

Descriptions of New Courses in Engineering Technology

ENGT 100 Introduction to Engineering Technology:

Credit 3 hours. Introduction to a broad range of engineering technology topics and fields, such as mechanical design, engineering materials, machining, computers and programming, data analysis and graphing, robotics, and communications. Discussion includes the roles, duties, responsibilities, professional ethics, professionalism, fundamental skills and knowledge required of engineering technologists.

ENGT 132. Construction Materials:

Credit 3 hours. Prerequisite: Engineering Technology 100. A study of the behaviors and performance of building materials and assemblies, as well as construction standards and constraints. Emphasis is placed on the understanding of the advanced engineering aspects of specific materials and assemblies used in commercial and industrial structures. Two hours of lecture and two hours of laboratory per week. Laboratory fee required.

ENGT 150 Software for Data Management:

Credit 3 hours. Concepts of acquisition, organization, exchange and storage of quantitative data through the use of visual languages and packages.

ENGT 202 Computer Applications:

Credit 3 hours. Prerequisite: Mathematics 165. A study of the common computer applications used to solve technological problems. Software to be used includes Microsoft Office components, software tools for project management and logistic support, and visual programming languages.

ENGT 205 Mathematical Methods for Engineering:

Credit 3 hours. Prerequisite: Mathematics 200. Post-calculus mathematical techniques for engineering technology, including applied differential equations, matrices, determinants, and statistics and probability.

ENGT 212 Introduction to Programming:

Credit 3 hours. Prerequisite: Mathematics 165. An introduction to applied programming in C for engineering technologists. Major topics include elements of computer organization, concepts of programming languages, data structures, and Object Oriented Programming using C++.

ENGT 213 Electrical Circuits:

Credit 3 hours. Prerequisite: Mathematics 165. A study of the fundamentals of electrical equipment and installations related to engineering technology. Topics include DC and AC power, electrical measurements, print reading, electrical wiring, application of network laws and theorems, nodal and mesh analysis for passive RLC circuits, transformers and polyphase circuits, illumination, heating, wiring codes and specifications. Two hours of lecture and two hours of laboratory per week. Laboratory fee required.

ENGT 221 Programming for Technologists:

Credit: 3 hours. Computer programming, data structures, and basic elements of software engineering. Program coding using a high level language such as Java.

ENGT 225 Electronics I:

Credit 3 hours. Prerequisites: Mathematics 200, Co-requisite: Physics 192. Introduction characteristics and applications of diodes and transistors (BJT and FET). Logic gates. Digital and analog integrated circuits. Operational amplifiers and active circuits using op amps. Analysis of analog electronic circuits, involving rectifiers, amplifiers, oscillators, etc. Two hours of lecture and one hour of laboratory per week.

ENGT 226 Electronics II:

Credit 3 hours. Prerequisite: Engineering Technology 225. Fundamentals of sensor technology and its applications. Various types of sensors. Operational amplifier and signal conditioning circuits, modern sensors, ADC/DAC, and interfaces between these components. Concepts of power electronics, including converters, inverters, and power supplies. Introduction to optoelectronics. Two hours of lecture, and one hour of laboratory per week.

ENGT 231. Surveying I:

Credit 3 hours. Prerequisite: Engineering Technology 100 and Mathematics 165. Theory, principles, and practices of surveying applied to construction and engineering instrumentation, computation, and site layout. Two hours of lecture and two hours of laboratory per week.

ENGT 232. Surveying II:

Credit 3 hours. Prerequisite: Engineering Technology 231. Theory and supervised field practice of work in the layout of engineering and construction projects utilizing extensive surveying principles, applied science, mathematics, legal implications and computer applications. Two hours of lecture and two hours of laboratory per week.

ENGT 234. Concrete and Masonry Design:

Credit 3 hours. Prerequisite: Engineering Technology 132, Engineering Technology 241, and Engineering Technology 271. Materials, methods, constructability, equipment, drawings and specifications related to reinforced concrete and masonry structural elements, including beams, T-beams, girders, slabs, post tension slabs, columns, in accordance with current AIC codes and standards. Two hours of lecture and two hours of laboratory per week.

