Washtenaw Community College Comprehensive Report

ELE 254 Programmable Controllers (PLCs) II
Effective Term: Winter 2018

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Industrial Technology
Discipline: Electricity/Electronics
Course Number: 254
Org Number: 14400
Full Course Title: Programmable Controllers (PLCs) II
Transcript Title: Prog. Controllers (PLCs) II
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Consultation with all departments affected by this course is required.
Course title
Course description
Pre-requisite, co-requisite, or enrollment restrictions
Outcomes/Assessment
Objectives/Evaluation
Rationale: Updating syllabus to reflect course changes.
Proposed Start Semester: Winter 2018
Course Description: This is an advanced, lab based course in PLC system hardware, software and troubleshooting. Topics include analog I/O, data manipulation, PID process control, data communications (DeviceNet and EtherNet/IP), and HMIs. Labs use A-B SLC-5/04 and ControlLogix controllers, and RSLogix software. This course is intended for Industrial Electronics and Mechatronics students, electricians, electrician (and other) apprentices, technicians and engineers. The title of this course was previously PLC Applications.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 60 **Student:** 60
Lab: Instructor: 30 **Student:** 30
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

No Level Required

Requisites

Level II Prerequisite
Academic Math Level 3 or higher
and
Level II Prerequisite
ELE 224 minimum grade "C-"

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Install and troubleshoot PLC analog I/O.
   Assessment 1
   Assessment Tool: A departmental final exam will be used to assess understanding of key concepts
   Assessment Date: Fall 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: At least 3 sections
   Number students to be assessed: All students in at least 3 sections
   How the assessment will be scored: Departmentally-developed answer key
   Standard of success to be used for this assessment: Students will correctly answer 70% of the questions related to the outcome
   Who will score and analyze the data: Faculty who teach the class
   Assessment 2
   Assessment Tool: Departmental lab quizzes will be used to assess proficiency in applying the concepts and in performing hands-on tasks
   Assessment Date: Fall 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: At least 3 sections
   Number students to be assessed: All students in at least 3 sections
   How the assessment will be scored: Departmentally-developed answer key
   Standard of success to be used for this assessment: Students will correctly answer 70% of the questions related to the outcome
   Who will score and analyze the data: Faculty who teach the class

2. Install and troubleshoot PLC based process control.
   Assessment 1
   Assessment Tool: A departmental final exam will be used to assess understanding of key concepts
   Assessment Date: Fall 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: At least 3 sections
   Number students to be assessed: All students in at least 3 sections
   How the assessment will be scored: Departmentally-developed answer key
   Standard of success to be used for this assessment: Students will correctly answer 70% of the questions related to the outcome

Who will score and analyze the data: The faculty who teach the class

Assessment 2

Assessment Tool: Departmental lab quizzes will be used to assess proficiency in applying the concepts and in performing hands-on tasks
Assessment Date: Fall 2020
Assessment Cycle: Every Three Years
Course section(s)/other population: At least 3 sections
Number students to be assessed: All students in at least 3 sections
How the assessment will be scored: Departmentally-developed answer key
Standard of success to be used for this assessment: Students will correctly answer 70% of the questions related to the outcome
Who will score and analyze the data: The faculty who teach the class

3. Install and troubleshoot PLC communications.

Assessment 1

Assessment Tool: A departmental final exam will be used to assess understanding of key concepts
Assessment Date: Fall 2020
Assessment Cycle: Every Three Years
Course section(s)/other population: At least 3 sections
Number students to be assessed: All students in at least 3 sections
How the assessment will be scored: Departmentally-developed answer key
Standard of success to be used for this assessment: Students will correctly answer 70% of the questions related to the outcome
Who will score and analyze the data: The faculty who teach the class

Assessment 2

Assessment Tool: Departmental lab quizzes will be used to assess proficiency in applying the concepts and in performing hands-on tasks
Assessment Date: Fall 2020
Assessment Cycle: Every Three Years
Course section(s)/other population: At least 3 sections
Number students to be assessed: All students in at least 3 sections
How the assessment will be scored: Departmentally-developed answer key
Standard of success to be used for this assessment: Students will correctly answer 70% of the questions related to the outcome
Who will score and analyze the data: The faculty who teach the class

Course Objectives

1. Install hardware for analog I/O.
2. Program and interpret the operation of scaling instructions.
3. Troubleshoot PLC-based analog I/O.
4. Program and interpret the operation of data manipulation instructions.
5. Identify components and operation of open and closed loop control systems.
6. Program and interpret the operation of process control instructions.
7. Install hardware for open and closed loop control systems.
8. Troubleshoot PLC-based open and closed loop control systems.
9. Identify the common characteristics of data communications networks.
10. Configure and interpret software for DeviceNet and EtherNet/IP networks.
11. Install hardware for DeviceNet and EtherNet/IP networks.
12. Troubleshoot DeviceNet and EtherNet/IP networks.
13. Develop and interpret operator interface terminal (HMI) programs.
14. Develop and interpret PLC programs to communicate with operator interface terminals.
15. Install hardware for operator interface terminals.

16. Troubleshoot PLC operator interface terminal systems.
17. Troubleshoot sequential control systems.

New Resources for Course

Course Textbooks/Resources

Textbooks

Manufacturer Literature. *ELE 254 3-Ring Binder*, ed. WCC, 2017

Manuals

Petty, D.. ELE 254 Coursepack, Xanedu or college copy center, 08-01-2017

Periodicals

Software

Equipment/Facilities

Level III classroom

Computer workstations/lab

Reviewer	Action	Date
Faculty Preparer:		
Dale Petty	*Faculty Preparer*	*Jul 03, 2017*
Department Chair/Area Director:		
Thomas Penird	*Recommend Approval*	*Jul 06, 2017*
Dean:		
Brandon Tucker	*Recommend Approval*	*Jul 18, 2017*
Curriculum Committee Chair:		
Lisa Veasey	*Recommend Approval*	*Oct 17, 2017*
Assessment Committee Chair:		
Michelle Garey	*Recommend Approval*	*Oct 18, 2017*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Oct 25, 2017*