Western Technical College

10601121 HVACR Introduction to Installation

Course Outcome Summary

Course Information

Description	The learner will design and install forced air duct system with fabricate sheet metal box, a gas furnace, install a residential air conditioner, and install a gas boiler and the components of a boiler and in floor heating system. Learners will take the EPA Refrigeration Handling Certification test. HVACR is a common reference to Heating, Ventilation, Air Conditioning and Refrigeration.
Career Cluster	Architecture and Construction
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	90

Textbooks

Refrigeration and Air Conditioning Technology. 9th Edition. Copyright 2021. Whitman, Bill, Bill Johnson, John Timczyk, and Eugene Silberstein. Publisher: Cengage Learning. **ISBN-13**:978-0-357-12227-3. Required.

Learner Supplies

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

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset

Program Outcomes

1. Install HVACR systems

2. Analyze HVACR systems
3. Design HVACR systems

Course Competencies

1. Fabricate sheet metal fittings.

Assessment Strategies

1.1. Demonstration

Criteria

You will know you are successful when

1.1. you fabricate ducts for air distribution systems.
1.2. you identify the types of material used in air duct systems.
1.3. you fabricate fittings for an air duct system.
1.4. you assemble duct fittings.
1.5. you remove duct work in the HVACR lab according to the duct design plan.
1.6. you install duct work in the HVACR lab according to the duct design plan.

Learning Objectives

1.a. Practice how to fabricate ducts for air distribution systems.
1.b. Detail the various types of material used in air duct systems.
1.c. Fabricate fittings used in air duct system.
1.d. Assemble duct fittings.
1.e. Remove duct work work in HVACR lab according to duct design.
1.f. Install duct work in HVACR lab according to duct design plan.

2. Install gas or oil furnace.

Assessment Strategies

2.1. Demonstration

Criteria

You will know you are successful when

2.1. you meet qualifications for CSST Installation certification.
2.2. you follow the steps to vent flue gas and intake pipe.
2.3. you cut and thread black steel pipe.
2.4. you complete the installation of heating accessories.
2.5. you complete the installation of the ductwork to the furnace.
2.6. you list what is required in oil piping systems.
2.7. you use the manufacturer's installation instructions to complete installation.
2.8. you start up furnace using manufacturer's checklist.

Learning Objectives

2.a. Obtain certification for CSST installation.
2.b. Vent flue gas and intake pipe.
2.c. Cut and thread black steel pipe.
2.d. Install heating accessories.
2.e. Install ductwork to furnace.
2.f. Examine oil piping systems.

3. Install residential air conditioner/heat pump.

Assessment Strategies

3.1. Demonstration

Criteria

You will know you are successful when

3.1. you obtain EPA certification for refrigerant handling.
3.2. you mount an indoor coil.

3.3. you set an outdoor unit.
3.4. you construct refrigerant piping.
3.5. you install extra system components and accessories as instructed by faculty.
3.6. you use the manufacturer's installation instructions.
3.7. you start up system using manufacturer's checklist.

Learning Objectives

3.a. Complete EPA certification for refrigerant handling.
3.b. Mount indoor coil.
3.c. Set outdoor unit.
3.d. Construct refrigerant piping.
3.e. Install additional system components and accessories.
3.f. Use manufacturer's installation instructions.
3.g. Start up system using manufacturer's checklist.

4. Install in-floor heating system.

Assessment Strategies

4.1. Demonstration

Criteria

You will know you are successful when

4.1. you install tubing.
4.2. you use the manufacturer's installation instructions.
4.3. you start up system using manufacturer's checklist.
4.4. you install system components and accessories as instructed by faculty.

Learning Objectives

4.a. Install tubing.
4.b. Install system components and accessories.
4.c. Start up system using manufacturer's check list.
4.d. Use manufacturer's installation instructions.

5. Install boilers.

Assessment Strategies

5.1. Demonstration

Criteria

You will know you are successful when

5.1. you set boiler and install near boiler piping.
5.2. you vent flue gas and intake pipe.
5.3. you list various fuel systems.
5.4. you use the manufacturer's installation instructions.
5.5. you start up boiler using manufacturer's checklist.

Learning Objectives

5.a. Understand the operation of a hydronic heating system.
5.b. Set boiler and install near boiler piping.
5.c. Vent flue gas and intake pipe.
5.d. Explore different fuel systems.
5.e. Use manufacturer's installation instructions.
5.f. Start up boiler using manufacturer's checklist.

6. Prepare an estimate, bid and proposal

Assessment Strategies

6.1. Written Product

Criteria

You will know you are successful when

6.1. bid meets the guidelines of a grading rubric

Learning Objectives

6.a. Identify the characteristics of an estimate, a bid, and a proposal for a client.
6.b. Prepare an HVACR estimate for a project to determine costs and budgeting needs.
6.c. Develop a HVACR bid to complete specific aspects of the project.
6.d. Develop a HVACR proposal that includes scope of the project, timelines, deliverables, and costs.