



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**MICROPROCESSOR INSTRUMENTATION
MEC3490 3 Credit Hours**

Student Level:

This course is open to high school and post-secondary level students.

Catalog Description:

MEC 3490 - MICROPROCESSOR INSTRUMENTATION (3 hrs)

The student will demonstrate knowledge of microprocessor based microcontroller applications including input/output interfacing techniques, digital to analog conversions, analog to digital conversions, and basic sensor signal conditioning as used in industry.

Prerequisites:

None

Controlling Purpose:

This course is designed to help the student increase their knowledge regarding fundamentals for manufacturing microprocessors.

Learner Outcomes:

Upon completion of the course, the student will be able to demonstrate a proficiency in practical skills required to design and troubleshoot actual digital circuitry that they will see on the job.

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the

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less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.

- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT 1: An Introduction to Microprocessors						
Outcomes: Upon completion of this unit, students will be able to successfully understand the structure of a microprocessor.						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Understand what the microprocessor is.
						Know what a microprocessor based system contains.
						Understand assembly language programming versus high-level programming.
						Comprehend how a microprocessor executes instructions.
						Understand the definition of an embedded system.

UNIT 2: The Hardware Architecture of a General Microprocessor-Based System

Outcomes: Upon completion of this unit, students will be able to successfully identify the location/function of microprocessor components.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Understand the hardware architecture of a generic microprocessor.
						Learn about the use and components of the system bus.
						Understand the general classifications of memory.
						Learn about peripheral mapped I/O and memory mapped I/O.
						Learn about typical input/output devices.

UNIT 3: Programming a General Microprocessor

Outcomes: Upon completion of this unit, students will be able to successfully program a microprocessor using pseudo code.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Understand the programming model of a typical microprocessor.
						Know the classifications of instructions for a typical microprocessor.
						Be able to program a generic microprocessor using a generic microprocessor instruction set.
						Be able to write, assemble, and execute a generic program.
						Know how to flowchart a program.
						Understand the use of pseudo code as a tool.

UNIT 4: Programming the 8085-Advanced Techniques

Outcomes: Upon completion of this unit, students will be able to successfully perform advanced coding of a microprocessor.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Be able to calculate the length of a delay routine.
						Be familiar with the use of register pairs in the techniques of indexing.
						Know the 16-bit arithmetic operation of the 8085.
						Be able to write subroutines and use CALL and RETURN instruction.
						Be familiar with how subroutines can be nested.

UNIT 5: General Purpose Support Chips

Outcomes: Upon completion of this unit, students will be able to successfully understand auxiliary chips and their uses.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Be familiar with five common programmable support chips.
						Have a basic understanding of the 8255A.
						Understand how the Programmable Interval Timer (PIT) works.
						Obtain a basic understanding of Direct Memory Access Controller.

Projects Required:

As assigned

Textbook:

Contact Bookstore for current textbook.

Materials/Equipment Required:

None

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus

Maximum class size:

Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability, which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.