Engineering Technology (ET)

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. (Fall, Spring)

100H. Introduction to Engineering Technology Honors. Credit 3 hours. Prerequisite: Active status in the University Honors Program, or permission of the Department Head. 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. (Varies)

111. Engineering Graphics. Credit 3 hours. Topics covered include applied geometry, vectors, space, freehand sketching, orthographic projection, two-dimensional renderings with AUTOCAD, sectioning, dimensioning, and 3-D modeling body as well as assembling design using SolidWorks. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Fall, Spring)

132. Construction Materials and Methods. Credit 3 hours. 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. A laboratory fee is required for this course. (Fall)

202. Computer Applications. Credit 3 hours. Prerequisite: MATH 175. Introduction to the MATLAB programming environment including data types, graphics, functions, inputs/outputs, text processing, plotting functions, reading and writing data files, and case studies using MATLAB. (Summer, Fall, Spring)

205. Mathematical Methods for Engineering. Credit 3 hours. Prerequisite: MATH 200. A course on post-calculus mathematical techniques and methods specifically designed for engineering technologists. Topics include applied differential equations, matrices, determinants, statistics and probability. (Fall, Spring)

212. Introduction to Programming. Credit 3 hours. Prerequisite: MATH 175. An introductory programming course in C. Topics include hardware/software and fundamentals of problem solving and algorithm development including data types, computation, simple input/output, selection and repetition, functions, and arrays. (Fall, Spring)

213. Electrical Circuits. Credit 3 hours. Prerequisite: MATH 175. 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. A laboratory fee is required for this course. (Fall, Spring)

214. Electrical Circuits II. Credit 3 hours. Prerequisite: ET 213. Sinusoidal steady state analysis, AC power analysis, three-phase circuits, Laplace transform and its application to circuit analysis, network functions, frequency response, magnetically coupled circuits and transformers. A laboratory fee is required for this course. (Spring)

215. Digital Computer Logic and Organization. Credit 3 hours. Prerequisite: ET 100. An introduction to computer organization and digital logic design. Provides an understanding of the basic hardware makeup of a computer and the basic concepts of its operation. The course includes Boolean algebra and binary arithmetic, basic building blocks of digital hardware, combinational and sequential circuits and their design methods using standard logic design chips, basic computer cycles, machine instructions, microprogramming, and I/O communication. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Fall)

221. Programming for Technologists. Credit 3 hours. Prerequisite: ET 212. An introduction to object-oriented computer programming, data structures, basic algorithms, and basic elements of software engineering. Program coding using a high-level language such as C++ or similar. (Spring)

225. Electronics I. Credit 3 hours. Prerequisite: ET 213. Introduction to electronics including characteristics and applications of diodes, transistors (BJT and FET), logic gates, digital and analog integrated circuits, operational amplifiers, and active circuits using op amps as well as concepts of power electronics including inverters and converters. Analysis and design of analog electronic circuits involving rectifiers, amplifiers, oscillators and other components will also be discussed. A laboratory fee is required for this course. (Fall)

226. Electronics II. Credit 3 hours. Prerequisite: ET 225. Review of semiconductors, diode theory and circuits, and BJT transistors. Introduction to transistor biasing, AC models, voltage amplifiers, CC and CB amplifiers, JFETS, Thyristors, differential amplifiers, operational amplifiers and circuits. A laboratory fee is required for this course. (Spring)

231. Surveying I. Credit 3 hours. Prerequisite: ET 100. Engineering principles and practices of surveying applied to instrumentation, computation, and construction site layout dealing with both commercial and residential construction. Two hours of lecture and two hours laboratory per week. A laboratory fee is required for this course. (Spring)

232. Surveying II. Credit 3 hours. Prerequisite: ET 231. Theory and supervised field practice 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. A laboratory fee is required for this course. (Fall)

241. Introduction to Engineering Materials. Credit 3 hours. Prerequisite: MATH 162 or registration for or prior credit for MATH 175. An introduction to engineering materials with focus on mechanical behaviors of materials, material properties, industrial applications, limitation and selection of materials. Topics include atomic structure and bonds, stress and strain analysis, engineering structures, environmental consideration, limitations and failures, and properties testing and measurement of materials. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Summer, Fall, Spring)

