

Module-1

[13 Hours]

University portion (80%)

Line Constant Calculations: Introduction to per unit system and calculation for transmission system. Magnetic flux Density, Inductors and Inductance Magnetic field Intensity due to long current carrying conductors, Inductance of two wire transmission line, Flux linkages with one conductor in a group of conductors, Transposition of power lines, Composite Conductors, Inductance of Composite Conductors, Inductance of double circuit three phase line, Concept of GMD, Bundled conductors, Skin and Proximity effect.

Capacitance of Transmission Lines: Electric Field of a Line of charge, Straight Conductor, The Potential Difference between Two Points due to a line Charge, Two infinite lines of charge, Capacitance of a Two Wire Line, Capacitance of a Three Phase Line with Unsymmetrical Spacing, Capacitance of a double circuit line, Inductance of three phase unsymmetrically spaced transmission, Effect of Earth on the Capacitance of conductors.

Module-2

[10 Hours]

University portion (80%)

Performance of Lines: Representation of Lines, Short Transmission Lines, The Medium Transmission Lines, The Long Transmission Line: The Long Transmission Line, ABCD constants, Ferranti Effect Hyperbolic Form of The Equations, The Equivalent Circuit of a Long Line, Power Flow Through Transmission Line, Reactive Compensation of Transmission Line. Series and shunt compensation.

Module-3

[10 Hours]

University portion (80%)

Overhead Line Insulators: Insulator Materials, Types of Insulators, Voltage Distribution over Insulator String, Methods of Equalizing the potential

Mechanical Design of Overhead Transmission Lines: The catenary curve, Sag Tension calculation, supports at different levels, Stringing chart, sag Template, Equivalent span, Stringing of Conductors, Vibration and Vibration Dampers

Distribution: Comparison of various Distribution Systems, AC three-phase four-wire Distribution System, Types of Primary Distribution Systems, Types of Secondary Distribution Systems, Voltage Drop in DC Distributors, Voltage Drop in AC Distributors, Kelvin's Law, Limitations of Kelvin's Law, General Design Considerations

Module-4

[6 Hours]

University portion (80%)

Insulated Cables: The Insulation, Extra High Voltages Cable, Insulation Resistance of Cable, Grading of Cables, Capacitance of Single Core Cables, Heating of cables, Current rating of cables, Overhead lines Vs Underground Cables, Types of cable

Power System Earthing: Soil Resistivity, Earth Resistance, Tolerable Step and Touch Voltage, Actual Touch and Step Voltages, Design of Earthing Grid.

Text books:

1. *Power System Analysis- By John J. Grainger & W. D. Stevenson, Jr, Tata Mcgraw-Hill, 2003 Edition, 15th Reprint, 2010.*

Reference books:

2. *Weedy B.M. and Cory B.J., "Electric Power Systems", 4th Ed., 2008 Wiley India.*
3. *Electrical Power Systems-C.L.Wadhwa, New Age International Publishers, Sixth Edition.*
4. *Power System Analysis & Design- By B. R. Gupta, S. Chand Publications, 3rd Edition, Reprint, 2003.*

ELECTRICAL POWER TRANSMISSION & DISTRIBUTION LAB

1. *Study and of Ferranti Effect.*
2. *Determination of ABCD Parameter.*
3. *Determination of string efficiency.*
4. *Earth resistance measurement.*
5. *Series and shunt capacitance computation in transmission line.*
6. *Transformer oil test.*
7. *Study of various [lightning arresters](#).*
8. *Distribution system power factor improvement using switched capacitor.*
9. *Study of corona discharge.*