Western Technical College

10601122 HVACR Commercial Refrigeration

Course Outcome Summary

Course Information

Description	This course covers the operation, control and maintenance of commercial ice makers, super market refrigeration, and special refrigeration applications. Refrigerant handling and recovery will be emphasized. HVACR is a common reference to Heating, Ventilation, Air Conditioning and Refrigeration.
Career Cluster	Architecture and Construction
Instructional Level	Associate Degree Courses
Total Credits	4
Total Hours	108

Pre/Corequisites

Prerequisite	10601101 HVACR Refrigeration
Prerequisite	10601116 HVACR Electric Motors & Controls

Textbooks

Refrigeration and Air Conditioning Technology-With CD. 8th Edition. Copyright 2017. Whitman, Bill, Bill Johnson, John Tomczyk, and Eugene Silberstein. Publisher: Cengage Learning. **ISBN-13**:978-1-3055-7829-6. 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. Service HVACR systems
3. Troubleshoot HVACR systems
4. Repair HVACR equipment
5. Analyze HVACR systems

Course Competencies

1. Complete a Semi-hermetic compressor replacement.

Assessment Strategies

1.1. Skill Demonstration

Criteria

You will know you are successful when

1.1. you will isolate the compressor body.
1.2. you will recover refrigerant from the compressor body.
1.3. you will remove and replace the compressor.
1.4. you will remove and replace the compressor oil.
1.5. you will leak test the system.
1.6. you will evacuate the body to 500 microns.
1.7. You will pump the system down and replace the filter drier.
1.8. You will evaluate system performance as compared to the manufactures specifications.

Learning Objectives

1.a. Understand compressor isolation procedure.
1.b. Understand field compressor replacement procedures.
1.c. Understand compressor oil replacement methods.

2. Evaluate a semi-hermetic compressor.

Assessment Strategies

2.1. Skill Demonstration
2.2. Written Product

Criteria

You will know you are successful when

2.1. you will teardown a semi-hermetic compressor.
2.2. you will inspect internal compressor components.
2.3. you will use fill out a manufacturers compressor inspection report.
2.4. you will reassemble the compressor.

Learning Objectives

2.a. Understand compressor construction.
2.b. Understand what causes compressor failure.
2.c. Understand how to identify internal compressor components that are affected by system problems.

3. Evaluate the operation of commercial coolers and freezers

Assessment Strategies

3.1. Written Product

Criteria

You will know you are successful when

3.1. you identify all system components.
3.2. you record pressures and temperatures during the refrigeration cycle.
3.3. you adjust and test operation of operating and safety controls.
3.4. you write the order of operations for the unit.
3.5. you construct a system wiring diagram.
3.6. you remove and replace a system part using proper field procedures.

Learning Objectives

3.a. Identify system components.
3.b. Monitor system pressures and temperatures - hot pull down to normal.
3.c. Adjust safety and operating controls to manufacturers specs.
3.d. Write a sequence of operation.
3.e. Construct a wring diagram.
3.f. Remove and replace a system part.

4. Evaluate electrical circuits of commercial refrigeration systems.

Assessment Strategies

4.1. Written Product
4.2. Skill Demonstration

Learning Objectives

4.a. Review typical sequence of operations.
4.b. Revise a sequence of operation.
4.c. Write a sequence of operation.
4.d. Review typical supermarket system electrical diagrams.
4.e. Revise a supermarket system electrical diagram.
4.f. Design a supermarket system electrical diagram.

5. Evaluate the operation of domestic refrigerators and freezers.

Assessment Strategies

5.1. Written Product
5.2. Skill Demonstration
5.3. Drawing/Illustration

Criteria

You will know you are successful when

5.1. you identify all system components.
5.2. you record pressures and temperatures during the refrigeration cycle.
5.3. you adjust and test operation of operating and safety controls.
5.4. you construct a system wiring diagram.
5.5. you write the order of operations for the unit.
5.6. you cycle unit through defrost and record pressures and temperatures.

Learning Objectives

5.a. Identify system components.
5.b. Monitor system pressures and temperatures and record.
5.c. Adjust safety and operating controls to manufacturers specs.
5.d. Write a sequence of operation.
5.e. Construct a wring diagram.

6. Diagnose commercial and domestic refrigeration system problems.

Assessment Strategies

6.1. Skill Demonstration
6.2. Written Product

Learning Objectives

6.a. Analyze a system using manufacturer's information.
6.b. Analyze a wiring diagram.
6.c. Articulate a diagnostic procedure.

6.d. Analyze individual circuits of the system.
6.e. Diagnose Electrical circuits.
6.f. Interpret information from manifold gauges.
6.g. Interpret information from technical manuals.
6.h. Demonstrate use of appropriate test instruments.

7. Set up a walk-in cooler / freezer combination.

Assessment Strategies

7.1. Skill Demonstration

Criteria

You will know you are successful when

7.1. you remove and replace a walk-in cooler / freezer.
7.2. you remove and replace refrigeration equipment serving a walk-in cooler / freezer.

Learning Objectives

7.a. Construct and disassemble a walk-in cooler and freezer.
7.b. Construct a refrigeration system for a walk-in cooler and freezer.
7.c. Appraise running condition of the walk-in cooler and freezer.
7.d. Determine the correct refrigerant charge for the walk-in cooler and freezer.

8. Evaluate the operation of walk-in coolers and freezers.

Assessment Strategies

8.1. Skill Demonstration
8.2. Written Product
8.3. Drawing/Illustration

Criteria

You will know you are successful when

8.1. you identify all system components.
8.2. you record pressures and temperatures during the refrigeration cycle.
8.3. you adjust and test operation of operating and safety controls.
8.4. you write the order of operations for the unit.
8.5. you construct a system diagram.
8.6. you remove and replace a system part using proper field procedures.

