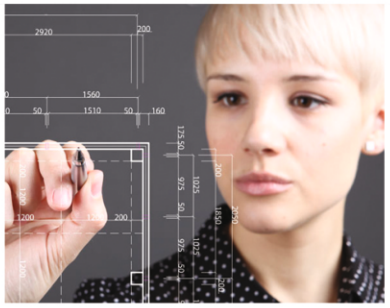
Advance Electrical Design & Engineering Institute (AEDEI)

(ISO 9001:2015 CERTIFIED INSTITUTE) : NEW DELHI
(SUBSTATION DESIGN)






Email:info@advanceelectricaldesign.com • Website : www.advanceelectricaldesign.com

Contact us : + 91-8467024957, +91-7531923094, +91-7838919111

About us :

Advance Electrical Design & Engineering Institute (AEDEI) ISO certified 9001:2015 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 Online and Offline :

- Substation Design Training(AIS and GIS)
- Electrical System Design
- Solar Power Plant Design(KW and MW)
- Technical Transformer Design
- Technical Cable Design
- Mechnical Electrical and Pluming (MEP) design
- HVAC Design
- Piping Power Plant Design
- Gas insulated Substation Design
- Electric Vehicle Charging Station Design
- Electrical Testing Engineer
- QA/QC Electrical
- Power System Software
- Hybrid Electric vehicle Design
- Railway Traction Design
- Floating Solar Power Plant

SUBSTATION DESIGN TRAINING :

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 : 2 Months

Mode: Regular /online

key Features of Substation Design Training :

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	AIS & GIS Substation	DAILUX & AUTO CAD
Power System Software(ETAP)	Transformer Sizing Calculation	Conductor Sizing

Study Materials :

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

Substation Design Training (Syllabus)

Module-1 Substation Design Development

- Introduction to Bus-Bar Schemes
- Details Designing of Switching Schemes
- Details Substation Layout Design
- Detail Study of One and Half CB Scheme
- Detail Study of Double Main and Transfer Bus Scheme
- Introduction to Key SLD
- Development of Detail SLD
- Introduction to Equipments
- Layout development from SLD
- Inter Coordination between SLD, Plan and Section
- Structure Loading Layout
- Clearance Diagram Development
- Cable Trench Layout Development
- EKD & BOM Development
- Details of Battery Sizing based on IEEE 485

Module-2 SUBSTATION DESIGN AND CALCULATIONS :

- Rigid B/B Design
- Flexible B/B Design
- Wind Force Calculation
- Sag Tension Calculation
- Rigid SCF Calculation
- Flexible SCF Calculation
- Pinch Force Calculation
- Cantilever Strength Calculation

Module-3 Cable Sizing and Selection of Low Voltage and High Voltage Cable :

- 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 Impedances
- Maximum Permissible Voltage Drop by ANSI and IEC std.
- Calculating Maximum Cable Length due to Voltage Drop
- Short Circuit Temperature Rise calculation of cable.
- HT Cable sizing (Transformer to HT switchgear and HT switchgear to Pooling station /Metering Point

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Module-4 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

Rfer Std. ● IS 2309,NFC 72-102

Module-5 Earthing Design and Calculation of Power Plants

- Factors Influencing The Choice Of Earthed And Unearthed Systems
- System Earthing & Equipment Earthing Connections To Earth
- Resistance to Earth & Earth Electrode Current Density at The Surface of an Earth Electrode
- Selection of an Earthing Conductor and Connection af an Electrode
- Chemical Earthing Calculation Voltage Gradient around Earth Electrodes
- Connections to Earth Electrodes Earthing And Protective Conductors
- Earthing Arrangement for Protective Purposes Earthing Arrangement for Functional Purposes
- Earthing Arrangements For Combined Protective And Functional Purposes
- Equipotential Bonding ConductorsTypical Schematicof Earthing & 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
- Earhing Calculation For Switchyard And Power Plants
- Step Voltage,Touch
- VoltageDesign Procedure
- Calculation of Maximum Step And Mesh Voltages
- Refinement of Preliminary Design
- Std. Ref. IS, IEC. IEEE, BS
- IEEE Std 80-2000 Guide for Safetyin AC Substation Grounding.

