COWLEY COLLEGE
& Area Vocational Technical School

COURSE PROCEDURE FOR

PROGRAMMABLE LOGIC CONTROLLERS
MEC3492 3 Credit Hours

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

Catalog Description:

MEC 3492 - PROGRAMMABLE CONTROLLERS (3 hrs)
The student will program a PLC interfacing it with three or more components in a system. Students will troubleshoot an automated system locating faults in programming and programming errors.

Prerequisites:
None

Controlling Purpose:
This course is designed to help the student increase their knowledge regarding fundamentals of Programmable Logic Controllers used in manufacturing.

Learner Outcomes:
Upon completion of the course, students will learn the theory of operation and selection of common industrial control components. Students learn to design, program, and troubleshoot PLC systems. An introduction to closed loop control systems is included.

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 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: Computers and Computer Programming

Outcomes: Upon completion of this unit, the student will be able to successfully understand basic programming concepts.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Understand programming language commonly used in industry.
						Understand programming techniques commonly used in industry.
						List and describe interfacing principals for computers.
						Understand relay ladder logic including controllers timers, and latch and unlatch relays.
						Understand digital logic interface.
						List and describe programming techniques as well as interfacing.
						Understand antilog I/O and digital logic.

UNIT 2: Software and Hardware

Outcomes: Upon completion of this unit, the student will be able to successfully understand common applications for PLCs.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List and describe analysis techniques for systems.
						Understand common software codes.
						List and describe PLC's available for use in industry.
						Understand user defined function blocks and local and global variables.
						Understand Bit addressing and Byte addressing.

UNIT 3: Layout, Wiring, Troubleshooting and Implementation of PLC's

Outcomes: Upon completion of this unit, the student will be able to successfully understand how to set up PLCs.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Wire and connect sensors, mechanical switches, and relays to a given PLC.
						Program PLC's to perform tasks as predicted.
						Troubleshoot PLC controlled systems.

UNIT 4: PLC Interface with Sensors Outcomes: Upon completion of this unit, the student will be able to successfully understand how to interface PLCs.						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Understand position sensing as it interfaces with PLC's.
						Understand pressure sensing as it interfaces with PLC's.
						Understand timing and counting methods controlled by PLC's.

UNIT 5: Laboratory Outcomes: Upon completion of this unit, the student will be able to successfully apply understanding of PLCs in a hands-on environment.						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Develop and troubleshoot a PLC integrated system.
						Program a PLC to interface with three or more components in a system.
						Troubleshoot software to locate and correct faults.

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.