ENGT 241 Strength of Materials:

Credit 3 hours. Prerequisite: Mathematics 200 and Physics 191 An introduction to study of stress, strain and deformation in materials and structures subjected to various loading such as tension, compression, torsion, and flexure as well as deflection of prismatic members, columns, combined stresses applied to machine design.

ENGT 244. Construction Regulations, Contracts, and Specifications:

Credit 3 hours. Prerequisites: Engineering Technology 132. A study of codes and specification required by municipal, country, states; building codes; construction contracts and professional ethics. This includes the following topics: contractual relationships amongst construction parties; types of agreements, workmen's compensation, insurance, and ethics in construction. Two hours of lecture and two hours of laboratory per week.

ENGT 271 Engineering Statics:

Credit 3 hours. Prerequisites: Mathematics 200 and Physics 191. This course uses vector methods for the study of force, couples and equivalent force systems, equilibrium of particles and rigid bodies, centroids, centers of gravity, moments of inertia, and virtual work. It includes analysis of simple structures such as trusses and beams, applications of dry friction models to belts and wedges, and the method of virtual work.

ENGT 283 Manufacturing Processes:

Credit 3 hours. Prerequisites: Engineering Technology 241. This course serves as an introduction to a broad range of traditional and non-traditional manufacturing processes. Topics include casting and solidification processes, forming and shaping processes, material removal processes, joining processes, semiconductor industry, engineering metrology and instrumentation, process capabilities, and other aspects of manufacturing.

ENGT 305 Human Factors Engineering:

Credit 3 hours. Prerequisite: Junior standing. An investigation of the methods used to improve the interaction of humans with their physical work environment. The course emphasizes the application of the human factors database, including anthropometric data and behavioral and physiological research, to practical design problems involving the work environment, tools and equipment, and consumer products.

ENGT 320 Microprocessors and Interfacing:

Credit 3 hours. Prerequisites: Computer Science 290. Principles of microprocessor and microcontroller operation, CPU, memory, buses, and I/O interfaces. Microcomputer-based system design, Windows programming, and interfacing. Includes a design project. Two hours of lecture and two hours of laboratory per week.

ENGT 331. Construction Estimating I:

Credit 3 hours. Prerequisites: Engineering Technology 100 and Engineering Technology 132. Fundamentals of construction estimating procedures with analysis of construction prints and specifications, quantifying material, labor overhead and equipment related to project bid preparation. Also, study of estimating and bidding procedures for building, civil, and industrial construction projects. Includes unit price estimating, conceptual estimating, detailed estimating, overhead allocation, bidding strategies and bid formulation. Use of current computer software for the development of construction bids for simulated projects. Two hours of lecture and two hours of laboratory per week.

ENGT 332. Construction Estimating II:

Credit 3 hours. Prerequisites: Engineering Technology 331. An advanced study of estimating and bidding procedures for building, civil, and industrial construction projects. Includes unit price estimating, conceptual estimating, detailed estimating, overhead allocation, bidding strategies and bid formulation. Use of current computer software for the development of construction bids for simulated projects. Two hours of lecture and two hours of laboratory per week.

ENGT 336. Steel Design:

Credit 3 hours. Prerequisites: Engineering Technology 132, Mathematics 200, Engineering Technology 241, and Engineering Technology 271. The application of principles of strength of materials in the design and analysis of structural steel beams, columns, trusses and frames, and

connection and base plates in accordance with current AISC specifications. Two hours of lecture and two hours of laboratory per week.

ENGT 353. Total Quality Management:

Credit 3 hours. Prerequisite: Industrial Technology 407. This course provides students with an understanding of managing a total quality environment to improve quality, reduce costs, and improve productivity. Emphasis is placed upon the management, creation, organization, and evaluation of quality systems necessary to assure organizational and functional compliance with stated quality system requirements of national and international standards.

ENGT 355. Management of Technical Organizations:

Credit 3 hours. Prerequisite: Industrial Technology 402. A study of the structure of industrial and service organizations; the duties of the Industrial Engineering technologist in a technical organization in developing effective production teams; and the study labor administration, labor legislation, current labor practices, and international management.