Module-6 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 ofStrain 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

Module-7 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 maintaince and erection solution

Module-8 Types of Protection used in Substation for BAYS

- Line Protection
- Bus Bar Protection
- Transformer Protection
- Bus and Line Reactor Protection
- Capcitor protection

Module-09 Design of AIS and GIS Substations from 11kv to 765 kv voltage

- Preparing the substation layout
- Substation switching Schemes
- Substation BAYS
- Electrical Clearances(Groud clearance, Phase to phase clearance, phase to earth and Safty clearance.

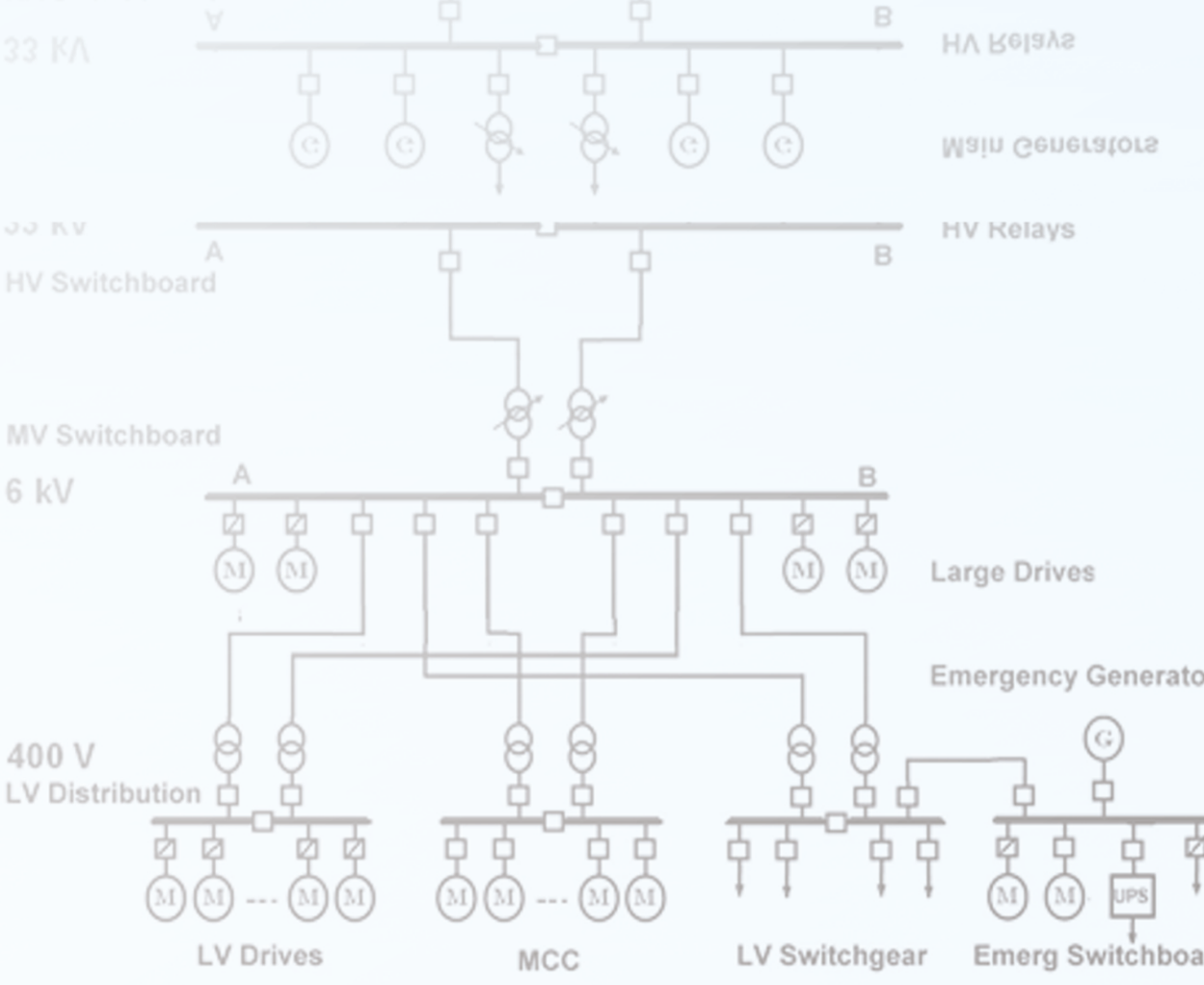
- **SLD Design Design for 11kv,33kv,66kv,110kv,132kv,22okv,400kv & 756kv**

