

**M.TECH SECOND SEMESTER
ECONOMIC OPERATION OF POWER SYSTEMS**

17EEPC2T2

Lecture: 4 periods/week

Credits: 4

Internal Assessment: 40 marks

End Semester Assessment: 60 marks

Course Objective:

To learn Economics of power system through Economic generation dispatch, unit commitment, hydro-thermal scheduling and their implementation through various classical methods.

Course Learning Outcomes: At the end of the course the student will be able to

1. Calculate the economic load dispatch for a given generator and load specifications.
2. Understand the different solution methods of economic dispatch problem.
3. Analyze LFC, AGC for multi area power systems.
4. Solve the Unit Commitment problem using various solution methods and analyse the optimal power flow calculations by combining Economic dispatch and power flow.

UNIT-I:

Economic dispatch, input output characteristics, cost function, incremental cost, generation scheduling for economic dispatch without and with transmission losses, Optimum Scheduling of Hydro Thermal System, Long and Short term Hydro Thermal Scheduling, Hydro Thermal Scheduling with Network loss considered.

UNIT-II:

The Economic Dispatch Problem, Economic Dispatch with Piecewise Linear Cost Functions; LP Method - Piecewise Linear Cost Functions, Economic Dispatch with LP; Lambda Iteration Method; Base Point and Participation Factors; Thermal System Dispatching with Network Losses Considered.

UNIT-III:

Automatic generation control -Review of LFC and Economic Dispatch control (EDC) using the three modes of control viz. Flat frequency – tie-line control and tie-line bias control – AGC implementation – AGC features - static and dynamic response of controlled two area system.

UNIT-IV:

Unit Commitment Definitions; Constraints in Unit Commitment, Unit Commitment Solution Methods: Priority-List Methods, Lagrange Relaxation Solution.

Optimal Power Flow Calculation Combining Economic Dispatch and the Power Flow, Optimal Power flow using Newton methods, Gradient, Linear Programming Method.

TEXT BOOKS:

1. Power Generation, Operation and Control – AJ Wood and BJ Wollenberg, Gerald B. Shebl John Wiley & Sons
2. Power System Analysis Operation and Control – Abhijit Chakrabarti and Sunita Halder, PHI Learning Private Limited

REFERENCE BOOKS:

1. Electric Energy Systems Theory An Introduction- O I ELgerd, Tata McGraw Hill Edition
2. Modern Power System Analysis- DP Kothari and IJ Nagrath, Tata McGraw Hill Edition
3. Power System Optimization –DP Kothari and JS Dhillon, PHI Pvt. Ltd.
4. Economic Operation of Power System – L K Kirchmeyer, Wiley & Sons
5. Economic Operation of Interconnected System - L. K. Kirchmeyer, Wiley & Sons
6. Power System Analysis John J Grainger, William D Stevenson, Tata McGraw Hill Edition.
7. Power System Analysis – Hadi Saadat, Tata McGraw Hill Edition