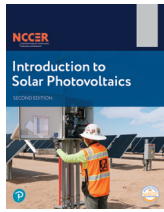


Introduction to Solar Photovoltaics



40 Hours
Revised: 2023, Sixth Edition
Module ID 57101

PAPERBACK

Trainee Guide: \$24.99

NCCERconnect Access Card: \$24.99

NCCERconnect +

Hardcover Trainee Guide: \$49.99

ISBN

978-0-13-818595-4

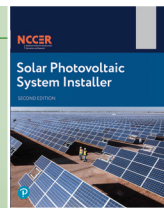
978-0-13-818638-8

978-0-13-818598-5

- Downloadable instructor resources are available.

Solar photovoltaic (PV) modules transform solar energy, sunlight, into electrical energy that powers an electrical load, such as your computer or refrigerator. Using PV modules, the United States and other nations around the world can harness solar energy. Solar energy is being used to reach 2030 and 2050 global climate change initiatives to reduce carbon emissions and decrease the reliance on fossil fuels. Completion of this module helps prepare solar PV trainees for the North American Board of Certified Energy Practitioners (NABCEP) PV Associates Exam and an exciting career in the solar PV industry.

L1 SOLAR PHOTOVOLTAIC SYSTEMS INSTALLER



LEVEL 1



Curriculum Notes

- 297.5 Hours (includes Core)
- Published: 2024, Second Edition
- Developed using NABCEP's PV Task Analysis and aligned with NABCEP's PV Associate Certification.
- Downloadable instructor resources are available.

PAPERBACK

Trainee Guide: \$74.99

ISBN

978-0-13-820810-3

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Introduction to Solar Photovoltaics (40 Hours)

ISBN 978-0-13-818595-4

(Module ID 57101) Welcome to Solar Photovoltaics training! In this program, you will learn about solar energy and how it is harnessed to provide electricity for residential, commercial, and utility installations. Along with reviewing a Solar PV system's primary component, this program addresses system installation, site assessment, system design, maintenance, and troubleshooting. You'll also learn about Solar PV installation safety considerations.

Site Assessment (10 Hours)

ISBN 978-0-13-821291-9

(Module ID 57102) Site assessment is one of the first steps in solar PV installation. As a site assessor, it's your job to gather customer and site information to help determine the proper size, configuration, and location of the solar PV system. Interviewing the customer helps you establish energy needs, and a thorough site assessment ensures the system is positioned properly on the location. In addition to reviewing site assessment steps, this module prepares the trainee for different career paths associated with solar PV installation.

System Design (25 Hours)

ISBN 978-0-13-821292-6

(Module ID 57103) Effective solar PV system designers work closely with owners to determine the appropriate configuration of a PV system. An experienced designer will recommend a particular approach based on site assessment data, the electrical load, budget, and other relevant conditions. It is the duty of the designer to fully discuss all aspects of the possible configurations to help the owner make an informed choice. A successful solar PV system design and installation must meet the owner's expectations. This module focuses on component selection and wiring for stand-alone and grid-tied solar PV systems.

System Installation and Inspection (60 Hours)

ISBN 978-0-13-821294-0

(Module ID 57104) After the jobsite has been assessed and a system designed, it's time to install solar PV components. Prior to installation, it's important to understand jobsite hazards, the appropriate PPE, and proper tool safety. This module reviews these topics, along with summaries of basic installation requirements, ground- and roof-mounted systems, a variety of solar PV components, and system commissioning activities.

Maintenance and Troubleshooting (10 Hours)

ISBN 978-0-13-821295-7

(Module ID 57105) PV equipment requires regular inspection and maintenance. PV system maintenance begins by locating and reviewing the system records and the manufacturer's instructions for the equipment. Next, the system is inspected, and all required maintenance performed. If the system is not producing the expected output, a systematic process of troubleshooting must be followed. Finally, records must be prepared of all system maintenance activities, test results, and repairs. This module explains how to make operational checks, maintain, and troubleshoot PV equipment to help it last longer and operate more efficiently. It also examines how to prepare the system before a natural disaster and how best to recover after storm damage occurs.

Roofing Fundamentals (17.5 Hours)

ISBN 978-0-13-821296-4

(Module ID 57106) All roofs are designed to perform two major tasks: insulate a building and keep water from entering through the top of the structure. A roof is made up of several basic components that each contribute to these tasks, including a roof deck, an insulation or underlayment layer, a primary covering, such as a membrane or shingles, and flashing or drainage. A roof can also serve as a support structure for solar PV systems. As a solar PV installer, it is important to be familiar with some basic concepts of roofing. This module covers the function of

the deck, steep- and low-slope roofing systems, how slope is measured, and load types.

