



ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Workforce Development

COURSE: SLR 1200 Solar Power: Design and Installation

Date: Fall 2023

Credit Hours: 3

Prerequisite(s): None

Enrollment by assessment or other measure? Yes No
If yes, please describe:

Corequisite(s): None

Pre- or Corequisite(s): None

Consent of Instructor: Yes No

Delivery Method:	<input checked="" type="checkbox"/> Lecture	2 Contact Hours (1 contact = 1 credit hour)
	<input type="checkbox"/> Seminar	0 Contact Hours (1 contact = 1 credit hour)
	<input checked="" type="checkbox"/> Lab	2 Contact Hours (2-3 contact = 1 credit hour)
	<input type="checkbox"/> Clinical	0 Contact Hours (3 contact = 1 credit hour)

Offered: **Fall** **Spring** **Summer**

CATALOG DESCRIPTION and IAI NUMBER (if applicable):

This class will prepare electricians for work in the solar industry but will also introduce homeowners and business owners alike to the value of small-scale solar power arrays. The students will learn to correctly size solar systems for their individual needs, install the system they designed, and understand and calculate the cost savings of using solar, along with relevant state and federal rebates and tax incentives. The students will also learn to maintain and troubleshoot solar power systems.

ACCREDITATION STATEMENTS AND COURSE NOTES:

None

COURSE TOPICS AND CONTENT REQUIREMENTS:

Solar panels

- How do they work
- Components
- Take one apart
- Wattage
- Lifetime
 - Changes
 - Decreases

Inverters

- Micro
- Line
- Technical nature of inverters
- Troubleshooting
- Biggest point of failure
- Line side and load side tap

Metering

- Net Energy Metering (NEM)
 - California's NEM 3.0 policy,

System design

- Size needed
- Roof pitch
- Solar exposure
- Google Earth
- Drones
- Helio, Aurora
- PV Watts
- How big of a system do I need?
- Types of solar systems
 - Ground, roof, off-grid, battery backup
 - Identifying project scope
- What to do about trees, roof orientation and roof age.
- Pros and cons of getting solar.

Solar city

- 2-watt panels
- Practice program

Financing

- Costs?
- How to understand my electric bill
 - Supply, Delivery, Taxes
 - Why is it going up?
 - Municipal Utilities
- Incentives
 - Investment Tax Credit
 - SREC - Solar Renewable Energy Credits
 - CEJA - State

- REAP - Renewable Energy for America Program
- Depreciation
- Loans
 - Solar Loans / Green Loan
 - Home Equity Loan
- Lease
- PPA

History

- How did we get here?

Future

- Where are we going?
- Perovskite solar cells
- Solar shingles

Highs and Lows of this technology

- Solar panel disposal
- Mining for minerals

Organizations

- NREL - National Renewable Energy Lab in CO
- SEI - Solar Energy International
- IBEW - Electrical Workers Union
- IPA - Illinois power Agency
 - Also called Illinois Shines
- DOE - Department of Energy
- DOE - Department of Agriculture

INSTRUCTIONAL METHODS:

Lecture

Calculations

Hands-on Activities

Team Projects

Verifying work through Instruments and Measurements

Discussion

Demonstration

EVALUATION OF STUDENT ACHIEVEMENT:

Attendance

Participation

Group Projects

Homework

Tests and quizzes

Grading scale to be determined by each individual instructor.

INSTRUCTIONAL MATERIALS:

Solar Photovoltaic Basics: A study guide for the NABCEP Associate Exam
ISBN 978-1-138-10285-9

Resources

- Design software

- Helio, Aurora

Equipment

- Solar panels
- inverters
 - Micro
 - Line
- 4 sites for 4 teams to work on ground mounts
- Racking / mounting
- Wiring
- Electrical Boxes

LEARNING OUTCOMES AND GOALS:

Institutional Learning Outcomes

- 1) Communication – to communicate effectively.
- 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion.
- 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally.
- 4) Responsibility – to recognize how personal choices affect self and society.

Course Outcomes and Competencies

Job readiness

- Build a functioning solar power array.
- Use tools and measuring instruments correctly.
- Use equipment correctly.
- Troubleshoot problems.
- Size and install solar power systems.
- Maintain solar power systems.

Personal application

- Understand how to apply solar power at your business.
- Understand how to apply solar power at your home.

Calculations

- Calculate the size/scope of a new project.
- Calculate power output of a solar power system.
- Calculate the cost of a new solar power system.
- Calculate the monthly cost savings of solar energy applied to your application.
- Calculate long term savings.
- Calculate ROI of a solar power system
- Calculate expected power loss as equipment ages.

Financial literacy

- Understand your power bill.
- Understand state and federal funding programs.
- Understand rebates.
- Understand tax issues regarding solar installations.