Advanced Solar Inverter Technologies Training Course

Professional Development Training Course Outline

Category	Renewable Energy	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The global transition toward renewable energy systems, smart grids, and sustainable power solutions has significantly increased the demand for advanced knowledge in solar inverter technologies. Solar inverters play a critical role in converting DC power from photovoltaic (PV) systems into usable AC power, while ensuring grid stability, energy efficiency, and system optimization. With the rise of AI-driven energy management, hybrid inverter systems, and battery storage integration, professionals must stay updated with cutting-edge innovations shaping the solar industry.

Advanced Solar Inverter Technologies Training Course is designed to equip engineers, technicians, and energy professionals with in-depth expertise in next-generation inverter design, grid-tied and off-grid solutions, power electronics, and smart monitoring systems. The course emphasizes practical skills, real-world case studies, and emerging trends such as IoT-enabled solar systems, predictive maintenance, and energy storage integration, ensuring participants are industry-ready in the rapidly evolving renewable energy sector.

Programme Curriculum

Advanced Solar Inverter Technologies Training Course

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Course Duration

5 days

Course Objectives

1. Understand advanced solar inverter architectures and configurations
2. Analyze grid-tied, off-grid, and hybrid inverter systems
3. Apply power electronics and conversion efficiency optimization techniques
4. Explore AI-based energy management systems
5. Design systems with battery storage integration and energy backup solutions
6. Evaluate smart inverter communication protocols (IoT, SCADA)
7. Implement predictive maintenance using data analytics
8. Improve system reliability and fault diagnostics
9. Integrate renewable energy systems with smart grids
10. Optimize energy efficiency and performance monitoring
11. Understand cybersecurity in smart solar systems
12. Develop skills in solar inverter troubleshooting and testing
13. Stay updated with emerging trends in clean energy technologies

Target Audience

1. Solar Engineers and PV System Designers
2. Electrical and Electronics Engineers
3. Renewable Energy Consultants
4. Installation and Maintenance Technicians
5. Energy Project Managers
6. Smart Grid and Utility Professionals
7. Technical Trainers and Academics
8. Engineering Students specializing in Renewable Energy

Course Modules

Module 1: Fundamentals of Solar Inverters

- Types of inverters-string, central, microinverters
- Basic working principles of DC to AC conversion
- Key performance metrics and efficiency
- Role in PV systems
- Safety standards and compliance

  Case Study: Performance comparison of string vs microinverters in residential systems

Module 2: Power Electronics in Inverters

- Semiconductor devices (IGBT, MOSFET)
- Switching techniques and PWM

- Thermal management
- Efficiency optimization
- Harmonics reduction

  Case Study: Improving inverter efficiency using advanced switching techniques

Module 3: Grid-Tied Inverter Systems

- Grid synchronization techniques
- Anti-islanding protection
- Net metering systems
- Voltage and frequency regulation
- Grid compliance standards

  Case Study: Large-scale solar farm grid integration

Module 4: Off-Grid and Hybrid Systems

- Standalone inverter design
- Hybrid system architecture
- Diesel-solar hybrid integration
- Load management strategies
- Energy independence solutions

  Case Study: Rural electrification using hybrid solar systems

Module 5: Battery Storage Integration

- Battery types (Li-ion, lead-acid)
- Battery management systems (BMS)
- Charging/discharging cycles
- Energy storage optimization
- Backup power solutions

  Case Study: Solar + battery system for commercial buildings

Module 6: Smart Inverter Technologies

- IoT-enabled inverters
- Remote monitoring systems
- SCADA integration
- Smart grid communication
- Real-time analytics

  Case Study: Smart inverter deployment in urban smart grids

Module 7: AI and Data Analytics in Solar Systems

- Predictive maintenance
- Machine learning for performance optimization
- Fault detection algorithms
- Data-driven decision making
- Energy forecasting

  Case Study: AI-based fault prediction in solar plants

Module 8: System Design and Sizing

- Load analysis
- Inverter sizing techniques
- System optimization
- Site assessment
- Cost-benefit analysis

  Case Study: Designing a commercial solar inverter system

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price

23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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