Module-10 Cost estimating of AIS and GIS Substation

- Preparing the cost estimate
- Classes of estimates
- Equipment and material costs
- Installation costs
- Other costs

Module-11 AIS and GIS Substation Software

- ETAP (Latest Version)
- DAILUX



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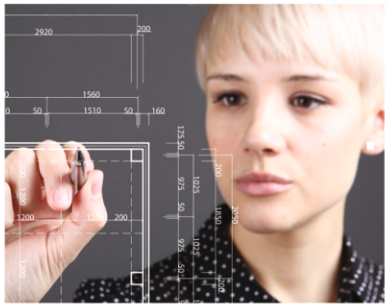
(ISO 9001:2015 CERTIFIED INSTITUTE) : NEW DELHI

(ONLINE ELECTRICAL SYSTEM DESIGN)



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We cover all the range of engineering industries skills disciplines:

- Online Electrical System Design
- Online Solar Power Plant Design
- Online Technical Transformer Design
- Online Substation Design
- Online Green Hydrogen Plant Design
- Online Solar Floating Design Course
- Online HVAC Design
- Online Battery Energy Storage System Design
- Online Solar Structure Design (MMS)
- Online Power System Protection and Relay coordination l
- Online Electric Vehicle Charging Station Design
- Online QA/QC Electrical
- Online Power System Software (ETAP)
- Online Hybrid Electric vehicle Design
- Online Railway Traction Design
- Online Piping Design course

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	DAILUX

Power System Software (ETAP)

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 departmental stores, indoor stadium, theater and hospitals ● Exterior lighting- flood, street, aviation and transport 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 3646Code of Practice for Interior Illumination ● National Lighting Code (Nlc)-2010 ● IS 6665 Code of Practice forIndustrial 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 Impedances ● 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,MCCB, RCB, RCBO MPCB) ● 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
Rfer 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 EarthingConnections To Earth ● Resistance to Earth and Earth Electrode Current Density at The Surface of an Earth Electrode ● Selection of an Earthing Conductor and Connection af an Electrode ● Chemical Earthing Calculation Voltage Gradient around Earth Electrodes ● Connections to Earth Electrodes Earthing And Protective Conductors ● Earthing Arrangement for Protective Purposes Earthing Arrangement for Functional 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 ● Earhing Calculation For Switchyard And Power Plants ● Step Voltage,Touch ● VoltageDesign Procedure ● Calculation of Maximum Step And Mesh Voltages ● Refinement of Preliminary Design ● Std. Ref. IS, IEC. IEEE, BS ● IEEE Std 80-2000 Guide for Safetyin AC Substation Grounding. ● BS 7430 Code of practice forEarthing IS : 3043Code 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
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- Classification of soil of Soil for 220KV transmission line
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- Choice of Spans for 440kV transmission
- Transmission line Earthing Calculation
- Selection of Transmission line Insulator and fittings
- Overhead transmission line lightning Calculation
- Transmission line maintaince and erection solution

