



Western Technical College

10620159 Process Control Systems

Course Outcome Summary

Course Information

Description	Introduces the concept of automatic process control on the technician level. Studies controller functions and effects such as proportional, integral and derivative and how different combinations of each cause controller outputs and inputs to respond in open and closed loops. Practices digital controller configuration and loop tuning for level, pressure, flow, and temperature.
Career Cluster	Manufacturing
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	90

Pre/Corequisites

Prerequisite 10660118 AC Circuits Analysis

Textbooks

Instrumentation and Process Control - eBook. 7th Edition. Copyright 2022. Weedon, Thomas A., Franklyn W. Kirk, and Philip Kirk. Publisher: American Technical Publishers, Inc. **ISBN-13:** 978-0-8269-9542-1. Required.

Instrumentation and Process Control. 7th Edition. Copyright 2019. Weedon, Thomas A., Franklyn W. Kirk, and Philip Kirk. Publisher: American Technical Publishers, Inc. **ISBN-13:** 978-0-8269-3446-8. Optional.

Learner Supplies

Scientific calculator (recommend T1-36x Solar). **Vendor:** Campus Shop. Required.

Safety Glasses. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Increase Self-Awareness
2. Live Responsibly: Develop Resilience

3. Live Responsibly: Embrace Sustainability
4. Live Responsibly: Foster Accountability
5. Refine Professionalism: Act Ethically
6. Refine Professionalism: Improve Critical Thinking

Program Outcomes

1. Perform work safely.
2. Troubleshoot electrical and mechanical systems and devices.
3. Repair electrical and mechanical systems.
4. Communicate technical information.
5. Integrate electrical and mechanical systems and devices.

Course Competencies

1. Explore process control systems.

Assessment Strategies

- 1.1. Written Objective Test

Criteria

You will know you are successful when:

- 1.1. You explain industry needs for process control systems.
- 1.2. You discuss issues related to industrial process control systems.
- 1.3. You identify common process control systems used.
- 1.4. You identify common process control feedback systems.
- 1.5. You compare digital and analog process control systems.
- 1.6. You identify various process control system controllers.

Learning Objectives

- 1.a. Explore industry needs for process control systems.
- 1.b. Explore issues related to industrial process control systems.
- 1.c. Identify common process control systems used.
- 1.d. Identify common process control feedback systems.
- 1.e. Explore digital and analog process control systems.
- 1.f. Identify various process control system controllers.

2. Explore the four modes of industrial process control.

Assessment Strategies

- 2.1. Written Objective Test

Criteria

You will know you are successful when

- 2.1. You describe the function of a P (Proportional) control system.
- 2.2. You describe the function of a PI (Proportional, Integral) control system.
- 2.3. You describe the function of a PID (Proportional, Integral, Derivative) control system.
- 2.4. You describe the function of a On/Off control system.

Learning Objectives

- 2.a. Examine the function of a P (Proportional) control system.
- 2.b. Examine the function of a PI (Proportional, Integral) control system.
- 2.c. Examine the function of a PID (Proportional, Integral, Derivative) control system.
- 2.d. Examine the function of a On/Off control system.

3. Investigate a temperature process control system.

Assessment Strategies

- 3.1. Written Objective Test

Criteria

You will know you are successful when:

- 3.1. You identify input devices used in temperature process control systems.
- 3.2. You identify output devices used in temperature process control systems.
- 3.3. You identify control devices used in temperature process control systems.
- 3.4. You identify the relationship between devices used in temperature process control systems.

Learning Objectives

- 3.a. Investigate input devices used in temperature process control systems.
- 3.b. Investigate output devices used in temperature process control systems.
- 3.c. Investigate control devices used in temperature process control systems.
- 3.d. Investigate relationship between devices used in temperature process control systems.
- 3.e. Explore application of temperature process control systems.

4. Build a temperature process control system.

Assessment Strategies

- 4.1. Demonstration

Criteria

You will know you are successful when:

- 4.1. You design a temperature control system.
- 4.2. You build a temperature control system.
- 4.3. You run the control system while monitoring the conditions.
- 4.4. You troubleshoot the system.
- 4.5. You adjust system parameters to insure operation.

