PROGRAMMABLE LOGIC CONTROLLER I

The course is designed to provide the individual with an ability to understand the various output methods, programming and troubleshooting techniques using the programmable controllers (PLC). I-O methods for DC and AC and analog, ladder programming and analysis, logical math functions, comparison, data manipulation, timers and counters, are among the specific topics covered. The student will be able to correlate motor control systems to PLC systems.

PREREQUISITES
INTE 113 and INTE 175 with a C grade or higher

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)
Upon completion of this course, the student will be able to:
1. Describe the kinds of I-O cards required for the PLC
2. Program ladder diagram circuits
3. Program timer and counter diagram circuits
4. Connect and operate the PLC to external components and circuits
5. Program math and data manipulation instructions
GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

The student will demonstrate:
1. the ability to apply foundational skills in an industrial setting, safely and to industry guidelines (1 - 5)
2. the ability to think critically and apply problem-solving skills. (2 - 5)
3. the ability to exhibit competence in the entry-level skills of technical profession in Industrial Technology (1, 2)
4. the ability to exhibit competence i the entry-level skills of Programmable Logic Controllers (1 - 5)

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

Written Exams (1, 2)
Projects with written examinations (3 - 5)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Physical and electrical characteristics of PLC components
   a. Processor
   b. Back plane
   c. I-O cards

II. Basic computer operation as it applies to the PLC

III. PLC interfacing and connections to electromechanical equipment
   a. Field device to input card connections
   b. Field device to output card connections
   c. Noise immunity protection

IV. PLC ladder programming techniques

V. Timer and counter programming and application
   a. Timer programming
   b. Counter programming
   c. Timers and counters working together
   d. Math instructions
   e. Data manipulation instructions

VI. Using data tables for troubleshooting with the PLC