ELET - 1001 Seminar, 1.00 Credit
Level: Lower
This course is an examination of strategies for success, including organizational and study skills, and electrically related career opportunities for engineering technology students. The class entails textbook and research readings followed by written assignments. Topics include the variety of engineering technology and engineering careers, diversity in society and the technical workplace, sustainability, and ethics. Students make personal assessments of goals, values, strengths and weaknesses as related to college and technical career success. Employment application techniques addressed in assignments include resume writing, and letters of application. Research assignments use library and internet resources.

ELET - 1103 Circuit Theory I, 3.00 Credits
Prerequisite(s): MATH 1033 with D or better or MATH 1034 with D or better or MATH 1054 with D or better or MATH 1063 with D or better or MATH 1084 with D or better or MATH 2043 with D or better
Level: Lower
In circuit theory, a student will analyze electrical circuits according to the fundamental definitions and laws as they apply to direct current circuits. The physical parameters defined include charge, voltage, current, resistance, capacitance and inductance. The laws applied include Ohm's Law, Joule's Law, Kirchhoff's Voltage Law, and Kirchhoff's Current Law. The analysis relies on algebra and exponentials.

ELET - 1111 Digital Logic Laboratory, 1.00 Credit
Corequisite(s):
Level: Lower
Applied Learning-Other
This laboratory implements the theoretical principles of ELET 1133, Digital Logic. Students learn to build working circuits based upon design goals. Applications include examples of combinatorial and sequential logic such as adders, multiplexers, counters and 7-segment displays. Logic solutions utilize programmable logic devices and external interfaces as well as transistor-transistor logic integrated circuits, and simulation software. Written laboratory reports are required.

ELET - 1133 Digital Logic, 3.00 Credits
Level: Lower
Digital Logic introduces a student to two-state logic. Logic analysis will use the binary number system and Boolean algebra. Both combinational (AND-OR) logic and sequential (flip-flop) logic are studied. Typical logic designs include 7-segment displays, adders, multiplexers, and counters. Logic designs are implemented using simulation, programmable logic devices and transistor-transistor logic.

ELET - 1142 Electronic Fabrication, 2.00 Credits
Level: Lower
Applied Learning-Practicum
This course covers the fundamentals of prototype design, fabrication, and documentation. Major topics include: safety, sheet metal fabrication, printed circuit board design & fabrication, schematic & wiring diagram drafting & analysis, computer applications for schematic drawing & printed circuit board layout, circuit construction, troubleshooting fundamentals, soldering techniques, project parts procurement & cost analysis, and the ability to work in teams. Personal laptop computers are required.

ELET - 1151 Circuit Theory Laboratory, 1.00 Credit
Prerequisite(s): ELET 1104 with D or better * or ELET 1103 with D or better *
Level: Lower
Applied Learning-Other
Laboratory experiments parallel material presented in Circuit Theory. The theories and laws governing dc circuits are applied and verified. Hands-on building of electrical circuits reinforces the interpretation of schematic diagrams. Verification includes detailed analysis of the circuit under test by calculation, measurement, and simulation. Outside preparation and laboratory report writing are required.

ELET - 1202 Intro to Electrical Eng Tech, 2.00 Credits
Level: Lower
Applied Learning-Practicum
This is an introductory course related to the field of electrical engineering technology. Laboratory topics introduce the students to the fundamental electrical principles and practices. The student will be introduced to various electrical components such as resistors, capacitors, inductors, diodes, LEDs, transistors, and integrated circuits. Analog and digital meters will be used for measuring electrical quantities, such as resistance, voltage, and current, in electrical circuits. Circuit construction and operation, reading schematic diagrams, computer applications for schematic drawing and simulation, familiarization with electrical tools and fabrication, and soldering techniques will also be introduced.

ELET - 2103 Electronics Theory I, 3.00 Credits
Prerequisite(s): (ELET 1104 with D or better and ELET 1151 with D or better) or (ELET 1103 with D or better and ELET 1152 with D or better) or (ELET 1103 with D or better and ELET 1151 with D or better) or (MCET 2423 with D or better and MCET 2461 with D or better)
Corequisite(s): (ELET 1104 with D or better and ELET 1151 with D or better) or (ELET 1103 with D or better and ELET 1152 with D or better) or (ELET 1103 with D or better and ELET 1151 with D or better) or (MCET 2423 with D or better and MCET 2461 with D or better)
Level: Lower
This course examines solid state electronic devices. Devices covered include diodes, bipolar transistors, and field effect transistors. The theory of operation, biasing, stabilization, frequency response, distortion, and gain are analyzed using mathematical analysis, equivalent circuits, and computer models.

