

**Course Syllabi: UEE404: Transmission and Distribution of Power (L : T : P :: 3 : 1 : 0)**

1. **Course number and name:** UEE404: Transmission and Distribution of Power

2. **Credits and contact hours:** 3.5 and 4

3. **Text book, title, author, and year**

**Text Books / Reference Books**

- *Chakrabarti, A., Soni, M.L., Gupta, P.V. and Bhatnagar, U.S., a Text Book on Power System Engineering, DhanpatRai (2008).*
- *Wadhwa, C.L., Electrical Power Systems, New Age International (P) Limited, Publishers (2008).*
- *Gupta, B.R., Power System Analysis and Design, S. Chand (2009).*
- *Nagrath, I.J. and Kothari, D.P., Power System Engineering, Tata McGraw–Hill (2007).*
- *Pabla, A.S., Electric Power Distribution, McGraw Hill (2008).*
- *Stevenson, W.D., Power System Analysis, McGraw–Hill (2007).*

a. Other supplemental materials

- Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

**Introduction:** Structure of power systems, Growth of power systems–Indian overview, Interconnections and their advantages.

**Transmission Line Parameters:** Choice of voltage and frequency, Types of conductor, Size of conductor, Resistance, Inductance and capacitance of single phase and three phase transmission lines.

**Mechanical design of overhead transmission lines:** Tension and sag calculations, Factors affecting Sag, Sag template, Stringing charts, Vibrations and vibration damper.

**Insulators:** Insulator types, String efficiency, Improvement of String Efficiency Grading rings, Insulator arc Failure, Arcing horns, Armored rods and Bushing.

**Transmission Line Performance:** Characteristics and performance of power transmission lines: Short, Medium, Long lines, Generalized constants, Power flow, regulation, Power circle diagrams, Series and shunt compensation, Corona visual and disruptive, Critical voltage, Phenomenon of Corona, Corona loss, Factors affecting Corona, Ferranti Effect, Electrostatic and Electromagnetic interference with communication lines.

**Insulated Cables:** Constructional features, Parameters, Cable laying procedures, Fault location Methods, High voltage cables, Thermal characteristics, Ratings of Cables, Introduction to XLPE cables.

**Distribution Systems:** Classification of distribution system, Primary and secondary distribution, Ring main and radial systems, Systematic design of distribution systems.

**EHV transmission and HVDC transmission:** Need of EHV transmission system, types of DC links, advantages of DC transmission, HVDC systems in India.

5. **Specific goals for the course**

After the completion of the course, the students will be able to:

- Analyse the transmission line models and evaluate its performance parameters.
- Design the transmission lines under various working conditions.

- Describe and select the configurations of different line insulators and evaluate their performance.
- Supervise the laying of cables and fault detection in cables.
- Design the distribution system network.

**6. Brief list of topics to be covered**

- Transmission Line Parameters
- Mechanical design of overhead transmission lines
- Insulators
- Transmission Line Performance
- Insulated Cables
- EHV transmission and HVDC transmission