EE 311: POWER SYSTEM ANALYSIS (3-0-0: 3)-Revised

Representation of Power System Components

Introduction, single phase solution of balanced three phase networks, one line diagram and impedance or reactance diagram, per-unit (p.u.) system, complex power, synchronous machine, representation of loads.

Symmetrical Fault Analysis

Introduction, transient on a transmission line, short circuit of a synchronous machine on no load, short circuit of a loaded synchronous machine, balanced three phase fault, short circuit capacity, fault analysis using bus impedance matrix, selection of protective equipments.

Symmetrical Components and its Application to Power System

Symmetrical component transformation, phase shift in star-delta transformers, sequence impedance of transmission lines, sequence impedance and sequence network of power system, sequence impedance and network of synchronous machine, sequence impedance of transmission lines, sequence impedance and networks of transformers, construction of sequence networks of power systems.

Unsymmetrical Fault Analysis

Symmetrical component analysis of unsymmetrical faults, single line to ground (LG) fault, line to line (LL) fault, double line to ground (LLG) fault, open conductor faults, bus impedance matrix method for analysis of unsymmetrical faults.

Power System Stability

Introduction to stability, dynamics of a synchronous machine, power angle equation, power angle curve, simple systems, steady state stability, transient stability, equal area criteria, numerical solution of swing equation, some factors affecting transient stability.

Text Books:

1. W. D. Stevenson, “Element of Power System Analysis”, Tata McGraw Hill.
2. I. J. Nagrath and D.P. Kothari, “Power System Engineering”, Tata McGraw Hill.

References:

1. P. Kundur, “Power System Stability and Control”, Tata McGraw Hill.
2. G. W. Stagg and A. H. EI-Abaid, “Computer Methods in Power System Analysis”, Tata McGraw Hill.
3. C. L. Wadhwa, “Electric Power System”, New Age International Ltd.
4. C. S. Indulkar and D P Kothari, “Power System Transients, A Statistical Approach”, PHI Pvt Ltd.
5. A. Husain, “Electrical Power Systems”, CBS Publishers.
6. N. G. Hingorani and J Gyugi, “Understanding FACTS”, IEEE Press.