

**Central Ohio Technical College
Course Description Listing
2006-2007 Academic Year**

ENGINEERING TECHNOLOGIES COURSES: 3000

3018 PC Hardware: Troubleshooting and Maintenance

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: None. Course is graded A-E.

This course offers a detailed study of microcomputer systems hardware modules. Combining theory and practice the course will cover module level maintenance, repair, replace, and retrofit and upgrading trade-off decision parameters; and introductory troubleshooting, with a focus on software troubleshooting. Students will remove and replace defective modules, perform hardware upgrades, and install software with attendant hardware boards. Students will gain experience in the assembly and disassembly of microcomputer stems.

3019 Electronic Drafting and Fabrication

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: None. Course is graded A-E.

This is a basic course that introduces electronic components, schematics symbols and basic drafting skills to Electronic Engineering/Electromechanical Engineering Technologies students. Fundamental orthographic and isometric drawing concepts are covered. The student is introduced to software used for drawing schematics, circuit simulation and PCB design. By assembling a small electronic instrument, the student will learn planning and design, component identification, breadboarding, printed circuit board technology, soldering, chassis assembly, troubleshooting approaches, calibration and meter use.

3025 Physics--Mechanics

5 credit hours, 6 contact hours (4 hours lecture and 2 hours lab). Prerequisite: 1226, or concurrent enrollment in 1226, or a score of at least 46 on the COMPASS Trigonometry test. Course is graded A-E.

Introduces the fundamental concepts of force, motion, statics, dynamics, and gravity. The study of energy, work, and power, with applications to basic machines and the practical effects of friction are included.

3028 Circuits I

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 1210. Course is graded A-E.

This introductory course presents the terminology and concepts necessary for understanding electrical units and laws and circuit analysis. Topics of study include direct current sources, series and parallel circuits, Ohm's law, Kirchoff's Laws, resistance, power, mesh analyses, capacitance, and inductance. Laboratory sessions include experiments, both simulated and bread boarded, verifying the lecture material through the proper use of voltmeters, ammeters, ohmmeters, and DC power supplies.

3029 Circuits II

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 1226 and 3028. Course is graded A-E.

The concepts introduced in 3028 are reviewed and applied to AC circuits. AC phasers, AC series and parallel networks, impedance, resonance, transformers and three phase power are new topics covered in this course. Laboratory experience includes use of function generators and oscilloscope, both simulated and real.

3032 Physics of Heat, Light, Sound

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: 3025. Course is graded A-E.

Fundamental concepts of matter including the properties of solids, liquids and gases. Temperature scales and the effect of heat on matter. The gas laws and change of state. Simple harmonic motion and the nature of sound. The nature of light and illumination, including applications of light: reflection, refraction, and dispersion.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3060 Overview of the Electrical Trades Industry**

3 credit hours, 4 contact hours (2 hours lecture and 2 hour lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

This course is an overview of the Electrical Trades Industry that focuses on the apprentices' responsibility, industry structure, and safety on the job. The course also introduces the apprentice to common materials and equipment typically found on a commercial or industrial work site.

3061 Blue Print Reading and Conduit Fabrication I

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

This course includes conduit fabrication and common installations of conduit plus the introduction to blueprints in which the student uses actual blueprints and construction specifications for a job.

3062 National Electrical Code I

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: 3062; Open to students accepted into the ETA program only. Course is graded A-E.

In this first course on National Electric Codes (NEC), the student will be introduced to the code and its importance on the job site. The student will also cover code topics in wiring and wiring devices.

3063 National Electrical Code II

6 credit hours, 6 contact hours (6 hours lecture and 0 hours lab). Prerequisite: 3062; Open to students accepted into the ETA program only. Course is graded A-E.

In a continued study of the national and local electrical codes for wiring, the student will learn wiring design and production, methods, materials, general use equipment, special occupancies, equipment and tables and diagrams for the solution of wiring problems.

3064 Blueprint Reading and Conduit Fabrication II

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: 3063; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student will examine grounding and bonding requirements for industrial and commercial electrical installations. Using a combination of lessons, National Electric Code sections and labs, the student will explore all facets of grounding and bonding. The student is introduced to a variety of real world applications requiring a fundamental understanding of electrical theory, codes and installation practices. Topics include grounding requirements for AC systems, service equipment, ground faults and testing.

3065 Test Instrumentation and Safety

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

An introduction to basic Test Instruments and Transformers, the student will learn the theory of operation and use of analog meters, Digital Multimeters, and Oscilloscopes. Emphasis will be placed on accurate safe measurement techniques. The student will also learn basic transformer theory.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3066 Electrical Grounding**

6 credit hours, 6 contact hours (6 hours lecture and 0 hours lab). Prerequisite: 3063; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will examine grounding and bonding requirements for industrial and commercial electrical installations. Using a combination of lessons, National Electric Code sections and labs, the student will explore all facets of grounding and bonding. The student is introduced to a variety of real world applications requiring a fundamental understanding of electrical theory, codes and installation processes. Topics include grounding requirements for AC systems, service equipment, ground faults and testing.

