

# ELE 254: PROGRAMMABLE CONTROLLERS (PLCS) II

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## Completed Workflow

1. AMTD Chair (acoleman10@wccnet.edu)
2. AT Dean (krue@wccnet.edu,esamulski@wccnet.edu)
3. C&A Assistant (aabooker@wccnet.edu)
4. Curricular Systems Coordinator (cacevans@wccnet.edu)
5. C&A Coordinator (sabird@wccnet.edu)
6. C&A Director (bjlinford@wccnet.edu)
7. Before Comm review (aabooker@wccnet.edu)
8. Comm Review step (sabird@wccnet.edu)
9. After Comm review (sabird@wccnet.edu,bjlinford@wccnet.edu)
10. Curriculum Committee Chair (rwanwagnen@wccnet.edu)
11. Assessment Committee Chair (jhale15@wccnet.edu)
12. Before VPI (sabird@wccnet.edu)
13. Vice President for Instruction (hbhirth@wccnet.edu; brtucker@wccnet.edu)
14. Banner (cacevans@wccnet.edu)

## Approval Path

1. 2026-01-04T07:40:12Z  
Allan Coleman (acoleman10): Approved for AMTD Chair
2. 2026-01-04T10:58:00Z  
Eva Samulski (esamulski): Approved for AT Dean
3. 2026-02-17T18:44:52Z  
Ben Linford (bjlinford): Approved for C&A Assistant
4. 2026-02-23T14:58:53Z  
Carol Evans (cacevans): Approved for Curricular Systems Coordinator
5. 2026-03-04T17:02:45Z  
Ben Linford (bjlinford): Approved for C&A Coordinator
6. 2026-03-04T17:11:07Z  
Ben Linford (bjlinford): Approved for C&A Director
7. 2026-03-06T20:12:09Z  
Ben Linford (bjlinford): Approved for Before Comm review
8. 2026-03-13T20:32:25Z  
Ben Linford (bjlinford): Approved for Comm Review step
9. 2026-03-17T14:26:50Z  
Ben Linford (bjlinford): Approved for After Comm review
10. 2026-04-01T16:28:14Z  
Sera Bird (sabird): Approved for Curriculum Committee Chair
11. 2026-04-01T16:28:28Z  
Sera Bird (sabird): Approved for Assessment Committee Chair
12. 2026-04-01T16:28:40Z  
Sera Bird (sabird): Approved for Before VPI
13. 2026-04-01T16:42:01Z  
Brandon Tucker (brtucker): Approved for Vice President for Instruction
14. 2026-04-02T07:03:11Z  
Approved for Banner

## History

1. Apr 2, 2026 by William Sturm (wjsturm)

### Viewing: ELE 254 : Programmable Controllers (PLCs) II

Changes proposed by: William Sturm (wjsturm)

#### Effective Term

Fall 2026

#### Rationale and proposal summary

Changes in equipment require the pre-req to become a level 1 "C" and remove model-specific from the description and objectives. (Change to brand vs models) Minor revisions to objectives with updated terminology.

## Course Cover

### Full Course Title

Programmable Controllers (PLCs) II

### Transcript Title

Prog. Controllers (PLCs) II

### Subject Code

ELE - Electricity/Electronics

### Course Number

254

### Department

Advanced Manufacturing (AMTD)

### Banner Division

ATP

### Division/College

Adv Tech/Public Serv Careers (AT)

### Org Code

14400

### Course Description

In this advanced course, students will explore PLC system hardware, software and troubleshooting in a lab setting. Topics include analog inputs and outputs, data manipulation, open and closed loop control, communications, and operator interface terminals. Labs use a combination of Allen Bradley and Siemens PLC's.

### Planned Delivery Format

Face to Face

### Has this course been approved for virtual or blended virtual?

No

### Has this course been approved for online or online blended?

No

### Grading method

Standard Letter, Audit, Academic Forgiveness

### CIP Code

159999 - Engineering/Engineering-Related Technologies/Technicians, Other.

