COURSE INFORMATION FORM

DISCIPLINE: Geology
COURSE TITLE: Solar Thermal Design and Installation
CR.HR: 3  LECT HR: 2  LAB HR: 2  CLIN/INTERN HR: 0  CLOCK HR: 0

CATALOG DESCRIPTION
Design, installation and maintenance of solar thermal systems, with special emphasis on residential domestic hot water.

PREREQUISITES
GEOL 186 and INTE 260.

EXPECTED STUDENT OUTCOMES IN THE COURSE
Upon completion of this course, the student will be able to:
1. Analyze load demand and synthesize with site-specific data to correctly size collectors, storage, and other components for a solar thermal system.
2. Calculate monthly and annual energy output, and synthesize with other data to compare costs and benefits to end-user of a solar thermal system.
3. Design a basic solar thermal system that is correctly sized and meets all code requirements.
4. Safely install a basic solar thermal system under qualified supervision, demonstrating correct roof penetration techniques.
5. Generate a list of appropriate BOS components and necessary equipment for a specific thermal system installation.
6. Troubleshoot a solar thermal system for design errors and performance problems.
CLASS-LEVEL ASSESSMENT MEASURES

Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)
Assessment measures may include some or all of the following: written assignments, group assignments, lab assignments, homework exercises, quizzes, exams, papers, special projects, classroom demonstrations, and a comprehensive final exam.

- Written assignments (1-6)
- Homework exercises (1, 2)
- Lab assignments (4, 6)
- Quizzes and exams (1-6)

PROGRAM-LEVEL OUTCOMES ADDRESSED

General Education Outcomes
Specify which general education outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes and assessment measures.

Quantitative Reasoning and Numerical Literacy (ESO)
4. Make reasonable estimates (computational—practical) (1, 2)
5. Interpret and apply numeric information embedded in text or real-life situations (1, 2)
6. Interpret and apply numeric information presented in tables, charts, and graphs (1, 2)
7. Apply mathematical models to solve problems and draw conclusions (1, 2)

Occupational Program Outcomes
Specify which occupational program outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes to assessment measures.
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Load Demand Analysis and Site Evaluation

II. Thermal System Design
   A. Collector sizing and collector mounting methods
   B. Storage and mechanical BOS component selection
   C. Electrical BOS and code compliance

III. Thermal System Installation
   A. Collector Installation
   B. Electrical BOS installation, including monitoring and controls
   C. Storage, piping and mechanical BOS
   D. System charging and commissioning

IV. Thermal System Maintenance and Troubleshooting
   A. Common design errors
   B. Common performance problems
   C. System maintenance

V.* Solar Thermal Applications Other Than DHW
   A. Solar pool heating
   B. Solar space heating
   C. Solar cooling

VI. Safety Issues