

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: ESET-341 Department: ESET.AS
Course Title: Circuit Theory Semester: 2008 Year: Fall

Objectives/Competencies

Course Objective	Competencies
1. Understand traditional electronic theories and principles.	<ul style="list-style-type: none">a. Understand and apply Ohm's Lawb. Understand and apply Kirchhoff's Voltage Lawc. Understand and apply Kirchhoff's Current Lawd. Understand and apply the Superposition Principle.e. Understand and apply Thevenin and Norton Equivalentents.f. Understand fundamental semiconductor principles.g. Understand magnitude/phase notation.h. Understand complex number notation.i. Understand impedance.j. Understand admittance.k. Understand two-port analysis concepts.l. Understand black box analysis concepts.m. Understand and use decibel notation.n. Understand common-mode rejection ratio.o. Understand and differentiate between transient and steady-state analysis.p. Understand Fourier Analysis concepts.q. Understand RC, RL & RLC pulse analysis

Course Objective	Competencies
2. Understand the operation of common passive and active electronic components.	<ol style="list-style-type: none">a. Understand resistance & conductance.b. Understand inductance and inductive reactance.c. Understand capacitance and capacitive reactance.d. Understand the operation of diodes.e. Understand the operation of Bi-polar junction transistors.f. Understand the operation of field effect transistors.g. Understand the operation of MOS devices.h. Understand common integrated circuit amplifiers (op-amps, differential amps & instrumentation amps).
3. Use software to analyze and simulate electronic circuits.	<ol style="list-style-type: none">a. Develop confidence in using computer simulation software to model a physical circuit.b. Develop confidence in using the PC to evaluate mathematical circuit descriptions.c. Use Lab View software to assist in the data acquisition of tested circuits.d. Use MSEExcel to parse, evaluate, analyze and graph data collected.

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: ESET-266 Department: ESET.AS

Course Title: Embedded Controls Lab Semester: Spring Year: 2008

Objectives/Competencies

Course Objective	Competencies
1. Understand basic concepts of digital electronic circuits.	<ul style="list-style-type: none">a. Understand the difference between digital and analog electronic signals.b. Be able to relate digital signals (voltage/current) to 0's and 1's, HIGH's and LOW's.c. Understand the logical operations of AND, OR, NOT, NAND, NOR, XOR and XNOR.d. Implement simple truth tables using 7400 devices.e. Use 7400 logic devices to implement simple Boolean expressions.f. Be familiar with various conventions used to describe Boolean expressions.g. Use a DVM to perform DC and AC voltage measurement.h. Use a DVM to perform DC current measurement.i. Use a DVM to perform continuity and resistance measurements.

Course Objective	Competencies
<p>2. Understand how to interface an embedded controller (PIC peripheral interface controller) with a PC for programming.</p>	<ul style="list-style-type: none"> a. Be able to load required software on a PC to program the PIC. b. Be able to interface a programmable device to a PC using the serial port. c. Be able to install software required for programming and communication with the embedded controller. d. Understand the concept of I/O (input and output). e. Be able to save, retrieve, upload and download program files used by the PIC.
<p>3. Understand basic PIC input/output types and the interface circuitry required for their use.</p>	<ul style="list-style-type: none"> a. Understand how to properly bias an LED and use it as an output devices. b. Understand how to interface and use a 7-segment LED display. c. Understand how to interface and use an LCD display. d. Be able to use a speaker as an output device. e. Understand the need for driver circuitry to increase output current/voltage/power. f. Be able to wire switches to provide proper input signal levels. g. Understand the use of buffer circuits for I/O operations. h. Understand basic Analog to Digital and Digital to Analog circuits. i. Be able to read schematic diagrams and construct circuits based upon them. j. Be able to read diagnostic flowcharts and use them to aid in debugging software.

Course Objective	Competencies
4. Understand common sensors and actuators used in digital control systems.	<ul style="list-style-type: none">a. Know how to use a thermistor.b. Know how to use an IC based temperature sensor.c. Know how to use various light sensors.d. Understand the application of limit switches.e. Understand linear motion sensors.f. Understand rotary motion sensors.g. Understand magnetic (hall effect) sensors.h. Be able to evaluate programs and debug as necessary.i. Be able to use simple BJT devices to increase output current capability.j. Build simple motor driver and control circuits.k. Understand the difference between open and closed loop digital control systems.

Course Objective	Competencies
4. Develop professional research and documentation skills.	<ul style="list-style-type: none">a. Student will be able to maintain an lab notebook.b. Student will realize the importance of meeting deadlines.c. Student will be able to create and submit, both electronically and paper, professional lab reports.d. Students will be able to use the internet as a research tool.e. Students will be familiar with manufacturer data sheets and be able to research this information via on-line sources.f. Students will be able to work in teams and develop delegation skills.