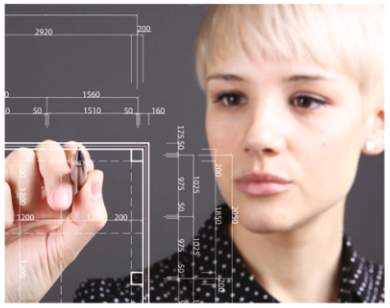
Advance Electrical Design & Engineering Institute (AEDEI)

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



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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 :

- 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-9 Different Protection Function

- Distance Protection
- Differential Protection
- Ref protection
- Stub protection
- Directional & non directional overcurrent & earth fault protection
- VT fuse fail protection
- Over voltage protection
- Under voltage protection
- Reactive Compensation Equipment
- Broken conductor protection
- Auto recloser
- SOTF
- Check synchronisation
- Channel added schame
- Local breaker bacup protection (lbb/50bf)
- Over flux protection
- Over load protection
- Transformer troubles protection
- Standby earth fault protection
- End fault protection
- High impedance & low impedance

Module-10 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-11 Cost estimating of AIS and GIS Substation

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

Module-12 AIS and GIS Substation Software

- ETAP (Latest Version)
- DAILUX