

Engineering Technology (ET)

Courses

ET 101. Fundamentals of Engineering Technology. 2 Credits.

This course equips students with the tools to be a successful student and practicing engineering technologist. Topics covered include ethics, project management, team work, working with data, creating presentations, engineering design, and an understanding of the engineering technology profession.

P: None

Fall Only.

ET 103. Surveying. 3 Credits.

This course covers fundamental concepts and theory of engineering measurements; adjustment and use of instruments; computations; measurement of distance, difference in elevation, angles, and directions; and route and construction surveys. Applications of probability and statistical analysis of surveying are included.

P: MATH 104 or higher; Major in Environmental Engineering Tech

Fall Only.

ET 105. Fundamentals of Drawing. 3 Credits.

This course equips students with the computer aided design software tools to generate 2D and 3D graphics that meet industry standards.

P: MATH 101 with at least a C grade or WPT-MFND score >465 and WPT-AALG score >525 and a declared major in Mechanical, Electrical, or Environmental Engineering Technology

Fall and Spring.

ET 130. Basic Electrical Circuits I. 3 Credits.

This course uses theory, laboratory investigation, and circuit simulation to introduce basic electrical and circuit analysis principals with emphasis on DC current. Concepts of electric and magnetic fields in the context of capacitors and inductors and transient responses responses in DC circuits is included.

P: MATH 104 or higher; Major in Electrical or Mechanical Engineering Tech

Fall Only.

ET 131. Basic Electrical Circuits II. 3 Credits.

This course uses theory, laboratory investigation, and circuit simulation to introduce basic electrical and circuit analysis principals with emphasis on AC current. Transformers, 3 phase power, frequency response and analysis, and selected DC current topics will be included.

P: ET 130 with C or higher; Major in Electrical Engineering Tech

Spring.

ET 142. Introduction to Programming. 3 Credits.

This is an introductory course in computer programming using the C++ language. Topics covered include problem solving, algorithms, selected statements, repetition, arrays, functions, and sub-programs. Applications to electrical engineering technology are emphasized.

P: MATH 104 with a C or higher, and declared major in Electrical Engineering Technology or Electrical Engineering.

Spring.

ET 150. Codes, Safety, and Standards. 2 Credits.

This course provides a survey of codes applied to the electrical construction industry, including the National Electric Code, with discussion of safety organizations and their guidelines, including OSHA, IEEE, ISA, ANSI, and UL. Safety procedures and up-to-date electrical codes are emphasized.

P: ET 130 with a C or higher

Fall Only.

ET 198. First Year Seminar. 3 Credits.

First Year Seminar, topics vary.

Reserved for New Incoming Freshman.

ET 201. Introduction to Environmental Engineering. 3 Credits.

This course is designed to educate students in the principal and practice of air quality management and solid and hazardous waste management. This includes sources of air pollution, health and environmental effects of air pollution, and regulations governing air pollution. For solid waste this includes sources of solid waste, disposal of solid waste, regulations, and health and environmental effects.

P: CHEM 211 and CHEM 213 with a C or higher and Major in Environmental Engineering Tech

Fall Only.

ET 203. Introduction to Water and Waste Water. 3 Credits.

This course provides an overview of water resources, drinking water standards, water quality characteristics, water pollutants, and storm water management. Sampling and laboratory instrument procedures are included with statistical analysis of data to complete lab reports.

P: CHEM 211 and CHEM 213 with a C or higher

Fall Only.

ET 206. Chemistry for Engineers. 4 Credits.

This course will provide engineering students with a background in important concepts and principles of chemistry. Emphasis will be on areas not relevant for an engineering context with practical applications. In addition to the fundamental concepts of atomic structure, solutions, stoichiometry, kinetics, and enthalpy of reactions, the connections between chemistry, physics, and materials science will be investigated.

P: Math 104 or concurrent enrollment or equivalent, and either Mechanical Engineering or Mechanical Engineering Technology or Electrical Engineering Technology or Electrical Engineering major.

Fall Only.

ET 207. Parametric Modeling. 2 Credits.

This course provides skills and knowledge to enhance computer-aided design and solid modeling concepts including; part modeling, assemblies, engineering drawings and sheet metal modeling. Also Introduces kinematics motion and finite element simulation concepts by using the SOLIDWORKS software.

P: ENGR 104 with a C or higher OR ET 105 with a C or higher, and declared major in Mechanical Engineering or Mechanical Engineering Technology Fall and Spring.