3067 Industrial Blueprints and Advanced Transformers

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 3064; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student using grounding and bonding skills from previous lessons will apply the knowledge to common industrial and commercial electrical applications. The student will explore the mathematics and science of three phase grounded systems. Topics include advanced three phase (WYE and DELTA) transformers, calculating ground faults, and using complex industrial blueprints.

3068 Advanced Codes and Practices

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 3063; Open to students accepted into the ETA program only. Course is graded A-E.

In a continued study of the national and local electrical codes for Overcurrent, ground faulty and short circuit protective devices, the student will learn the fundamentals of circuit protection. The student will learn how to calculate the load and apply the correct circuit protection for various applications.

3069 Motors and Motor Control I

5 credit hours, 6 contact hours (4 hours lecture and 2 hours lab). Prerequisite: 3082; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student begins an in-depth study of motors and industrial motor control systems. The student first learns the operation and construction of polyphase AC motors and DC motors, then applies those skills to commercial and industrial applications and their controls. Topics include polyphase motors, basic motor control applications.

3070 Lightning Protection and HVAC

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: 3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student begins a study of HVAC fundamentals, Lightning protection systems, and Locating Cable faults pertaining to applications found in modern commercial and industrial environments.

3071 OSHA 30

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded S/U.

This course provides in-depth coverage of OSHA policies, procedures and standards, as well as construction safety and health principles. Topics include scope and application of the OSHA construction standards, fall protection, electrical safety, excavations, trenching, personal protective equipment, ladders, lockout/tagout and scaffolds as well as hazard communication, fire protection, hand tools, power tools, welding, cranes, hoists, power transmission, asbestos, mechanized equipment and concrete. Special emphasis is placed on those areas that are the most hazardous, using OSHA standards as a guide. Upon successful course completion, the student will receive an OSHA construction safety and health 30-hour course completion card. This course is graded Satisfactory/Unsatisfactory.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year**

3072 Program Logic Controllers for Electricians

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3069; Open to students accepted into the ETA program only. Course is graded A-E.

This course of study provides the electrical worker with hands-on exposure to PLC's and their associated installation and programming requirements. The student will learn basic ladder logic and PLC programming.

3073 Fire Alarm Systems

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student will use skills from previous lessons and apply the knowledge to Fire Alarm systems. Using a combination of lessons and labs, the student will explore the mathematics and science of fire alarm applications. Topics include using complex blueprints, fire alarm installation requirements, code requirements for fire alarm applications.

3074 Automated Networks and Special Code Applications

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course, the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. Using a combination of lessons, National Electric Code sections and labs, the student will explore the mathematics and science of Automated Networks and special power systems. Topics include using complex blueprints, and Automated and Integrated building networks.

3075 Advanced Test Instruments

4 credit hours, 4 contact hours (4 hours lecture and 0 hours lab). Prerequisite: 3065; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. The student will explore Measurement techniques, Instrumentation fundamentals, calibration, Installation and Maintenance.

3076 Distributed Generation

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: 3068; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial Distributed Generation Systems. Topics include uninterrupted Power Supplies, Solar Photovoltaic Systems and Fuel Cells.

3077 High Voltage and Insulation Testing

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 3065; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. The student will explore the process of detecting, testing and safety measures of High Voltage testing. Power Quality is explored to understand, identify, troubleshoot and repair Power Quality problems. Topics include High Voltage safety and testing measures, Power Quality concepts, problems, harmonics and system troubleshooting.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year**

3078 Telephone and Security Systems

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3074; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will use skills from previous lessons and apply the knowledge to common industrial and commercial electrical applications. Using a combination of lessons and labs, the student will explore Basic Telephone and Security systems.

3079 OSHA 10

1 credit hour, 1 contact hour (1 hour lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded S/U.

This course provides in-depth coverage of OSHA policies, procedures and standards, as well as construction safety and health principles. Topics include scope and application of the OSHA construction standards, fall protection, electrical safety, excavations, trenching, personal protective equipment, ladders, lockout/tagout and scaffolds and hazard communications. Special emphasis is placed on those areas that are the most hazardous, using OSHA standards as a guide. Upon successful completion of the course, the student will receive an OSHA construction safety and health 10-hour course completion card. This course is graded Satisfactory/Unsatisfactory.

3080 Mathematics for Electrical Workers I

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: Open to students accepted into the ETA program only. Course is graded A-E.

First year inside apprentices continue their studies with an in-depth overview of mathematics used in field. Topics studies include fractions, trigonometric functions, prefixes and powers of ten, algebraic equations and calculating square roots. The student will also review standard and metric conversions.

3081 Physics - DC Theory for Electricians

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: 3080; Open to students accepted into the ETA program only. Course is graded A-E.

An introduction to direct current fundamentals, electron physics, current and voltage, work, power series and parallel resistances, electrical measurement devices, circuit analysis.

3082 Physics - AC Theory for Electricians

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3081; Open to students accepted into the ETA program only. Course is graded A-E.

Properties of alternating current, AC measurements, inductance and inductive, reactance, capacitance, impedance, series and parallel circuits, resonance, power and power factor correction, single and three phase transformers and load analysis are discussed.

