

Course Outline

Class: D.Tech in Electrical Engineering (Power Systems)

Course Text Book: Principles of Power Systems by V.K.Mehta

Lecturer: Benard Mumo Makaa (www.benardmakaa.com)

Power generation:

- Importance of Electrical Energy
- Generation of Electrical Energy— Hydro, nuclear, geo-thermal, thermal, diesel, solar and wind system;
- Sources of Energy—Comparison of Energy Sources—Units of Energy—Relationship among Energy Units.
- Generating Stations-Steam Power Station-Hydro Electric Power station, Diesel Power Station-Nuclear Power Station, Gas Turbine Power Plant.

Economics of power supply:

- Cost of electrical energy
- Expressions of Cost of Electrical Energy
- Importance of High Load Factor
- Factors affecting cost, load curves, economics of conductors and cables.

Supply Systems

- Electric Supply System—Typical A.C. Power Supply Scheme
- Comparison of D.C. and A.C. Transmission
- Advantages of High Transmission Voltage
- Various Systems of Power Transmission
- Comparison of Conductor Material in Overhead System
- Comparison of Conductor Material in Underground System
- Comparison of Various Systems of Transmission
- Elements of a Transmission Line
- Economics of Power Transmission
- Economic Choice of Conductor Size—Economic Choice of Transmission Voltage
- Requirements of satisfactory electric supply
- War of currents. AC vs DC.
- Wireless Power Transmission-Introduction.

Overhead transmission lines:

- Constants of a Transmission line.
- Resistance of a Transmission line.
- Skin effect
- Inductance of a single phase and 3-phase overhead lines.
- Concept of self-GMD and mutual GMD.

Underground cables

- Construction of cables-Insulating materials for cables.
- Classification of cables-Cables for 3-phase service.
- Laying of underground cables-Insulation core cable.
- Most economical conductor size in cable.
- Grading of cables.
- Current carrying capacity of underground cables.

Neutral Grounding

- Grounding or Earthing
- Equipment Grounding
- System Grounding-Ungrounded Neutral System
- Neutral Grounding-Advantages of Neutral Grounding
- Methods of neutral grounding-Solid Grounding-Resistance Grounding-Reactance Grounding-Arc Suppression Coil Grounding (or resonant grounding)-Voltage Transformer Earthing-Grounding Transformer.