ET 218. Fluid Mechanics. 3 Credits.

This course covers the theory of fluids including hydrostatics, hydrostatic forces, buoyancy and stability, Bernoulli's equation, pipe flow, open channel flow, drag and lift.

P: PHYSICS 103 with a C or higher OR PHYSICS 201 with a C or higher OR ENGR 213 with a C or higher, and declared major in Environmental Engineering Technology or Mechanical Engineering Technology

Spring.

ET 232. Semiconductor Devices. 3 Credits.

This course introduces semiconductor materials and manipulation to create several types of diodes, transistors, and optoelectronic devices. The theory and operation of these devices is explored. Laboratory experiments will be performed to measure device characteristics and verify circuit performance.

P: ET 131 with a C or higher

Spring.

ET 233. Linear Circuits. 3 Credits.

This course focuses on the operation, analysis, and application of linear active circuits utilizing transistors, operational amplifiers, comparators, mixers, and other components as well as integrated circuit functions such as converters and phase locked loops.

P: ET 232 with a C or higher

Fall Only.

ET 240. Micro-controllers and Programmable Logic Controllers. 3 Credits.

This course introduces embedded computer systems and mid-range micro-controller peripherals, including electric motor control components, using assembly and C programming. PLC topics such as troubleshooting, timers, counters, sequencers, data move, math, and analog input and output are covered.

P: ET 142 and ET 233 both with a C or higher

Spring.

ET 250. Continuous Signals and Linear Systems. 3 Credits.

This course provides an introduction to signals and systems analysis techniques for continuous-time signals and linear systems. Topics include continuous-time signals and linear systems definitions and properties as well as signal processing techniques and applications. Signals and systems representations and applications to circuit analysis will also be performed using MATLAB.

P: MATH 203 with a C or higher, and declared major in Electrical Engineering Technology

Fall Only.

ET 305. Environmental Systems. 4 Credits.

Physical and chemical aspects of natural environmental processes. The movement, transformation, and fate of materials and contaminants.

P: CHEM 212 with at least a C grade AND GEOSCI 202 with at least a C grade AND MATH 104 or MATH 202 with at least a C grade AND BIOLOGY 201/202 with at least a C grade

Fall and Spring.

ET 311. Digital Electronics. 3 Credits.

This course introduces digital electronics, the operation of logic gates, and the theory of combination logic circuits. Programmable logic devices, Karnaugh mapping, encoders, decoders, multiplexers, binary adders, parity circuits, multi-vibrators, and glitch-free clocks are introduced.

P: ET 233 with a C or higher

Fall Only.

ET 318. Fluid Power Systems. 3 Credits.

This course covers the concept of fluid power and introduces common hydraulic and pneumatic systems used in engineering applications. Design, analysis, operation, maintenance, and application of these fluid power systems are discussed. Topics also include fluid directional, flow and pressure control.

P: ET 218 with a C or higher

Fall Only.

ET 320. The Soil Environment. 4 Credits.

The physical, chemical and biological properties and principals of soils; formation, classification and distribution of major soil orders; function and management of soils in natural, agricultural and urban environments. Includes field and laboratory experiences.

P: Chem 108 with at least a C grade or 212 with at least a C grade; REC: Geosci 202.

Fall Only.

ET 323. Pollution Prevention. 3 Credits.

Emphasizes principles of pollution prevention and environmentally conscious products, processes and manufacturing systems. Also addresses post-use product disposal, life cycle analysis, and pollution prevention economics.

P: Env Sci 318 with at least a C grade, OR instructor consent

Spring Odd.

ET 324. Motors and Drives. 3 Credits.

This course analyzes selection, set-up, and circuitry associated with AC and DC drives and motors. Topics include DC motor characteristics. AC induction, specialty machine performance and characteristics, stepper motors, servomotors, and three phase power systems are also included.

P: ENGR 308 with a C or higher, and declared major in Mechanical Engineering Technology

Spring.

ET 330. Hydrology. 3 Credits.

Study of the principal elements of the water cycle, including precipitation, runoff, infiltration, evapotranspiration and ground water; applications to water resource projects such as low flow augmentation, flow reregulation, irrigation, public and industrial water supply and flood control.

P: MATH 104 with at least a C or higher math course

Fall Only.

ET 331. Advanced Water and Waste Water Treatment. 3 Credits.

Water and waste water treatment systems, including both sewage and potable water treatment plants and their associated collection and distribution systems. Study of the unit operations, physical, chemical and biological, used in both systems.