3083 Mathematics for Electrical Workers II

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: 3080; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student will learn basic Trigonometry functions and right triangle theory. Topics covered will include Pythagorean's Theorem, scalars, vectors, phasors, and complex numbers.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3084 Physics-Electronics for Electricians**

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: 3083; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student is introduced to electronic theory that applies to industrial and commercial electrical systems. Through the use of lessons and labs, the student is exposed to most basic components found in electronic circuits. The student is introduced to a variety of real world applications requiring a fundamental understanding of electronics and electronic components. Topics include semiconductors, diodes, SCRs, transistor, rectifiers, amplifiers, integrated circuits, oscillators and timers.

3085 Physics - Digital Electronics for Electricians

4 credit hours, 5 contact hours (3 hours lecture and 2 hours lab). Prerequisite: 3084; Open to students accepted into the ETA program only. Course is graded A-E.

In this course the student begins an in-depth study of digital electronics. The student is exposed to Boolean Algebra, along with some characteristics of logic circuits, while building upon the binary number system and computer mathematics to explore memory, RS, flip-flops, binary arithmetic circuits, clock circuits, and digital switching circuits.

3101 Multimedia I

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: Completion of the Network Certificate or permission of the Academic Director. Course is graded A-E.

This course covers the architectural concepts of a multimedia system. Specifically, the student will learn such things as effective placement of microphones, speakers, cameras, video displays, projection systems, and proper lighting and acoustics. The lecture material will be augmented by hands-on laboratory exercises.

3102 Multimedia II

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: 3101. Course is graded A-E.

This course covers the operational and maintenance aspects of a multimedia system. Specifically, the student will learn such things as the operation and maintenance of lighting systems, projection systems, and image capture systems, and various communication media, including traditional cabling arrangements and wireless configurations. The lecture material will be augmented by hands-on laboratory exercises.

3103 Systems Troubleshooting

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: 3102. Course is graded A-E.

This course covers troubleshooting of complete systems, including the hardware, software, and networking components. Specifically, the student will learn how to isolate system troubles and implement appropriate solutions and fixes. The lecture material will be augmented by hands-on laboratory exercises.

3132 Communications Electronics I

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: (3131 or 3133). Course is graded A-E.

Includes the theory and operation of power supplies, oscillators, AF and RF amplifiers, AM Transmitters and Receivers, SSB, Testing and Alignment, and Troubleshooting of Communication Systems. Laboratory experiences consist of construction of basic circuits, test and repair of commercial units, and the use of specialized test equipment.

3133 Electronics I

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 3029. Course is graded A-E.

The student will pursue the study of the theory and operation of semiconductor diode and transistor circuits. Equivalent circuits, large and small signal analysis, and biasing circuits are also discussed. Laboratory sessions, both bread boarded and simulated, emphasize transistor in audio amplifiers.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3144 Linear Integrated Circuits**

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 1231 and (3131 or 3133). Course is graded A-E.

Includes semi-conductor devices and circuits, junction field effect transistors, MOSFET, linear integrated circuits, operational amplifiers and optoelectronic devices.

3152 Communications Electronics II

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: 3132. Course is graded A-E.

Continues the concepts presented in 3132 and introduces AM-FM broadcasting, stereo, wave propagation, antennas, directional antennas, transmission lines and special communication techniques, satellite, fiber optic, microwave and data communications. The laboratory work consists of testing and troubleshooting existing equipment and systems.

3154 Digital Electronics I

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 1600 (or concurrent enrollment in 1600) or permission of the instructor or the Academic Director. Course is graded A-E.

Students pursue the study of digital logic elements such as logic gates, flip-flops, counters and shift registers. The study of math as used in digital circuits is covered in laboratory and lecture.

3164 Digital Electronics II

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 1600 and 3154 or equivalent. Course is graded A-E.

The architecture of a microprocessor is studied in this course. The buss architecture of several common busses will be discussed. The programming of a microprocessor in both machine and assembly language will be introduced.

3167 Digital Electronics III

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 3164. Course is graded A-E.

The study of circuit elements used in microprocessor systems. Includes the study of microprocessor busses, memory devices, series and parallel output devices and programmable peripheral interface devices. Laboratory projects focus on the application of these devices and the associated control software.

3185 EET Capstone Design Course

3 credit hours, 6 contact hours (0 hours lecture and 6 hours lab). Prerequisite: 3132, 3144, and (3316 or 3326), or permission of the instructor. Course is graded A-E.

The student will work in small groups to design and build an operational electronic project that demonstrates the knowledge acquired during the completion of their EET degree. During these projects, the student is expected to contribute to each aspect of the project, to participate in group planning, to participate in the final demonstration, and to use the lab time efficiently.

3243 Hydraulics and Pneumatics

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: C grade (2.00) or better in 3025 or (3027 or 3029). Course is graded A-E.

This course covers hydraulic and pneumatic fluid power systems. First, basic principles and laws and their influence are described. Types of pressure, flow, and directional control valves are presented and analyzed. Students learn to select and size pumps and actuators for specific applications. Complete circuits are studied and analyzed, and basic electrical control of fluid power circuits is introduced.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3244 Industrial Power**

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: (3027 or 3029). Course is graded A-E.

