Western Technical College

10620130 Introduction to Electromechanical Technology

Course Outcome Summary

Course Information

Description	This course will introduce the student to the field of Electromechanical Technology. We will explore the function of the electromechanical technician and employment opportunities. Topics such as hand tools, test equipment, and basic wiring practices will be discussed and applied. The course will also cover basic soldering and desoldering of wires and components.
Career Cluster	Manufacturing
Instructional Level	Associate Degree Courses
Total Credits	2
Total Hours	54

Textbooks

Delmar's Standard Textbook of Electricity. 7th Edition. Copyright 2020. Herman, Stephen. Publisher: Cengage Learning. **ISBN-13:** 978-1-337-90034-8. Required.

Electric Motors and Control Systems. 3rd Edition. Copyright 2020. Petruzella, Frank. Publisher: McGraw-Hill Publishing Company. **ISBN-13:** 978-1-260-43939-7. Required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** Campus Shop. Required.

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

Fluke 117 Digital Multimeter. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience

5. Live Responsibly: Foster Accountability
6. Refine Professionalism: Act Ethically
7. Refine Professionalism: Improve Critical Thinking
8. Refine Professionalism: Participate Collaboratively
9. Refine Professionalism: Practice Effective Communication

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. Adhere to industry established safety procedures.

Assessment Strategies

1.1. Skill Demonstration

Criteria

You will know you are successful when:

1.1. you demonstrate correct lockout/tagout procedures.
1.2. you wear your PPE at all required times.

Learning Objectives

1.a. Safely demonstrate use of Lockout/Tagout.
1.b. Demonstrate disciplined wiring skills to avoid loose connections or 'shorts'.
1.c. Wear proper PPE when working on circuits.

2. Investigate electrical conductors for applications.

Assessment Strategies

2.1. Written Product
2.2. Demonstration

Criteria

You will know you are successful when

2.1. you determine conductor size.
2.2. you identify types of conductors.
2.3. you classify conductor ampacity.
2.4. you distinguish conductor insulation types.
2.5. you identify types of cords and cables.

Learning Objectives

2.a. Determine conductor size.
2.b. Identify types of conductors.
2.c. Classify conductor ampacity.
2.d. Distinguish conductor insulation types.
2.e. Identify types of cords and cables

3. Demonstrate proper termination of conductors at wiring devices.

Assessment Strategies

3.1. Demonstration

3.2. Written Product

Criteria

You will know you are successful when

3.1. you prepare wire correctly for termination.
3.2. you insert wires the correct depth in device.
3.3. you connect wires together using standard industrial methods.
3.4. you secure wires in devices correctly.

Learning Objectives

3.a. Prepare wire correctly for termination.
3.b. Insert wires the correct depth in device.
3.c. Connect wires together using standard industrial methods.
3.d. Secure wires in devices correctly.

4. Create basic residential circuits utilizing standard components.

Assessment Strategies

4.1. Demonstration
4.2. Drawing/Illustration

Criteria

You will know you are successful when

4.1. you install electrical outlets.
4.2. you install electrical switches.
4.3. you install electrical circuit protection.
4.4. you install correct electrical components for specified circuits.

Learning Objectives

4.a. Install electrical outlets.
4.b. Install electrical switches.
4.c. Install electrical circuit protection.
4.d. Install correct electrical components for specified circuits.

5. Repair common residential electrical circuits.

Assessment Strategies

5.1. Skill Demonstration
5.2. Written Product

Criteria

You will know you are successful when

5.1. you repair circuit opens.
5.2. you repair circuit shorts.
5.3. you repair circuit grounding systems.

Learning Objectives

5.a. Repair circuit opens.
5.b. Repair circuit shorts.
5.c. Repair circuit grounding systems.

6. Describe solder and the soldering process.

Assessment Strategies

6.1. Written Product
6.2. Written Objective Test

Criteria

You will know you are successful when

6.1. you list the advantages of soldering.
6.2. you describe the wetting action of a soldered connection.
6.3. you explain the role of flux in soldering.

6.4. you explain the heat cycle of the work when soldering.
6.5. you describe the characteristics of a good solder connection.

Learning Objectives

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

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

Assessment Strategies

7.1. Written Objective Test
7.2. Written Product

Criteria

You will know you are successful when

7.1. you list the parts of a soldering iron.
7.2. you identify characteristics of commercially available solders which are essential for making different types of electrical connections.
7.3. you compare the characteristics of mechanical and thermal strippers.
7.4. you select the proper tools for desoldering a connection.
7.5. you select the proper materials for desoldering a connection.
7.6. you list the materials required for soldering four types of electrical terminals.

Learning Objectives

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

8. Solder industry standard electronic components and connectors.

Assessment Strategies

8.1. Skill Demonstration
8.2. Written Product

Criteria

You will know you are successful when

8.1. you solder static sensitive components.
8.2. you solder wire conductors to turret, cup, bifurcated and pierced terminals.
8.3. you solder axial and radial lead components to PC board.
8.4. you solder transistors and IC's to PC board.

Learning Objectives

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

9. Desolder industry standard electronic components and connectors.

Assessment Strategies

9.1. Skills Demonstration
9.2. Written Product

Criteria

You will know you are successful when

9.1. you desolder static sensitive components.

9.2. you desolder axial and radial lead components to PC board.
9.3. you desolder transistors and IC's to PC board.

Learning Objectives

9.a. Desolder static sensitive components.
9.b. Desolder axial and radial lead components to PC board.
9.c. Desolder transistors and IC's to PC board.

10. Solder conductors and cables.

Assessment Strategies

10.1. Skill Demonstration
10.2. Written Objective Test

Criteria

You will know you are successful when

10.1. you construct cables, cable splicing, and cable ends.
10.2. you solder cables, cable splicing, and cable ends.
10.3. you complete cables, cable splicing, and cable ends.
10.4. you verify operation of completed cables and/or conductors.

Learning Objectives

10.a. Construct cables, cable splicing, and cable ends.
10.b. Solder cables, cable splicing, and cable ends.
10.c. Complete cables, cable splicing, and cable ends.
10.d. Verify operation of completed cables and/or conductors.
10.e. Fix problems identified.

11. Evaluate solder connections.

Assessment Strategies

11.1. Written Product
11.2. Skill Demonstration
11.3. Written Objective Test

Criteria

You will know you are successful when

11.1. you explain useful criteria for evaluating solder connections.
11.2. you identify the desirable and undesirable characteristics of a good connection.
11.3. you evaluate cup terminal wire connections.
11.4. you evaluate bifurcated terminal wire connections.
11.5. you evaluate pierced and hook terminal wire connections.
11.6. you evaluate axial and radial lead PCB connections.

Learning Objectives

11.a. Explain useful criteria for evaluating solder connections.
11.b. Identify the desirable and undesirable characteristics of a good connection.
11.c. Evaluate cup terminal wire connections.
11.d. Evaluate bifurcated terminal wire connections.
11.e. Evaluate pierced and hook terminal wire connections.
11.f. Evaluate axial and radial lead PCB connections.