

COURSE CONTENTS

Unit -I

General - Problems associated with modern interconnected power Systems, deregulation, power systems restructuring, distributed generation, congestion, available transfer capacities, pricing of energy and transmission services.

Unit-II

Power flow studies - Formulation of static power flow equations and solutions using Gauss-Seidel, Newton Raphson and FDLF methods, comparison of these methods, Economic operation of power system – Economic dispatch, Emission dispatch, line loss, ITL, economic dispatch using lagrangian multiplier method.

Unit-III

MW Frequency control- Fundamental of Speed Governing, Modeling of Speed Control Mechanism, Primary ALFC, Closing of ALFC, Static & Dynamic Response to Primary ALFC, Speed Control Characteristics ,Fundamental of AGC,AGC in Isolated & Interconnected Power Systems, Modeling of the Tie line, Static & Dynamic response of two area system, Economic dispatch Control.

Unit-IV

Reactive Power & Voltage control –Protection & Absorption of Reactive Power Method of Voltage Control, Static VAR systems, Different types, Application ,characteristics, characteristics of an excitation system, DC AC and static excitation system, General block diagram representation of voltage regulators.

Unit-V

Power System Stability - Steady state, dynamic and transients stability, Swing equation , equal area criterion, solution of swing equation using step by step method modified Eulers method and Rnge-Kutta method, methods of improving transient stability.

Reference Books :

1. I.J. Nagrath& D.P. Kothari , Modern Power System Analysis, Tata Mc Graw – Hill Publication Company Ltd 2nd edition.
2. C.L. Wadhwa ,Electrical Power Systems ,New Age International (P) Limited Publishers, 2nd edition 1998.
3. T.J.E. Miller , Reactive power Control in Electric Systems, John Wiley & Sons.
4. A Chakrawarti, Power System Analysis:Operation and Control PHI Learning 3rd edition
5. Elgerd O.I., “Electric Energy Systems Theory”, TMH, New Delhi, Second Edition 1983.
6. PrabhaKundur, “Power system stability and control”, Mc-Graw Hill Inc, New York, 1993.
7. Taylor C.W., “Power System Voltage Stability”, Mc-Graw Hill Inc, New York, 1993.
8. Nagrath IJ, Kothari D.P., “Power System Engineering”, Tata Mc-Graw Hills, N Delhi 1994.
9. Weedy B.M. “Electric Power System” John Wiley and Sons, 3rd edition.
10. P.S.R. Murthy, “Power System Operation and Control”, B S Publication
11. Power Generation, Operation and Control by A.J. wood and B.F. Wollenberg John Wiley & Sons Inc. 1984.
12. T.K. Nagsarkar, M.S. Sukhiza, -“Power System Analysis”, Oxford University Press.

List of Experiments:

1. To develop a program in Matlab for information of Y-bus matrix for N bus system.
2. Load flow solution for 3-bus system using Gauss- Seidel, Newton Raphson and FDLF methods upto 3 iteration.
2. Load flow solution for IEEE 6-bus and 30-bus system in Matlab using Newton Raphson method.
3. Assessment of transient stability of a single machine system.
4. Effect of compensation on voltage profile of IEEE 6-bus system.
5. Study of any software tools (PSAT, EDSA, MY POWER, ETAPetc).