### Occupational Indicator

Yes

### ACS Code

130

## Credit hours, contact hours, repeatability

### Repeatable for additional credit

No

### Course credits

4

### Lecture contact hours

60

**Lab contact hours**

30

**Total Contact Hours**

90

**Expected Total Contact Hours**

90

**Prerequisites and prerequisite skill levels****College-Level Math**

Other

**College-Level Reading and Writing**

College-level Reading and Writing

**Approved Level I Prerequisite:**

Academic Reading and Writing Levels of 6; Academic Math Level 3 or MTH 157; ELE 224 minimum grade "C"

**Is concurrent enrollment an option for this prerequisite?**

No

**Course Assessment Plan****Learning Outcome****Outcome**

Install and troubleshoot PLC analog I/O.

**Assessment #1****Assessment Tool**

Outcome-related exam questions

**Anticipated Next Assessment Year**

2026

**Anticipated Next Assessment Term**

Fall

**Assessment Cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

Departmentally-developed answer key

**Who does the scoring?**

Departmental faculty

**Standard of success**

70% of students will score 70% or higher.

**Assessment #2****Assessment Tool**

Outcome-related lab quizzes

**Anticipated Next Assessment Year**

2026

**Anticipated Next Assessment Term**

Fall

**Assessment cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

Departmentally-developed answer key

**Who does the scoring?**

Departmental faculty

**Standard of Success**

70% of students will score 70% or higher.

**Assessment #3**

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**Learning Outcome**

**Outcome**

Install and troubleshoot PLC based process control.

**Assessment #1**

**Assessment Tool**

Outcome-related exam questions

**Anticipated Next Assessment Year**

2026

**Anticipated Next Assessment Term**

Fall

**Assessment Cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

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**Assessment Tool**

Outcome-related lab quizzes

**Anticipated Next Assessment Year**

2026

**Anticipated Next Assessment Term**

Fall

**Assessment cycle**

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All students from all sections

**How the assessment will be scored**

Departmentally-developed answer key

**Who does the scoring?**

Departmental faculty

**Standard of Success**

70% of students will score 70% or higher.

**Assessment #3****Learning Outcome****Outcome**

Install and troubleshoot PLC communications.

**Assessment #1****Assessment Tool**

Outcome-related exam questions

**Anticipated Next Assessment Year**

2026

**Anticipated Next Assessment Term**

Fall

**Assessment Cycle**

Every Three Years

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Outcome-related lab quizzes

**Anticipated Next Assessment Year**

2026

**Anticipated Next Assessment Term**

Fall

**Assessment cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

Departmentally-developed answer key

**Who does the scoring?**

Departmental faculty

**Standard of Success**

70% of students will score 70% or higher.

**Assessment #3****Course Objectives**

	Objective(s)
1.	Install hardware for analog input and output devices.
2.	Program and interpret analog scaling and translation techniques.
3.	Troubleshoot PLC based analog inputs and outputs.
4.	Program and interpret 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.	Develop and test PLC based open and closed loop control systems.
9.	Identify the common characteristics of data communications networks.
10.	Configure and interpret hardware for relevant communication networks.
11.	Develop software for relevant communication networks.
12.	Troubleshoot communication networks.
13.	Develop and interpret operator interface terminal (OIT) programs.
14.	Develop and interpret PLC logic and data to communicate with operator interface terminals.
15.	Troubleshoot PLC operator interface terminal systems.
16.	Troubleshoot sequential control systems.

**General Education Area(s)****Area 1: Writing**

No

**Area 2: 2nd Writing or Communication/Speech**

No

**Area 3: Mathematics**

No

**Area 4: Natural Science**

No

**Area 5: Social and Behavioral Science**

No

**Area 6: Arts and Humanities**

No

**MTA General Education**

No

## Review

**Is conditional approval requested?**

No

**Is this course currently conditionally approved, and you are now submitting it for full approval?**

No

### Reviewer Comments

**Ben Linford (bjlinford) (2026-02-17T18:44:50Z):** Pulling forward for expedited review -BL

**Ben Linford (bjlinford) (2026-03-04T17:02:42Z):** Pulling forward to get on next C&A Committee agenda -BL 3/4/26

**Sera Bird (sabird) (2026-04-01T16:28:12Z):** Approved by C&A Committee Chairs via internal tracking system 3/19/26.

**Sera Bird (sabird) (2026-04-01T16:28:26Z):** Approved by C&A Committee Chairs via internal tracking system 3/19/26.

Key: 4858

## 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

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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

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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, Xanadu or college copy center, 08-01-2017

##### Periodicals

##### Software

#### Equipment/Facilities

Level III classroom

Computer workstations/lab

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