Ohio Articulation Number (OAN)  
Course Submission Form  
2005-2006  

College/University  Edison Community College  

Course(s) Submitted (Title & Course #)  ELT-241S, Microcontrollers  for  
Ohio Articulation Number  OET 004  

Date  1 August 2006  Course  1  of a  1  Course OAN mapping.  

Name and title of individual submitting on behalf of the college/university  
Name  Amanda Swigert  Title  Administrative Assistant to Vice President  
Address  1973 Edison Drive  
E-mail  Swigert@edisonohio.edu  
Phone  937-778-7822  
Fax  937-778-1920  

Credit Hours  4  qtr  X  sem  X  
Lecture Hours  3  (if applicable)  
Laboratory Hours  2  (if applicable)  

Pre-Requisites(s)  Course work (if applicable)  
ELT-141S, Digital Electronics  

Placement Score (if applicable) 
(Name of test)  
(Score)  

Catalog/Course Description (Includes Course Title and Course #)  
Introduction to wiring and programming a micro-controller. The target micro- 
controller for applications in this course will be one that is common in 
industrial applications. Programming is done in assembly language. The 
student will construct, program, debug, and interface inputs and outputs to a 
single board computer. Prerequisite: ELT141S. Lab fee.  

Texts/Outside Readings/Ancillary Materials
Course Objectives and/or Plan of Work

COURSE GOALS:

The student will:

1. Describe the fundamental elements of every computer system.
2. Assemble a micro-controller.
3. Create flow charts to show the flow/function of a program.
4. Write programs to move data and perform arithmetic and logic operations.
5. Create branches and loops within a program using conditional statements.
6. Organize code into subroutines.
7. Use assembler directives to enhance source code.
8. Utilize program memory and variable memory in programs.
9. Interface input and output devices with the micro-controller.
10. Describe the process of servicing interrupts.
11. Demonstrate the process of analog-to-digital conversion.
12. Cause output events to happen at specified times.
13. Explain the difference between asynchronous and synchronous serial communications.

TOPIC OUTLINE:

1. Introduction to micro-controllers
2. CPU architecture
3. Instruction set
4. Assembling the micro-controller.
5. Program development.
6. Structured assembly preprocessor
7. Alphanumeric liquid-crystal displays
8. Rotary pulse generators
9. Interrupts and interrupt timing
10. Analog-to-digital conversion
11. Time-interval measurements
12. Math Subroutines
13. Serial communications.

Description of Assessment and/or Evaluation of Student Learning

Grading:

Midterm: 20%
Labs: 50%
Homework: 20%
In class participation: 10%

Exams will be open notes, open book. Notes may include your own assignments, labs,
Master Syllabi and Working Syllabi (if both are used)

**COURSE DESCRIPTION:**

Introduction to wiring and programming a micro-controller. The target micro-controller for applications in this course will be one that is common in industrial applications. Programming is done in assembly language. The student will construct, program, debug, and interface inputs and outputs to a single board computer. Prerequisite: ELT141S. Lab fee.

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**TOPIC OUTLINE:**

1. Introduction to micro-controllers
3. CPU architecture
3. Instruction set
15. Program development.
16. Structured assembly preprocessor
17. Alphanumeric liquid-crystal displays
18. Rotary pulse generators
19. Interrupts and interrupt timing
20. Analog-to-digital conversion
21. Time-interval measurements
22. Math Subroutines
23. Serial communications.

**TEXT:** Peatman, Embedded Design with the PIC18F452 Microcontroller, Prentice Hall 2003.
## SYLLABUS
### PART II
### EDISON COMMUNITY COLLEGE
### ELT 241S – MICROCONTROLIERS
### 4 CREDIT HOURS

**Instructor:** Susan Barth  
**Home phone:** 335-1797  
**Cell phone:** 524-1482  
**Email:** dbarth1773@hotmail.com or sbarth@edisonohio.edu

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| Aug. 25 | CH 1 (Introduction, Flash Memory Technology), CH 2.2, 2.3, 2.7, 2.8 (CPU Architecture, Processor Comparison: Motorola, Microchip, Intel, Bus architecture and timing, Memory types: Direct addressing, Indirect addressing)  
Thursday | CH 2 continued |
| Sept. 1 | Lab #1, Appendix A1 (Construction of your microprocessor)  
Thursday | CH 3 (Assembly Instruction Set), Lab #1, Appendix A1 |
| Sept. 8 | Lab #1 continued  
Thursday | CH 4 (QwikFlash Target Board), CH 5 (Assembly Program Development) |
| Sept. 15 | Lab #2 pg. 400 (Introduction to the Microcontroller Development Environment)  
Thursday | Lab #3 pg. 404, CH 6 (Slow rate control development using loops) |
| Sept. 22 | CH 7 (Alphanumeric Liquid –crystal Displays)  
Thursday | CH 7 continued |
| Sept. 29 | Lab #4 pg. 405 (Enhanced Slow Rate Control)  
Thursday | CH 14 (Math Subroutines) |
| Oct. 6 | Lab #5 pg. 406 (New DISPLAY Utility)  
Thursday | CH 8 (Rotary Pulse Generators), CH 20.2 & 20.3 (Config. Bytes & Oscillator Alter.) |
| Oct. 13 | Review  
Thursday | Midterm |
Oct. 20        Lab #6 pg. 407 (Square Wave Generator – Part 1)
    Thursday  CH 16 (Output Time-Interval Control)
Oct. 27        Thursday  CH 10 (Analog-to-Digital Conversion), CH 11 (I/O Pin
Considerations)
Nov. 4          Lab #7 pg 410 (Square Wave Generator – Part 2)
    Thursday  Lab #8 pg. 412 (Rate RPG/ADC Use)
Nov. 10         Thursday  CH 9 (Interrupts and Interrupt Timing)
Nov. 17         Thursday  CH 12 (LCD Screens)
Nov. 24         Thursday  CH 13 (Time –Interval Measurements)
Nov. 24         Thursday  Lab #9 pg. 414 (Max PW)
Dec. 1          Thursday  Lab #9 pg. 414 (Max PW)
                Thursday  Thanksgiving, NO CLASS!
Dec. 1          Thursday  Ch 15 (Serial Peripheral Interface for I/O Expansion)
Dec. 1          Thursday  Lab #10 pg 415 (Temperature Display)

Grading:
Midterm: 20%
Labs: 50 %
Homework:  20%
In class participation:  10%

Exams will be open notes, open book. Notes may include your own assignments, labs, etc.

Additional Documentation

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