244. Construction Regulations, Contracts, and Specifications. Credit 3 hours. Prerequisite: ET 132. A study of codes and specifications required by municipality, counties/parishes, and states as well as construction contracts and professional ethics. Topics include contractual relationships amongst construction parties, types of agreements, worker's compensation, insurance, and ethics in construction. (Fall)

271. Engineering Statics. Credit 3 hours. Prerequisites: MATH 175 and PHYS 191. This course uses vector methods for the study of force, coupled 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 and applications of dry friction models. A laboratory fee is required for this course. (Summer, Fall, Spring)

283. Manufacturing Processes. Credit 3 hours. Prerequisite: ET 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, special processing and assembly technologies, engineering metrology and instrumentation, and other aspects of manufacturing. A laboratory fee is required for this course. (Spring)

305. Human Factors Engineering. Credit 3 hours. Prerequisite: Junior standing. This course provides the student with a basic knowledge of human factors design principles and the nature of human interaction with their environment. The course introduces cognitive engineering, ergonomics, system design, and the nature of human performance in the workplace. (Fall, Spring)

320. Microprocessors and Interfacing. Credit 3 hours. Prerequisite: CMPS 297 or ET 215. An introduction to principles of microprocessor and microcontroller operation, CPU, memory, buses and I/O interfaces. Topics include microcomputer-based system design, Windows programming, and interfacing. This course includes a design project. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Spring)

322. Programmable Logic Controllers. Credit 3 hours. Prerequisite: ET 215. This course provides a practical application of processes using variety of Programmable Logic Controllers that are commonly used in industry. It includes selecting and working with multiple modules while learning about ladder logic design and structured text programming. The class covers PLC expressions, operators, conditional statement and loops and their applications in mechanical and electrical systems. This course also includes PLC hardware connections, troubleshooting and the use of HMI. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Varies)

325. Digital Electronics. Credit 3 hours. Prerequisite: ET 225. Review of semiconductors and BJT transistors. Introduction to transistor biasing, small-signal AC models, voltage amplifiers, CC and CB amplifiers, JFETS, Thyristors, differential amplifiers, operational amplifiers, EPROM, and digital circuits and applications. A laboratory fee is required for this course. (Spring)

331. Commercial Construction Estimating I. Credit 3 hours. Prerequisite: ET 132. Fundamentals of construction estimating procedures, with analysis of light commercial construction prints and specifications to determine the quantity of materials, labor, equipment and overhead as well as profit as it relates to the bidding process. The use of traditional estimating practices and current computer software for the development of construction bids will also be discussed. (Spring)

332. Commercial Construction Estimating II. Credit 3 hours. Prerequisite: ET 331. An advanced study of heavy construction estimating for commercial, civil, and industrial construction projects. Includes advanced mathematics to solve conceptual problems that determine the unit price, labor cost, detailed estimating, overhead allocation, bidding strategies, and bid formula. Also includes use of latest estimating software for the development of construction bids for simulated projects. (Fall)

334. Reinforced Concrete Design. Credit 3 hours. Prerequisites: ET 132 and 271. Discussion about materials, constructability, and specifications related to reinforced concrete (RC) elements such as beams, girders, slabs, columns, and foundations in accordance with current ACI codes and standards. Topics include design and analysis of RC flexural members, shear resistance or RC and effect of combined compression and bending on RC columns. (Fall)

336. Steel Design. Credit 3 hours. Prerequisite: ET 132 and ET 271. The application of principles of strength of materials to the design and analysis of structural steel beams, columns, trusses and frames, as well as connection and base plates in accordance with current AISC specifications. The class also covers using finite element software to design simple steel structures. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Spring)

341. Electromagnetics. Credit 3 hours. Prerequisite: ET 214. Introductory course on electromagnetic. Topics covered: fundamental concepts and applications of Maxwell equations including static electric, magnetic fields, dielectric and ferromagnetic materials using Laplace's equation. A laboratory fee is required for this course. (Varies)

353. Total Quality Management. Credit 3 hours. Prerequisite: IT 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 on 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. (Varies)

355. Management of Technical Organizations. Credit 3 hours. Prerequisite: MATH 175. An introduction to industrial management principles. It covers topics in organizational, such as organizational strategy and conflict management; in technology management; such as technology transfer and new product development, and in human resources management, such as labor relations and legislation. (Varies)

