Modesto Junior College
Course Outline of Record
ELTEC 214

I. OVERVIEW
The following information will appear in the 2009 - 2010 catalog

ELTEC 214 Microprocessor Programming and Interfacing 4 Units
Also offered as: CMPET - 214: Microprocessor Programming and
Formerly listed as: ELTEC - 214: Microprocessor Programming and
Advisory: Before enrolling in this course, students are strongly advised to Successfully complete ELTEC/CMPET 212 Digital Electronics
Materials Fee Required

Introduction to the structure and operation of microprocessors as controllers for today's electronic devices and systems. Basic microprocessor hardware including memories, registers, counters, input/output ports, decoders, and arithmetic logic using the popular PIC RISC microcontroller. Emphasis on interfacing to electronic hardware. Field trips are not required. Course is applicable to the associate degree.

II. LEARNING CONTEXT
Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:
   a. Microprocessor architecture
   b. BASIC program instructions
   c. Interfacing techniques
   d. Interrupts and polling
   e. Making uP systems reliable
   f. Flowcharting
   g. Practical microprocessor applications
   h. Analog/Digital and Digital/Analog converters

2. Required Lab Content:
   a. Introduction to microcontrollers
   b. Input and output operations
   c. Interfacing LEDs
   d. Interfacing switches and sensors
   e. Interfacing motors
f. Making sounds

Interfacing potentiometers

h. Robotic navigation

i. Interfacing infrared sensors

j. Final project (student design)

B. ENROLLMENT RESTRICTIONS

1. Advisories

Before enrolling in this course, students are strongly advised to successfully complete ELTEC/CMPET 212 Digital Electronics

C. HOURS AND UNITS

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<tr>
<th>INST METHOD</th>
<th>TERM HOURS</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>Lect</td>
<td>36.00</td>
<td>2.00</td>
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<tr>
<td>Lab</td>
<td>108.00</td>
<td>2.00</td>
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4 Units

D. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture

2. Lab demonstrations

3. Course topic discussions

4. Presentations via media (DVD, Videos, etc)

E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

- Daily reading assignments from the text and handouts.
- Weekly homework problems and research from the text and handouts.
- Design projects that are completed in and outside of class to be demonstrated and tested in lab.

2. EVIDENCE OF CRITICAL THINKING

Assignments require the appropriate level of critical thinking

Assignments:

1. Design an operational traffic light system with two different street directions, 30 seconds of "on" time for the green lights and 5 seconds for the yellow lights.

2. What is the purpose of the "pulsout" instruction?

Exam Questions:
1. Which instructions would you use to: Do a set of instructions 213 times?
2. Which microprocessor architecture uses two sets of address and data buses?

F. TEXTS AND OTHER READINGS (TYPICAL)

III. DESIRED LEARNING

A. COURSE GOAL
   As a result of satisfactory completion of this course, the student should be prepared to:

   Effectively program and interface microprocessors and microcontrollers to other digital circuits, memories, peripherals, and components.

B. STUDENT LEARNING GOALS
   Mastery of the following learning goals will enable the student to achieve the overall course goal.

1. Required Learning Goals
   Upon satisfactory completion of this course, the student will be able to:
   
   a. Identify and describe the basic architecture of a microprocessor.
   b. Design and construct hardware circuits that interface to microcontrollers.
   c. Generate and debug programs utilizing the specific instruction set of the microprocessor being employed.
   d. Interface electromechanical sensors and devices to microprocessors.
   e. Solve practical application problems using microprocessor hardware and software.
   f. Design, build, debug, and demonstrate proper operation of an entire microprocessor-based product.

2. Lab Learning Goals
   Upon satisfactory completion of the lab portion of this course, the student will be able to:
   
   a. Design and construct hardware circuits that interface to microcontrollers.
   b. Generate and debug programs utilizing the specific instruction set of the microprocessor being employed.
   c. Interface electromechanical sensors and devices to microprocessors.
   d. Solve practical application problems using microprocessor hardware and software.
   e. Design, build, debug, and demonstrate proper operation of an entire microprocessor-based product.

IV. METHODS OF ASSESSMENT (TYPICAL)
A. FORMATIVE ASSESSMENT
   1. Quizzes
   2. Student participation in course topic discussions
   3. Homework
   4. Weekly Lab Exercises

B. SUMMATIVE ASSESSMENT
   1. Mid Term Exam
   2. Final Exam
   3. Comprehensive lab projects