Faculty is required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT. Plumbing & Heating Technology COURSE NUMBER: PLHT 1125

NUMBER OF CREDITS: 3 (1 lecture; 2 lab)

COURSE TITLE: Heating and Air Conditioning Fundamentals

CATALOG DESCRIPTION: Explore heating systems, various energy sources, and the technology around modern heating systems. Topics will include controls, sizing, types of heat, venting and distribution requirements. This course will explore the evolving impact of technology and efficiency of systems and energy consumption.

AUDIENCE: Students interested in pursuing a career in plumbing and heating.

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Area: by meeting the following competencies:
Area: by meeting the following competencies:
Area: by meeting the following competencies:

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:

LENGTH OF COURSE: Semester

THIS COURSE IS USUALLY OFFERED:
Every other year ☐ X fall ☐ spring ☐ summer ☐ undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The academic objectives of this course are:
   a. Fundamentals of heating systems, various energy sources, and technology.
   b. Types of heat, heating systems, venting and distribution requirements.
   c. Fundamentals of air conditioning systems.
   d. Safe handling methods for hazardous materials and gases.

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:
   a. Completing homework (reading, reports, and worksheets)
   b. Participating in classroom discussions
   c. Taking open and closed book quizzes and tests
d. Complete assigned lab projects

3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
   a. Participate in classroom discussions and reports.
   b. Participate in assignments, worksheets and reports

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Participate in classroom discussions.
   b. Work with fellow students on projects.
   c. Working with students from other cultures.

5) Topics will include controls, sizing, types of heat, venting and distribution requirements. This course will explore the evolving impact of technology and efficiency of systems and energy consumption.

TOPICS TO BE COVERED:
1. Components of heat producing systems
2. Components of cooling systems.
3. Components of air distribution systems.
4. Safe handling methods of hazardous gases and fluids.
5. Proper use of personal protective equipment, testing & measuring equipment.
6. Troubleshooting residential heating and cooling systems.

COURSE LEARNING OUTCOMES (GENERAL):

1. Demonstrate safety practices in shop and job site.
2. Identify and describe fundamental components of heat producing and cooling systems.
3. Understand components of air distribution systems.
4. Proper use of testing and measuring meters and equipment.
5. Proper handling methods of hazardous gases and fluids.

STUDENT LEARNING OUTCOMES (SPECIFIC):
Students will:
1. Identify and describe major components of the heat producing system.
2. Identify and describe major components of the cooling system.
3. Identify and describe major components of the air distribution system.
4. Check and set pressures for propane, natural gas and fuel oil heating system.
5. Identify and test the operation of all line voltage components.
6. Identify and test the operation of all low voltage components, safety and controlling.
7. Test and set the efficiency of a residential forced air-heating/cooling system.
8. Test for carbon monoxide (CO) in residential forced air-heating systems.
9. Calculate sensible heat in British thermal unit (BTU)
10. Calculate the cubic foot per minute (CFM) of a residential forced air-heating system.
11. Identify the four basic components of a refrigeration system used in residential a/c
12. Understand four basic components functions of a residential a/c system.
13. Charge, Evacuate and reclaim a residential A/C system

LEARNING/TEACHING TECHNIQUES used in the course are:

- Collaborative Learning
- Problem Solving
- Student Presentations
- Interactive Lectures
- Creative Projects
- Individual Coaching
- Lecture
- Films/Videos/Slides
- Demonstrations
- Other (describe below)
- Lab

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:

- Reading
- Tests
- Individual Projects
- Oral Presentations
- Worksheets
- Collaborative Projects
- Textbook Problems
- Papers
- Portfolio
- Group Problems
- Term Paper
- Other (describe below)

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

The information in this course outline is subject to revision

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or via your preferred Telecommunications Relay Service.

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