HVAC/R CONTROLS 2  
Course Syllabus

Course Number: ARCO-1134B          OHLAP Credit: No
OCAS Code: None                      Course Length: 23 Hours
Career Cluster: Architecture & Construction
Career Pathway: Maintenance/Operations
Career Major(s): HVAC Technician

Pre-requisite(s): Electricity for HVAC/R

Course Description: This course is an introduction to controls, gas valves, fuel controls, residential control systems-heating/cooling, commercial control systems, heat pump controls, direct digital controls (DDC), and energy management systems (EMS).

Textbooks:  
Refrigeration & Air Conditioning Technology, 7th Ed, (2013), Whitman /Johnson/ Tomczyk Silberstein / Publisher Delmar Cengage

Course Objectives:

A. Understand Heat Pump Controls.
   1. Explain the operation and function of a reversing valve.¹
   2. Identify the main types of defrost controls.¹
   3. Identify and explain the operation of each type of defrost control.¹
   4. Identify and explain the operation of flow and safety control for geothermal system.¹
   5. Describe the purpose and function of outdoor thermostats.¹
   6. Describe the sequence and purpose of emergency heat controls.¹
   7. Identify and explain the operation of check valves in heat pumps.¹
   8. Describe the sequence between first stage and second stage heating thermostat.¹
   9. Describe the auxiliary heat controls.¹
   10. Select and install appropriate system thermostat.¹
   11. Wire the control circuit of a heat pump system.¹
   12. Install or replace a heat-sequencing relay.¹
   13. Perform tests on reversing valve to determine if mechanical or electrical failure.¹

B. Wire Air Conditioner Trainer Boards.
   1. Define bimetal and describe how a thermostat works.
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2. Differentiate between types of thermostats and their applications.
3. Distinguish between the bellows, diaphragm and Bourdon tube.
4. Explain operation of pressure controls and their applications.
5. Compare low and high voltage controls.
6. Discuss types of motor protection.
7. Describe the functions of mechanical and electromechanical controls.
8. Complete electrical diagram of a residential air conditioning system.
9. Wire components of a residential air conditioning system on training board and explain sequence of operation.

C. **Wire Refrigerator Trainer Units.**
   1. Draw electrical pictorial and schematic type diagrams for refrigerator unit.
   2. Wire components in refrigerator unit according to diagram.
   3. Turn refrigerator unit on and check operation of electrical components.

1 ODCTE objective
All unmarked objectives are TTC instructor developed.

**Teaching Methods:**
The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

**Grading Procedures:**
1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

**Description of Classroom, Laboratories, and Equipment:**
Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

**Available Certifications/College Credit:**
The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

**College Credit Eligibility:**
The student must maintain a grade point average of 2.0 or better.