ENGT 357. Auto Identification and Data Capture:

Credit 3 hours. Prerequisite: Engineering Technology 150. A study of auto identification and data capture technology and its applications in manufacturing and distribution industries. Topics include objectives, bar coding, radio frequency systems, magnetic stripe, voice recognition, radio data terminals, machine and optimal character recognition. Two hours of lecture and two hours of laboratory per week.

ENGT 371 Engineering Dynamics:

Credit 3 hours. Prerequisite: Engineering Technology 271 or permission of instructor. This course uses vector methods for the study of two-dimensional and three-dimensional kinematics and kinetics of particles, systems of particles, and rigid bodies. Topics covered include equations of motion, conservation of energy and momentum, principle of linear impulse and momentum, and work and energy methods.

ENGT 375 Applied Thermodynamics:

Credit 3 hours. Prerequisites: Chemistry 121, Physics 191, Mathematics 200. A study of elementary thermodynamics including engineering calculations relative to heat, power, work and mechanical and electrical energy.

ENGT 376 Applied Fluid Mechanics:

Credit 3 hours. Prerequisites: Engineering Technology 371 and Engineering Technology 375. Examines fluid statics, dynamics and energy as well as flow measuring devices, fluid components and systems.

ENGT 381 Engineering Materials:

Credit 3 hours. Prerequisite: Engineering Technology 241 This course covers advanced topics in ferrous and non-ferrous metallurgy, ceramics, composites, polymers, mechanics of materials, including failure theories and analysis of composites. Traditional methods and Finite Element Modeling and Analysis (FEM/FEA) are used. Two hours of lecture and two hours of laboratory per week.

ENGT 385 Mechanical Design:

Credit 3 hours. Prerequisite: Engineering Technology 241 and Engineering Technology 271. Analysis of mechanical elements with application to mechanical behavior and mechanics of materials, stress concentration, fracture, combined stresses, fatigue, and factor of safety to the design of machine components. Capstone design project will be included.

ENGT 386 Machines and Control:

Credit 3 hours. Prerequisite: Engineering Technology 213. An introductory control and instrumentation course for machine control. Topics include electrical measurements and instrumentation, motors and generators and their control, feedback control systems, and programmable logic controllers. Two hours of lecture and two hours of laboratory per week.

ENGT 390 Engineering Economics:

Credit 3 hours. Prerequisite: Junior standing. A study of economic theory and applications in engineering and industrial organizations including capitalization and amortization, time value of money, cost comparison analysis, and break-even value. Also included are personal finance topics as applied to engineering situations and case study.

ENGT 410 Signals and Systems:

Credit 3 hours. Prerequisite: Engineering Technology 205 or permission from the department head. An introduction to topics in signal and system analysis. Analysis techniques for signals and systems in both continuous and discrete time, signal representation including Fourier series and transforms, Convolution, sampling and Z-transforms, Laplace transform methods, system definitions and properties.

ENGT 425 Control and Automation:

Credit 3 hours. Prerequisites: Engineering Technology 205 and Engineering Technology 410 or permission of instructor. Time and frequency domain modeling of control systems. Response in time and frequency domains. Actuators and sensors for control. Elements of digital and computer control systems. Programmable logic controllers. Matlab for control system analysis. Two hours of lecture and two hours of laboratory per week.

ENGT 441 Construction Planning and Scheduling:

Credit 3 hours. Prerequisites: Engineering Technology 132 and Engineering Technology 332. Analysis and application of scheduling techniques in the construction industry. The use of critical path method (CPM), program evaluation and review (PERT), and PRIMAVERA. Two hours of lecture and two hours of laboratory per week.

ENGT 442. Construction Inspection:

Credit 3 hours. Prerequisites: Engineering Technology 100 and Engineering Technology 132. Introduction to construction inspection, functions, responsibilities, authority and technical requirements related to construction. Two hours of lecture and two hours of laboratory per week.

ENGT 443 Foundations and Soil Mechanics:

Credit 3 hours. Prerequisites: Engineering Technology 100, Engineering Technology 132, and Mathematics 200. Theory and application of soil properties, selection and methods of installation of foundations and other soil supported structures, including footings, piles, caissons, and retaining structures. Two hours of lecture and two hours of laboratory per week.

