

# **REC INSTITUTE OF POWER MANAGEMENT & TRAINING, HYDERABAD, (INDIA)**

## **CONTENTS OF THE COURSE FOR WEB BASED TRAINING PROGRAMME**

### **CERTIFICATE COURSE IN ELECTRICAL POWER MANAGEMENT**

**Duration: 3 Weeks**

- 1) Introduction**
  - Power scenario of India and its Organizational Structure
  - Planning of distribution system, Load Forecasting & Analysis
  - Regulatory concepts and Tariff Concepts
  
- 2) Design, Construction, Operation & Maintenance of Distribution substations and lines**
  - Specifications of materials and Construction standards for Distribution systems
  - Mechanical Design of lines - Span and Sag Calculations
  - Electrical Design – Voltage Regulation – Selection of Conductors
  - Distribution Transformers – Types, Operation & Maintenance & Failure Analysis
  - Indoor and Outdoor Switchgear – Installation and Maintenance
  - Design and construction of 33/11 KV Substation and line
  - Adoption of Innovative and Cost Effective Technologies & low cost 33/11 KV SS
  - Safety Measures and Prevention of Electrical Accidents
  - Switched Capacitors – HT & LT, Reactive Power Compensation
  - Power System Protection & Relays coordination
  - Earthing System and Protection against Lightning, Surges and Transient
  - O & M Practices for distribution lines and Sub-stations and lines
  
- 3) Performance improvement of distribution systems**
  - Energy Audit & Accounting
  - Energy Efficiency and Distribution loss assessment and Loss Reduction methodologies
  - Optimal Integrated Strategy for Loss Reduction and Voltage Improvement
  - Pilferage & Theft of Energy
  - Load management & Demand Side Management Techniques
  - HV Distribution System
  - Distribution Automation & SCADA
  
- 4) Revenue management of Power distribution utilities**
  - Issues and challenges in Metering, Billing & Collection
  - Different Distribution Participatory Models including Franchising
  - Metering Technologies & Advancements in Metering – Remote, Pre-paid & Pilfer Proof

Smart Metering and Spot Billing technologies  
EV Charging Infrastructure  
Concept of content and carriage in Distribution Management

**5) Power Quality & Customer Service**

Quality of service and Power Supply  
Standards of performance for power supply  
Reliability – Reliability Indices  
Customer Relation Management & Customer Care Center  
Harmonics – Courses – Remedial Measures.

**6) Recent Developments in power distribution Management**

Participatory Modes (Franchisee Model) in Distribution Models  
SCADA and IT for Distribution Management  
Management Information Systems (MIS) & Consumer Information System (CIS)  
Geographical Information Systems (GIS) and Global Positioning Systems (GPS)  
Smart Meter & Smart Grid  
Mobile/Web enabled Services

**7) Commercial Aspects of power distribution**

Tariff policies and pricing mechanisms for power utilities  
Energy Audit and Accounting, Technical and commercial Losses in power sector  
Metering, Billing and Collection of revenue  
Power Purchase Agreement, short term and long term power purchases  
Electricity Market, Trading & ABT

**8) Regulatory Aspects related to Power distribution Sector**

Regulatory framework in Power sector,  
Electricity Act-2003  
Legal Framework, Tariff Policy, Grid code, Open Access, Energy conservation act-2010,

**9) Exercises & Case studies and projects**

Voltage Regulation Calculations for 33 KV, 11 KV and LT Lines  
Calculation of Line Losses in Distribution  
System Improvement Schemes – Methodology  
Sample DPR for System Improvement Project  
Sample DPR for HVDS Scheme  
Load Flow Study

**Day wise training programme is as below:**

**REC INSTITUTE OF POWER MANAGEMENT AND TRAINING::  
HYDERABAD**  
International Training Programme on  
“CERTIFICATE COURSE IN ELECTRICAL POWER MANAGEMENT”  
E-ITEC (Web Based Training Programme)  
04<sup>th</sup> October 2021- 23<sup>rd</sup> October 2021 (3 weeks)  
Programme Schedule

