

ELECTRICAL DESIGN ENGINEERING

Design | Engineering | Construction | Maintenance

A robust course for Electrical Engineers with sufficient depth in a specific area of **Electrical Design Engineering** to solve complex real world engineering problem and to understand engineering trade-off and contribute effectively in multi disciplinary project with informed decision making.



SMARTBRAINS ENGINEERS & TECHNOLOGIST PVT. LTD.



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About the Program?

The objective of this course is to provide the candidates the Detail knowledge and skills in Electrical Design discipline to facilitate faster learning curves while on the job.

The design and construction of industrial plants involves a multi-disciplinary team effort. The goal is to design safe and dependable processing facilities in a cost effective manner. The fact is that there are very few formal training programs that focus on design and engineering of Electrical systems of such big industrial plants. Our Electrical Design Engineering Program is designed by Industry experts that covers the best approaches and most in-use practices for Electrical Systems Design & Engineering for Oil and Energy Sector.

The objective of this course is to provide delegates the Detail knowledge and skills into Design, Engineering, Construction, Commissioning operation & Maintenance in the field of Electrical Engineering for Oil & Energy Sector.

2

Learning Objective

- Introduction to oil and Energy Industry
- Role of Electrical Design Engineer in Industry
- Engineering Procurement and construction (EPC) contracts.
- Codes & Standards, Design Basis, std. practices and specifications
- Electrical Drawings and Documentations
- Fundamentals of Electrical Design & Engineering
- Developments of Single Line Diagrams and Control Schematics
- Load Estimation of Plants
- Selection, Sizing and Protections of Electrical Equipments
- Cables Selection, Cable Sizing, Cable Routing
- Plant Lighting System Design & Illumination Design
- Fundamentals of Plant Earthing Design and Protections
- Hazardous Area Classification
- Substation / Switchyard Design
- System Studies:
 - Load Flow, Short Circuit Analysis

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Methodology

SmartBrains Engineers Technologist Pvt. Ltd. uses mixes of techniques aligned to a unique pedagogy which is Goal-Centric & Action Oriented. Demonstrates Case Studies using the statistical tools, exercises & brainstorming using Adaptive Probing Methodology along with classroom theories and live Project exposure. Delivered by Senior Industry Professionals having extensive experience in their core domain.

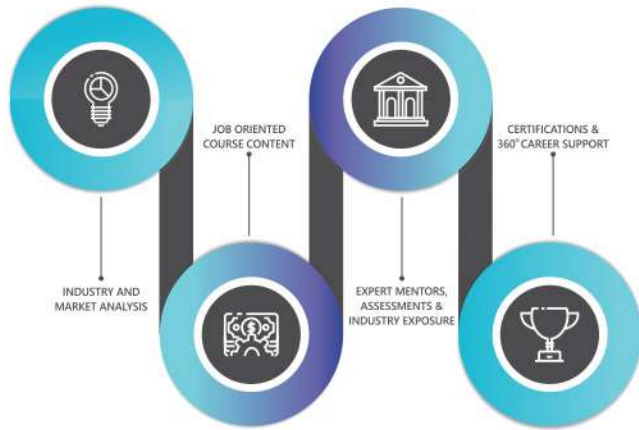
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Career Benefits

- **Become Eligible** for Design & Engineering jobs in to electrical Engineering demanding background.
- Open doors to **Job Opportunities Abroad** demanding specialization.
- Fill the void of thousands of untapped **High-Paying Jobs** in Design Engineering with **Talent Shortage**.
- **Get Promoted** in your current profile with most in-demand skill.
- Distinguish your profile from peers during **Job Interviews**.
- Earn a **Rewarding Global Certification** Certified by (National Skill Development Corporation of India (NSDC), Under the Ministry of Skill Development and Entrepreneurship (Govt. of India) Training & Certification Program.
- **Improve your CV & LinkedIn Profile** with professional development.



