



Western Technical College

## 10620105 Fundamental Electrical Skills

### Course Outcome Summary

#### Course Information

<b>Description</b>	This course will introduce fundamental electrical skills. Proper wiring practices and an introduction to residential wiring systems will be included. Soldering and desoldering of wires and component connections will also be addressed.
<b>Career Cluster</b>	Manufacturing
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	1
<b>Total Hours</b>	36

#### Textbooks

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

#### Learner Supplies

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

#### Program Outcomes

1. Perform work safely.
2. Troubleshoot electrical and mechanical systems and devices.
3. Repair electrical and mechanical systems.

#### 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. Identify 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 for the application.
- 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. Examine conductor sizes.
- 2.b. Explore types of conductors.
- 2.c. Classify conductor ampacity.
- 2.d. Examine 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.
- 3.5. you describe proper termination of conductors to wiring devices.

#### **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.

4.5. you diagram a variety of residential circuits.

#### **Learning Objectives**

- 4.a. Practice installing electrical outlets.
- 4.b. Practice installing electrical switches.
- 4.c. Practice installing electrical circuit protection.
- 4.d. Practice installing correct electrical components for specified circuits.
- 4.e. Examine diagrams/schematics of a variety of residential circuits.

### **5. Examine solder and the soldering process.**

#### **Assessment Strategies**

- 5.1. Written Product
- 5.2. Written Objective Test

#### **Criteria**

*You will know you are successful when*

- 5.1. you list the advantages of soldering.
- 5.2. you describe the wetting action of a soldered connection.
- 5.3. you explain the role of flux in soldering.
- 5.4. you explain the heat cycle of the work when soldering.
- 5.5. you describe the characteristics of a good solder connection.

#### **Learning Objectives**

- 5.a. Examine the advantages of soldering.
- 5.b. Describe the wetting action of a soldered connection.
- 5.c. Examine the role of flux in soldering.
- 5.d. Explore the heat cycle of the work when soldering.
- 5.e. Identify the characteristics of a good solder connection.

### **6. Solder industry standard electronic components and connectors.**

#### **Assessment Strategies**

- 6.1. Skill Demonstration

#### **Criteria**

*You will know you are successful when*

- 6.1. you solder static sensitive components.
- 6.2. you solder wire conductors to turret, cup and pierced terminals as well as other wire conductors.
- 6.3. you solder axial and radial lead components to PC board.
- 6.4. you solder transistors and IC's to PC board.
- 6.5. you de-solder a wire jumper connection from a PCB using both a de-soldering wick and a solder sucker

#### **Learning Objectives**

- 6.a. Practice soldering static sensitive components.
- 6.b. Practice soldering wire conductors to turret, cup and pierced terminals as well as other wire conductors.
- 6.c. Practice soldering axial and radial lead components to PC board.
- 6.d. Practice soldering transistors and IC's to PC board.
- 6.e. Practice technique to de-solder a wire jumper connection from a PCB using both a de-soldering wick and a solder sucker