P: ET 203

Spring Even.

ET 334. Solid Waste Management. 3 Credits.

This course will focus on technical concepts of solid waste management related to the design and operation of landfills, waste-to-energy systems, composting facilities, recycling facilities, and other emerging waste management technologies.

P: ET 202.

ET 336. Environmental Statistics. 3 Credits.

This course emphasizes the principles of data analysis using advanced statistical software (such as R, SAS, etc.). It employs primarily environmental examples to illustrate procedures for elementary statistical analysis, regression, analysis of variance and nonparametric statistics.

P: MATH 260

Fall and Spring.

ET 340. Advanced Programmable Logic Controllers. 3 Credits.

This course covers interfacing programmable logic controllers to communicate with each other in a complete system. Actuators used in typical industrial related processes are explored. Operation and application of electronic instrumentation and control systems are also covered.

P: ENGR 328 with a C or higher, and ENGR 329 with a C or higher

Fall Only.

ET 342. Supervisory Control and Data Acquisition. 3 Credits.

This course uses knowledge acquired from previous courses including embedded controllers and electrical circuit design as it applies to techniques for precision measurements, interpreting measurement data, and using it to control systems. Hands on laboratory experiments are provided to demonstrate and verify the concepts in precision measurement theory as it relates to process measurements and the accuracy of electrical measurements in industry.

P: ENGR 328 with a C or higher

Fall Only.

ET 344. Industrial Electronics and Control. 3 Credits.

This course covers the fundamental concepts of power electronics, characteristics of static power semiconductor devices (BJT, MOSFET, IGBT, Thyristors), AC/DC power converters: uncontrolled and controlled rectifiers (single phase and three phase), dual converter, AC/AC power converters: phase controlled converters (single phase and three phase), AC switch, cycloconverter. DC/DC converters: choppers (step down and step up), switching regulators (buck, boost, buck-boost), DC/AC converters: single phase and three phase inverters, and various power control applications.

P: ET 311 with a C or higher

Spring.

ET 350. Data Communication and Protocols. 3 Credits.

Concepts needed to understand data, communications, and networking are presented in this course. The principles associated with data communication, transmission media, interfaces, error control, flow control, synchronization, circuit switching, and packet switching are investigated.

P: ET 250 with a C or higher

Spring.

ET 360. Project Management. 3 Credits.

This course presents an overview of project management with an emphasis on engineering projects. Topics include pre-construction planning, project scheduling systems, critical path management, risk and effects analysis, and failure models.

P: Junior standing and either Electrical, Environmental, or Mechanical Engineering Technology major or junior standing and Mechanical Engineering major
Spring.

ET 377. Industrial Safety and Hygiene. 3 Credits.

This course analyzes hazards that can affect safety/health, including assessment of safety/health risks, associated with equipment, materials, processes, and activities. Also covered will be occupational health and safety management principles to initiate and/or improve safety management systems.

P: ET 101, ET 201, ET 203, and CHEM 212; REC: BIOLOGY 201/202.

ET 380. Industrial Automation Control. 3 Credits.

This course provides exposure to the technology of automation and control for both discrete and continuous manufacturing industries; architecture of industrial automation systems; introduction to automatic control; fundamentals and programming principles of programmable logic controllers (PLC) and relay logic controllers (RLL).

P: ENGR 216 with a C or higher, and ENGR 308 with a C or higher
Fall Only.

ET 385. Robotics. 3 Credits.

This course introduces the fundamentals of robotics, transformation of coordinate frame, kinematics, dynamic modeling, trajectory generation and control of robots. Will involve robot simulations using MATLAB/Simulink.

P: ENGR 204 with a C or higher, and ENGR 214 with a C or higher
Fall Only.

ET 390. Mechatronics. 3 Credits.

This course is the study of mechanical, electrical, and electronic systems. Students from both the mechanical engineering and mechanical engineering technology programs will form teams and will design and build a project using an electro-mechanical control system.

P: ENGR 204 with a C or higher, ENGR 214 with a C or higher, and ENGR 308 with a C or higher
Spring.

ET 391. GIS. 3 Credits.

This course provides an introduction to Geographic Information Systems and the utilization of spatial data for solving geographic problems. Both theoretical concepts of GIS technology and practical applications of GIS will be studied.

P: ET 101 and ET 105 both with a grade of C or higher
Fall Only.

ET 400. Co-op/Internship in Engineering Technology. 3 Credits.