Module-9 Design and Engineering of Switchyard

- Selection of project – Classification – Zone/Area wise
- Electrical Clearance of substation
- Insulation Coordinationcalculation of Equipment
- Outdoor Substation Layout
- Control Room Layout
- Types of bus-bar schemes of Substation
- Substation Main Equipment
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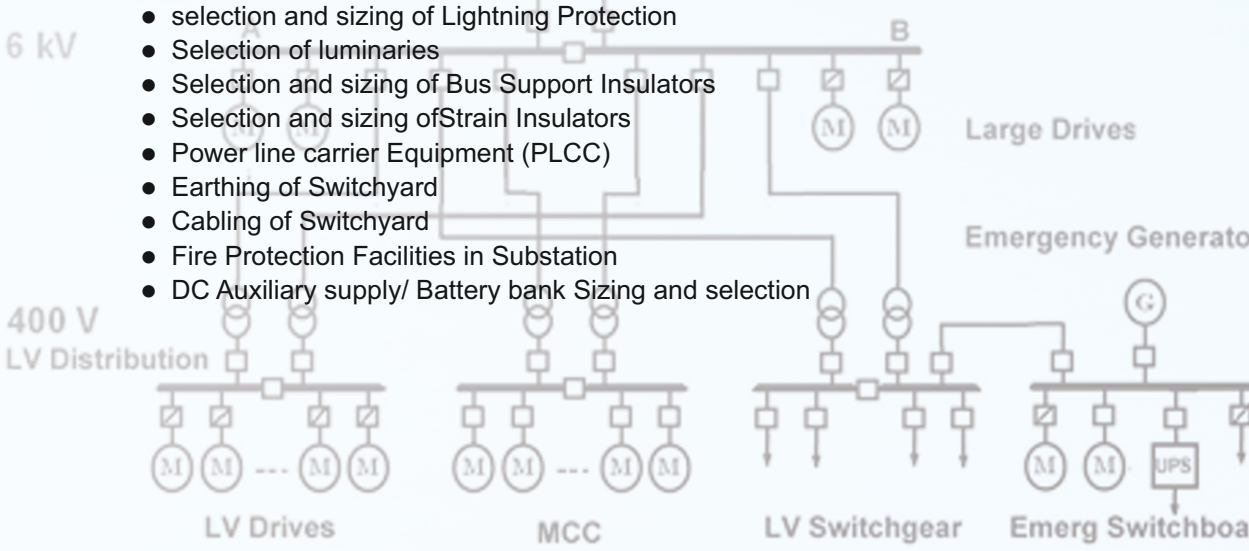
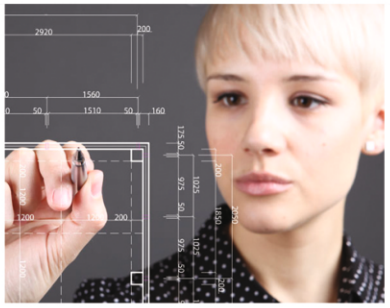
- Selection of PLC, Communication protocol
- Benefits of Substation Automation system
- Substation Automation with IEC 61850 Standard
- selection and sizing of Disconnectors and earth switches (isolators)
- selection and sizing of Lightning Protection
- Selection of luminaries
- Selection and sizing of Bus Support Insulators
- Selection and sizing ofStrain 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



Advance Electrical Design & Engineering Institute (AEDEI)

(ISO 9001:2008 CERTIFIED INSTITUTE) : NEW DELHI
(Solar Power Plant Design Training)



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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
- Mechanical design
- HVAC Design
- Oil & Gas Plant Design
- Gas insulated Substation Design
- Automation & Control
- Electrical Testing Engineer
- QA/QC Electrical
- Power System Software
- Hybrid Electric vehicle Design
- Railway Traction Design

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 : 60 Days

Mode: Regular /Internship/online/Correspondence

Why You Should Attend :

When you complete this course you will be able to:

