



Western Technical College

10601134 HVACR Energy

Course Outcome Summary

Course Information

Description This course studies the interrelationship of a building, its occupants and the systems in the building. Topics include ventilation, moisture, renewable energy, sustainability, LEED design, and energy use in buildings. Learners will use building diagnostic procedures such as testing for duct leakage, infiltration, and backdrafting. HVACR is a common reference to Heating, Ventilation, Air Conditioning and Refrigeration.

Career Cluster Architecture and Construction

Instructional Level Associate Degree Courses

Total Credits 2

Total Hours 36

Pre/Corequisites

Prerequisite 10601107 HVACR Force Air Heating

Prerequisite 10601102 HVACR Air Handling, Psychrometrics & IAQ

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.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Embrace Sustainability

Program Outcomes

1. Evaluate HVACR system designs

Course Competencies

1. Develop a philosophy that recognizes the need to live sustainably.

Assessment Strategies

- 1.1. Written Objective Test

Criteria

You will know you are successful when

- 1.1. presentation on sustainability complies with oral presentation rubric

Learning Objectives

- 1.a. Summarize the principles of sustainability
- 1.b. Give an oral presentation on the importance of living sustainably
- 1.c. Outline LEED standards and codes
- 1.d. Explain the Peak Oil theory

2. Value energy efficiency.

Assessment Strategies

- 2.1. Written Objective Test

Criteria

You will know you are successful when

- 2.1. exam questions relating to 1st and 2nd laws of thermodynamics are answered with 80% correct responses
- 2.2. exam problems relating to energy change equations are answered with 80% correct responses
- 2.3. renewable energy presentation complies with oral presentation rubric

Learning Objectives

- 2.a. Describe the 1st law of thermodynamics
- 2.b. Describe the 2nd law of thermodynamics
- 2.c. Apply the 1st and 2nd laws of thermodynamics
- 2.d. Use energy change equations
- 2.e. Give a presentation on renewable energy
- 2.f. Conduct an energy audit of a house

3. Summarize the interaction of a building, its occupants, and the systems in the building.

Assessment Strategies

- 3.1. Written Objective Test

Criteria

You will know you are successful when

- 3.1. exam questions relating to the principles of building science are answered with 80% accuracy
- 3.2. exam questions relating to moisture in buildings are answered with 80% accuracy
- 3.3. exam questions relating to the ventilation of buildings are answered with 80% accuracy

Learning Objectives

- 3.a. Outline the principles of building science
- 3.b. Point out how moisture affects buildings and its occupants
- 3.c. Describe the importance of proper ventilation in a building

4. Use building performance test instruments.

Assessment Strategies

- 4.1. Skill Demonstration

Criteria

You will know you are successful when

- 4.1. duct blaster exam questions are answered with 80% accuracy
- 4.2. blower door exam questions are answered with 80% accuracy
- 4.3. back drafting exam questions are answered with 80% accuracy

Learning Objectives

- 4.a. Detect air leaks in a duct system using the Duct Blaster
- 4.b. Explain how to detect infiltration in a house using a blower door test
- 4.c. Use a blower door
- 4.d. Explain how to test gas-fired appliances for back drafting
- 4.e. Use an infrared camera