

# COURSES

## **ELT 105 DC CIRCUITS**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

An introductory course employing applied mathematics for circuit analysis. The fundamental concepts of current, voltage and resistance are the major components of the course. Topics: resistive circuits, Ohm's law, Kirchoff's laws, series circuits, parallel circuits, voltage divider, current divider, superposition, Thevenin Theorem, capacitance, inductance, RL and RC transient circuits, transient response. Prerequisite: MAT 184 or concurrent enrollment therein.

## **ELT 107 INTRO PROGRAMMING FOR AUTOMATION**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

This course is a study of computer programming for both PC-based and microcontroller applications. Topics include common programming structures such as variables, decisions, repetition, and data files. Prerequisite: Student is at Math Placement Level 2 or higher (see DCC Math Placement Table) Corequisite: It is recommended that ELT 105: DC Circuits or PHS 115: Fundamentals of Electricity be taken as a corequisite to this course, since many of the programming examples are based on circuits calculations.

## **ELT 115 DIGITAL FUNDAMENTALS**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

An introductory course in the building, analysis, and testing of digital electronic circuits used in both computing and control system applications. Topics include binary numbers, binary codes, Boolean algebra, combinational logic, sequential logic, timers and counters, and an introduction to multiplexers, buffers and shift registers. Use of metering tools, such as the oscilloscope, and troubleshooting skills are a priority throughout the course. Prerequisites: Compass Algebra Score of at least 76, OR Integrated Algebra Regents within the last 2 years of at least 85, OR completed DCC Intermediate Algebra Parts I, II and III with a C or higher.

## **ELT 116 AC AND ELECTRONIC CIRCUITS**

**3 Lecture Hours 3 Lab Hours 4 Credit Hours**

A study of steady state response of circuits containing resistive, capacitive, and inductive elements subject to sinusoidal excitation and basic electronic components. AC Circuits topics include sinusoidal characteristics, impedance, phasors, ac power, and introduction to 3-phase ac, series RLC AC circuit analysis, and series resonance. Electronics topics include basic study of semiconductor devices including diodes and transistors. The dc and ac characteristics of various electronics applications are studied including power supplies, switching and driving circuits, and amplifiers. Prerequisites: ELT 105 and MAT 184, each with a grade of C or better

## **ELT 117 PNEUMATICS/HYDRAULICS/MECH DRVS**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

This course is a study of hydraulics, pneumatics, and mechanical drives. Prerequisite: ELT 105 or permission of the department

## **ELT 122 MANUF TOOLS AND PRACTICES**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

The focus of this course is the use of and safety involved with tools used by electrical technicians in the field, particularly in manufacturing facilities. Topics include lecture and lab practice with safety equipment such as hazardous voltage protection equipment and lockout/tagout. Tools include hand drills, drill press, thread taps, hole saws, chassis punches, associated hand tools, applicable measuring tools. Students will practice their skills with exercises such as building and wiring an industrial control panel. Pre- or Corequisites: ELT 105 with a grade of C or better or PHS 115 with a grade of B or better.

## **ELT 203 ELECTRIC POWER SYSTEMS**

**3 Lecture Hours 0 Lab Hours 3 Credit Hours**

A course in the transmission and distribution of electrical energy, with a concentration on the components of residential, commercial, and industrial scale electric power systems. Topics include three-phase delta and wye configurations, motor circuits, transformers, distribution and overcurrent protection equipment, and power systems studies. Prerequisite: ELT106 or PHS115

## **ELT 211 SEMICONDUCTOR PROCESS TECH**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

This course provides a detailed overview of semiconductor device fabrication. Topics include a review of semiconductor physics and device operations, device fabrication and various process modules. Process modules will focus on vacuum technology, silicon wafer, lithography, deposition, hot process, doping, etching and metallization. Challenges in process integration and device technology will also be discussed. Students are also required to participate in field trips. Prerequisites: CHE 111 and ENT 102, or ELT 108

## **ELT 213 ELECTRO-MECHANICAL DEVICES**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

This course is a study of electro-mechanical devices, including motors, relays, mechanical gears and linkages, pneumatic components, robotics and an introduction to microsystems. Prerequisite: ELT 106 or permission of the department

### **ELT 216 AUTOMATION SYSTEMS**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

A study of the computer-based control systems found in a wide variety of industry applications, including their use in manufacturing processes. The course will include a review of control system components, including sensors, relay logic, and programmable logic controllers (PLCs), leading up to a complete study of microprocessor-based control systems. Prerequisites: ELT 213 with a grade of C or better or permission of the department

### **ELT 217 MOTORS AND ROBOTICS**

**2 Lecture Hours 2 Lab Hours 3 Credit Hours**

This course is a study of motors including fundamentals of operation, types of dc and ac motors, servo, brushless, and stepper motors, and motor controls. Study of robotics will include teaching and programming a pick-and-place robotic. Hands-on lab activities will be part of all course topics. Prerequisite: ELT 116 or permission of the department

### **ELT 218 ELECTRONICS II**

**2 Lecture Hours 3 Lab Hours 3 Credit Hours**

This course is designed to train students in the analysis and application of advanced electronic circuits. Topics include the DC and AC performance constraints of electronic circuits and the implications of those constraints, frequency response and Bode plots, basic electronic circuits using the operational amplifier such as amplifier circuits and comparators, active filter circuits, and oscillator circuits. Practical applications are stressed throughout such as analog-to-digital conversion, digital-to-analog conversion, process control, and modulation. Students will construct, test and troubleshoot circuits, and analyze circuits by computer simulation. Prerequisite: ELT 108 or permission of the department

### **ELT 231 PHOTOVOLTAIC SYSTEMS**

**3 Lecture Hours 0 Lab Hours 3 Credit Hours**

An introduction to photovoltaic applications, design, and practices. Topics covered include photovoltaic industry history and trends, solar radiation, characteristics of solar cells and modules, system components, system sizing and design, economic analysis, electrical and mechanical integration, applicable building codes, regulations and safety, and utility interconnection. 3 credits. Prerequisites: ELT 106 (AC Circuits) or PHY 152 (or equivalent) or permission of the department

### **ELT 250 ELT CAPSTONE PROJECT**

**1 Lecture Hour 3 Lab Hours 2 Credit Hours**

A project-oriented course with design and analysis components. Students will propose and produce projects using a combination of theory from analog, digital and electro-mechanical disciplines. Students will use technology for computer simulation and generating schematics. Prerequisites: ELT218 with a grade of C or better and ELT 115.

### **ELT 271 SPECIAL STUDY PROJECT I**

**1 Lecture Hour 0 Lab Hours 1 Credit Hour**

A special learning experience designed by one or more students with the cooperation and approval of a faculty member. Proposed study plans require departmental approval. Projects may be based on reading, research, community service, work experience, or other activities that advance the student's knowledge and competence in the field of electrical technology and related areas. The student's time commitment to the project will be approximately 35-50 hours.

### **ELT 272 SPECIAL STUDY PROJECT II**

**2 Lecture Hours 0 Lab Hours 2 Credit Hours**

Similar to ELT 271, except that the student's time commitment to the project will be approximately 70-90 hours.

### **ELT 273 SPECIAL STUDY PROJECT III**

**3 Lecture Hours 0 Lab Hours 3 Credit Hours**

Similar to ELT 271, except that the student's time commitment to the project will be approximately 105-135 hours.