Energy Yield Calculation ● Grid interactive solar power plant design ● Off Grid Solar Power Plant Design ● Roof top Solar Power Plant Design ● MW Solar Power Plant Design ● Tilt Angle Calculation ● Net Metering Solar Power Plant Design ● Solar Energy Calculation Software Auto Cad 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 : Types of Solar Power Plant

- Grid Connected solar Power Plant
- Grid interactive solar power plant
- Net Metering Solar Power Plant
- Off-Grid / Hybrid solar power plant
- Schemes of solar power plant

Module 1 : Selection of site and shadow analysis

- PV module structure interrow spacing calculation
- Pitch analysis
- Selection of PV module tilt angle
- Near shading object calculation
- Site survey and plant assessment
- Type of solar radiation
- Irradiance assessment and comparison
- Solar Radiation Data
- Sun path Diagram
- Defining the Position of the Sun
- Solar Altitude
- Geometric Effects
- Tilting Solar Modules
- Magnetic North & True North

Module 3 : Selection of PV module technology

- Crystalline technology
- Thin film technology
- Bi-facial technology
- Comparison between PV module technology
- Comparison between solar power plant energy out put

Module 4 : Selection of PV module (cells and BOM) and sizing

- Types Crystalline module cells
- Manufacturing process of PV cells
- Comparison between mono crystalline
- Selection of PV cells
- Selection of front and rear sheet
- Selection of PV module glass
- Selection of EVA sheet , Bus bar and frame
- Characteristics of a Solar Cell
- Power Characteristics of a Solar Cell
- Fill factor and Equivalent Solar cell Circuit
- STC and NOCT
- Factors Which Affect the Performance of Solar Cells
- Commercial Modules v Electrical Protection

Module 5 : Inverters Selection and Sizing (Grid Connection and Off Grid)

- Types of solar inverter
- Selection of string /central / off grid inverter
- Selection of power conditioning unit (PCU)
- Sizing of solar inverter for roof top and grid connected projects
- Selection and sizing of string inverter
- Selection and sizing of central inverter
- AC/DC overloading calculation and losses
- Protection requirement of solar inverter
- Passive and active protection
- Anti- islanding protection
- Mounting arrangement of string inverter
- IEC/IEEE /Grid Compliance of inverters
- Grid-Connected Inverters vs. Stand-Alone Inverters
- Inverter Communication and remote monitoring
- Inverter Products For Use In India

Module 6 : Connection of PV Module(Series and Parallel Circuit)

- Series Circuits
- Parallel Circuits
- Combining Series & Parallel Circuits
- PV module string connection
- Selection of string fuse
- 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 7 : Preparation of single line diagram and plant array layout .

- Preparation of rooftop solar power (single line diagram) SLD
- Preparation of Net Metering solar power (single line diagram) SLD
- Preparation utility scale solar power (Ground mounted) SLD
- Preparation of off Grid solar power (single line diagram) SLD
- Rooftop solar power plant layout
- Ground mounted solar power plant layout
- DC SLD /AC SLD
- Protection SLD
- Earthing Layout/ AC /DC cabling Layout
- DC Block sizing layout
- Overall Array Plant Layout

Module 8 : Solar Power Plant String Combiner Box/ ACDB/ MDB/Metering cubical

- Selection and sizing of SCB/SMB
- Selection of Isolator/ fuse
- Selection of Monitoring of SCB/SMB
- Mounting arrangement of SCB/SMB
- Selection sizing of SPD and Protection
- ACDB Switchgear sizing
- Types of energy meter and selection

Module 9 : Solar power plant HT switchgear selection and sizing

- Selection and sizing of inverter duty transformer
- Selection and sizing of HT switchgear
- Selection and sizing of ICOG/ Main switchboard
- Selection and sizing of Aux. transformer
- Aux. Losses calculation
- Inverter duty No-load and load losses calculation

