A. Course Description

- **Credits:** 2.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 1.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course will provide the student with an understanding of alternative heating and cooling applications and installations. Students will gain a fundamental working knowledge of a solar thermal and geothermal heating and cooling system. Including but not limited to how controls work within the system, panel installation, piping and site assessment. Also covered will be gas fireplaces, pellet/corn stoves and wood fired boilers. This course will use lectures, handouts, media presentations, and structured lab to deliver the subject material.

B. Course Effective Dates: 8/24/15 – Present

C. Outline of Major Content Areas

As noted on course syllabus

D. Learning Outcomes

1. Analyze and explain solid fuel heating systems and gas fireplaces to include the installation, operation and maintenance of these systems.
2. Define three main sections of a solar thermal heating system and the individual components that make each section. Analyze and explain how the entire system operates as a whole.
3. Define, discuss, and explain the main components of a geothermal heat and cooling system. Calculate energy savings over a conventional heating and cooling system.
4. Demonstrate proper HVAC/R technician behavior and participate in the ride along days, as well as recognizing defining and practicing safe work habits.
5. Describe, analyze and explain geothermal ground loops. Including closed/open loops, differences in loop designs and fluids. Identify the benefits and draw backs of soil installations verses water installations.
6. Perform a geothermal system start-up in accordance with manufactures recommendations and develop a list of common problems with geothermal.
7. Perform a site assessment survey for a solar thermal heating system using modern techniques. Understand proper panel mounting techniques and safe roof practices.
E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

F. Learner Outcomes Assessment
   As noted on course syllabus

G. Special Information
   None noted