XCELERATE TRAINING INSTITUTE

your learning & development partner

ELECTRICAL ENGINEERING

Solar Energy System – Installation and Storage Training Course

DURATION	LANGUAGE	FORMAT
10 days	English	Classroom / Online

Upcoming dates

Dates	Venue	Format	Fee
17 – 28 May 2027	Live online	Online (live)	€1,800
22 Nov – 3 Dec 2027	Live online	Online (live)	€1,800
27 Dec 2027 – 7 Jan 2028	Boston	Classroom	€5,400

Register or ask a question

Online: staging.x8ti.com/course/solar-energy-system-installation-and-storage…

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Solar Energy System – Installation and Storage Training Course

Introduction

The Solar Energy System – Installation and Storage course focuses on the essentials of solar energy conversion, solar cells, optical engineering, photoelectrochemical cells, thermoelectric generators, and distribution systems. It covers global energy needs, solar cell material science, current trends in photovoltaic (PV) energy engineering, design and installation of solar panels for residential and engineering applications, integration with the national grid, and cost analysis of the overall system. Additionally, it addresses industrial processes for producing solar panels, environmental impacts, and related system engineering aspects.

Learning Objectives

Upon completing this course by Xcelerate Training Institute, participants will be able to:

- Understand available solar energy and current conversion and utilization processes.
- Address challenges in sustainable energy processes, perform cost analysis, and plan PV systems for various applications.
- Understand manufacturing processes, environmental challenges, economic aspects, and future potentials of solar energy.
- Gain knowledge of semiconductor physics, optical systems, photovoltaic engineering, load matching, storage, and grid connections.
- Design advanced PV systems with different approaches and engineering aspects.

Training Methodology

This interactive training program includes:

- Lectures
- Seminars & Presentations
- Group Discussions
- Practice Questions
- Assignments
- Case Studies & Functional Exercises Following the ‘Do-Review-Learn-Apply’ model.

Benefits for Your Organisation

Organizations can benefit from:

- Understanding solar energy concepts and appreciating their significance in power systems.
- Awareness of solar energy during project construction or maintenance.
- Having professionally trained staff in solar energy.
- Networking and knowledge sharing among participants.
- Achieving reduced capital, operating, and maintenance costs while increasing efficiency.

Benefits for You

Participants will gain:

- Knowledge of solar modules, optimizers, junction boxes, inverters, and solar meters.
- Ability to optimize panel placement for Solar PV.
- Skills to calculate efficiency losses, Solar Array size, and peak sun hours.
- Understanding of roof pitch and azimuth suitability for Solar Systems.
- Knowledge of solar cells chemistry.

Who Should Attend

This course is intended for individuals working in or seeking employment in the renewable energy industry, including students in renewable energy programs, early-career professionals, experienced specialists offering renewable energy products/services, and those without professional certification or degrees in solar energy. It is ideal for beginners with no solar experience and experienced professionals looking to enhance their skills. Engineers, Solar Sales Professionals, Entrepreneurs, Solar Enthusiasts, or anyone interested in learning Solar Photovoltaic energy fundamentals can benefit from this course.

Course Outline

History of Solar

- History and timeline of solar energy
- Solar panel production

Types of Solar Energy Systems

- Solar Electric / Photovoltaic Systems
- Solar Thermal Systems
- Off-Grid Applications
- Grid-Tied Applications

Evaluating the Solar Resource

- Electromagnetic Spectrum
- Solar Irradiance
- Atmospheric Effects on Solar Radiation
- Latitudinal Effects on Solar Radiation

Load Analysis

- Energy Audit
- Determining Load
- Peak Load

Solar Photovoltaic Systems

- Components
- Mounting Options
- Grid Interconnectivity

- Electronic Basics
- The Next Generation of Cheap Solar Cells

Solar Hot Water Systems

- Collector Types
- Distribution Types
- Storage Types
- System Sizing
- Maintenance

System Maintenance

- Shading Control
- Snow, Wind, Cleanliness
- Batteries
- Troubleshooting
- Solar PV Systems: Users' Maintenance Guide

PV Markets & Applications

- Key contributions to PV development
- Common types of PV systems
- Advantages and disadvantages of PV
- Features and benefits of standalone and utility-interactive systems
- Roles in the PV industry
- Opportunities for grid-tied and standalone PV systems
- Conservation and energy efficiency with PV

Safety Basics

- Safety hazards of PV systems and components
- Personal protective equipment (PPE) requirements for installing PV
- Safe practices and OSHA standards
- Electrical hazards including shock and arc flash

Electrical Basics

- Basic electrical parameters
- Power vs. Energy
- Common electrical system components
- Electrical test equipment
- Ohm's Law
- Electric utility system operations

Solar Energy Fundamentals

- Basic solar terms
- Diagramming the sun's movement across the sky
- Sun path diagrams

- Factors influencing solar energy collection
- True North vs. Magnetic North
- Shading and gauging the solar window using software
- Avoiding inter-row shading
- Tools for measuring solar power and energy

PV Module Fundamentals

- How solar cells transform sunlight into electricity
- PV cells, modules, panels, and arrays
- Key electrical output parameters
- I-V Curve
- Series and parallel module connections
- PV modules as battery chargers
- Performance rating and measurement
- Manufacturing processes of solar cells
- Crystalline silicon cells and thin-film modules
- Efficiency calculation per unit area
- PV modules as limited current sources
- Bypass diodes
- Qualification testing for safety and reliability

System Components

- Common system configurations
- Major PV system components
- Balance of system components
- PV system power processing equipment

PV System Sizing Principles

- Standalone vs. utility-interactive PV systems
- Peak power demand and energy consumption determination
- De-rating factors
- PVWATTS
- Number of modules with inverters

PV System Electrical Design

- One-line electrical diagrams preparation
- Electrical conductors properties
- Nameplate specifications on PV modules and inverters
- Charge control
- Labelling requirements on PV systems
- PV system grounding
- Voltage drop calculation using Ohm’s Law
- Approvals and code compliance for PV systems

- National Electric Code

PV System Mechanical Design

- Securing PV arrays
- Benefits of different mounting options
- Temperature effects on PV cells
- Building-integrated PV (BIPV) applications
- Weather sealing
- Roofing structural attachments
- Structural loads (dead, live, wind, snow, seismic)
- Safety, performance, code compliance, and warranties

Efficiency vs. Renewable Energy

- Definition of efficiency
- Definition of renewable energy
- Current costs of efficiency and renewable energy

The Big Picture

- Market overview
- Impact of financial crisis and ARRA (stimulus) spending
- Predicted growth of solar

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Registration Form

Solar Energy System – Installation and Storage Training Course

Preferred dates: ..... Venue or online: .....

Duration: 10 days Language: .....

Please complete and email this form to us, or register online. We confirm your place and send the invoice within one working day.

Delegate information

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Official email: ..... Personal email: .....

Company information

Company name: .....

Address: .....

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Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

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☐ Please invoice me ☐ Please invoice my company

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Register online
Open the course page