ELET - 2124 Electrical Power Circuits, 4.00 Credits
Prerequisite(s): ELET 1103 with D or better and (MATH 2043 with D or better or MATH 1054 with D or better or MATH 1063 with D or better or MATH 2074 with D or better)
Level: Lower
Applied Learning-Practicum
Students will build upon dc circuit theory concepts as they apply to alternating current using phasor analysis. Complicated networks are analyzed using mesh and nodal matrix methods. MATLAB is introduced as a computational tool. The course emphasis is upon ac power applications including transformers and three-phase systems. Electrical signal conditioning is address with filters and Bode Plots. Laboratory sessions will back up the analysis with hands on exercises utilizing oscilloscopes, digital multimeters, wattmeters, and waveform generators. Measurements are made using single and three phase power sources.

ELET - 2143 Embedded Controller Fundmtls, 3.00 Credits
Prerequisite(s): ELET 1111 with D or better and ELET 1133 with D or better and (ELET 1142 with D or better or ELET 1143 with D or better)
Level: Lower
Applied Learning-Practicum
Fundamentals of both the hardware and software aspects of the microcontroller. A RISC (reduced instruction set computer) microcontroller is used with an in-system programmer to create an engineering development system. Structured programming code is written in assembly language, assembled and downloaded to the controller. Switches, light emitting diodes, seven segment displays, pneumatic solenoids and motors are among the devices that will be connected to the controller.

ELET - 2151 Electronics Laboratory I, 1.00 Credit
Prerequisite(s): (ELET 1103 with D or better and ELET 1151 with D or better) or (MCET 2423 with D or better and MCET 2461 with D or better)
Corequisite(s): (ELET 1103 with D or better and ELET 1151 with D or better) or (MCET 2423 with D or better and MCET 2461 with D or better)
Level: Lower
Applied Learning-Other
The material in this course parallels and supplements the subject matter in ELET 2103. The use of appropriate electronic test equipment is emphasized, along with computer simulation, and computer aided test equipment.

ELET - 3103 Electronics Theory II, 3.00 Credits
Prerequisite(s): ELET 2103 with D or better
Corequisite(s): ELET 2103 with D or better
Level: Lower
This course involves the study and application of operational amplifiers. Inverting, non-inverting and follower amplifiers are presented in detail with consideration of gain, bandwidth, and impedance. Different feedback circuits are studied to realize basic mathematical operations. Op-amps topologies are then used to make filters, oscillators, and regulated power supplies.

ELET - 3151 Electronics Laboratory II, 1.00 Credit
Prerequisite(s): ELET 2103 with D or better
Corequisite(s): ELET 2103 with D or better
Level: Lower
Applied Learning-Other
This laboratory is an experimental study of operational amplifiers and linear integrated circuits as applied to comparators, amplifiers, waveform generations, signal conditioning, and regulated power supplies. Emphasis is placed on design, proper measuring techniques and documentation of results. Device characteristics and limitations will be studied. The use of manufacturer's data sheets is required. Computers are used to design, analyze and test circuits along with manual measuring techniques.

ELET - 4154 Microelectronics, 4.00 Credits
Prerequisite(s): ELET 1103 with D or better
Level: Lower
Applied Learning-Practicum, Course Fee $98.00
This course provides the student with a realistic experience in semiconductor manufacturing processes. Oxidation, diffusion, photolithography (spin/bake/expose/develop), etch, and vapor deposition equipment allow students the opportunity to design, build, and test simple solid-state devices in a cleanroom environment. Properties and characteristics of semiconductor materials will be examined. Introduction to fabrication processes, design rules, and semiconductor device models will be applied to the design and fabrication of resistors, capacitors, diodes, and transistors.

ELET - 4224 Alternative Energy Generation, 4.00 Credits
Level: Lower
Applied Learning-Practicum
The purpose of this course is to provide students with a realistic look at the potential and the limitations of electrical generation through energy conversion. The energy sources include solar, wind and water. The course will include semiconductor properties of photovoltaic cells and the electronic circuits necessary for energy conversion. Using trigonometry, students will be able to calculate the position of the sun at any time or place and calculate the energy available at different panel orientations. Students will have the beginning tools to design off-grid and on-grid photovoltaic energy systems. MATLAB and LabVIEW software will be used to analyze and measure the solar resource. Some background knowledge of trigonometry and basic electrical circuits is expected.