This course covers the use and control of industrial electronic power. Control of AC loads with semiconductor devices used in conjunction with phase-shift, timing, and opto-electronics is explored and reinforced with laboratory experiments. Types of DC and AC single and three phase motors and their operating characteristics are studied. Basic motor control devices and circuits as well as current electronic motor control technology are studied and then used in the lab. During these laboratory experiences, students will also learn wiring practices and how to select and apply proper protection devices.

3252 Programmable Logic Controllers

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: C grade (2.00) or better in (3027 or 3029) and 3154. Course is graded A-E.

This course includes electrical control of Fluid Power/Electrical systems with relay ladder diagrams, but concentrates mainly on PLC's and their use for control of on/off electrical devices. Sensing devices such as limit and temperature switches and control switches and their use in ladder circuits are reviewed. Timing and counting devices as well as event-driven and time-driven sequencing schemes are studied. Architecture, use, and programming of PLC's are covered and reinforced in practically oriented laboratory projects.

3253 Mechanical Components and Mechanisms

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: C grade (2.00) or better in 3025. Course is graded A-E.

Mechanical elements of power transmission including gears, levers, chains, belts, and pulleys are introduced and the student will learn basic design rules for these elements. The course also includes analysis of simple power trains and linkage devices, and the study of the nature of gear tooth contact.

3257 Statics and Strength of Materials I

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 1226 (or a score of at least 46 on the COMPASS Trigonometry test) and 3025. Course is graded A-E.

Includes the study of static forces and equilibrium and the resultant stress, strain, deformation, failure and strength requirements in straight-line tension structures, compression and bearing members, shear elements, torsion elements, and angled structures.

3258 Statics and Strengths of Materials II

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 3257. Course is graded A-E.

Includes the study of static forces and equilibrium and the resultant stress, strain, shear and bending considerations in the design and selection of trusses, rectangular beams, built up beams, and standard structural members.

3261 Electromechanical Systems

5 credit hours, 9 contact hours (3 hours lecture and 6 hours lab). Prerequisite: 3252. Course is graded A-E.

Concepts and applications of sensors, controllers, actuators, and industrial processes used in closed loop process control are studied in this course. System stability and controller tuning are explored. The use of PLC's for analog process control is also covered. For laboratory activities, the student will make use of material from previous courses to complete capstone design projects typical of industrial process control applications.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3262 Industrial Instrumentation**

4 credit hours, 6 contact hours (2 hours lecture and 4 hours lab). Prerequisite: C grade (2.00) or better in (3017 or 3028) and 3032. Course is graded A-E.

Students will measure various physical quantities by using industrial sensors. Specifications and suitable applications as well as calibration procedures for different types of sensors will be discussed. Process and Instrumentation Drawings (P&ID) are introduced.

3303 Project and Certification

2 credit hours, 4 contact hours (0 hours lecture and 4 hours lab). Prerequisites: Second year standing in Electronic Engineering Technology. Course is graded A-E.

This course is divided into two components; the first consists of information on various technician certification and licensing, application for testing and practice testing. The second component is the preparation and planning for the TET project. The project should involve original research, if possible, or design of a circuit or process to satisfy a data communication problem.

3304 Video Systems

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: 3152. Course is graded A-E

This course emphasizes modern aspects of electronic communication systems and an in depth study of fiber optics, television systems, microwave equipment, satellite receiver equipment, CATV, DBS, HOTV, and systems design and analysis.

3306 Local Area Networks

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: 1600 (or equivalent computer operation experience). Course is graded A-E

This course is an introduction to local area networking with personal computers in small environments such as offices. Subjects covered include planning a LAN, selecting hardware and software, net management, installation, troubleshooting, and Internet working. Laboratory exercises involve constructing and operating a LAN. No knowledge of electronics is necessary, but familiarity with personal computer operation would be helpful, particularly the IBM PC and DOS.

3308 Telecommunications Capstone Course

1 credit hour, 3 contact hours (0 hours lecture and 3 hours lab). Prerequisite: 3303. Course is graded A-E

This course follows 3303 and is the implementation of the plan developed there. The student will construct, perfect, and demonstrate the project to the faculty and students and will submit a final report.

3316 Local Area Networks - Novel

4 credit hours, 5 contact hours (3 hours lecture and 2 hours lab). Prerequisite: 3306. Course is graded A-E

This course teaches the student to set up and maintain Novel networks. The student will install a Novel network and set up the working environment. The student will also learn how to detect and correct software and hardware errors associated with the network components.

3320 Data Communications

4 credit hours, 6 contact hours (3 hours lecture and 3 hours lab). Prerequisite: 3167 and 3306 or permission of the instructor. Course is graded A-E

This course introduces basic fundamentals related to data communication: analog and digital communication, multiplexing telephone systems, codes and formats, and error detection and correction.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3326 Local Area Networks - Microsoft**

4 credit hours, 5 contact hours (3 hours lecture and 2 hours lab). Prerequisite: 3306. Course is graded A-E.

This course teaches the student to set up and maintain Microsoft networks. The student will install a Microsoft network and set up the working environment. The student will also learn how to detect and correct software and hardware errors associated with the network components and applications.

3413 Production Planning and Control

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: None. Course is graded A-E.

Production planning and control is one of four major management functions within the production activity of manufacturing. It is involved with the systems and controls within the manufacturing environment that provides the efficient transformation of raw materials into a form that can be sold.

