Content Community Connection

United States
The Electricity Forum Inc.
742 Pre Emption Road
Geneva, NY 14456
Tel 289-387-1025

Canada
The Electricity Forum
1885 Clements Rd, Unit 218
Pickering, ON L1W3V4
Tel 905-686-1040
Fax 905-686-1078
Toll Free 855-824-6131

Solar PV System Design

View Course Details

COURSE DATES AND TIMES

April 14-15 , 2026

10:00am - 4:30pm ET

Our 12-Hour (2-day) instructor-led, live online course provides a comprehensive overview of stand-alone and grid-connected Photovoltaic (PV) systems designs. Drawing upon the National Electrical Code (NEC 2023) and CE Code (2024), this course offers a thorough understanding of both residential and commercial-scale systems. The course learning is also applicable across various Solar PV installations, including utility-scale projects.

Participants will gain knowledge of PV systems' operations, site assessment procedures, and both grid-connected & off-grid system theories. Emphasis will be placed on safe system designs in adherence to the NEC and Canadian Electrical Code. Additionally, the course will offer case studies of PV system design.

This course is beneficial for professionals such as Solar PV System Designers, Electrical Engineers, Building Designers, Architects, Construction Project Managers, Energy Consultants, Sustainability Consultants, Facilities Managers, Building Services Engineers, and Renewable Energy Engineers as it enhances their understanding of solar PV systems and their integration into building designs. This is a valuable skill in today’s sustainable and energy-efficient construction industry.

Learning Outcomes

- Understanding of solar energy concepts and photovoltaic technology.
- Knowledge of electrical principles in PV systems, including the electrical characteristics of PV systems and power electronics in PV systems.
- Familiarity with solar module technologies and inverter technologies.
- Understanding of PV systems for residential and commercial buildings using software tools.
- Understanding of PV systems integration into existing building electrical systems.
- Knowledge of building codes, standards, and regulations for PV installations.

- Ability to conduct economic analysis and understand financing options for solar projects.

Solar PV System Design Training - Our 12-Hour (2-Day) live online, instructor-led workshop introduces students to the National Electrical Code (NEC 2023) and CE Code (2024) photovoltaic system standards as well as other international standards that pertain to the safe and efficient design of grid-direct Solar PV Systems. This course foruses primarily on both residential and commercial-scale systems. However, the NEC and CE Code requirements for Solar PV Systems, including most design parameters and best practices are applicable to all types and sizes of Solar PV installations, including large utility-scale projects.

The objectives of this 12-hour (2-day) Solar PV System design course are to:

- Provide an introduction to Solar energy
- Describe various PV systems and their components
- Explain operation of modules and electrical characteristics
- Go through a site assessment including shade analysis
- Explain the theory of both grid-connected and off-grid systems
- Size and design few grid-connected PV systems
- Size and design few off-grid PV systems
- Utilize the Canadian Electrical Code to design systems safely
- Design and install a 1.5kW string inverter system
- Design and install a 1.5kW micro inverter system

You will learn in details about:

- PV Electrical Design Basics
- PV Module Fundamentals
- PV System Sizing Principles
- PV System Electrical Design
- You will learn how to design solar power systems and reduce or eliminate energy bills.

WHO SHOULD ATTEND

- Owners of PV Systems.
- Technicians specializing in PV Systems.
- Electrical Project Designers.
- Consulting Electrical Engineers.
- Electrical Engineers in Industrial, Commercial, and Institutional sectors.
- Electricians in Industrial, Commercial, and Institutional sectors.
- Project Managers overseeing PV installations.
- Installation and Operating Engineers seeking proficiency in Solar PV Systems.

STUDENTS RECEIVE

- **FREE** 100-Page Digital Electrical Handbook (Value $20)
- **$100 Coupon** Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.2 Continuing Education Unit (CEU) Credits (12 Professional Development Hours)
- **FREE** Magazine Subscription (Value $25.00)
- Course Materials In PDF Format

COURSE OUTLINE

Solar PV System Design Training Course Outline

Day 1:

Session 1: Solar Energy Concepts

- The role of solar energy in sustainable building design.
- Photovoltaic technology and its applications.
- The benefits and challenges of using solar energy.
- Impact of solar energy on the environment and economy.
- Recent advancements and trends in solar power system technologies.

Session 2: Electrical Principles in PV Systems

- Electrical characteristics of PV systems.
- Power electronics in PV systems.
- Principles of electricity as applied to solar power.
- How PV systems convert sunlight into electricity.
- I-V (current-voltage) curve characteristics of modules, arrays, and PV system designs
- MPPT (Maximum Power Point Tracking) and it’s uses.

Session 3: Solar Modules and Inverters

- Inverter technologies and selection criteria.
- Solar modules and inverters work together in a PV system.
- Temperature and irradiance fluctuations effect on PV cells, modules, arrays and the design of PV systems
- Maintenance and troubleshooting of solar modules and inverters.
- Efficiency and performance factors of different module and inverter technologies.

Session 4: PV System Design for Buildings

- Solar resource data
- Designing PV systems for residential buildings considering location, orientation, and shading.
- Designing PV systems for commercial buildings with a focus on maximizing efficiency and ROI.
- Software tools for PV system design.
- System design optimization for different types of buildings and energy needs.
- Common challenges and solutions in PV system design for buildings.

Session 5: Codes, Standards, and Regulations

- Building codes and standards for PV installations.
- How to ensure compliance with local, regional, and national regulations.
- The role of standards in ensuring safety and performance of PV systems.
- The implications of non-compliance with codes and standards.

Day 2:

Session 6: Grid-Connected Solar PV Systems

- Integration techniques for PV systems into existing electrical infrastructure.
- Energy and property's ability to accommodate a PV system.
- Load analysis of existing system and its components.
- How to determine the correct size of a grid-connected PV system using a yearly kWh consumption derived from the customer’s electricity bills.
- Types of grid-dependent inverters

Session 7: Economic Analysis and Financing of Solar Projects

- Cost-benefit analysis of solar projects.
- Different financing options for solar projects.
- How to calculate payback period and ROI for solar installations.
- Incentives, subsidies, and grants available for solar projects.
- Trends in solar project financing.

Session 8: Case Studies and Real-world Applications

- Real-world applications of course concepts.
- Best practices and common pitfalls in real-world scenarios.
- Potential issues and solutions during the integration process.

- How to ensure seamless operation between the PV system and existing electrical system.

Session 9: Final Assessment and Q&A Session

- Assessment to gauge knowledge gained from the course.
- Q&A session to clarify doubts and deepen understanding of topics covered.
- Key points from the course during the wrap-up session.
- Feedback on assessment performance and areas for improvement.

COURSE SCHEDULE:

Start: 10 a.m. Eastern Time
Finish: 4:30 p.m. Eastern Time

Contact us Today for a FREE quotation to deliver this course at your company's location.

Request Quote