<b>WEEK - 1</b>			
Date/Day	Session	Topic	Name of the Resource Faculty
04-10-2021 Monday	1	Registration, Joining formalities & Introduction of participants, Inauguration of the Programme	
	2	About ITEC Training Programme, Welcome by Coordinators Glimpse of 50 years ITEC Celebrations-Short Video Play Indian Culture and Heritage – Overview (Video Play)	
	3	Curtain Raiser & Familiarization Session – About India & Hyderabad – Indian Culture, Heritage, Policy etc. About REC and RECIPMT	
	4	Power Sector Scenario in India, Major milestones in developments of Indian Power sector, Statistical analysis of various parameters and Organizational Structure of Indian Power Sector, discussions and lessons to learn	
05-10-2021 Tuesday	1&2	Introduction to Power Distribution Systems and planning of distribution systems	
	3&4	Design considerations for distribution substations, Layout Planning, Bus-Bar Arrangements, Selection and sizing and standards for substation equipment's, DPR Preparation, Bill of quantity, Construction Practices for substations including Earthing	
06-10-2021 Wednesday	1&2	Design considerations for distribution lines standards and construction practices	
	3&4	Different types of transformers – conventional, CSP, Failsafe, sealed type, resin cast, amorphous core, etc. Transformers – principles and various components – selection of distribution transformers, testing erection and commissioning and O&M	
07-10-2021 Thursday	1&2	Load forecast & Future Network expansion, Formulation Network Projects & Investment Estimates, Benefits & Financial Analysis, Advance Distribution system planning Energy Audit & Mobile Applications	
	3&4	Insulation coordination and fixing of LA rating, lightening masts and lightening protection issues and EHV Substation Earthing Practices	
08-10-2021 Friday	1 &2	Bus bar and LBB Protection, Protection system Case Studies & Discussion	
	3&4	Best Maintenance practices for Substations, Battery, battery chargers, role batteries in reliability of circuit breakers operation	

**Session Timings: (10:00 AM to 17:30 PM) according to Indian Standard Timings (IST)**

Session 1: 10:00 – 11:15 Hrs  
Session 2: 11:30 - 13:00 Hrs  
Session 3: 14:00 – 15:30 Hrs  
Session 4: 15:45 – 17:30 Hrs

Tea Break: 11:15 – 11:30 Hrs  
Lunch Break: 13:00 – 14:00 Hrs  
Tea Break: 15:30 – 15:45 Hrs

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**Programme Schedule**

<b>WEEK – 2</b>			
Date/Day	Session	Topic	Name of the Resource Faculty
11-10-2021 Monday	1&2	Metering, Billing, collection and revenue management of power distribution utility	
	3&4	Metering Technology, Role of Metering in Distribution Sector, Basics of Metering, LT & HT Metering, LT & HT Metering precautions to avoid pilferage of energy/ 60 point programme	
12-10-2021 Tuesday	1& 2	Smart Metering Smart Metering, New Concepts like RMR, AMR & Prepaid Metering Spot Billing in power sector way toward smart grid,	
	3&4	Regulatory issues and tariff designing for distribution systems	
13-10-2021 Wednesday	1& 2	MV System Survey , Equipment Particulars, LV Customer indexing , Introduction to Power DMS and Applications to Distribution Systems, Introduction GIS, GPS ,Creation of GIS database GIS Network Editing & Network Display	
	3&4	Advance Maintenance planning and Management in power distribution New Customer management	
14-10-2021 Thursday	1& 2	Transformer protection : Differential, REF Protection, E/F protection, Bus bar and LBB protection Failure analysis	
	3&4	Distribution SCADA and automation	
15-10-2021 Friday	1&2	High Voltage Distribution System, implementation, advantages & Disadvantages	
	3&4	Power Quality issues in distribution systems, Quality of power supply and standards of performance	

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<b>WEEK - 3</b>			
<b>Date/Day</b>	<b>Session</b>	<b>Topic</b>	<b>Name of the Faculty</b>
18-10-2021 Monday	1&2	Efficiency improvement in Power Distribution Sector, Efficiency improvement through network optimization, Network Load flow, Technical Loss Reduction techniques	
	3 &4	Energy Auditing, Energy efficiency and pinpointing losses, Minimization of Distribution Losses and applications of GIS and GPS in Distribution Systems	
19-10-2021 Tuesday	1&2	Theft in Power Distribution and legal and technical ways to deal with, Meter Tampering, Testing & Legal Remedies & Case Study with Video clipping	
	3&4	Concept of smart grid, smart cities and smart metering and role of solar PV systems	
20-10-2021 Wednesday	1&2	Customer Relation Management, Understanding Customer	
	3&4	Power Purchase Agreement, short term and long term power purchases, Electricity Market, Trading & ABT	
21-10-2021 Thursday	1&2	Project Presentations by participants	
	3&4	Project Presentations by participants	
22-10-2021 Friday	1&2	Project Presentations by participants	
	3&4	Project Presentations by participants	
23-10-2021 Saturday	1&2	Examination	
	3&4	Valedictory session	

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