357. Auto Identification and Data Capture. Credit 3 hours. Prerequisite: CMPS 173. This course provides the students with an understanding of different auto identification and data capture technologies and their applications in manufacturing and distribution industries. Topics include bar coding, radio frequency identification, magnetic stripe, voice data entry, radio data terminals, and optical character recognition. (Varies)

361. Solar Thermal Systems. Credit 3 hours. Prerequisites: PHYS 191 and MATH 200. An introduction to solar thermal systems and their applications. Topics include solar radiation, solar thermal materials, solar thermal collectors, solar energy storage, solar cooling, solar thermal power systems, solar thermal efficiency evaluation, and economics of solar thermal systems. (Spring)

362. Solar and Geothermal Systems. Credit 3 hours. Prerequisites: PHYS 191 and MATH 200. This course introduces fundamentals of solar thermal process, solar thermal collectors, solar energy storage, solar cooling, analysis and design of photovoltaic modules, battery, inverters, charge control method, grid integration, and economic impact of solar systems. Topics also include discussion of geothermal systems, the direct and indirect use of geothermal energy in heating and electricity generation, and solar thermal systems and their applications. (Fall)

363. Photovoltaics. Credit 3 hours. Prerequisite: ET 225 or permission of Department Head. An introduction to photovoltaic systems and their applications. Topics include fundamentals of solar radiation, design and construction of solar cells, and basics of semiconductor devices and circuits. The course will also discuss analysis and design of photovoltaic systems including photovoltaic modules, battery, inverters, charge control method, grid integration, and economic impact will also be discussed. (Spring)

365. Power Electronics. Credit 3 hours. Prerequisite: ET 225. An introduction to power electronic devices, circuits, and their applications. Topics include characteristics and analysis of power semiconductor devices, rectifier and switching power supply circuits, AC/DC, DC/AC converters, and computer modeling and simulation. (Varies)

371. Engineering Dynamics. Credit 3 hours. Prerequisite: ET 205 or permission of Department Head. This course uses vector methods for the study of two-dimensional as well as three-dimensional kinematics and kinetics of particles, systems of particles, and rigid bodies. Topics include equations of motion, conservation of energy and momentum, principles of linear impulse and momentum, work and energy methods. A laboratory fee is required for this course. (Spring)

375. Applied Thermodynamics. Credit 3 hours. Prerequisites: MATH 200 and PHYS 191. An introduction to the fundamentals of gas concepts. gas measuring devices, and calibration of measuring instruments. Topics also include vapor and gas cycles, ideal gas mixtures, reading of psychometric charts, determining fuel combustion efficiency of steam generating systems such as boilers and measuring of analyzing humid air and steam conditions including heat content. Basic concepts of Rankine cycle as the basis for steam and heat engine operations will also be introduced. (Fall)

376. Applied Fluid Mechanics. Credit 3 hours. Prerequisite: ET 205. This course provides a comprehensive introduction to the basics of fluids and fluid mechanics as well as applications in engineering and science. Topics include fluid statics and dynamics, fluid energy and flow measuring devices, fluid components and systems. (Fall)

381. Strength of Materials. Credit 3 hours. Prerequisites: ET 241 and ET 271. This course covers advanced topics in analysis of engineering materials and design of mechanical systems. Main focus will be given to mechanical behavior and mechanics of engineering materials, including fracture and failure as well as strength analysis. A laboratory fee is required for this course. (Fall)

385. Mechanical Design. Credit 3 hours. Prerequisite: ET 381. This course covers kinematic analysis and design of mechanisms, analysis of machine elements in terms of mechanical behavior of materials, stress concentration, combined stresses, fracture, and fatigue. Traditional methods and Finite Element Modeling and Analysis (FEM/FEA) are used. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Spring)

386. Machines and Controls. Credit 3 hours. Prerequisites: ET 202 and 213. An introductory control and instrumentation course applied to machine control. Topics include electrical

measurements and instrumentation, motors and generators and their control, feedback control systems, and programmable logic controllers. A laboratory fee is required for this course. (Fall)

390. Engineering Economics. Credit 3 hours. Prerequisite: Junior standing. This course provides basic economic knowledge for analyzing financial performance of engineering projects. It includes the study of design economics, time value of money, depreciation, taxes, capitalization and amortization, replacement analysis, and risk analysis techniques. (Varies)