ENGT 445 Commercial Architecture:

Credit 3 hours. Prerequisite: Engineering Technology 100. Analysis and solution of basic problems in the design and construction of small commercial properties using a variety of materials and methods of construction. Two hours of lecture and two hours of laboratory per week.

ENGT 446. Construction Systems:

Credit 3 hours. Prerequisite: Engineering Technology 132. A study of the economic and functional application of construction equipment, including the types of equipment, ownership and operational costs and equipment scheduling and selection. Also, study of the design, installation, and operation of materials and equipment in HVAC and plumbing systems in residential and commercial construction. Includes design projects, print reading, and quantification of labor and material units for productivity and cost estimation. Two hours of lecture and two hours of laboratory per week.

ENGT 448. Construction Hydraulics:

Credit 3 hours. Prerequisite: Mathematics 200. Physical phenomena of hydraulics and hydraulics forces, with application of fundamental laws and empirical formulae. Pressure and forces on submerged areas, buoyancy, flow in a closed conduit, open channels, and fluid measurements. Two hours of lecture and two hours of laboratory per week.

ENGT 463 Cost Estimating:

Credit 3 hours. Prerequisites: Engineering Technology 390 and Industrial Technology 406. A study of the fundamentals of cost estimating for labor, materials and overhead for products, projects, operations and systems; and the concepts of internal and external cost estimating, types of costs, ethics, budgets, and profit.

ENGT 465. Industrial Simulation & Modeling:

Credit 3 hours. Prerequisite: Industrial Technology 406. An analysis of manufacturing and service operations encountered in manufacturing industries through the use of computer simulation techniques.

ENGT 467. Industrial Engineering Technology Case Problems:

Credit 3 hours. Prerequisite: Industrial Technology 405. Application of theories developed in the Industrial Engineering Technology (IET) coursework to selected IET case problems. Students will be provided experiences in integrating and applying engineering principles to solve industrial engineering problems.

ENGT 478 HVAC:

Credit 3 hours. Prerequisites: Engineering Technology 213, Engineering Technology 375, and Engineering Technology 385. An introductory course on HVAC (heating, ventilating, and air conditioning). Topics include heat transfer devices, AC motors and compressors, residential and commercial refrigeration and heating, heat load calculation, and HVAC system layout and control.

ENGT 480 Advanced Strength of Materials:

Credit 3 hours. Co-requisite: Engineering Technology 271 An introduction to study of stress, strain and deformation in materials and structures subjected to various loading such as tension, compression, torsion, and flexure as well as deflection of prismatic members, columns, combined stresses applied to machine design.

ENGT 484 Advanced Manufacturing Technologies:

Credit 3 hours. Prerequisite: Engineering Technology 283 or permission of the department head. This course focuses on advanced technological processes such as joining, machining, and particulate material processing. Based on student and faculty interests, it will involve student participation in research and development in a particular technological field of interest.

ENGT 488 Robotics and Automation:

Credit 3 hours. Co-requisite: Engineering Technology 386. Introduction to robotics and automation. Topics include introduction to manipulators and mobile robotics, actuators and sensors, industrial control systems, and robot and system integration. Two hours of lecture and two hours of laboratory per week.

ENGT 490 Seminar:

Credit 1 hour. Discussion of social, ethical, special topics, and professional issues. Students present reports on topics of current interest in engineering and technology.

ENGT 492 Project Management:

Credit 3 hours. This course covers the principles of project management for technologists, and the use of project management software. It develops the concepts involved in review techniques such as PERT, the critical path method (CPM) and elements of operations research for making project management decisions.

ENGT 493 Senior Design I:

Credit 2 hours. **Co-requisites:** Senior standing and Engineering Technology 492 (or concurrent registration). The first part of capstone design course. This course covers engineering ethics, teamwork and leadership, problem solving, oral and written technical communication, project management, and the integration of ET with real-world examples such as case studies in computer systems, robots, and mechatronics. All team projects are subject to instructor's approval.

ENGT 494 Senior Design II:

Credit 3 hours. Prerequisite: Engineering Technology 493. The second half of capstone design course. The team projects initiated in Senior Project I continue until the end of the semester. Each project team should submit its biweekly progress report and work plan to the instructor for approval. The final grade is determined based on individual contribution to the project, biweekly report and work plan, and presentation at the end of semester.