Advance Electrical Design & Engineering Institute (AEDEI)

(ISO 9001:2008 CERTIFIED INSTITUTE) : NEW DELHI

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About us:

Advance Electrical Design & Engineering Institute (AEDEI) ISO certified 9001:2008 Electrical Design & Engineering training programs for Dedicated to Electrical Engineers. AEDEI is latest venture for providing the quality education in the best possible facilities is a key aim of Skill developments for various verticals in Electrical Engineering design.

Our Mission:

Our Technical Institute offers a full range of training in electrical, Electronics & communication and mechanical design courses full fill requirement of current industries,

These courses which encompass all aspects of core electricity from fundamentals to in-depth of design knowledge are based on several value adding pillars.

Our trainers share their know-how and design experience through demonstrations on dedicated equipment on industries. Courses include training dedicated documents and the possibility of follow-up with regular/internship/e-learning modules. Over one to 45 days depending on the topic, trainees get in-depth, hands-on instruction and the opportunity to practice their acquired know-how.

We cover all the range of engineering industries skills disciplines:

- Electrical System Design
- Solar Power Plant Design
- Technical Transformer Design
- Cable Design
- Thermal Power Plant Design
- Hydro Power Plant Design
- Mechanical design
- HVAC Design
- Oil & Gas Plant Design
- Gas insulated Substation Design
- Automation & Control
- Electrical Testing Engineer
- QA/QC Electrical
- Power System Software
Electrical System Design:

This introductory course in design fundamentals will guide you through a step-by-step study of Electrical System design. You will consider all phases, from initial site review and selection to Designing Electrical Equipments.

**Experienced Instructors:**

Your instructors, professional engineers with many years of field and design experience, will trained you through theory calculation practical, instructor having expertise electrical system design.

**Duration:** 45 Days

**Mode:** Regular/Internship/online/Correspondence

**Why You Should Attend:**

When you complete this course you will be able to:

- Lighting Design
- Industrial Load Calculation
- Substation design
- Industrial motor design
- Transformer sizing
- Generator sizing
- Plant Load Estimate
- Earthing system
- Cable selection
- BOM/BOQ Preparation
- Tendering
- AUTO CAD
- Power System Software

**Study Materials:**

You will receive extensive course materials that will serve as valuable references in your work.

What You Will Study (Syllabus)

**Module-1 System planning**

- Basic design considerations
- Planning guide for the supply and distribution system
- Power system modernization and evaluation studies/programs
- Voltage considerations
- Voltage control in electric power systems
- Voltage selection
- Voltage ratings for low-voltage utilization equipment
- Voltage drop considerations in locating the low-voltage/ high-voltage
- Calculation of voltage drops

**Module-2 Cost estimating of industrial power systems**

- Preparing the cost estimate
- Classes of estimates
- Equipment and material costs
- Installation costs
- Other costs
Module-3 LIGHTING DESIGN:
- Different entities of illuminating systems
- Light sources: daylight, incandescent, electric discharge, fluorescent, arc lamp
- Luminaries, wiring, switching & control circuits
- Laws of illumination; illumination from point, line and surface sources
- Photometry
- Interior lighting – industrial, residential, office department stores, indoor stadium, theater and hospitals
- Exterior lighting - flood, street, aviation and transportation lighting
- Utility services for large building/office complex & layout of different meters and protection units
- Different type of loads and their individual protections
- Selection of cable/wire sizes; potential sources of fire hazards and precautions
- Prepare layout of different type lights
- Refer Std:- IES(illumination Engineering Society)
- IS 3646 Code of Practice for Interior Illumination
- National Lighting Code (Nlc)-2010
- IS 6665 Code of Practice for Industrial Lighting
- IS 1944 Code of Practice for Lighting of public Thoroughfares
- IEC 60598-2-3 Particular requirements – Luminaires for road and street lighting.

Module-4 Cable Sizing and Selection of single Phase and Three Phase:
- Load Details Calculation
- Cable type and Construction features
- Site Installation Conditions
- Cable Selection Based on Current Rating of feeder
- Base Current Ratings of feeder
- Installed Current Ratings of Cable
- Feeders load detail
- Motors load detail
- Voltage Drop of cable
- Cable Impedance
- Maximum Permissible Voltage Drop by ANSI and IEC std.
- Calculating Maximum Cable Length due to Voltage Drop
- Short Circuit Temperature Rise calculation of cable.

