ACADEMIC AFFAIRS

Course Number: <u>ESET-261</u>   Department: <u>ESET.AS</u>

Course Title: <u>Embedded Controllers</u>   Semester: <u>Spring</u>   Year: <u>2008</u>

Objectives/Competencies

Course Objective	Competencies
1. Understand basic concepts of digital electronics.	a. Easily convert among binary, decimal and hexadecimal numbers. b. Understand the difference between a digital signal and an analog signal. c. Understand the logical operations of AND, OR, NOT, NAND, NOR, XOR and XNOR. d. Construct and evaluate truth logic truth tables. e. Write simple Boolean expressions. f. Be able to implement simple Boolean expressions using discrete components. g. Be familiar with various conventions used to describe Boolean expressions.

Course Objective	Competencies
2. Understand how to interface an embedded controller (PIC peripheral interface controller) with a PC for programming.	a. Understand the difference between hardware and software. b. Know the purpose of an editor. c. Know how to interface a programmable device to a PC using the serial port. d. Be able to install software required for programming and communication with the embedded controller. e. Understand the concept of I/O (input and output). f. Be able to save, retrieve, upload and download program files used by the PIC.
3. Understand basic PIC input/output types and the interface circuitry required for their use.	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. f. Understand the need for driver circuitry to increase output current/voltage/power. g. Be able to wire switches to provide proper input signal levels. h. Understand the use of buffer circuits for I/O operations. i. Understand basic Analog to Digital and Digital to Analog conversion theory and application.

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4. Program embedded controller devices using a high level programming language.	a. Be able to read and create a programming flow chart. b. Be able to load, save and edit files. c. Be able to distinguish various file types. d. Be able to evaluate programs and debug as necessary. e. Understand fundamental programming concepts such as variable declaration, loops, timing, I/O statements, conditional statements, bit masking & manipulation, subroutines and authorization passwords. f. Be able to program simple algebraic formulas. g. Be able to use Logical Operators (AND, OR, NOT) in programs. h. Be able to determine if the solution to a problem is better done in hardware or software. i. Be able to use the PIC to implement simple and complex combinational logic problems. j. Be able to use the PIC to implement sequential logic problems.
5. Understand the fundamentals of sensor types and actuators.	a. Understand the use of switches and relays. b. Understand the basic operation of thermal, optical, pressure and other transducers. c. Understand common motor types and their application to motion control systems. d. Understand common linear and rotary motion sensors. e. Understand basic buffer and amplifier applications.