Solar PV and Thermal Installation Skills

PROGRAM OUTLINE

PROGRAM GOAL AND OUTCOMES

Program Goal

To provide students with the knowledge and skills needed to know best practices for installing, troubleshooting, and repairing solar photovoltaic and thermal systems on residential and small commercial buildings.

Program Outcomes	Courses	Evidence of Learning
Explain the fundamentals of solar energy systems for generating heat and electricity	Orientation to Solar Technology	Lesson review, multiple-choice lesson exams
Describe how different, complex electrical wiring systems are integrated with solar photovoltaic systems	Orientation to Solar Technology	Lesson review, multiple-choice lesson exams
Identify the components of a solar photovoltaic system and explain their function	Photovoltaic Components	Multiple-choice lesson exams
Examine the installation, commissioning, and troubleshooting procedures used in a solar photovoltaic system	Photovoltaic Installation, Commissioning, and Troubleshooting	Multiple-choice lesson exams
Identify the components of a solar thermal heating system and explain their function	Solar Thermal Heating Components	Multiple-choice lesson exams
Describe how to install, commission, and troubleshoot a solar thermal heating system	Solar Thermal Heating Installation, Commissioning, and Troubleshooting	Multiple-choice lesson exams

PROGRAM STRUCTURE

Starting Your Program

Lesson 1	**Starting Your Program**

Course 1: Orientation to Solar Technology

Lesson 2	**Introduction to Solar Systems**
Lesson 3	**Solar Fundamentals**

Course 2: Photovoltaic Components

Lesson 4	**Introduction to Solar PV Systems and Modules**
Lesson 5	**PV Inverters, Standalone PV Systems, and the BOS**
Lesson 6	**Solar Panel System Sizing and Design**

Course 3: PV Installation, Commissioning, and Troubleshooting

Lesson 7	**PV System Layout**
Lesson 8	**Installing the PV Array and the BOS**
Lesson 9	**Testing, Troubleshooting, and Connecting the PV Array**

Course 4: Solar Thermal Heating Components

Lesson 10	**Components of a Solar Thermal Heating System**
Lesson 11	**Calculating the Size of a Solar Thermal Heating System**

Course 5: Thermal Installation, Commissioning, and Troubleshooting

Lesson 12	**Installing Solar Thermal Heating Systems**
Lesson 13	**Commissioning Solar Thermal Heating Systems**
Lesson 14	**Troubleshooting Solar Thermal Heating Systems**

COURSE DESCRIPTIONS AND OBJECTIVES

SLT101: Orientation to Solar Technology

In this course, you'll learn how to be successful as a Penn Foster student by learning about your student portal. You'll explore how the universal solar system works in relationship with the solar energy systems. You'll examine how the location of the sun in the sky affects the amount of energy produced by a solar energy system and how the sun's energy produces electricity and heat for hot water.

By the end of this course, you'll be able to:

- Identify skills needed to be a confident and independent online learner
- Describe the solar industry and how the sun affects solar energy
- Define the electrical fundamentals, language, tools, and safety procedures used in the solar industry

SLT102: Photovoltaic Components

In this course, you'll explore the function of solar photovoltaic (PV) components and the purpose and function of each.

By the end of this course, you'll be able to:

- Describe a PV system, including solar panels and modules, and how they produce energy
- Identify PV inverters, standalone PV systems, and the BOS
- Explain how to design a PV system, including determining what size system is needed

SLT103: PV Installation, Commissioning, and Troubleshooting

In this course, you'll discover how to install the PV system using effective system layout and safe and secure mounting methods. You'll determine how to verify that all mechanical connections are secure, test voltages for correct electrical connections, and energize a PV system. You'll also examine how to safely and effectively troubleshoot a PV system.

By the end of this course, you'll be able to:

- Describe the layout, location, and planning for a PV system
- Identify how to install a PV array and BOS
- Explain the process for testing and troubleshooting a solar system

SLT104: Solar Thermal Heating Components

In this course, you'll identify the components of a solar thermal heating system, describe how the components function, and explain how to use them in a system.

By the end of this course, you'll be able to:

- Identify the components of solar thermal heating systems and describe how they work
- Determine the optimal sized system to meet hot water heating needs in a house and small business

SLT105: Thermal Installation, Commissioning, and Troubleshooting

In this course, you'll determine how to install solar thermal heating systems in accordance with building codes, commissioning procedures, and troubleshooting techniques.

By the end of this course, you'll be able to:

- Describe how to install solar thermal heating systems
- Outline how to commission solar thermal heating systems
- Explain troubleshooting solar thermal heating systems

Note: The titles of your learning materials may be different from those listed on your program outline. There is no need to call your instructor about these differences. While the titles of certain learning materials may differ, the educational content is the same. All learning materials are designed to give you the finest education in your field. If you need instructional assistance, however, be sure to call for help. We reserve the right to revise the program of study and the instructional materials and to substitute for the items of equipment offered.