- The program is a global standard offering that uses mixes of techniques aligned to a unique pedagogy which is Goal-Centric & Action Oriented
- Includes classroom theory, learning videos, demonstration of statistical tools like Advanced Excel Programs and Other Software tools
- Real-project case studies using the statistical tools demonstrated, exercises and brainstorming using adaptive probing methodology



Program Highlights



Assessment



Byte Size Learning



Assignments



Projects



Industry Interaction



360° Career Support



Case Study



Discussion Forum

SmartBrains engineers and technologist Pvt. Ltd. has received recognition, endorsement and affiliation from National Skill Development Corporation of India (NSDC), a Public Private Partnership (PPP), Under the Ministry of Skill Development and Entrepreneurship (Govt. of India) and various Skill Sector Councils as an authorized training partner under various trades. SmartBrains is authorized to provide skill based training for engineering/non-engineering candidates as per their interest. SmartBrains as a training institute will provide complete practical knowledge based skill training to the candidates and NSDC/Skill Councils will be responsible for providing recognition & certification to the candidates. The National Skill Development Corporation (NSDC) is one of its kind, Public Private Partnership Under the Ministry of Skill Development and Entrepreneurship (Govt. of India) aims to promote skill development by catalyzing creation of large, quality and for-profit vocational institutions. Further, the organisation provides funding to build scalable and profitable vocational training initiatives. Its mandate is also to enable support system which focuses on quality assurance, information systems and train the trainer academies either directly or through partnerships. NSDC acts as a catalyst in skill development by providing funding to enterprises, companies and organizations that provide skill training. It also develops appropriate models to enhance, support and coordinate private sector initiatives. The differentiated focus on 21 sectors under NSDC's purview and its understanding of their viability will make every sector attractive to private investment.



MODE/DURATION

- Fast Track - 60 Hours
- Weekend - 80 Hours
- Onilne - 80 Hours

LEARNING BASED OUTCOMES

Get hands-on experience in applying design tools & techniques to real engineering problems and understand Design, Engineering, Construction, O & M etc. Thus, become a Technology Driven Engineering Professional.

TRAINER

Delivered by Senior Industry Professionals having extensive experience of Design & Engineering in diverse domains & industries. These practitioners are also Empanelled as subject matter experts with SmartBrains Engineers & Technologist Pvt. Ltd.

CONTENT

Get 24 x 7 access to SmartBrains LMS platform (Online/Offline) with Abundant Content on Electrical Engineering including Courseware (PPT / PDF), data, case studies, articles, books, videos, examples, presentations, resource library & related more.

JOB ORIENTED OUTCOMES

Fill the Void of Talent Shortage in Design Engineering by becoming eligible for thousands of High Paying Jobs in India & Abroad with an upgraded profile through this skill & certification. Additionally, Get Promoted from your current position with added skill set.

Become eligible for Electrical Design Engineering job demanding background

Explore + Analyse + Solve Engineering Problems using Analytics Tools & Design Software

Fill the void of thousands of untapped High-Paying Jobs in Electrical Design Engineering

Helps understand Engineering Procurement and construction (EPC) contracts.

Distinguish your professional profile from peer during Job Interviews and stand out of the box

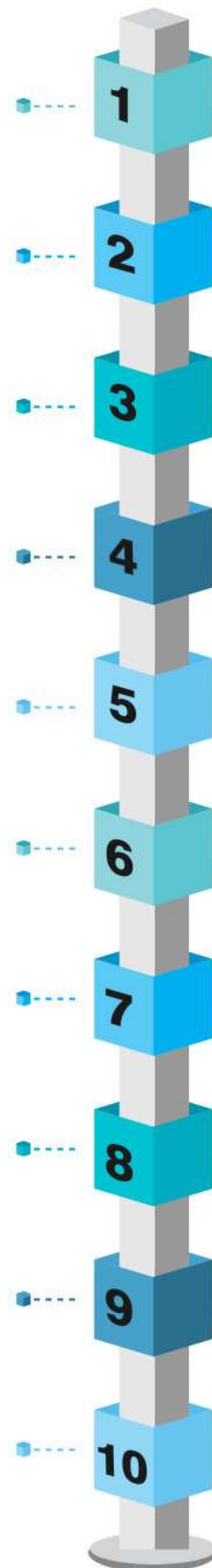
Understand 'What' & 'How' aspects of Electrical Design Engineering

Perform exercises by accessing our labs and simulation software

Improve your Curriculum Vitae and your social job profile with professional development

Support your startup or your professional life with high hike

Build a startup in one of the most rewarding fields of Electrical Design Engineering



1. Introduction to power system & epc contacts

- Various forms of energy and energy conversion
- Conventional power sources – coal fired, hydro and nuclear power plants
- Renewable power sources – Solar, wind, biomass
- Transmission and distribution of electricity
- Electrical Distribution Systems
- Introduction of key electrical equipments used in projects
- Overview of Codes & Standards IEC / ANSI / IEEE
- What is an EPC Contacts
- The tender & procurement process
- The scope of works
- Consideration aspects in site selection.
- Environmental & design considerations

2. Estimation of plant electrical load

- Preparation of load schedule.
- Determination of power supply capacity.
- Standby capacity consideration.
- Rating of generators in relation to prime movers -
- Importance of max and min temp.
- Rating of motors in relation to their driven machines.