Module-5 Internal Electrification design:
- Electrical Layout in residential building using Auto CAD
- Selection of house wiring
- Sizing and Selection of Conduit
- Sizing and selection of Switch Socket
- Calculation of load on circuit
- Design of sub circuit (Lighting Circuit and Power Circuit)
- Distribution of Power Circuit
- Calculation of fan
- Calculation of Earthing for residential buildings
- Sizing and selection of low voltage switchgears (MCB, MCB, RCB, RCBO MCB)
- Refer Std. IS 4648,CPWD

Module-6 Protection of Buildings and Allied Structures Against Lightning
- Method of Lightening protection
- Basic Consideration for Protection
- Calculations for Evaluating the Need for Protection
- Calculation of Protective Angles And Zone Of Protection For Various
- Forms of Air Termination
- Selection of lightening protection device
- Selection of ESE type Lightening Protection
- Refer Std. IS 2309, NFC 72-102

Module-7 Earthing Design and Calculation of Power Plants
- Factors Influencing The Choice Of Earthed And Unearthed Systems
- System Earthing &Equipment Earthing
- Connections To Earth
- Earth Electrode Current Density at The Surface of an Earth Electrode
- Selection of an Earthing Conductor and Connection of an Electrode
- Chemical Earthing Calculation
- Voltage Gradient around Earth Electrodes
- Connections to Earth Electrodes
- Earthing And Protective Conductors
- Earthing Arrangement for Protective Purposes
- Earthing Arrangements For Combined Protective And Functional Purposes
- Equipotential Bonding Conductors Typical Schematic of Earthing And Protective Conductors
- Earthing In Power Stations And Substations
- Earthing Associated With Overhead Power Lines Calculation of Earth Fault Currents
- Measurement of Earth Resistivity Measurement of Earth Electrode Resistance
- Measurement of Earth Loop Impedance
- Equipotential Bonding Conductors
- Earthing Calculation For Switchyard And Power Plants
- Step Voltage,Touch
- Voltage Design Procedure
- Calculation of Maximum Step And Mesh Voltages
- Refinement of Preliminary Design
- Std. Ref. IS, IEC, IEEE, BS
- BS 7430 Code of practice for Earthing
- IS : 3043 Code of Practice for Earthing.
Module-8 Design and Engineering of Transmission line
- Transmission Planning
- Indian Electricity Rules and State Regulations for transmission line
- Choice of Route of transmission line
- Selection of conductors for Overhead transmission
- Spacing of Conductors in transmission lines
- Calculation of SAG and Tension
- Overhead transmission line Clearance
- Selection of structure Pole, Lattice, Tower
- Survey of transmission line upto 220KV
- Sag Template and Tower Spotting
- Classification of soil of Soil for 220KV transmission line
- Tower Erection at Site Condition
- Choice of Spans for 440KV transmission
- Transmission line Earthing Calculation
- Selection of Transmission line Insulator and fittings
- Overhead transmission line lightning Calculation
- Transmission line maintenance and erection solution

Module-9 Design and Engineering of Switchyard
- Selection of project – Classification – Zone/Area wise
- Electrical Clearance of substation
- Insulation Coordination calculation of Equipment
- Outdoor Substation Layout
- Control Room Layout
- Types of bus-bar schemes of Substation
- Substation Main Equipment
- Sizing of Transformers
- Reactive Compensation Equipment
- Shunt Capacitors
- Static VAR Systems
- Selection and Sizing of Voltage Transformers (VT) for switchyards
- Selection and Sizing of Current Transformers (CT)
- HT/LT Circuit Breaker Selection and Sizing
- Control & Relay Panels
- Standard Protection Schemes for Substation and Transmission line
- Substation Automation system design
- Selection of PLC, Communication protocol
- Benefits of Substation Automation system
- Substation Automation with IEC 61850 Standard
- Selection and sizing of Disconnectors and earth switches (isolators)
- Selection and sizing of Lightning Protection
- Selection of luminaries
- Selection and sizing of Bus Support Insulators
- Selection and sizing of Strand Insulators
- Power line carrier Equipment (PLCC)
- Earthing of Switchyard
- Cabling of Switchyard
- Fire Protection Facilities in Substation
- DC Auxiliary supply / Battery bank Sizing and selection
Solar Power Plant Design

This solar power plant design course has been developed to meet the requirements of the National Occupational Standards. The Solar PV course is designed to provide already practising electrical installers with all the skills and knowledge required to enable them to select the most appropriate solar PV system for a building based on consultation with the client about their needs and demands, to install any of the common types of PV systems in a safe and workmanlike manner. It also provides training in the maintenance and servicing of PV systems.

