**PLANNING & MANAGEMENT OF POWER TRANSMISSION AND DISTRIBUTION SYSTEMS**

**Duration: 8 Weeks**

**AIM**

Power is a vital infrastructure for economic development. It is most capital intensive infrastructure. Accelerating economic growth and achieving higher standards of living depend upon the availability of adequate and reliable power at an affordable price. To make power sector commercially sound and self-sustaining, efficient transmission management policies and adoption of modern technologies are fundamental. Obsolescence in design, construction practices and technologies, inadequate interregional transmission links will lead to poor quality, unreliable power supply, high energy losses and interregional imbalances. It has become, utmost important to review the existing practices and technologies adopted to optimize and modernize them, so as to supply electricity at affordable cost to all categories of consumers to help bolster economic growth.

**OBJECTIVE**

* Impart knowledge on design, operation & maintenance of power Transmission and distribution systems.
* Orient the participants with the latest technologies and methods including automation and IT practices in Power Transmission distribution sector
* Discuss about the commercial and managerial aspects of power transmission and distribution business

**CONTENTS OF THE COURSE**

**Introduction**

Power scenario – Indian experience

Organizational Structure of Power Sector in India

Planning and designing of transmission and distribution system

Role of Regulatory Commissions & Electricity Act, 2003

**Transmission System**

Transmission System Planning in India

Tower Design, Erection and Structural Details

Technical and Economic aspects of Systems Interconnection

EHV,UHV and HVDC System

Erection Commissioning and testing of sub stations and Lines:

Standards, Specifications of materials and Construction practices for Transmission infrastructure

O & M Practices of Overhead lines and Sub-stations, Power Transformers – O & M & Failure Analysis, EHV Switchgear –Maintenance Practices

Protection Aspects of Sub Stations and Lines

Salient features of substation protection systems and Lines

Protection Aspects of Transformers,

AC and DC systems including battery capacity required;

Communication system for data transmission and protection covering PLCC and OPGW Inter-System Power Exchange & ABT

Maintenance of EHV-AC and HVDC Substation and Electrical Equipment

Best practices in Grid management

IT Application in Transmission system, Safety Measures and Prevention of Electrical Accidents

Energy Efficiency and Maintenance Free Transformers

**Advance topics in O&M of Substations and lines**

* Condition Monitoring of Power Transformers and Substations
* Hotline Maintenance Practices
* Gas Insulated Substations
* Substation Automation & SCADA and SAS
* Field Visit to a 400/220 KV SS and a Gas Insulation Substation

**Distribution System**

Standards, Specifications of materials and Construction practices

O & M of Overhead lines and Sub-stations

Transformers – Installation and O & M & Failure Analysis

Switchgear – Installation and Maintenance

Adoption of Innovative and Cost Effective Technologies & Unmanned Sub-station

Safety Measures and Prevention of Electrical Accidents

Energy Efficiency and Maintenance Free Transformers

Switched Capacitors & Reactive Power Compensation

Integrated Distribution Planning for Loss Reduction and Voltage Improvement

Gas Insulated Sub-stations (GIS) & Dissolved Gas Analysis of Transformers

Power System Protection & Differential Relays

Earthing System and Protection against Lightning, Surges and Transient

Energy conservation in Agriculture, Domestic & Industrial Services

HVDS – Control, Operation, Protection and Economics – Case Study

DSM Tools & Techniques and its Methodology

**Energy Meters**

Introduction to Energy Meters – An Overview

Specification of Energy Meters - Meter Seal, Testing and Calibration

Meter Reading Instrument Technologies and Spot Billing

Solid-state Electronic Meters and Automatic Meter Reading Equipment

Recent Developments in Metering – Remote, Pre-paid, etc.

**Commercial Aspects**

Tariff Structure, Billing and Accounting

Technical and Legal Remedies to Control Theft of Energy

Annual Revenue Requirement Calculations

Power Distribution Franchising

Energy Audit & Accounting

Clean Development Mechanisms (CDMs)

**Information Technology (IT)**

IT for Transmission and Distribution Management

Management Information Systems (MIS) & Consumer Information System (CIS)

Geographical Information Systems and Global Positioning Systems (GIS & GPS)

SCADA Applications and Functions

Customer Relation Management & Consumer Analysis Tools

**Exercises**

Voltage Regulation Calculations for 33 KV, 11 KV and LT Lines

Load Flow Study & Calculation of Line Losses

**Group Discussions**

Measures to prevent Pilferage of Electricity & Line Losses

Measures to prevent failure of Distribution Transformers

**Local Field Visits**

SCADA and Power Management Center, SLDC, Laboratories

Gas Insulated Sub-station, Transformer Manufacturing & Load Dispatch centers, Etc