. (2 Credits)**

Mathematical modeling and simulation of selected chemical processes.

Computer programming for numerical solutions and subroutines.

Prerequisite: ET 401. Prerequisite or Corequisite: ET 403. (Fall)

Course Fees: \$60

**ET 414. Electric Power Reliability and Maintenance. (4 Credits)**

This course examines the role of reliability and maintenance processes in electric power generation industries. Topics include identifying and troubleshooting faults, inefficiencies, equipment failures, system disturbances, and preventive/corrective maintenance procedures and processes. Hands-on laboratory experiences are required and included in the 2 laboratory hours per week. Prerequisites: ET 224, ET 314, MA 122 or MA 126, PH 242 or PH 252.

Course Fees: \$60

**ET 415. Molecular Biology for Engineers. (4 Credits)**

The molecular basis for gene structure, function and regulation of gene expression. Emphasis on understanding current molecular biology methods, performing laboratory techniques, and data interpretation. Also listed as BI 415 but only creditable in field for which registered unless approved. Two class periods, two 2-hour laboratory periods per week.

Prerequisites: BI 306 and BI 307. (Fall)

Course Fees: \$60

**ET 490. Independent Research. (1,2 Credits)**

Independent research on individual projects under faculty supervision for selected students who have completed at least 60 credit hours with a minimum 3.0 overall scholastic average. Scheduled work and conferences require a minimum average of four hours per week per credit hour. May be repeated to a maximum of eight credit hours. Students must receive departmental approval prior to enrolling in this course. (Fall, Spring, Summer)

Course Fees: \$60

**ET 495W. Engineering Tech Capstone. (4 Credits)**

The capstone course is designed for students preparing for careers in engineering technology. Student teams will analyze engineering technology problems as a project, propose solutions, and present recommendations externally. Documentation includes memos, reports, and formal presentations. Prerequisites: MA 122 and Senior Standing. (Fall)

Course Fees: \$60