EASTERN ARIZONA COLLEGE
Programmable Logic Controllers
Course Design
2014-2015

Course Information
Division
Industrial Technology Education
Course Number
ELT 271
Title
Programmable Logic Controllers
Credits
3
Developed by
Charles A. Smith
Lecture/Lab Ratio
2 Lecture/3 Lab
Transfer Status
<table>
<thead>
<tr>
<th>ASU</th>
<th>NAU</th>
<th>UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMT Dept.</td>
<td>CTE Dept</td>
<td>Non Transferable</td>
</tr>
<tr>
<td>Elective</td>
<td>Elective</td>
<td></td>
</tr>
</tbody>
</table>

Activity Course
No
CIP Code
47.0105
Assessment Mode
Pre/Post Test (42 Questions/100 Points)
Semester Taught
Spring
GE Category
None
Separate Lab
No
Awareness Course
No
Intensive Writing Course
No

Prerequisites
ELT 112 or instructor approval

Educational Value
A. To general education: Elective Credit
B. To other courses or curricula: This course is a curriculum requirement for the Electrical and Instrumentation Technology AAS degree.

Description
This course introduces the student to the principles of Programmable Logic Controllers (PLCs). This course emphasizes the applications and implementation of PLCs as used in industrial control settings. It analyzes the interfacing of inputs, outputs, and development of ladder logic control programming. The course will subject the student to elementary, intermediate, and advanced programming functions as commonly used in PLCs.

Supplies
Scientific calculator
Competencies and Performance Standards

1.  Familiarization of PLC Components and Hardware

   Learning objectives
   
   What you will learn as you master the competency:
   a.  Analyze parts and components of a PLC
   b.  Examine the principle of operation
   c.  Modify operations and programming
   d.  Familiarization of inputs and outputs
   e.  Examine memory types and designs
   f.  Understand and use programming devices and workstations
   g.  Record and retrieve data

   Performance Standards
   
   You will demonstrate your competence:
   o  in-class discussion
   o  group practice
   o  using model electrical circuits
   o  written tests

   Your performance will be successful when:
   o  learner completes written test to 70% correct
   o  learner manipulates model circuit to accomplish assigned task

2.  Understand and Use Number Systems, Codes, and Logic

   Learning objectives
   
   What you will learn as you master the competency:
   a.  Review of the decimal number system
   b.  Review the binary number system
   c.  Review the octal number system
   d.  Review the hexadecimal number system
   e.  Implement the binary coded decimal system
   f.  Review the ASCII code
   g.  Review the AND, OR, NOT logic functions
   h.  Demonstrate ability to use Boolean algebra

   Performance Standards
   
   You will demonstrate your competence:
   o  in-class discussion
   o  group practice
   o  using model electrical circuits
   o  written tests

   Your performance will be successful when:
   o  learner completes written test to 70% correct
   o  learner manipulates model circuit to accomplish assigned task
3. **Performing Basics of PLC Programming**

   **Learning objectives**
   
   *What you will learn as you master the competency:*
   
   a. Analyze PLC programming language
   b. Solve relay ladder logic
   c. Implement addressing
   d. Perform branch instructions
   e. Program timers, counters, and math functions
   f. Demonstrate use of program control instructions
   g. Demonstrate use of data manipulation
   h. Program sequencer instructions

   **Performance Standards**
   
   *You will demonstrate your competence:*
   
   - in class discussion
   - group practice
   - using model electrical circuits
   - written tests

   *Your performance will be successful when:*
   
   - learner completes written test to 70% correct
   - learner manipulates model circuit to accomplish assigned task

---

**Types of Instruction**

Lecture/modeling
Electrical lab assignments
Group practice
Individual projects/presentations

---

**Grading Information**

**Grading Rationale**

- Post/Final Exam(s): 35%
- Chapter Exams: 35%
- Lab Assignments: 20%
- Attendance: 10%

**Grading Scale**

- A: 90% - 100%
- B: 80% - 89%
- C: 70% - 79%
- D: 60% - 69%
- F: Below 60%