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: 2025

NUMBER OF CREDITS: 2 (Lab)

COURSE TITLE: PHOTOVOLTAIC SYSTEMS LAB

CATALOG DESCRIPTION: This hands-on course will cover the National Electrical Code (NEC) specifics concerning photovoltaic installation Article 690. Code-compliant wiring of modules, inverters, charge controllers, and batteries will be explored. Students will plan and execute photovoltaic system installations.

AUDIENCE: Solar Technicians

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:
MN West Prerequisites: ELCO 1110 or ELCO 1100, concurrent enrollment in SOLR 2020 with a grade C or higher.

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) ACADEMICCONTENT: The academic objectives of this course are:
   a. Solar associations
   b. Manage a solar project
   c. Install electrical components
   d. Install mechanical components
   e. Completing installation and system commissioning
   f. Conducting maintenance and troubleshooting activities

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 quizzes and tests

3) COMMUNICATIONSKILLS: 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 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. Tools required for PV system installation  
2. PPE required for PV system installation  
3. PV module mounting systems  
4. PV modules and related wiring  
5. PV inverters and related wiring  
6. PV charge controllers and related wiring  
7. Battery system wiring and maintenance  

COURSE LEARNING OUTCOMES:  
1. Know NEC code requirements relating to PV system installation.  
2. Identify lead acid and lithium ion battery systems.  
3. Design, install, troubleshoot and maintain stand alone and grid connected systems.  
4. Install and demonstrate how to use monitoring and control systems.  
5. Demonstrate troubleshooting knowledge and skills.  

STUDENT LEARNING OUTCOMES (SPECIFIC):  
- describe the PPE required for PV system installation and applications where it is required.  
- describe the tools required for PV system installation and their use.  
- describe the components in a PV system and their location in the system chain.  
- locate applicable code requirements in the NEC for PV systems and battery systems.  
- install a typical PV mounting system.  
- mount and wire PV module strings.  
- mount and wire a PV inverter.  
- mount and wire a PV charge controller.  
- perform PV System Maintenance and Troubleshooting.  
- describe battery system containment vessels.  
- wire a battery system for a standalone PV system.  
- perform battery maintenance required for a PV battery system.  
- measure and bend conduit as required.  
- calculate work heights on a steep roof with appropriate fall protection equipment.  
- discuss concerns with the local AHJ.  
- calculate staging a job site for a solar installation.  
- select the appropriate equipment for and schedule that equipment for a solar project: Cranes, lifts, and skid loaders.
• calculate forming and pouring concrete footings and structures including reinforcing installation.
• calculate and describe transformer requirements for a solar system.
• discuss details related to the variations in different community solar projects.

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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Revised 10/1/16