3414 Production Management

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: 3702. Course is graded A-E.

Manufacturing is a managed, human, productive activity. The goal of manufacturing is to efficiently change a raw material into a form that can be sold. Management is the sum of the practices that see that manufacturing efficiently moves the material through the various stages to the final sale. There are five major areas of activity in management: 1) Research and Development; 2) Marketing; 3) Production; 4) Industrial Relations; and 5) Financials. This course will review the importance of these five major activities as they relate to manufacturing. The production activity, which involves manufacturing engineering, production planning and control, manufacturing and quality control, will be studied in depth.

3415 Statistical Process Control

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: 1210 (or a score of at least 76 on the COMPASS Elementary Algebra test). Course is graded A-E.

Quality control is one of four major functions of the production activity within the manufacturing environment. The concern for quality production has led to a "building it right the first time" philosophy of manufacturing. Developing a product that meets quality standards now requires several activities: 1) designing for quality; 2) implementing quality processes; and 3) manufacturing for quality. This course will present an overview of the quality management system in today's manufacturing environment. The student will study the basic statistical methods and applications of Statistical Process Control within the production function of manufacturing.

3417 Forming Processes

3 credit hours, 6 contact hours (1 hour lecture and 5 hours lab). Prerequisite: None. Course is graded A-E.

This course covers forming processes used in industry. In the plastics area injection molding, extrusion, blow molding, thermoforming, and spray-up are studied. Students also study metal casting, bending and stamping processes.

3701 Civil Cad

2 Credit Hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3708 and 3733 or permission by instructor. Course is graded A-E.

This course will introduce the student to the use of CAD in preparation of civil drawings and calculations. Includes subdivision layout, contours, profiles, highway layout, and earthwork.

3706 Introduction to CAD

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: None. Course is graded A-E.

This is the first course in a series of Computer Aided Drafting courses. The students will gain familiarity with the system hardware, peripherals and software. They will learn to construct a basic dimensioned orthographic drawing with the CAD system.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
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3707 Intermediate CAD

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3702 or 3706. Course is graded A-E.

This is the second in a series of CAD courses building on a foundation of Introduction to CAD. Advanced concepts in CAD will be explored including symbol libraries, isometric and 3D constructions, using the block commands, creation of bill of materials and MS-DOS usage.

3708 Advanced CAD

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3707 within the last year. Course is graded A-E.

This course, the third in a series, builds on the concepts established in the first two CAD courses in which the student uses LISP routines to create custom menus, and to manipulate system variables. The concepts of 3-D drawing are taught include wire-frames, surfaced models, solid models, and rendering.

3709 Solid Modeling with CAD

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3708 or equivalent experience, and 3728 or equivalent experience. Course is graded A-E.

This course covers the development of 3-dimensional solid models using specialized software. The student will create individual parts and assemblies. Rendering and Finite Element Analysis will also be covered.

3717 Materials for Engineering Technicians

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: None. Course is graded A-E.

This course provides an overview of the fundamental characteristics of the materials used in heavy construction. Classification and proper use of materials, as well as, construction methods are investigated.

3718 Architecture History Survey

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: None. Course is graded A-E.

This course provides a survey of architectural traditions from early civilization to the modern architecture of the 20th Century, including buildings, landscape and planning.

3719 Advanced AEC CAD

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3708 or permission of the instructor. Course is graded A-E.

This advanced computer-aided drafting course is the fourth in the COTC CAD sequence, structured for students in the Drafting and Design Technology program. The student will use specialized CAD software for architecture and civil engineering applications. These applications include, but are not limited to, the following: 2D and 3D plans, details, schedules, roof forms, elevation drawings, equipment layouts, subdivision layouts, highway layouts, contours, profiles, and earthwork.

3728 Drafting II

3 credit hours, 6 contact hours (0 hours lecture and 6 hours lab). Prerequisite: 3702 or 3758. Course is graded A-E.

Developing the techniques learned in 3702, continues the study of drafting with the main emphasis on orthographic projection, sectioning, isometric drawings, perspectives, geometric constructions, auxiliary views, and lettering. Correct use of drafting instruments in the production of these types of drawings is stressed.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year**

3731 Introduction to Civil Drafting/Design

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: 1210 (or concurrent enrollment in 1210). Course is graded A-E.

This course is an introduction to the methods and practices of civil drafting. Includes surveying fundamentals, mapping, plot plans, contours, profiles, and highway layouts.

3733 Civil Drafting/Design II

4 credit hours, 7 contact hours (2 hours lecture and 5 hours lab). Prerequisite: 3717. Course is graded A-E.

This course, the second in a series of three civil drafting and design courses, focuses on site grading/earthwork and storm and wastewater systems.

3736 Civil Drafting/Design III

4 credit hours, 7 contact hours (2 hours lecture and 5 hours lab). Prerequisite: 3733. Course is graded A-E.

This course, the third in a series of three civil drafting and design courses, focuses on transportation systems and subdivision design. Topics covered include highways, urban roadways and railroads, and survey controls used in the design and layout of subdivision plats.

3737 Building Mechanical Systems

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: 3733 or 3766 or permission of the instructor. Course is graded A-E.