ELET - 4900 Directed Study, 1.00 TO 6.00 Credits
Level: Lower
A student may contract for one to six credit hours of independent study through an arrangement with an instructor who agrees to direct such a study. The student will submit a plan acceptable to the instructor and to the department chairperson. The instructor and student will confer regularly regarding the progress of the study.

ELET - 5113 Electronic Communications, 3.00 Credits
Prerequisite(s): ELET 2103 with D or better
Level: Upper
Applied Learning-Other, Upper Level
This course is the study of analog and digital communication concepts and systems. Students begin by learning the terminology and measurements used in the communication industry. The course includes analysis of AM, and FM transmission and reception, Single-Sideband communications, Digital Wired and Wireless Communications, Network Communications, and Multiplexing and De-multiplexing techniques. Emphasis is on the system approach with block diagrams, with the presentation of theoretical fundamentals and study of the concepts within each diagram. The associated laboratory and projects augment the lecture theory. Students investigate further by completing an individual project.

ELET - 5900 Directed Study, 1.00 TO 6.00 Credits
Level: Upper
Upper Level
A student may contract for one to six credit hours of independent study through an arrangement with an instructor who agrees to direct such a study. The student will submit a plan acceptable to the instructor and to the department chairperson. The instructor and student will confer regularly regarding the progress of the study.

ELET - 6004 Advanced Power Systems, 4.00 Credits
Prerequisite(s): (ELET 2124 with D or better or ELET 2123 with D or better) and ELET 2103 with D or better
Level: Upper
Applied Learning-Practicum, Upper Level
This course is the study of electrical power transmission and conversion. A project involves the design of a dc-dc converter from theory through a completed printed circuit board. Circuit topologies studied include linear, buck, boost and buck-boost converters. On the utility scale, ac circuit theory is applied to grid power flow and transmission line models. Synchronous generators and transmission lines are modeled in theory and examined in the laboratory. Power electronics are analyzed for their role in conversion and transmission.

ELET - 6143 Electrical Machine and Control, 3.00 Credits
Prerequisite(s): ELET 1103 with D or better or ELET 1104 with D or better or MCET 2423 with D or better
Level: Upper
Applied Learning-Practicum, Upper Level
Students will study electromagnetic machines through circuit models, mathematical analysis, and experimental measurements. Mechanical, electrical, and electromagnetic fundamentals are reviewed as applied to motors and generators. Machine topologies studied include three-phase synchronous, generators and motors, three-phase induction motors, single-phase motors, and dc motors and generators. To control these machines, students will implement relay ladder logic and programmable logic circuits. Variable frequency drives and SCR drives are analyzed and tested. Sustainable engineering is promoted in this course through the selection of the most efficient and appropriate machine and control system for the application.

ELET - 7104 Integrated Circuit Technology, 4.00 Credits
Prerequisite(s): MATH 1063 with D or better or MATH 1084 with D or better
Level: Upper
Applied Learning-Practicum, Course Fee $98.00, Upper Level
This course is an introduction to the physics, chemistry and materials of integrated circuit fabrication. Topics include the basic process steps of crystal growth, oxidation, photolithography, diffusion, ion implantation, chemical vapor deposition (CVD) and metallization used to build integrated circuits. The laboratory uses a 4-level metal gate PMOS process to fabricate a working integrated circuit test-chip and provide experience in device design, process design, materials evaluation, in-process characterization and device testing.

ELET - 7404 Embedded & Real Time Systems, 4.00 Credits
Prerequisite(s): ELET 2143 with D or better and CISY 5123 with D or better
Level: Upper
Applied Learning-Practicum, Upper Level
This course prepares the students for the design and implementation of a real-time operating system (RTOS) on an embedded microcontroller. The course is constructed around a project where each student is required to design and prototype a real-time traffic light using MicroC/OS-II operating system loaded on a PIC18F452 microcontroller. The lecture portion of the course is comprised of lectures and quizzes that support the course project. Lecture topics include basic characteristics of the real-time applications and real-time operating systems, hardware interfacing techniques, fixed and dynamic priority scheduling algorithms, concurrency theory, intertask communication, synchronization, response-time analysis, Petri-net modeling, fixed-point computations, and optimization. The lab portion of the course consists of labs that provide the building blocks of the course project. Upon completion of the course project students will compare MicroC/OS-II with other similar operating systems such as FreeRTOS and Salvo.