400. Internship. Credit 3 hours. Prerequisites: Junior or Senior standing and permission of the Department Head. Student must be an integral part of an engineering project team in industry during the semester. Graded as Pass/Fail only. This course can be repeated but only 3 credit hours can count as a technical elective. (Summer, Fall, Spring)

409. Special Topics. Credit 3 hours. Prerequisite: Permission of Department Head. Organized class or individual instruction on topics that are appropriate for the Engineering Technology program. May be repeated when topics vary for a maximum of 6 credit hours. (Varies)

410. Signals and Systems. Credit 3 hours. Prerequisites: ET 202 and 205. This course covers signal and system analysis. Topics include analysis techniques for signals and systems in both time and frequency domain. It discusses the modeling, simulation and response of dynamic systems using Laplace transform methods and introduces the response parameters of first and 2nd order system responses. It also covers the time and frequency responses of dynamic systems and gives introduction to feedback control. (Fall)

421. Industrial Electrical Machinery and Controls. Prerequisites: ET 214 and 225. A study of Industrial Electrical Motors and their controls including the operating characteristics and applications of various AC and DC motors, motor drives using variable frequency and speed drives, electromagnetic controls, and trending industrial topics. (Varies)

422. Mechatronics Systems. Credit 3 hours. Prerequisite: ET 322. This course provides a comprehensive and practical approach to designing a Mechatronics system to solve the needs of an industrial process. This includes the proper selection of the mechanical motion and requirements, selection of the actuation elements, calculation of the power requirements, design of the drive circuitry and the control method, selection of the transducers, and selection of the PLC modules to run the process. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Varies)

425. Control and Automation. Credit 3 hours. Prerequisites: ET 202 and 205. This course covers control systems analysis and design. Topics include time and frequency domain modeling and response, actuators and sensors for controlling programmable logic controllers, design of compensators, and use MATLAB for control system analysis. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Fall, Spring)

431. Power Transmission and Distribution. Credit 3 hours. Prerequisite: ET 214 or permission of Department Head. This course introduces fundamental concepts and systems related to generation, transmission, and distribution of AC and DC electrical power. Modeling and analysis of polyphase circuits, generators, motors, and transmission lines will be discussed. (Fall)

433. Wind Turbines. Credit 3 hours. Prerequisites: MATH 200 and PHYS 191 or permission of Department Head. This course discusses fundamental concepts, technologies, applications, impacts, and economics of wind turbines. Topics include physical principles of wind energy conversion, wind blade and rotor aerodynamics, tower design, mechanical drive train, electrical and control systems, installation and maintenance, environmental issues, and costs of wind turbines. (Fall)

434. Geothermal Systems. Credit 3 hours. Prerequisite: Senior Standing. An overview of different types of geothermal systems. Topics include characteristics of geothermal systems, system components, geothermal resources and exploration, scope of geothermal projects, preliminary survey and well testing, direct use of geothermal heat and indirect use for electricity generation, and related legal aspects. (Varies)

435. Electrical Machines. Credit 3 hours. Prerequisite: ET 213. An introduction to electrical machines and their applications. Topics include fundamentals of electricity and magnetics, energy and power, transformers, AC and DC generators, AC and DC motors, and motor drives. (Varies)

436. Fluid Dynamics & Hydrodynamic Machinery. Credit 3 hours. Prerequisites: PHYS 191 and MATH 200. An introduction to hydrodynamic machines. Topics include fundamentals of fluid mechanics, momentum transfer and rotor dynamics, rotodynamic machines, and positive displacement machines such as turbines, pumps, fans, and compressors. (Varies)

441. Construction Planning and Scheduling. Credit 3 hours. Prerequisite: ET 332. An introduction to the methods and procedures used in planning and scheduling commercial construction

projects. Topics include critical path methods (CPM), program evaluation and review techniques (PERT), and PRIMAVERA. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Spring)

442. Construction Inspection. Credit 3 hours. Prerequisite: ET 132. This course discusses construction inspection, functions, responsibilities, authority and technical requirements related to construction industry. (Spring)

443. Foundation and Soil Mechanics. Credit 3 hours. Prerequisites: ET 132 and ET 271. This course aims to give knowledge and understanding of basic soil properties, weight volume relationship, soil classification, flow of water through soils, soil compaction and bearing capacity. The course also covers the 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. A laboratory fee is required for this course. (Spring)