Mechanical systems for residential buildings are the focus for this course. Topics include plumbing, supply and drain, waste, vent design, heat loss calculations, climate control, and electric distribution. The student is also introduced to standard drafting practices related to plumbing, climate control, and electrical plan documents.

3739 Drafting III

3 credit hours, 6 contact hours (0 hours lecture and 6 hours lab). Prerequisite: (3702, or 3013 and 3706) and 3728 (or concurrent enrollment in 3728). Course is graded A-E.

This is the third in a series of drafting courses using both manual and CAD drafting methods. This course develops concepts in geometric dimensioning and tolerancing, threaded fastener designation and use. Also covered is welding symbols and joint design, structural steel detailing and piping layout.

3743 Mechanical Design I

5 credit hours, 10 contact hours (0 hours lecture and 10 hours lab). Prerequisite: C grade or better in 3707, 3728 and 3754 (or concurrent enrollment in 3754). Course is graded A-E.

The second in the series of Mechanical Design courses, this course specializes in mechanical design involving the principles of production, fasteners, with an emphasis on tolerances in the design and detail drawings of basic machines. Computer Aided Design is introduced in this course and its use is carried through all the mechanical design courses.

3746 Mechanical Material Forming

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: 3754. Course is graded A-E.

This is a beginning course in the theory and practice of forming metal and plastic materials for manufacturing purposes. Topics include machining, extrusion, casting, and stamping. Emphasis is on good design practices.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year**

3748 Materials of Construction

5 credit hours, 6 contact hours (4 hours lecture and 2 hours lab). Prerequisite: 1210 (or a score of at least 76 on the COMPASS Elementary Algebra test) and 3757. Course is graded A-E.

An overview of the fundamental characteristics of the most frequently used materials in modern construction is presented. Proper use of materials, construction methods, and detailing practices are investigated.

3752 Mechanical Design II

5 credit hours, 10 contact hours (0 hours lecture and 10 hours lab). Prerequisite: 3257, 3708 and 3743. Course is graded A-E.

This course includes an introduction to the calculation and design of dies, jigs, fixtures, and the study of gauges for dimensional control. The design of a major machine project is required of each student.

3754 Materials for Mechanical Design

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: None.

This course covers common materials used in modern manufacturing. Topics include environmental impact of the manufacture and use of ferrous, non-ferrous metals, plastic and composite materials. Also included is material specification, testing and best use in the manufactured product.

3757 Architectural Design I

4 credit hours, 7 contact hours (1 hour lecture and 6 hours lab). Prerequisite: 3706 or (3702 and 3728). Course is graded A-E.

This course, the first in the Architectural Design series, presents the theories and practices used in architectural drafting and design. Emphasis is placed on developing skills required in architectural drafting and design. Design theories, drafting, surveying, basic structural design, and cost estimating are introduced.

3758 Engineering Sketching

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: None. Course is graded A-E.

This is a beginning course to learn techniques to develop and document ideas through freehand sketching. Emphasis is on the development of sketching techniques, multi-view and isometric drawings, dimensioning, and blueprint reading.

3762 Mechanical Design IV

5 credit hours, 10 contact hours (0 hours lecture and 10 hours lab). Prerequisite: 3752. Course is graded A-E.

This is the final course in a series. This course includes product designs, solution of vector and rotational forces, linkage and joint design, and bearing selection, through a format of real life projects.

3766 Architectural Design II

4 credit hours, 7 contact hours (1 hour lecture and 6 hours lab). Prerequisite: (3702 or 3706) and 3757. Course is graded A-E.

In this course, the second in the Architectural Design series, the student is given a sequence of drafting and design projects involved in residential construction. Both manual and CAD drafting are used to produce a set of working drawings for a residence. Concepts introduced in other courses are further explored along with an introduction to design techniques and model building.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year**

3771 Structural Steel and Concrete

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: 3707 and 3728. Course is graded A-E.

This course covers the fundamentals of structural steel and reinforced concrete designing and drafting. Topics covered include practices and methods used in the graphical representation of structural steel and reinforced concrete structures. Basic stress calculations and design concepts are studied for use in simplified design and detailing.

3776 Architectural Design III

4 credit hours, 7 contact hours (1 hour lecture and 6 hours lab). Prerequisite: 3707 and 3766. Course is graded A-E.

The focus of this course, the third in the Architectural Design sequence, is on commercial construction. CAD drafting is employed to produce a series of working drawings representative of types drawn for a commercial building. Topics in design, building type study and code review are also included as they relate to the specific project.

3786 Drafting and Design Capstone Course

5 credit hours, 8 contact hours (2 hours lecture and 6 hours lab). Prerequisite: 3736 or 3776 or 3752. Course is graded A-E.

This is a capstone course structured to give the student experience in real world drafting, designing and engineering problems. The student should apply skills and theories learned in previous course work to complete team projects. This class is structured to simulate a real world office.

3819 Graphic Design History

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: None. Course is graded A-E.

A survey of the historical developments of graphic design communications including pivotal people and events that led to current methods and theories of digital media communication. The student will learn the rich history of graphic communications and how it relates to society

3820 Design Fundamentals

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3837 or 3860 or concurrent enrollment in 3860 or permission of the instructor or academic director. Course is graded A-E.