Learning Objectives

8.a. Identify system components.
8.b. Monitor system pressures and temperatures - hot pull down to normal.
8.c. Adjust safety and operating controls to manufacturers specs.
8.d. Write a sequence of operation.
8.e. Construct a wring diagram.
8.f. Remove and replace a system part.

9. Construct piping diagrams of ice machine systems.

Assessment Strategies

9.1. Drawing/Illustration
9.2. Written Product

Learning Objectives

9.a. Identify system components.
9.b. Summarize motor and control circuits.
9.c. Draw a simple piping schematic diagram.
9.d. Record unit order of operation.

10. Evaluate the operation of ice machines.

Assessment Strategies

10.1. Written Product
10.2. Drawing/Illustration
10.3. Written Objective Test

Criteria

You will know you are successful when

10.1. you view and diagram an actual ice machine piping layout.
10.2. you identify system accessories correctly.
10.3. you locate and record information from a system nameplate.
10.4. you describe the harvest operation correctly.

Learning Objectives

10.a. Construct piping diagrams of ice machines.
10.b. Identify accessories specific to ice machines.
10.c. Locate information using manufacturers literature.
10.d. Describe the different ice harvest methods.

11. Analyze components and circuits specific to ice machine systems.

Assessment Strategies

11.1. Written Product
11.2. Drawing/Illustration
11.3. Skill Demonstration

Learning Objectives

11.a. Summarize thermostats and pressure controls.
11.b. Analyze thermostats and pressure controls.
11.c. Describe the purpose of the following circuits: ice making, harvest cycle, water quality, and prechill.
11.d. Diagram individual ice machine circuits.
11.e. Analyze individual ice machine circuits.

12. Analyze electrical diagram of an ice machine.

Assessment Strategies

12.1. Written Product
12.2. Skill Demonstration

Learning Objectives

12.a. Review typical sequence of operations.
12.b. Revise a sequence of operation.
12.c. Write a sequence of operation.
12.d. Review typical ice making system electrical diagrams.
12.e. Revise an ice making system electrical diagram.

13. Summarize the operation of a supermarket rack system cases.

Assessment Strategies

13.1. Drawing/Illustration
13.2. Written Product

Criteria

You will know you are successful when

13.1. you diagram a refrigerated case and piping showing how it is connected to the rack system.
13.2. you determine case defrost type and test operation.
13.3. you study Commercial Refrigeration Supermarket Handbook and complete a rack lab assignment.

Learning Objectives

13.a. Identify each part: temperature control, defrost, heat reclaim, EPR valves and oil control system.
13.b. Construct piping diagrams of a supermarket rack system.
13.c. Identify accessories specific to supermarket rack systems.
13.d. Outline the use of multiple evaporators on a rack system.
13.e. Outline the storage of refrigerated products.
13.f. Outline the need for defrost.
13.g. Describe the different defrost methods.
13.h. Outline the use of heat reclaim.

14. Analyze components and circuits specific to supermarket rack systems.

Assessment Strategies

14.1. Written Product
14.2. Written Objective Test
14.3. Skill Demonstration

Criteria

You will know you are successful when

14.1. you explain thermostat and pressure control functions and operations.
14.2. you complete lab tasks PC44A on a heating thermostat.
14.3. you complete PC45A on a cooling thermostat.
14.4. you complete PC37 and PC39 on a low pressure switch.
14.5. you complete PC39 and PC40 on a high pressure switch.

Learning Objectives

14.a. Explain thermostats and pressure controls.
14.b. Analyze thermostats and pressure controls.
14.c. Describe the purpose of the following components and circuits: defrost, oil pressure failure, solid state pressure control, solid state timer, and heat recovery.
14.d. Diagram typical supermarket rack system circuits.
14.e. Analyze typical supermarket rack system circuits.

15. Analyze supermarket rack system service procedures and and problems.

Assessment Strategies

15.1. Written Product
15.2. Skill Demonstration

Criteria

You will know you are successful when

15.1. you solve system problems after analyzing a system.
15.2. you use a recovery machine to recover system refrigerant.
15.3. you isolate a case on the rack system by using the proper isolation valves.
15.4. you identify many common refrigeration system problems.

Learning Objectives

15.a. Diagnose problems using a troubleshooting analysis form.
15.b. Complete refrigerant system recovery.
15.c. Complete case isolation for repair.
15.d. Identify typical refrigeration problems.

16. Evaluate the operation of specialized commercial refrigeration systems.

Assessment Strategies

16.1. Written Product
16.2. Skill Demonstration
16.3. Drawing/Illustration

Criteria

Your performance will be successful when:

16.1. you record pressures and temperatures during the refrigeration cycle.
16.2. you identify all system components.
16.3. you adjust and test operation of operating and safety controls.
16.4. you write the order of operations for the unit.
16.5. you construct a system wiring diagram.
16.6. you remove and replace a system part using proper field procedures.

Learning Objectives

16.a. Identify system components.
16.b. Monitor system pressures and temperatures and record.
16.c. Adjust safety and operating controls to manufacturers specs.
16.d. Write a sequence of operation.

16.e. Construct a wring diagram.
16.f. Analyze system accessories and adjust for operation.
16.g. Remove and replace a system part.
16.h. Explore each: Eutectic plate, transport, bulk tank, air dryers, drinking fountain, heat recovery equipment.