

17PS1103 - POWER SYSTEM OPERATION & CONTROL

Instruction/week: 4 hrs.

Max. Sessional marks: 40

Univ. Exam: 3 hrs.

Univ. Exam marks: 60

UNIT – I

LOAD – FREQUENCY CONTROL ANALYSIS: System Behavior, Modeling of single area system , evaluation of system performance, supplementary control, modeling of multi area system, uncontrolled two-area system static response, control strategy of multi area system, characteristic of Tie-line frequency, Bias control, Inadvertent interchange, dynamic response state variable model of two – area system.

UNIT – II

SHORT-CIRCUIT ANALYSIS : Symmetrical short – circuit analysis, symmetrical components and sequence impedances, development of zseq-an Illustration, fault configuration and equations, general analysis of short circuit simplification of the model, symmetrical short-circuit capacity and its use, sparse z.matrix.

UNIT – III

TRANSIENT STABILITY ANALYSIS : Derivation of Swing equation, representation of synchronous machines, modeling of network and load, solution procedure, numerical methods an illustration fast stabilities analysis, predicting stability, equal area criterion, long – duration Transient stabilities, study factors affecting transient stability, dynamic stability study, transient stabilities, study of interconnected system.

UNIT – IV

OPTIMUM OPERATING STRATEGIES :Generation mix, Optimum dispatch, Optimum Economic dispatch: Cost function, constraint relations incremental generation costs, optimum dispatch equations, inequality constraints, computation considerations.

UNIT – V

OPTIMUM GENERATOR ALLOCATIONS CONSIDERING TRANSMISSION LOSS: Analysis of two-bus system , analysis of N-generator case incremental transmission loss, computational procedure, Scheduling of hydro power plant- short term hydro thermal scheduling.

TEXT BOOKS:

1. “Computer Aided Power System Operation and Analysis” by P.N.DHAR, Tata MC Graw-Hill Publishing Company Limited, 1987.
2. “Computer Aided Power Systems Analysis” by George L Kusic, PrenticeHall of India Private Limited 1989.

REFERENCES:

1. "Elements of Power System Analysis" by Stevenson, W.D., MC Graw-Hill, Kogakusha, 1975.
2. "Electric Energy Systems Theory" by Olle I Elgerd.