This course is an orientation to digital design, with emphasis on the history and the basic principles of digital design using key computer graphics tools.

3822 Digital Photography I

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: None. Course is graded A-E.

This course provides an introduction to the techniques and theories of digital photography, with an emphasis on the design of photographic images and learning to "see." The course covers pre-visualization, composition, image capture, simple digital editing of the image and final digital output. Through group critiques, the student will learn to appreciate and use photography as part of the communication process of design. A digital still camera of at least 3 Megapixels is highly recommended.

3823 Design for Print II

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3843. Course is graded A-E.

This course continues with the exploration of creating designs for print using page layout and illustration software. Design projects will focus on the use of digital design to solve communication problems and client needs.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3824 Fundamentals of Color**

3 credit hours, 5 contact hours (1 hour lecture and 5 hours lab). Prerequisite: 3820 or (concurrent enrollment in 3820 and 3860) or permission of the instructor or Academic Director. Course is graded A-E.

This course provides an introduction to the theory and applications of color and color perception, including hue, saturation and value and both additive and subtractive color as used in design and digital output for screen and print.

3825 Digital Photography II

2 credit hours, 4 contact hours (1 hour lecture and 3 hours lab). Prerequisite: 3822. Course is graded A-E.

This course continues the exploration of digital photography begun in 3822, expanding into uses of digital software tools to manipulate the image. The student will continue to hone his or her own creative vision in capturing and manipulating photographic images using digital technology. The student will focus on extending the photographic image beyond what the camera can see through the use of filters (physical and software), image compositing and physical deconstruction of the original image.

3826 Fundamentals of Typography

2 credit hours, 4 contact hours (1 hour lecture and 3 hours lab). Prerequisite: 3837 or 3860 or concurrent enrollment in 3860. Course is graded A-E.

This course is an introduction to the history of type and the use of the letterform in digital design. The student will use software tools to develop a creative understanding of and a technical competence in using type as both a holder of content and an integral part of digital design.

3828 Digital Video Production I

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3831, and (either 3822 or concurrent enrollment in 3822) or permission of the instructor or Academic Director. Course is graded A-E.

This course is an introduction to the creation and editing of digital video. The course covers the history of film and video and explores the various forms of the medium. The student will learn the basic underlying technology of digital video and create their own projects from motion studies to complete non-linearly-edited video stories.

3829 Digital Video Production II

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3828. Course is graded A-E.

This course continues the exploration of digital video production, and the focus of this course is on non-linear editing and special effects. Topics covered include audio, video, transitional effects, 2-D animation and compositing, and video compression for digital media.

3831 Fundamentals of Drawing

4 credit hours, 8 contact hours (0 hours lecture and 8 hours lab). Prerequisite: None. Course is graded A-E. This course has been approved by the Ohio Board of Regents as meeting the Transfer Assurance Guide (TAG) course OAH001 requirements.

This course explores the basic techniques of drawing, focusing on composition, proportion, perspective and the basic fundamentals of line, shape, contrast, texture, balance, and unity. Projects include studies of figures, nature and interiors with the purpose of developing an understanding of how to rapidly communicate with basic analog tools before using digital media.

3832 Multimedia Production I

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3820 and 3831 or permission of the instructor or Academic Director. Course is graded A-E.

This course is exploration into the design and programming of interactive media, with an emphasis on Flash. The student will explore both hand-animated graphics and more complex Actionscript projects.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3833 Multimedia Production II**

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3832. Course is graded A-E.

This course continues the exploration of interactive media, integrating audio, video, text, graphics and animation into a single program under interactive control. Topics covered include interactive databases and integration with other Web technology.

3835 Digital Media Design Project

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3823, 3824, 3825, 3826, 3828, 3832, 3836, and 3844 or permission of the instructor or Academic Director. Course is graded A-E.

The Digital Media Design Project course completes the study of digital media design with a quarter long project focused on the digital media specialty of the student's choice. The student will choose a project, preferably in partnership with a community business or association, to produce production quality work for his or her portfolio. The student is expected to work closely with the instructor and the project client.

3836 Mass Media Communication

3 credit hours, 4 contact hours (2 hours lecture and 2 hours lab). Prerequisite: None [3837 or 3860 (or concurrent enrollment in 3860) or 3820 (or concurrent enrollment in 3820) is recommended]. Course is graded A-E.

This course is an introduction to the history and development of mass media, from print to the interactive future. The student will study how communication, in particular marketing and advertising, has developed and will integrate theory with practical exercises in developing communication strategies and implementations. The student will gain experience in creating copy and content for various digital media.

3839 Web Design & Development I

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3837 or 3860 (or concurrent enrollment in 3860) or permission of the instructor or Academic Director. Course is graded A-E.

This course is an introduction to Web site design and development. The student will be introduced to XHTML, page markup, page layout including tables, frames and layers, and the use of scripting languages.

3840 Web Design and Development II

3 credit hours, 5 contact hours (1 hour lecture and 4 hours lab). Prerequisite: 3839. Course is graded A-E.

