MINNESOTA WEST COMMUNITY & TECHNICAL COLLEGE
COURSE OUTLINE

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. SOLR  COURSE NUMBER: 1020

NUMBER OF CREDITS: 3 (Lecture)

COURSE TITLE: Introduction to Solar Assessment

CATALOG DESCRIPTION: This course introduces students to basics of solar energy and solar site assessment for solar photovoltaic and thermal systems. Students will measure the solar window with a solar Pathfinder (TM) and estimate the effects of climate, system design, and vegetation growth (and removal) on energy production. Using industry-standard hardware, mounting options and equipment, students will propose system designs, model economic and environmental cost and benefits, and report their findings.

AUDIENCE: Solar Technicians

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE: None

LENGTH OF COURSE:
One Semester

THIS COURSE IS USUALLY OFFERED:
Every other year  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. Identify Photovoltaic Electrical Designs
   b. How to measure the solar window with a Solar Pathfinder
   c. Identify the strengths and weaknesses of different types of PV systems

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 and or lab discussions
   c. Taking quizzes and tests
3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
   a. Participating in classroom discussions and reports
   b. Participating in assignments, worksheets
   c. Communicating with other students on solar lab projects

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Working with other students from other cultures
   b. Working with other students from different colleges
   c. Working on effective communication to complete assigned task given to them

TOPICS TO BE COVERED:
1) Factors affecting solar economics   7) Solar Thermal Design considerations
2) Conventional Energy use           8) Solar Finance
3) Design tools                     9) Solar mounting considerations
4) Permits and Licenses             10) The Solar Resource
5) Photovoltaic Electrical Design considerations   11) Incentives and Rebates
6) Routing Pipe and Conduits       12) Write a site assessment

STUDENT LEARNING OUTCOMES (SPECIFIC):
1. Describe factors that affect the profitability of solar energy systems.
2. Explain strengths and weaknesses of solar photovoltaic and thermal panels in different orientations.
3. Estimate the output of solar photovoltaic and thermal panels in different orientations when given climate data.
4. Demonstrate proficiency in use of a site analyzer.
5. Contact appropriate municipal offices for permit information.
6. Identify basic components of a solar air, water, and electric system.
7. Present options for mounting collectors and explain their effects on seasonal output and snow loading.
8. Present choices of appropriate technology to fit consumer needs. Example-flat plate vs. excavated tube.
9. Describe appropriate insulation, support and ultraviolet protection for solar wiring and plumbing and wiring
10. Describe factors that affect the efficiency of both thermal and electric solar systems.
11. Gather customer information by interviewing and analyzing utility records
12. Explain strengths and limitations of the solar resource.
13. Assess conditions of roofing materials for its appropriateness for solar.
14. Calculate cost, simple payback, return on investment and cash flow for solar energy systems.
15. Estimate the installed cost of a solar electric or thermal system, including materials, labor, subcontractors and permits when given a design.
16. Identify common roofing materials and describe their compatibility with roof attachment hardware.
17. Identify roof attachment hardware and their applications and limitations.
18. Model output and economics for a photovoltaic or domestic hot water system.
19. Model solar space heating and hot water output.
20. Size a system to a customer’s needs.
21. Explain when a structural engineering inspection of a roof is required.
22. Write solar site assessments including costs, benefits, and customer goals.

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

**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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