

EE-505: Power Systems Analysis

Credit	L	T	P
3	2	1	-

UNIT-I

Typical transmission and distribution scheme. DC 2-Wire and 3-wire, A.C single-phase, 3-phase and 4 wire system, comparison of copper efficiency, Kelvin's law, D.C. distributor fed at one end, three wire D.C. distributor fed at one end, distributor fed at both ends, uniformly loaded distributor, ring mains, stepped mains, A.C. distribution. Standard voltages and advantages of high voltage transmission. Comparison of D.C. and A.C. transmission

UNIT-II

One line diagram, impedance and reactance diagram, per unit representation of single phase and three phase system, change of base, per unit impedance of a transformer, Network model formulation, Formulation of Y-Bus and Load flow equation formulation, Classification of Buss.

UNIT-III

Load Flow Solution Techniques, Gauss-Siedal method, Newton-Raphson method, Fast decoupled load flow equation, comparison of solution methods.

UNIT-IV

Symmetrical 3-phase fault. Short-circuit current and reactance of synchronous machines. Fault current in unloaded systems. Internal voltage of loaded machines. Short-circuit currents by method of internal voltage and Thevenin's theorem. Symmetrical components of three-phase unbalanced phasors, Power in terms of symmetrical components, Phase-shift in Star-Delta transformer banks, Sequence impedance and sequence network. Zero-sequence equivalent circuits for various three-phase transformer connections.

UNIT-V

Inter-connection of sequence network for various faults: line-to-ground fault, line-to-line fault, double-line to ground fault, Fault through impedance. Introduction to computer calculations of fault current problems.

Additional topics:

Economic Operation of Power System
Stability Analysis

TEXT/REFERENCE BOOKS

1. William D. Stevenson, Jr., "Elements of Power Systems Analysis", McGraw Hill Book Co., Singapore.
2. H. Cotton and Barber, "The Transmission and Distribution of Electrical Energy", Third Edition, B.I. Publications Pvt. Ltd., New Delhi.
3. I. J. Nagrath and D.P. Kothari, "Modern Power System Analysis", Tata McGraw Hill Publishing Co., New Delhi.
4. C. L. Wadhwa, "Electrical Power System", New Age International, New Delhi.
5. HadiSaadat, "Power System Analysis", Tata McGraw Hill Publishing co. New Delhi

Websites

www.electricaltutorials.com.
www.epsinc.com
www.electrical4u.com