

COURSE OUTLINE **Radiant Heating Design**

Course Description

CLVG 110. Radiant Heating Design. 3 hours credit. This course will enable the student to calculate residential heat loss based on the Air Conditioning Contractors' of America (ACCA) Manual J[®]. Students will fill in Manual J[®] work sheets that correspond to the component heating load of the building. The student will then gain an understanding of the various radiant systems and components available for radiant installations. The student will size the radiant system based on the completed heat loss. The student will calculate pipe spacing, circuit lengths, water temperatures, flow rates, and required materials.

Course Relevance

Radiant heating is an ideal opportunity for companies that are looking to separate themselves from their competition by offering options to end users.. Radiant heating offers builders and homeowners a comfortable and energy efficient way to heat their home. This course is ideal for the student who recognizes the need to diversify and wants to offer different heating systems to clients.

Required Materials

ACCA. (2006). *Manual J[®] residential load calculations*. Arlington, VA: ACCA.

Viega North America. (2008). *Radiant workbook*. Nashua, NJ: Viega North America.

Learning Outcomes

The intention is for the student to be able to:

1. Perform residential heat loss calculation based on Manual J[®].
2. Understand radiant heating system options.
3. Design a radiant heating system to include tube spacing, water temperatures, flow rates and total number of circuits.
4. Calculate the required materials for the radiant heating system designed.

Course Content

- I. Skills/Competencies – Actions that are essential to achieve the course outcomes:
 - A. Understand Heating Load Components
 - B. Understand components of a radiant heating system
 - C. Calculate the radiant panel output
 - D. Calculate required materials in a radiant heating system

Learning Units

- I. Heating load components
 - A. Design conditions

- B. Fenestration heating load
- C. Opaque panel heating load
- D. Radiant floor
- E. Infiltration

II. Radiant heating system options

- A. Wet systems
- B. Dry systems
- C. Tubing
- D. Fasteners
- E. Manifolds

III. Radiant panel output

- A. Panel output
- B. Surface temperatures
- C. Floor coverings
- D. Tube spacing
- E. Water temperatures
- F. Circuit lengths
- G. Flow rates
- H. Pressure drop

IV. Material List

- A. Pipe
- B. Fasteners
- C. Manifolds
- D. Mixing option
- E. Controls

Learning Activities

Learning activities will be assigned to assist the student to achieve the intended learning outcomes through lecture, self-assessments, instructor-led class discussion, group activities, case studies, skill practice, and other activities at the discretion of the instructor.

Grade Determination

The student will be graded on the completion of learning activities and assessment tasks. Grade determinants may include the following: daily work, student presentations, class participation, skills improvement plan, and other methods of evaluation employed at the discretion of the instructor.