Learning Objectives

- 4.a. Design a temperature control system.
- 4.b. Build a temperature control system.
- 4.c. Run the control system while monitoring the conditions.
- 4.d. Troubleshoot the system.
- 4.e. Adjust system parameters to insure operation.

5. Investigate a pressure process control system.

Assessment Strategies

- 5.1. Written Objective Test

Criteria

You will know you are successful when:

- 5.1. You identify input devices used in pressure process control systems.
- 5.2. You identify output devices used in pressure process control systems.
- 5.3. You identify control devices used in pressure process control systems.
- 5.4. You identify the relationship between devices used in pressure process control systems.

Learning Objectives

- 5.a. Investigate input devices used in pressure process control systems.
- 5.b. Investigate output devices used in pressure process control systems.
- 5.c. Investigate control devices used in pressure process control systems.
- 5.d. Investigate relationship between devices used in pressure process control systems.
- 5.e. Explore application of pressure process control systems.

6. Build a pressure process control system.

Assessment Strategies

- 6.1. Demonstration

Criteria

You will know you are successful when:

- 6.1. You design a pressure control system.
- 6.2. You build a pressure control system.
- 6.3. You run the control system while monitoring the conditions.
- 6.4. You troubleshoot the system.
- 6.5. You adjust system parameters to insure operation.

Learning Objectives

- 6.a. Design a pressure control control system.
- 6.b. You build a pressure control control system.
- 6.c. Run the control system while monitoring the conditions.
- 6.d. Troubleshoot the system.
- 6.e. Adjust system parameters to insure operation.

7. Investigate a fluid level process control system.

Assessment Strategies

- 7.1. Written Objective Test

Criteria

You will know you are successful when:

- 7.1. You identify input devices used in fluid level process control systems.
- 7.2. You identify output devices used in fluid level process control systems.
- 7.3. You identify control devices used in fluid level process control systems.
- 7.4. You identify the relationship between devices used in fluid level process control systems.

Learning Objectives

- 7.a. Investigate input devices used in fluid level process control systems.
- 7.b. Investigate output devices used in fluid level process control systems.
- 7.c. Investigate control devices used in fluid level process control systems.
- 7.d. Investigate relationship between devices used in fluid level process control systems.
- 7.e. Explore application of fluid level process control systems.

8. Build a fluid level process control system.

Assessment Strategies

- 8.1. Demonstration

Criteria

You will know you are successful when:

- 8.1. You design a fluid level control system.
- 8.2. You build a fluid level control system.
- 8.3. You run the control system while monitoring the conditions.
- 8.4. You troubleshoot the system.
- 8.5. You adjust system parameters to insure operation.

Learning Objectives

- 8.a. Design a fluid level control system.
- 8.b. Build a fluid level control system.
- 8.c. Run the control system while monitoring the conditions.
- 8.d. Troubleshoot the system.
- 8.e. Adjust system parameters to insure operation.

9. Investigate a fluid flow process control system.

Assessment Strategies

- 9.1. Written Objective Test

Criteria

You will know you are successful when:

- 9.1. You identify input devices used in fluid flow process control systems.
- 9.2. You identify output devices used in fluid flow process control systems.

- 9.3. You identify control devices used in fluid flow process control systems.
- 9.4. You identify the relationship between devices used in fluid flow process control systems.

Learning Objectives

- 9.a. Investigate input devices used in fluid flow process control systems.
- 9.b. Investigate output devices used in fluid flow process control systems.
- 9.c. Investigate control devices used in fluid flow process control systems.
- 9.d. Investigate relationship between devices used in fluid flow process control systems.
- 9.e. Explore application of fluid flow process control systems.

10. Build a fluid flow process control system.

Assessment Strategies

- 10.1. Demonstration

Criteria

You will know you are successful when:

- 10.1. You design a fluid flow control system.
- 10.2. You build a fluid flow control system.
- 10.3. You run the control system while monitoring the conditions.
- 10.4. You troubleshoot the system.
- 10.5. You adjust system parameters to insure operation.

Learning Objectives

- 10.a. Design a fluid flow control system.
- 10.b. Build a fluid flow control system.
- 10.c. Run the control system while monitoring the conditions.
- 10.d. Troubleshoot the system.
- 10.e. Adjust system parameters to insure operation.