Roof-Mounted Solar PV Installation (20 Hours)

ISBN 978-0-13-821300-8

(Module ID 57107) After having mastered fundamental concepts in roofing, you will be ready to take on solar PV installations on various types of roofs. Installing a solar PV system on both steep- and low-slope roofs is a very involved process that requires coordination of multiple crew members.

In this module, you will learn how to install a solar PV system on both steep- and low-slope roofs. The material covers the mechanical installation of the mounting hardware and the electrical installation of the wiring, PV modules, and any auxiliary electrical equipment. Jobsite safety is also addressed, as is the process of reviewing a job packet to gather important manufacturer-specific information.

Ground-Mounted Solar PV Installation (20 Hours)

ISBN 978-0-13-821301-5

(Module ID 57108) As with roof-mounted solar installations, the goal of ground-mounted solar PV systems is to generate as much electricity as possible by maximizing module Sun exposure. Ground-mounted solar PV systems can be constructed almost anywhere, so engineers can select sites that aren't obstructed by surrounding buildings and shade to maximize a system's electrical output. Additionally, they can be designed with tracking capabilities that allow the modules to rotate and follow the Sun. This module lists investigative steps, such as soil sampling to help determine the best foundation type and site surveying to develop the best layout and tracking system. It also examines how certain factors influence the design of a ground-mounted PV system, such as use of heavy equipment to prepare the site, laying the conduit, and setting the foundation.

Safety and Awareness: Utility-Scale PV Projects

(17.5 Hours)

ISBN 978-0-13-821303-9

(Module ID 57109) Utility-scale solar PV jobsites pose many risks to workers. Serious injury may result from electrocution, falls, pinch points, lacerations, and burns. Given that solar modules are energized when exposed to light, electrical safety is particularly important in solar PV projects.

This module introduces general safety concepts, hazard communication, and standards set by the US Occupational Safety and Health Administration (OSHA). It explores site awareness topics including signage, barricades and barriers, working safely from elevations and near heavy equipment, lockout/tagout procedures, and concludes with a thorough review of electrical safety.

L1 SOLAR PHOTOVOLTAIC SYSTEMS INSTALLER



LEVEL 1



Curriculum Notes

- 220 Hours (includes Core)
- Published: 2011, First Edition
- Developed using NABCEP's PV Task Analysis and aligned with NABCEP's PV Installer Certification.
- Downloadable instructor resources are available.
- *Introduction to Solar Photovoltaics* (Module ID 57101) has been approved for 40 general continuing education hours under GBCI's Credential Maintenance Program.
- NCCER is a recognized accrediting body for institutions to become providers of the NABCEP Entry Level Exam.
- This craft requires additional instructor qualifications. For more information, contact NCCER Customer Service at 1-888-622-3720 or visit the craft page at nccer.org.

PAPERBACK

Trainee Guide: \$74.99

ISBN

978-0-13-257110-4

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Introduction to Solar Photovoltaics (40 Hours)

ISBN 978-0-13-818595-4

(Module ID 57101) Solar photovoltaic (PV) modules transform solar energy, sunlight, into electrical energy that powers an electrical load, such as your computer or refrigerator. Using PV modules, the United States and other nations around the world can harness solar energy. Solar energy is being used to reach 2030 and 2050 global climate change initiatives to reduce carbon emissions and decrease the reliance on fossil fuels. Completion of this module helps prepare solar PV trainees for the North American Board of Certified Energy Practitioners (NABCEP) PV Associates Exam and an exciting career in the solar PV industry.

Site Assessment (10 Hours)

ISBN 978-0-13-266202-4

(Module ID 57102-11) Explains how to determine customer needs, assess site-specific safety hazards, conduct a site survey, and identify a suitable location for the PV array and other system components. Also explains how to acquire and interpret site solar radiation and temperature data.

System Design (25 Hours)

ISBN 978-0-13-266203-1

(Module ID 57103-11) Describes system design considerations, including array configurations, component selection, and wire sizing. Covers bonding, grounding, and the selection of overcurrent protection and disconnects.

System Installation and Inspection (60 Hours)

ISBN 978-0-13-266204-8

(Module ID 57104-11) Explains how to use the information from the site assessment and system design documents to safely install a photovoltaic array and other system components.

Maintenance and Troubleshooting (10 Hours)

ISBN 978-0-13-266205-5

(Module ID 57105-11) Covers basic system performance monitoring and troubleshooting procedures, including record-keeping requirements.