Experienced Instructors:
Your instructors, professional engineers with many years of field and design experience, will trained you through theory calculation practical, instructor having expertise solar power plant design.

Duration: 45 Days
Mode: Regular /Internship/online/Correspondence

Why You Should Attend:
When you complete this course you will be able to:

Study Materials:
You will receive extensive course materials that will serve as valuable references in your work.

What You Will Study (Syllabus)

Module 1: Solar Radiation
Irradiation and Peak Sun Hours ● Solar Radiation Data ● Sun path Diagram ● Defining the Position of the Sun ● Solar Altitude ● Geometric Effects ● Tilting Solar Modules ● Magnetic North & True North

Module 2: Connections of PV Module (Series and Parallel Circuits)
● Series Circuits ● Parallel Circuits ● Combining Series & Parallel Circuits ● Understanding Cell Connection ● Array

Module 3: PV Cells Selection and Sizing

Module 4: Inverters Selection and Sizing (Grid Connection & Off Grid)
● Purpose of inverters ● Grid-Connected Inverters vs. Stand-Alone Inverters ● Types of Grid-Connected inverters: Introduction ● Isolated Inverters ● Types of Inverters - PV to Inverter Interface ● Inverter Protection Systems ● Power Quality ● Monitoring ● Inverter Efficiency ● How DCIs Converted to AC Products for Use in India

Module 5: Module Mounting Systems
● Introduction ● Calculating the Wind Loading of the Solar Array ● Roof Mounted Systems ● PV Array Row Spacing ● Ground Mounted Systems

Module 6: Solar Power Plant Balance of System
● Introduction ● Cabling ● Array String Protection and Disconnect Switches ● Lightning Protection ● Array Junction Box ● PVMain Disconnection Devices ● Metering ● System Monitoring: Local and/or Web Based Display
Module 7 : Energy Efficiency & Calculation

Module 8 : Solar Power Plant Site Survey & Assessment
● Introduction ● Undertaking a Site Assessment ● Choosing a PV Module ● Choosing an Inverter ● Choosing a Mounting System Type ● Determining the Maximum Number of Modules That Can Fit on a Roof

Module 9 : Matching Array and Inverter Sizing
● Matching The PV Array To The Voltage Specifications of An Inverter ● Matching the PV Array to the Inverter’s Current Rating ● Matching the PV Array to the Inverter’s Power Rating ● Summary of Calculations for Matching Array and Inverter

Module 10 - Solar Power Plant System Protection
● Determining the Protection Equipment and Switching ● PV Array Maximum Voltage ● Circuit Protection: Over-Current ● Disconnection Devices ● System Earthing ● Connecting the System to the Grid

Module 11 - System Losses of Solar Power Plant
● Determining the Size of the DC and AC Cables ● Losses in a Grid-Connected PV System

● What Determines the Energy Yield of a System ● Calculating the Energy Yield for a PV Grid-Connected System ● Specific Yield ● Performance Ratio ● CUF Calculation.

Module 13 : Plant Installation and Commissioning
● IEC Standards ● Equipment Selection - Warranties I ● Installation Preparation ● Equipment Installation ● Monitoring Equipment ● Commissioning ● System Documentation ● System Installation & Pre-Commissioning Checklist ● Commissioning Test Sheets

Module 14 : Maintenance and troubleshooting
System Maintenance ● Trouble Shooting

Module 15 : Megawatt Solar Plant System
● Introduction ● Preliminary Planning ● Designing a Large PV Grid Connect System What Array/Inverter Configuration Should Be Selected ● Monitoring.

Module 16 : Costing and Tendering of Solar Power Plant
● Introduction ● Simple Payback ● Life Cycle Costing Determining Costs Associated with the Whole PV System Valuing a PV System

Module 17 : Smart Grids/Net Metering
● What Will The Smart Grid Do ● Smart Meters SPV Software ● PVsyst, meteornorm, Google sketchup

Ref. Std. IEC IEC 60068-2 (1,2,14,30),IEC 61683,IEC 60227,IEC 60502 IEC 60947 part I,II, III ,IEC 61215
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Job Oriented and Skill Development Electrical Courses

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