Western Technical College

10664109 Automated Systems Troubleshooting

Course Outcome Summary

Course Information

Description	A systems-based troubleshooting course reflecting industry standards and methodologies. The course addresses procedures, tools, instruments, and equipment necessary to analyze and repair modern automated industrial equipment.
Career Cluster	Manufacturing
Instructional Level	Associate Degree Courses
Total Credits	2
Total Hours	54

Pre/Corequisites

Prerequisite 10620164 Automation Systems Integration

Textbooks

No textbook required.

Success Abilities

1. Refine Professionalism: Improve Critical Thinking

High Impact Practices

1. Capstone Experience: in this course, you will develop a project that integrates and applies many of the concepts, skills, and characteristics needed of an industry expert in the field.
2. Technology-Enhanced Learning: this course will incorporate digital technologies like gamification, virtual reality experiences, or simulations. In addition, you will create technology-enhanced products

such as ePortfolios, multimedia presentations, or other e-products to showcase your learning.

Course Competencies

1. Outline industry standard troubleshooting processes

Assessment Strategies

1.1. Activity

Criteria

1.1. you explain the importance of troubleshooting to the organization
1.2. you identify basic troubleshooting equipment
1.3. you identify common causes of machine and equipment failure
1.4. you describe how a schematic is used in troubleshooting
1.5. you describe the troubleshooting needs clearly and completely
1.6. you outline steps or processes to take

Learning Objectives

1.a. Explain why efficient troubleshooting is important in a production plant
1.b. Review common troubleshooting aids
1.c. Identify steps in troubleshooting a machine
1.d. Identify steps in troubleshooting a system
1.e. Examine the role of clear communication in troubleshooting

2. Apply troubleshooting techniques

Assessment Strategies

2.1. Activity
2.2. Skill Demonstration

Criteria

2.1. you recognize normal machine operation
2.2. you relate types of wear and deterioration to common causes
2.3. you ask questions to uncover potential causes for machine failure
2.4. you suggest ways to reduce downtime
2.5. you make use of troubleshooting aids

Learning Objectives

2.a. Recognize normal machine operations
2.b. Recognize abnormal machine operations
2.c. Identify questions you should ask if the machine fails
2.d. Explain signs of a machine in need of servicing
2.e. Use troubleshooting aids

3. Construct a valid troubleshooting test

Assessment Strategies

3.1. Skill Demonstration

Criteria

3.1. you select a component for testing
3.2. you determine proper operation of the component or system
3.3. you measure with test equipment or observation that the operation meets test criteria
3.4. if test fails to find issue, create the next logical component test
3.5. you continue the testing process until the problem is resolved

Learning Objectives

3.a. Layout the testing process
3.b. Correlate types of tests with problems and failures
3.c. Identify types of test equipment
3.d. Apply safety precautions needed for testing
3.e. Differentiate between valid and invalid tests

4. Troubleshoot a Pneumatic System

Assessment Strategies

4.1. Skill Demonstration

Criteria

4.1. you construct a test to verify operation or failure of the equipment or part of a system
4.2. you conduct the test and observe and record results
4.3. you determine if further testing is needed
4.4. you identify the problem
4.5. you identify potential causes
4.6. you select a remedy
4.7. you verify operation
4.8. you apply a logical progression

Learning Objectives

4.a. Identify symptoms of common pneumatic system problems
4.b. Explain the sequence of steps to be followed in troubleshooting pneumatic problems
4.c. Isolate a pneumatic problem
4.d. Demonstrate how to inspect pneumatic systems for leaks and possible problems.
4.e. Explain the purpose of proper lubrication in pneumatic systems.
4.f. Inspect system components for deterioration and damage
4.g. Perform proper adjustments to a pneumatic system
4.h. Rectify the failure in a pneumatic system

5. Troubleshoot an Electrical System

Assessment Strategies

5.1. Skill Demonstration
5.2. Simulation

Criteria

5.1. you construct a test to verify operation or failure of the equipment or part of a system
5.2. you conduct the test and observe and record results
5.3. you determine if further testing is needed
5.4. you identify the problem
5.5. you identify potential causes
5.6. you select a remedy
5.7. you apply the remedy
5.8. you verify operation
5.9. you apply a logical progression

Learning Objectives

5.a. Identify symptoms of common electrical system problems
5.b. Correlate problems to remedies
5.c. Describe problems unique to electrical systems
5.d. Interpret drawings, schematics, and specifications for electrical systems
5.e. Evaluate recent maintenance history for electrical systems
5.f. Determine the cause of and provide a solution to a problem in the electrical system
5.g. Use troubleshooting charts for electrical systems
5.h. Rectify the failure in the electrical system

6. Troubleshoot a Motor Control System

Assessment Strategies

6.1. Skill Demonstration
6.2. Simulation

Criteria

6.1. you construct a test to verify operation or failure of the equipment or part of a system
6.2. you conduct the test and observe and record results
6.3. you determine if further testing is needed
6.4. you identify the problem
6.5. you identify potential causes
6.6. you select a remedy

6.7. you apply the remedy
6.8. you verify operation
6.9. you apply a logical progression

Learning Objectives

6.a. Identify symptoms of common AC and DC Motor Control System problems
6.b. Correlate problems to remedies
6.c. Describe problems unique to VFD controlled, 3-phase AC Motor Control Systems
6.d. Describe problems unique to constant speed and variable speed DC Motor Control Systems
6.e. Interpret drawings, schematics, and specifications for AC and DC motor control systems
6.f. Evaluate recent maintenance history for motor control systems
6.g. Determine the cause of and provide a solution to a problem in a motor control system
6.h. Use troubleshooting charts for motor control systems
6.i. Rectify the failure in a motor control system

7. Troubleshoot a PLC/HMI Controlled System

Assessment Strategies

7.1. Skill Demonstration
7.2. Simulation

Criteria

7.1. you construct a test to verify operation or failure of the equipment or part of a system
7.2. you conduct the test and observe and record results
7.3. you determine if further testing is needed
7.4. you identify the problem
7.5. you identify potential causes
7.6. you select a remedy
7.7. you apply the remedy
7.8. you verify operation
7.9. you apply a logical progression

Learning Objectives

7.a. Identify symptoms of common PLC/HMI control system problems
7.b. Correlate problems to remedies
7.c. Describe problems unique to PLC/HMI controlled systems
7.d. Interpret drawings, schematics, and specifications for PLC/HMI controlled systems
7.e. Evaluate recent maintenance history for PLC/HMI controlled systems
7.f. Determine the cause of and provide a solution to a problem in a PLC/HMI controlled system
7.g. Use troubleshooting charts for PLC/HMI controlled systems
7.h. Rectify the failure in a PLC/HMI controlled system