Building on the concepts and skills learned in 3839, the student will continue to examine website design, using interactive tools. Emphasis switches in this class from the basics of construction to an understanding of the Web visitor. Beginning with usability, the course will alternate with human-centered design and dynamic XHTML/XML, including Cascading Style Sheets, Layers, and Javascript.

3841 3-D Design & Animation II

3 credit hours, 5 contact hours (1 hours lecture and 4 hours lab). Prerequisite: 3838. Course is graded A-E

Continuing the design of 3-D models in software, the course expands on advanced rendering techniques such as radiosity and advanced animation, including inverse kinematics and bones.

3842 Digital Media Portfolio Capstone

2 credit hours, 4 contact hours (1 hour lecture and 3 hours lab). Prerequisite: 3823, 3824, 3825, 3826, 3828, 3832, 3836, and 3844 or permission of the instructor or Academic Director. Course is graded A-E.

This is capstone course structured to give the student experience in real world design problem solving. The student will apply skills learned in previous course work to develop several portfolio-level pieces, with an emphasis on design. The student will learn how to create an appropriate resume and portfolio for digital media.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3843 Design for Print I**

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3831 (or concurrent enrollment in 3831), 3820 or (3837 or 3860 plus concurrent enrollment in 3820) or permission of the instructor or the Academic Director. Course is graded A-E.

This course focuses on the layout of printed materials using standard digital page layout software. The student will focus on illustration and layout software while they explore the creation of projects such as brochures, advertisements, newsletters and other printed promotional materials, with an emphasis on the pre-press process and final printed output.

3844 3-D Design & Animation I

3 credit hours, 5 contact hours (1 hours lecture and 4 hours lab). Prerequisite: 3837 or 3860 or permission of the instructor or Academic Director. Course is graded A-E

This course is an introduction to the construction of three-dimensional models and environments with animated movement through those environments.

3850 Web Design & Development III

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3840 and 3832. Course is graded A-E.

This project-based course continues the exploration of Web development, expanding from XHTML with client-side languages, such as Javascript, with an introduction to server-side programming, such as CGI or PHP. The actual programming and scripting languages will remain flexible to reflect the latest industry standards. Emphasis is not on the syntax of programming but on problem solving, specifically as a course for Web designers.

3851 Information Design

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3823. Course is graded A-E.

This course provides an overview of information architecture through static and dynamic projects that emphasize visual problem solving. Students will learn to translate sometimes complex data into clear, visually compelling solutions.

3852 Motion Graphics

2 credit hours, 3 contact hours (1 hour lecture and 2 hours lab). Prerequisite: 3828. Course is graded A-E.

This course will focus on advanced projects in video compositing and motion graphics. Building on non-linear editing, the course explores compositing computer graphics and live video, special effects, and design of titles and animated graphics. The work of professional animators will be used to demonstrate techniques.

3855 Digital Media Internship

2 credit hours, 12 contact hours per week (0 hours lecture, 0 hours lab, and 12 hours internship) for a total of 120 contact hours. Prerequisite: Completion of all basic and level one technical coursework in the first four Plan of Study quarters, plus a grade of "B" (3.00) or better in 1532 and 1533. Course is graded A-E.

This course provides the student with the practical application of skills in graphic design, Web design, digital video production, interactive development, and/or other digital media design production at a business or agency. The internship correlates academic preparation with professionally supervised work experience.

3860 Digital Software Fundamentals

2 credit hour, 4 contact hours (1 hour lecture and 3 hours lab). Prerequisite: None. Course is graded A-E.

This is an overview course covering the background of digital media and an introduction to digital media software tools. The student will explore the layout of the interface for digital software programs most commonly used in digital media in preparation for further classes. This course should be taken before any digital media design course requiring the use of digital software.

**COTC Course Description Listing -- ENGINEERING TECHNOLOGIES COURSES
2006-2007 Academic Year****3910 Cooperative Work Experience/Architectural**

5 credit hours, 20 contact hours (0 hours lecture and 0 hours lab, 20 hours co-op directed practice). Prerequisite: 3702 (or 3013 and 3706), 3728, 3757 (3756 or 3755 or concurrent enrollment in 3757), a grade point average of 2.75 or greater, and permission of faculty advisor. Course is graded A-E.

This course, to be taken toward the end of the two-year Drafting and Design Technology, Architectural Major curriculum, is designed to give the student a real-world, office, work experience which uses the skills acquired earlier in the program. The course acts as a capstone, tying the concepts of the technology together and giving the student valuable job experience before graduation.

3990 Field Experience - Engineering

1-3 credit hours depending on the amount of work experience per week (1 credit hour per 12 hours work experience). Repeatable up to 12 credit hours. Prerequisite: 1525, 45 credit hours completed, and permission of Academic Director. Course is graded S/U.

This flexible course offering is composed of a paid work experience coordinated by the student's advisor. The work experience must be related to the student's academic program. Elective credit is awarded on a satisfactory/unsatisfactory basis.

39XX Special Topics in Engineering

1-5 credit hours. Prerequisite: Permission of instructor and Academic Director. Course is graded A-E.

Special topic study is designed to provide a student with the opportunity to work on special topics within the field of engineering under the directive of the Engineering faculty. This course may be substituted for an engineering technical elective course if it is applicable. The course may be repeated.