Western Technical College

31414343 Electrical Technical Skills

Course Outcome Summary

Course Information

Description	This course emphasizes beginning soldering techniques in practice exercises and project work. Electrical troubleshooting skills for motor control systems are also included.
Career Cluster	Manufacturing
Instructional Level	One-Year Technical Diploma
Total Credits	1
Total Hours	36

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Cultivate Passion: Increase Self-Awareness
3. Live Responsibly: Develop Resilience
4. Live Responsibly: Foster Accountability
5. Refine Professionalism: Act Ethically
6. Refine Professionalism: Improve Critical Thinking

Course Competencies

1. Describe solder and the soldering process.

Assessment Strategies

1.1. Written Product
1.2. Written Objective Test

Criteria

You will know you are successful when

1.1. you list the advantages of soldering.
1.2. you describe the wetting action of a soldered connection.
1.3. you explain the role of flux in soldering.
1.4. you explain the heat cycle of the work when soldering.
1.5. you describe the characteristics of a good solder connection.

Learning Objectives

1.a. List the advantages of soldering.

1.b. Describe the wetting action of a soldered connection.
1.c. Explain the role of flux in soldering.
1.d. Explain the heat cycle of the work when soldering.
1.e. Describe the characteristics of a good solder connection.

2. Investigate proper tools and materials for soldering and desoldering a connection.

Assessment Strategies

2.1. Written Objective Test
2.2. Written Product

Criteria

You will know you are successful when

2.1. you list the parts of a soldering iron.
2.2. you identify characteristics of commercially available solders.
2.3. you compare the characteristics of mechanical and thermal strippers.
2.4. you select the proper tools for desoldering a connection.
2.5. you select the proper materials for desoldering a connection.
2.6. you list the materials required for soldering four types of electrical terminals.

Learning Objectives

2.a. List the parts of a soldering iron.
2.b. Identify characteristics of commercially available solders which are essential for making different types of electrical connections.
2.c. Compare the characteristics of mechanical and thermal strippers.
2.d. Select the proper tools for desoldering a connection.
2.e. Select the proper materials for desoldering a connection.
2.f. List the materials required for soldering four types of electrical terminals.

3. Prepare the materials for soldering and desoldering a connection.

Assessment Strategies

3.1. Skill Demonstration
3.2. Written Objective Test

Criteria

You will know you are successful when

3.1. you remove insulation from wire conductor.
3.2. you set up a soldering workstation.
3.3. you tin wire conductor.
3.4. you clean connections prior to soldering.
3.5. you stabilize the parts of the connection.
3.6. you apply the appropriate technique for soldering static sensitive components.

Learning Objectives

3.a. Remove insulation from wire conductor.
3.b. Set up a soldering workstation.
3.c. Tin wire conductors.
3.d. Clean connections prior to soldering.
3.e. Wire the parts of the connection.
3.f. Apply the appropriate technique for soldering static sensitive components.

4. Solder industry standard electronic components and connectors.

Assessment Strategies

4.1. Skill Demonstration
4.2. Written Product

Criteria

You will know you are successful when

4.1. you solder static sensitive components.
4.2. you solder wire conductors to turret, cup, bifurcated and pierced terminals.

4.3. you solder axial and radial lead components to PC board.
4.4. you solder transistors and IC's to PC board.

Learning Objectives

4.a. Practice soldering static sensitive components.
4.b. Practice soldering wire conductors to turret, cup, bifurcated and pierced terminals.
4.c. Practice soldering axial and radial lead components to PC board.
4.d. Practice soldering transistors and IC's to PC board.

5. Desolder industry standard electronic components and connectors.

Assessment Strategies

5.1. Skills Demonstration
5.2. Written Product

Criteria

You will know you are successful when

5.1. you desolder static sensitive components.
5.2. you desolder axial and radial lead components from a printed circuit board.
5.3. you desolder transistors and IC's from a printed circuit board.

Learning Objectives

5.a. Practice desoldering static sensitive components.
5.b. Practice desoldering axial and radial lead components to PC board.
5.c. Practice desoldering transistors and IC's to PC board.

6. Analyze three-phase motor control circuit operation.

Assessment Strategies

6.1. Skill Demonstration
6.2. Simulation

Criteria

6.1. you explain the characteristics and use of ohm meters, volt meters and current meters in motor control circuit analysis.
6.2. you identify the starting and run characteristics of a three phase motor.
6.3. you explain the control and power circuit operation of a simple two-wire, three phase motor circuit.
6.4. you analyze the operation and expected current measurements of a functioning three phase motor control circuit.
6.5. you identify potential faults in a three phase motor control circuit.

Learning Objectives

6.a. Review characteristics and operation of ohm meters, volt meters and current meters in motor control circuit analysis.
6.b. Review operational parameters of a simple 3-phase motor control circuit.
6.c. Demonstrate the operation of a forward/reverse three-phase motor control circuit.
6.d. Verify the expected circuit measurements of a working forward/reverse three-phase motor control circuit.
6.e. Discuss the causes of possible operational faults in a three-phase motor control circuit.

7. Troubleshoot three-phase motor control circuits

Assessment Strategies

7.1. Skill Demonstration
7.2. Simulation

Criteria

Performance will be satisfactory when:

7.1. you complete the assigned review exercises regarding motor control troubleshooting tactics.
7.2. you complete assigned basic motor control troubleshooting exercises in a simulated circuit environment with 80% accuracy.
7.3. you complete assigned intermediate motor control troubleshooting exercises in a simulated circuit environment with 80% accuracy.

Learning Objectives

7.a. Review three phase motor control circuit troubleshooting tactics.
7.b. Complete basic troubleshooting exercises on 3-phase motor control circuits within expected parameters.
7.c. Complete advanced level troubleshooting exercises on 3-phase motor control circuits within expected parameters.