Module 10 : Selection and sizing of AC and DC Cable

- Ampacity calculation of solar cable
- Sizing of solar cable /DC cable
- Sizing of String cable
- Derating factor of cables
- Sizing of AC cable (Inverter to ACDB ,ACDB to MDB)
- Sizing of DC cable (Module to SMB , SMB to Inverter)
- Sizing of energy meter /ABT Meter

Module 11 : Selection and sizing of AC /DC Side Earthing

- Types of earthing
- Types of Earthing strip/ ground conductor
- Types of Vertical electrodes
- Sizing of Cross section area of GI strip
- Resistance calculation of GI strip
- Resistance calculation of Pipe electrode
- Solar Plant resistance calculation
- Preparation AC /DC earthing layout

Module 12 : Solar Power Plant Substation and switchyard

- Preparation of Protection SLD
- Selection and sizing of Substation
- Preparation of ring main and redial feeder SLD
- Selection and sizing of Power transformer
- Selection and sizing of Current transformer
- Selection and sizing of PT/Isolator/Breaker
- Construction of 33KV/132 KV substation
- Construction of four pole structure
- Construction of metering switchyard
-

Module 13 : Selection and sizing Lightening Protection (LA)

- Types of Lightening Protection Arrestor
- Lightening protection assessment calculation
- Protection zone calculation of Conventional type LA
- Down conductor cross section area calculation
- 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
- ESE LA down conductor and earthing calculation

Module 14 : System Losses of Solar Power Plant

- Determining the Size of the DC and AC Cables
- Losses in a Grid-Connected PV System

Module 15 : -Solar Power System Yield Performance(Energy Guarantee)

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

Module 16- Maintenance And Troubleshooting

- System Maintenance
- Troubleshooting

Module 1 7: - 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 18 : Smart Grid/Net Metering and software

- Smart Grid
- Smart Meters
- PVsyst, Google sketchup, Helioscope

LIVE Practical Projects on ROOFTOP and Ground Mounted Scale

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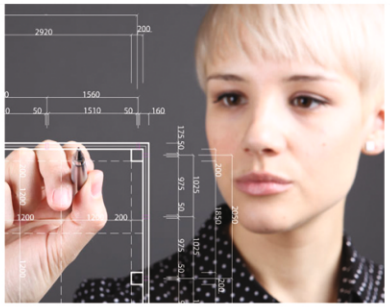
(ONLINE BATTERY ENERGY STORAGE SYSTEM (BESS))



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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 Online and Offline :

- Battery Energy Storage System (BESS)
- Substation Design Training(AIS and GIS)
- Electrical System Design
- Solar Power Plant Design(KW and MW)
- Technical Transformer Design
- Mechanical Electrical and Pluming (MEP) design
- HVAC Design
- Piping Power Plant Design
- Solar Structure Design Training (MMS Design)
- Electric Vehicle Charging Station Design
- Electrical Testing Engineer
- QA/QC Electrical
- Power System Software
- Hybrid Electric vehicle Design Training
- Railway Traction Design (OHE DESIGN)
- Floating Solar Power Plant Design

Battery Energy Storage System (BESS) :

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 : 3 Months

Mode: Regular /online (LIVE Session)

key Features of Battery Energy Storage System Training :

When you complete this course you will be able to:

- Electrical System Analysis
- Battery sizing and selection
- Scheme of BESS
- Engineering drawings
- Selection& sizing of Balance of system for BESS

Study Materials :

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

Battery Energy Storage System (BESS) (Syllabus)

Module-1: ELECTRICAL SYSTEM ANALYSIS

- Engineering Planning of storage system
- Identification Type of Load Pattern (Continuous, Intermitted or Backup)
- Identifications of existing electrical network and system information's
- Study of load pattern and load type to be served by BESS
- Calculation of on grid / off grid load.
- Calculation existing demand and future requirement
- System study for BESS.
- Electrical load and energy consumption calculation

