

# New Course Form

MET 140 Introduction to Programmable Logic Controllers 4

**Originator:** Kenny Keith      **Status:** Approved      **Date Created:** 02/01/2013

**Department:** MET: Mechatronics      **Submitted:** 02/05/2013      **Completed:** 02/27/2013

**To ACETS:**

**Course Prefix:** MET

**Course Number:** 140

**Course Title:** Introduction to Programmable Logic Controllers

**Cross-listing:** No

**Cross-listing  
information:**

**Semester for  
Implementation:** Fall

**Year of  
Implementation:** 2013

**Course Type:** Required Transfer Vocational

**Credit Hours:** 4

**Transfer Course:** BAS-articulation discussions are underway

**Course Catalog  
Description:** This course covers the principles and application of programmable logic controllers (PLCs) as found in a typical energy and manufacturing environment.

**Rationale:** This course provides the knowledge, skills and competencies to an intermediate level that would be required of a maintenance electrician to troubleshoot and maintain PLCs in a moderately complex industrial environment such as electronics, automotive, food, pharmaceuticals, consumer goods, packaging, metals, mining & materials, energy, pulp & paper, chemicals, or water & waste water.

**Total Lecture  
Contact Hours** 3  
**per Week:**

**Total Lab  
Contact Hours** 3  
**per Week:**

**Total Contact  
Hours:** 90

**Load Factor:** 5.1

**Requisites:** Yes

**Prerequisites:** MET 130 Industrial Electrical Systems

**Co-requisites:**

**Mode of Instructional Delivery:** (1) Traditional classroom instruction (3) Hybrid: internet with live lab (5) Laboratory

**If "other" mode of instruction, specify:**

**Library Resources:** N/A

**Assessment of Student Learning - Methods:** (1) Written Examinations (5) Demonstration of Skills

**IF "other" assessment, specify:**

**Recommend Course Enrollment:** 15

**Credit by Examination:** No

**Literacy/ Critical Inquiry Component:** N/A

**Ethnic/ Gender Awareness:** N/A

**Sustainability:** Yes

**Sustainability (explanation):**

**COURSE TOPICS:** Topics include principles, functions and operation of PLCs; basic ladder logic programming with relays, timers and counters; digital input and output interfacing; intermediate instructions such as program flow, subroutine, math, and data move; analog interfacing and associated instructions; basic multi-drop networking; operator display station application; use of remote inputs and outputs; and component and systems troubleshooting;

**COURSE OUTCOMES:**

1. Describe the function and principles of operation of a PLC
2. Demonstrate the ability to run, stop, and monitor a SLC500 PLC
3. Develop programs for the SLC500 PLC
4. Enter programs for the SLC500 PLC
5. Edit programs for the SLC500 PLC
6. Load programs for the SLC500 PLC
7. Save programs for the SLC500 PLC
8. Print programs for the SLC500 PLC
9. Demonstrate techniques for troubleshooting a SLC500 PLC
10. Describe how a PLC uses ladder logic relay, timer and counter instructions to control discrete and sequential operations
11. Design programs for the SLC 500 for applications such as a reciprocating

- actuator, cycle clamp and drill, plastic injection molding, and conveyor queing
12. Operate programs for the SLC 500 for applications such as a reciprocating actuator, cycle clamp and drill, plastic injection molding, and conveyor queing
  13. Describe how to select and interface PLC input and output modules to digital electro-mechanical and solid state devices such as switches, motor starters, solenoid valves and robot or machine-tool controllers
  14. Demonstrate the ability to select and interface PLC input and output modules to digital electro-mechanical and solid state devices such as switches, motor starters, solenoid valves and robot or machine-tool controllers
  15. Describe the function of the SLC 500 intermediate PLC operations using program control, subroutine, math and data move instructions
  16. Demonstrate programming of the SLC 500 intermediate PLC operations of using program control, subroutine, math and data move instructions
  17. Demonstrate how information about machine operations may be displayed to an operator
  18. Describe the function of the SLC500 analog input and output devices and interface cards
  19. Demonstrate the ability to install, configure and program the SLC500 as to analog input and output devices and interface cards
  20. Describe issues of shielding, wiring configuration, resolution, scaling, addressing, comparison and numeration in the SLC 500

**Proposer:** Kenny Keith