445. Commercial Architecture. Credit 3 hours. Prerequisite: ET 132. Analysis and solution to 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. A laboratory fee is required for this course. (Varies)

446. Construction Systems. Credit 3 hours. Prerequisite: ET 244. A study of the economic and functional application of construction equipment including the types of equipment, ownership and operational costs as well as equipment scheduling and selection. Design, installation, and operation of materials and equipment in the HVAC and plumbing systems for residential and commercial construction with also be discussed. (Varies)

448. Construction Hydraulics. Credit 3 hours. Prerequisites: PHYS 191 and MATH 200. A study of physical phenomena of hydraulics and hydraulic forces with application of fundamental laws and empirical formula. Pressures and forces on submerged areas, buoyancy, flow in a closed conduit, open channels, and fluid measurements will also be discussed. (Varies)

463. Cost Estimating. Credit 3 hours. Prerequisites: ET 390 and IT 406 or permission of Department Head. A study of the fundamentals of cost estimating for labor, materials, and overhead for products, projects, operations, and systems. The concepts of internal and external cost estimating, types of costs, ethics, budgets, and profits will also be discussed. (Varies)

465. Industrial Simulation and Modeling. Credit 3 hours. Prerequisite: IT 406. This course introduces computer simulation methods and techniques used for analysis of manufacturing and service operations encountered in manufacturing industries. Topics include industrial simulation software, data analysis, optimization and how to simulate a complex system. (Varies)

475. National Electrical Code. Credit 3 hours. Prerequisites: ET 214 and Senior standing. An introductory study of current electrical code requirements using NFPA 70 National Electrical Code. Topics include study of electrical safety requirements with emphasis on wiring designs and methods, over-current protection, selection of material and equipment for general use, and basic calculations. (Varies)

478. HVAC. Credit 3 hours. Prerequisites: ET 375 and ET 386. An introduction to 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. (Spring)

480. Advanced Strength of Materials. Credit 3 hours. Prerequisites: ET 271 and ET 381. A study of advanced topics of stress/strain analysis using Finite Element Method (FEM) with application to machine design. Topics include mechanical behaviors of materials and structures subjected to various loading conditions, such as tension, compression, torsion, and flexure. Deflection of prismatic members, columns, and combined stresses will be discussed. (Varies)

484. Advanced Manufacturing Technologies. Credit 3 hours. Prerequisite: ET 283 or permission of Department Head. This course covers advanced and non-traditional manufacturing processes, such as the application of lasers and other modern methods in manufacturing processes, high speed machining technologies, advanced treatment of metal forming processes, and particulate material processing. Students are required to participate in research and development of a specific manufacturing area of particulate material processing. Students are required to participate in research and development of a specific manufacturing area of interest. (Varies)

488. Robotics and Automation. Credit 3 hours. ET 213 and Senior standing. An introduction to robotics and automation. Topics include 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. A laboratory fee is required for this course. (Varies)

490. Seminar. Credit 1 hour. Prerequisite: ET 493. Discussion of social, ethical, and professional issues. Presentations and research on topics of current interest in engineering and technology. Grades assigned on a Pass/Fall basis only. (Fall, Spring)

492. Project Management. Credit 3 hours. Prerequisite: Junior standing. This course covers the principles of project management for technologists and the use of project management software. Topics include the concepts involved in review techniques, network modeling, and the critical path method. In addition, linear programming and network optimization models with application to solve project management problems will be discussed. (Summer, Fall, Spring)

493. Senior Design I. Credit 3 hours. Co-requisites: ET 492 and Senior standing. This course is the first part of the Capstone Design Project. It 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. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Fall, Spring)

494. Senior Design II. Credit 3 hours. Prerequisites: ET 493 and Senior standing. This course is the second part of the Capstone Design Project. It builds on and extends the themes covered in ET 493, culminating in a written Capstone Design Project and an oral presentation to the ET faculty and students at the end of the semester. The capstone project can take a variety of forms, such as analytical, computational, design-based, or experimental. Social, ethical, and professional issues as well as research on topics of current interest in engineering and technology will also be discussed. Two hours of lecture and two hours of laboratory per week. A laboratory fee is required for this course. (Fall, Spring)