Module-2: SCHEME OF BATTERY ENERGY STORAGE SYSTEM

- Solar-plus-storage system architectures
- Advantage and disadvantage of AC Coupling
- Advantage and disadvantage of DCC Coupling
- Selection of AC coupling equipment's
- Selection of DC coupling equipment's
- Comparison between AC coupling and DC coupling

Module-3: BATTERY SIZING AND SELECTION

- Type of battery and its selection (Li-ion, Ni-cd , lead acid etc.)
- Selection of battery cell and types
- Standardized sizes and shapes pertaining to both primary and secondary batteries
- **Selection of Key technical terms**: end of life ,Depth of discharge (DOD),State of charge (SoC),Cycling rate (C-rate)
- Study Battery critical parameters selection (voltage of cell , Specific energy, Charge (C-rate), dis-Charge (C-rate),Cycle life,current density,Thermal runaway and Applications
- Battery series parallel connection and String size.
- Battery mounting arrangement and installation methodology.
- Battery backup hours

Module-4: SELECTION & SIZING OF PCU AND GRID TIED SOLAR INVERTER

- Selection of bi-directional power conditioning unit (PCU)
- Working principle of bi-directional PCU
- Selection & sizing AC rating of PCU.
- Selection & sizing AC rating of grid tied solar inverter.
- Selection critical parameter of inverter and PCU: input AC, AC output
- Energy Management System
- Batteries and battery management systems
- Dc Input,Dc Output,Battery Charger parameters.

Module-5: SELECTION & SIZING OF BALANCE OF SYSTEM FOR BESS

- Selection sizing of inverter duty transformer
- Sizing of BESS container & ventilation arrangement
- Selection of ACDB , DCDB and switchgear selection.
- Selection of DC cable between DC DB to PCU
- Selection AC Cable between ACDB to transformer
- Cable section for PCU and Inverter
- Type of Earthing and calculation
- Section of string inverter or central inverter
- Protection scheme of HT side

Module-6: SELECTION & SIZING OF CABLE DESIGN FOR BESS

- Selection and Sizing of DC cable
- Selection and Sizing of AC cable
- Selection Criteria of DC cables and AC Cables
- Voltage Drop of cable
- Cable Impedances
- Maximum Permissible Voltage Drop as per standard
- Short Circuit Temperature Rise calculation of cable

Module-7: EARTHING DESIGN AND CALCULATION FOR BESS

- Type of Earthing and calculations
- Factors Influencing The Choice Of Earthed And Unearthed Systems
- System Earthing & Equipment Earthing Connections To Earth
- Resistance to Earth and Earth Electrode Current Density at The Surface of an Earth Electrode
- Selection of an Earthing Conductor and Connection of an Electrode

Module-8: SCHEMES OF PROTECTION FOR BESS

- Type of Protection schemes for BESS
- Fault Current / Short circuit current calculation for BESS
- Type of Protection schemes for BESS

Module-9: SWITCHGEAR SELECTION AND SIZING FOR BESS

- Types of Schemes of Switchgear
- Selection and Sizing of Transformers
- Selection sizing of inverter duty transformer

Module-10: Sizing of BESS Container & HVAC System

- Sizing of BESS container & ventilation arrangement

Module-11: ENGINEERING DRAWINGS & LAYOUTS

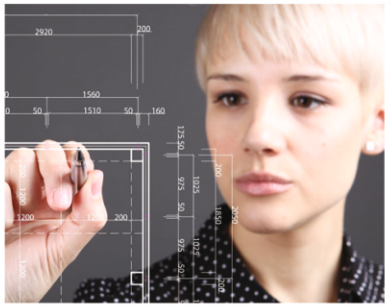
- Preparation of BESS single line diagram
- Preparation of AC single line diagram
- Preparation of DC single line diagram
- Preparation of BESS container layout & location
- Preparation of Earthing layout
- Preparation of cable layouts

CASE STUDY ON LIVE PROJECT ON BESS SYSTEM

Advance Electrical Design & Engineering Institute (AEDEI)

