

METROPOLITAN STATE COLLEGE of DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: Professional Studies

Department: Engineering Technology

Prefix & Course Number: EET 4370

Crosslisted With*: _____

Course Title: Microcontrollers

Check All That Apply: Required for Major: X Required for Minor: _____ Specified Elective: X

Required for Concentration: _____ Elective: _____ Service Course: _____

Credit Hours: 3 (2+2)

Total Contact Hours per semester (assuming 15-16 week semester):

Lecture 30 Lab 30 Internship _____ Practicum _____ Other (please specify type and hours): _____

Schedule Type(s): B Grading Mode(s): L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

**** NOTE: This information must be included in the course description.**

Restrictions (Variable Topics Course): _____

Prerequisite(s): EET 2350 and EET 3330 with grades of "C" or better

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:

Prerequisite(s): EET 2350 and EET 3330 with grades of "C" or better

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Catalog Course Description:

This course teaches microcontroller design. Topics include: Programming, Monitor functions, Hardware configurations, Timing, Analog to Digital Conversion, Parallel I/O, and Serial I/O.

APPROVED:	<u>Rubane Pozz</u>	<u>3/1/2011</u>
Department Chair OR Program Director		Date
	<u>B. J. Mergonney</u>	<u>3-11-11</u>
Dean OR Associate Dean		Date
	<u>Shirley A. Thompson</u>	<u>6/07/11</u>
Associate VP, Academic Affairs		Date

*If crosslisted, attach completed Course Crosslisting Agreement Form



Required Reading and Other Materials will be equivalent to:

Huang (2004). *PIC Microcontroller: An Introduction to Software & Hardware Interfacing*, or latest edition. Clifton Park, NY: Thompson Delmar Learning

Specific, Measurable Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to:

1. Define the architecture of microcontrollers
2. Write interrupt-driven programs
3. Use assembly language or C to program a microcontroller
4. Apply program control structures to microcontroller programming and develop formal program documentation
 - a) Program a microcontroller to communicate with external digital and analog circuitry Using I/O ports
Using analog/digital ports

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision):

- | | |
|--|------------------------------------|
| I. Introduction to Microcontroller | VI. Parallel Input and Output |
| A. Programming Model | A. Ports B and C |
| B. Addressing Modes | B. Handshaking |
| C. Block Diagram | |
| II. Instruction Set of the Microcontroller | VII. The Timing System |
| III. Assembly Language Programming | A. Port A |
| A. Assemblers | B. Input Capture |
| B. Assemblers Directives | C. Output Compare |
| C. Simulators | D. Pulse Accumulator |
| IV. The Microcontroller Evaluation Board | VIII. Analog to Digital Conversion |
| A. Capabilities | IX. Serial Input and Output |
| B. Operation | A. Port D |
| C. Buffalo Monitor Functions | B. Serial Communications Interface |
| D. Memory Map | C. Serial Peripheral Interface |
| V. Hardware Configuration of Microcontroller | |
| A. Operating Modes | |
| B. Pin Functions | |
| C. Read/Write Timing | |

Evaluation of Student Performance:

1. Written exams
2. Written lab reports