3. Engineering Drawings

- Introduction to Single-line and 3-line diagrams.
- Design & Development of -
 - Key SLD
 - Detail SLD
 - Lighting system SLD
 - Small power SLD
- Introduction to Control schematics.
- Logic gates and logic diagrams.
- Cabling and wiring drawings.
- Lighting layout design.
- Cable routing layout.
- Earthing layout design.
- Lightning layout design.
- Layout drawings for different applications.
- Lighting layout design.

- Cable routing layout.
- Earthing layout design.
- Lightning layout design.
- Layout drawings for different applications.

4. Electrical equipment selection sizing and protections

- Selection, Sizing, Protection, Specification, Data-Sheet, Vendor Data Review of following Electrical Equipment-
- **Electrical Equipment-**
 - Generators
 - Transformers
 - Motor
 - Equipment Protections
 - Power Capacitor Banks
 - HV/MV/LV Switch gears
 - HV/MV/LV Capacitor Bank
 - Power Reactor
 - CT/PT
 - Bus Duct
 - AC UPS
 - DC UPS
 - Variable Speed Drives

5. Cables selection, sizing and cable routing

- Power and Control Cable
- Cable selection
- Cable sizing for Low voltage system
- Cable sizing for High voltage system
- Voltage Drop Consideration
- Let through Energy consideration
- Earth fault Loop Impedance consideration
- Cable Schedule
- Cable interconnection Schedule
- Selection and Sizing of Cable Tray
- Cable tray schedule
- Cable Drum schedule
- Conduit Selection
- Cable routing Layout
- Cable Tagging & Installation details

6. Plant lighting & illumination design

- Type of Lighting Fixtures
- Selection of Lighting Fixtures



- Preparation Of Fixture Schedule
- Indoor Illumination Calculation
- Outdoor Illumination Calculation
- Street Lighting calculations
- Calculations on Software
- Lighting Layout Design
- Lighting Installation Detail
- Incandescent lamps, high intensity discharge lamps, mercury vapor, metal halide lamps, fluorescent lamps, compact fluorescent lamps, LEDs.
- Luminaire concepts.
- Energy efficiency.

7. Fundamentals of plant earthing design and surge protection

- Requirement of Earthing in Industrial Plants
- Earthing Design calculations
- Type of Earthing and Details
- Earthing Installation Details
- Earthing Layout Design
- Power supply System Grounding
- Equipment (Protective) Earthing
- Ground Electrode System
- Lightning Protection Requirement
- Lightning Protection Calculation
- Lightning Installation Details
- Lightning Layout Design
- Material Take Off

Surge Protection

- Surges: Types and methods of coupling.
- Protection of electrical components against surges.
- Surge protection zones and protection grading.

8. Hazardous area classification

- Zone /Division Classification
- Types of Protection for Hazardous Areas
- Hazardous source List Preparation
- Certification of Hazardous Area Equipment
- Marking of Equipment Nameplates
- Hazardous Area Drawings

