**ELEC 53.13 Course Outline as of Fall 2017**

# CATALOG INFORMATION

Dept and Nbr: ELEC 53.13 Title: PLC'S MAINT TECH 2
Full Title: Programmable Logic Controllers for Maintenance Technicians 2
Last Reviewed: 11/7/2011

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 2.00 | Lecture Scheduled | 2.00 | 17.5 | Lecture Scheduled | 35.00 |
| Minimum | 2.00 | Lab Scheduled | 0 | 6 | Lab Scheduled | 0 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 2.00 | | Contact Total | 35.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 70.00 Total Student Learning Hours: 105.00

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|---|---|
| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade or P/NP |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | ELEC299.42 |

**Catalog Description:**
Programmable Logic Controllers for the Maintenance Technician, advanced course. Advanced identification and troubleshooting of more difficult and typical controller problems, advanced intermediate to advanced ladder logic programming, teaching pendants.

**Prerequisites/Corequisites:**
Course Completion or Current Enrollment in ELEC 53.12

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: Programmable Logic Controllers for the Maintenance Technician, advanced course. Advanced identification and troubleshooting of more difficult and typical controller problems, advanced intermediate to advanced ladder logic programming, teaching pendants. (Grade or P/NP)
Prerequisites/Corequisites: Course Completion or Current Enrollment in ELEC 53.12
Recommended:

Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

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|---|---|---|---|
| **AS Degree:** | **Area** | Effective: | Inactive: |
| **CSU GE:** | **Transfer Area** | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | Effective: | Inactive: |

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|---|---|---|
| **CSU Transfer:** | Effective: | Inactive: |
| **UC Transfer:** | Effective: | Inactive: |

**CID:**

**Certificate/Major Applicable:**
Not Certificate/Major Applicable

## COURSE CONTENT

**Outcomes and Objectives:**
Upon completion of the course the student will be able to:
1. Design ladder logic programs and assemble documentation.
2. Modify programs using touch screens and teaching pendants.
3. Program a PLC (Programmable Logic Controller) using ladder logic and one additional PLC language.
4. Identify, troubleshoot, and repair faults in sensors and output devices.
5. Identify, troubleshoot, and resolve software problems.

**Topics and Scope:**

1. Fundamental operation of programmable logic controllers
   a. analog inputs and outputs
   b. latching instructions
   c. counters
   d. timers
2. Programmable logic controller output devices
   a. analog
   b. relay
3. Advanced troubleshooting techniques
   a. programmable logic controllers
   b. sensors
   c. related software
4. Touch screens and teaching pendants
5. Sensor fault diagnosis

**Assignment:**

1. Reading (10-30 pages per week)
2. Homework problems:
   Design ladder logic programs (1-4)
   Modify ladder logic programs (1-4)
   Assemble software documentation in two programming languages (1-4)
3. Write 1-3 case studies selecting and recommending correct sensors for a particular manufacturing process.
4. Midterm, and final exam

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| Case studies | Writing<br>5 - 30% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Homework problems, compare and critique robotic controllers. | Problem solving<br>40 - 60% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| None | Skill Demonstrations<br>0 - 0% |

**Exams:** All forms of formal testing, other than skill performance exams.

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| Multiple choice, true/false, matching items, completion, software writing and development; mid-term, final | Exams<br>10 - 50% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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|---|---|
| None | Other Category<br>0 - 0% |

**Representative Textbooks and Materials:**
Programmable Logic Controllers, 2/e, by Rabiee, copyright 2009, Goodheart-Willcox

Programmable Logic Controllers, 3/e, by Petruzella, copyright 2005 (classic text), McGraw-Hill, Inc.