(ISO 9001:2015 CERTIFIED INSTITUTE) : NEW DELHI
(ONLINE GREEN HYDROGEN PLANT DESIGN TRAINING)



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About us :

Advance Electrical Design & Engineering Institute (AEDEI) ISO certified 9001:2015 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 Online and Offline :

- Online Green Hydrogen plant Design Training
- Battery Energy Storage System (BESS)
- Substation Design Training(AIS and GIS)
- Electrical System Design
- Solar Power Plant Design(KW and MW)
- Technical Transformer Design
- Mechanical Electrical and Pluming (MEP) design
- HVAC Design
- Piping Power Plant Design
- Solar Structure Design Training (MMS Design)
- Electric Vehicle Charging Station Design
- QA/QC Electrical
- Power System Software
- Hybrid Electric vehicle Design Training
- Railway Traction Design (OHE DESIGN)
- Floating Solar Power Plant Design

Green Hydrogen Plant Design Training :

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 : 2 Months

Mode: Regular /online (LIVE Session)

key Features of Green Hydrogen plant Design Training :

When you complete this course you will be able to:

- selection & sizing hydrogen tank
- Selection & sizing electrolyzers
- selection & Detailing compressors
- Implementation of hydrogen plant
- Methodology of lower cost Hydrogen production& source of power supply

Study Materials :

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

Green Hydrogen Plant Design (Syllabus)

Module-1: Hydrogen Application

- The Use of Hydrogen in Industries
- Hydrogen Safety
- Oil Refineries
- Petrochemicals
- The Use of Hydrogen in the Chemicals Industry
- Mobility

Module-2: Methodology of lower cost Hydrogen production& source of power supply

- Methodology of lower cost Hydrogen production& source of power supply
- Production from Solar power plant energy
- Production from wind energy
- Selection of back up power source

Module-3: Implementation of hydrogen plant

- Introduction
- Calculation of renewable energy (solar , wind) requirement
- Calculation of hydrogen production equipment load
- **Sizing of solar/wind power plant capacity to meet hydrogen load demand**
- Selection of site to fulfill demand of energy for hydrogen production
- Selection of hydrogen plant location
- Identification of electrical network
- Energy storage system

Module-4: Selection & Sizing Electrolyzers

- Type of electrolyzers and capacity and sizing
- Difference between polymer electrolyte or protonexchange membrane (PEM) electrolyzers
- Sizing and selection membrane for hydrogen production
- Selection of alkaline electrolysis cells and PEM electrolysiss
- Selection Solid oxide electrolysis cells
- Key selection parameters of electrolysis : current density ,work pressure , operating temperature, hydrogen purity , Export component and Volume and weight.
- Working of hydrogen separator and oxygen separator
- Selection of water quality for hydrogen production

Module-5: Selection & sizing hydrogen tank

- Specification of hydrogen tank
- Calculate capacity of hydrogen tank
- Selection of storage hydrogen tank
- Key parameters of hydrogen tank selection : max pressure withstand , temperature, storage capacity, type of material,Design Temperature
- Protection from leakage of storage tank

Module-6: Selection & Detailing of compressors for Hydrogen Plant

- Architecture of Piping Arrangement
- Selection of Compressors
- Pressure Valve ,Pressure indicators, Gas Outlet & Inlets Valves.
- Tank Placement and Size

Module-7: The Mass shipping of hydrogen and storage

- Cost of Ships and Shipping
- Transport of Hydrogen as an Intermediate - Ammonia and hydrocarbons

Module-8: The Mass shipping of hydrogen and storage

- Selection switchgear of hydrogen equipment
- Sizing of cabling for electrical equipment's
- Illumination system design
- Earthing design of hydrogen plant
- Selection and sizing auxiliary supply and main supply system

Module-9: Case study

- Preparation of electrical power distribution scheme
- Preparation of electrical power distribution scheme
- Preparation of one line diagram of hydrogen plant
- Preparation of lay outing of hydrogen plant