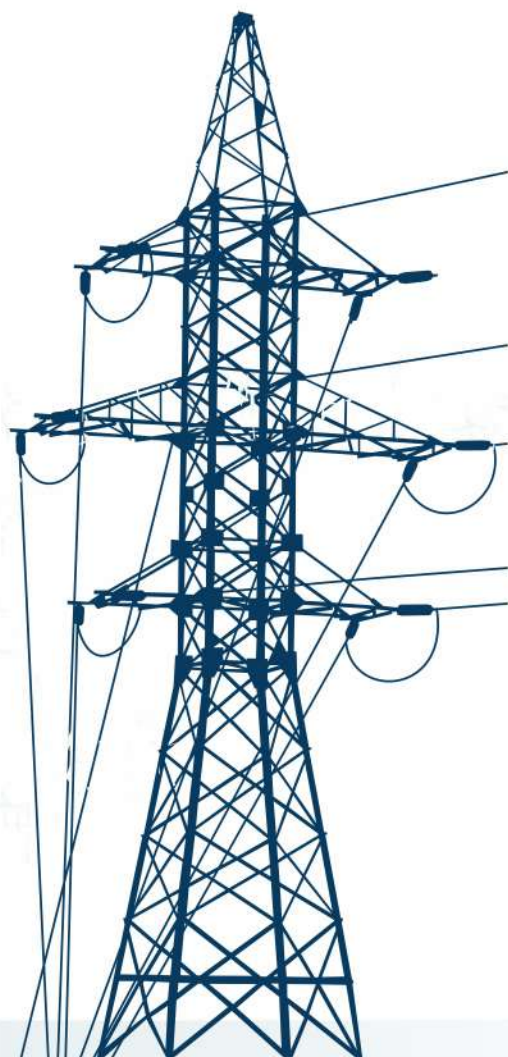
9. Substation / switch yard design

- Type of Sub-Stations

- Legislation, Standards,
- Drawings and Documents
- Substation Layout and Equipment
- Surge Arresters, Line Traps,
- Power Insulators,
- Bushings, Bus bars and Connectors
- CT, PT, PLCC, BPT
- Interlocking Lightning
 - Protection, Lighting
 - Substation Earthing Protections

10. System studies and calculations

- Short circuit analysis (Fault calculation and stability studies).
- Load flow analysis.
- Motor starting study.
- Harmonics study.
- Relay coordination study.
- Other modules based on attendees' request and time permitting.
- System studies practice on software



Prospect Recruiters



Course Certificates

SmartBrains is associated with The National Skill Development Corporation (NSDC) as the Training and Certification partner for various job oriented training programs across various sectors including Oil & Gas, Power, Renewable Energy, Hydrocarbon, IT & ITs, Electronics, Telecom, Agriculture, Life science etc. offering assessment based Training & certifications for a gamut of job profile.

Who should join?

- Working professionals in **Domains:** Site Engineering, Construction & Commissioning operation & Maintenance, Technicians in Electrical Engineering Field.
- Students (**Electrical Engineering, Diploma Engineers**) who want to develop their career in Design Engineering.



Global Certification

For facilitating corporation among government, Industry & academia to validate skill-sets & respective domain knowledge, SmartBrains offers various Global Certification. It helps in employability, Improving C.V's, Professional development & setting-up Start-ups or business.



SmartBrains is knowledge based multi-disciplinary organization with the work scope of whole life cycle for Engineering Consulting, Technology Services, Human resource outsourcing, Skill Development and Vocational Training Company, committed towards bringing an entire range of services for various sectors into most of business functions. Organization founded in 1998, combine deep industry experience, technical expertise and a global delivery model to create value-based solutions to fulfill industries requirements, success has been built upon the unstinted support and relationships with its partners and the patronage of its clients from across the Globe. SmartBrains has received recognition, endorsement and affiliation from National Skill Development Corporation of India (NSDC), a Public Private Partnership (PPP) , Under the Ministry of Skill Development and Entrepreneurship (Govt. of India Enterprises) & various Skill Sector Councils as an authorized training partner under various trades.

SmartBrains is the global market leader in providing high-level training services to the Oil and Gas sector, Petrochemical, Refinery, LNG, Power Plants, Fiscal, Contracts, Strategy, Process Engineering, Piping Engineering, Electrical Engineering, Instrumentation Design, Plant Equipments, Civil and Structural Engineering, HVAC, Project Management, HSE, Financial and Risk Management. Operating nation wise over the last 8 years, our courses are widely acknowledged within the energy community for quality and up-to-date information. Our success and distinguished reputation is down to our commitment to the industry, a high-level of expertise, sector knowledge, cultural diversity and experience that comes from organizing many courses.

Our other Electrical Engineering Courses

- Electrical Design Engineering
- Thermal Power Plant
- Solar Power Plant
- Industrial Automation
- Motion Control
- Hazops For Engineers & Technicians
- Power System Analysis
- Cathodic Protection
- Energy Management
- Electrical Drawings And Schematics
- Power Factor In Electrical Energy Management
- Design of Hydroelectric Power Plant
- Electrical Transmission And Distribution Safety
- Overview Of Un-interruptive Power Systems (UPS)
- Power Plant Electrical Distribution Systems
- Electrical Power Cables & Wiring Standards
- Electrical Design Engineering
- Electrical Power Systems
- Lighting System Design

For Corporate queries

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