Co-ops/internships are offered on an individual basis and consist of a program of learning activities planned in consultation with a faculty member and an industry sponsor. A student may also conduct research with sponsorship of an individual faculty member. Course is not repeatable for credit.

P: junior or senior standing; Major in Electrical, Environmental or Mechanical Engineering Tech
Fall and Spring.

ET 405. Applied Thermodynamics. 3 Credits.

This course provides senior level students with an overview of applied thermodynamics. Students will apply basic thermodynamics laws to analyze different cycles and systems, including: Vapor power cycles; Gas power cycles; Internal combustion engines; Refrigeration cycles and air conditioning systems; Combined heat and power (CHP) systems; Waste heat recovery technologies, especially organic Rankine cycles.

P: ENGR 324 with a C or higher
Spring.

ET 410. Capstone Project. 3 Credits.

In this class students form teams and define a technological problem with specifications. After developing project proposals, teams work toward solutions while applying principles of technical design from the curriculum. Each team will deliver a formal presentation and each student will provide a written report upon completion.

P: Senior standing in Environmental Engineering Technology or Electrical Engineering Technology or Mechanical Engineering Technology
Spring.

ET 415. Solar and Alternate Energy Systems. 3 Credits.

Study of alternate energy systems which may be the important energy sources in the future, such as solar, wind, biomass, fusion, ocean thermal, fuel cells and magneto hydrodynamics.

P: PHYSICS 104 with a C or higher OR PHYSICS 202 with a C or higher OR ENGR 210 with a C or higher or ENGR 308 with a C or higher
Spring.

ET 420. Lean Processes. 3 Credits.

This course focuses on the time value of money as well as operating a business using lean manufacturing with the Six Sigma and other operational models. Topics covered include decisions under risk, best alternative using economic models, present worth analysis, rate of return, and cost benefit analysis.

P: ET 101, ET 360 or concurrent enrollment; Major in Environmental Engineering Tech.

ET 424. Hazardous and Toxic Materials. 3 Credits.

The handling, processing, and disposal of materials which have physical, chemical, and biological properties that present hazards to human, animal, and plant life; procedures for worker safety and for compliance with regulations. The metals and nonmetals, carcinogens, radioactive materials, and pathogenic human, animal, and plant wastes.

P: CHEM 212

Spring Odd.

ET 432. Hydrogeology. 3 Credits.

Introduction to the geological and physical principles governing ground water flow. Description of aquifer properties, chemical processes, equation of flow, well hydraulics, and environmental concerns.

P: Geosci 202 with at least a C grade; REC: Env Sci 330 with at least a C grade; Math 202.

Spring.

ET 433. Ground Water: Resources and Regulations. 3 Credits.

An overview of the geology, properties, flow, and pollution of ground water systems. Techniques of aquifer characterization and water quality monitoring are introduced and evaluated. Regulatory and policy approaches to moderate use and ensure adequate high quality supplies of this valuable resource in the future are also reviewed.

P: GEOSCI 202

Fall Even.

ET 444. Geochemistry of Natural Waters. 3 Credits.

This class will explore the theory and application of aqueous geochemistry principles to the study of surface and groundwater systems at low to moderate temperatures. The class will focus on inorganic processes including the hydrologic cycle, chemical weathering, chemical activities in natural waters, thermodynamics, kinetics, acid/base equilibria, carbonate chemistry, acid water systems, heavy metals, redox reactions, saline waters, and ancient fluids preserved in fluid inclusions.

P: GEOSCI 202, CHEM 211 & CHEM 212

Fall Even.

ET 464. Atmospheric Pollution and Abatement. 3 Credits.

This course will provide students an understanding of atmospheric processes and weather patterns and how they affect pollutant transport. Sources, sinks, environmental effects, and abatement technologies for air pollutants will be addressed. Atmospheric reactions that create pollution or deplete stratospheric ozone will be included.

P: CHEM 212 and CHEM 214 and ET 201

Fall Odd.

ET 495. Teaching Assistantship. 1-6 Credits.

The student and supervising teacher must prepare a statement that identifies the course with which the assistantship will happen, objectives for the assistantship, and expectations in order to fulfill the course objectives. Students are not eligible to receive credit in both the course they assist the instructor with and the teaching assistantship in the same semester. Typically student has previously taken the course prior to enrollment in the assistantship. Course is repeatable for credit.

Fall and Spring.

ET 498. Independent Study. 1-4 Credits.

Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early in the semester to the registrar for entry on the student's transcript. Course is repeatable for credit.

P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.