M.TECH SECOND SEMESTER

EEPC2T6B **POWER SYSTEM DEREGULATION** **Credits: 4**
(ELECTIVE-IV)

Lecture: 4 periods/week **Internal assessment: 30 marks**
Semester end examination: 70 marks

Objective: This subject deals with electricity competition markets and evolution of deregulation. It emphasizes on electricity price calculation during congestion, transmission cost allocation methods, PBUC, SWC various Ancilary services and Auction market models.

Learning Outcomes:

1. Student will understands the restructured environment in electricity markets.
2. Benefits and importance of deregulation will be known
3. Understand the role of electricity markets and various operators like ISO, retailers etc in deregulated environment

UNIT I
Need for deregulation. Introduction of Market structure, Market Architecture, Types of Markets-Spot market, forward markets and settlements. Power System Operation: Old vs. New

UNIT II
Electricity sector structures and Ownership /management, the forms of Ownership and management. Different structure model like Monopoly model, Purchasing agency model, wholesale competition model, Retail competition model.

UNIT III
Methods for the analysis of Bilateral and pool markets, Paticipating in markets electrical energy-The consumers perspective, perfect and imperfect competition.

UNIT IV
Electricity price basics –MCP,LMP Nodal marginal price.Transmission network - physical transmission rights and market power. Review of marginal cost of generation, least-cost operation, incremental cost of generation.

UNIT V
Transmission cost allocation methods.Price based unit commitment-PBUC formulation and solution,security-constrained unit commitment and SCUC problem formulation.

UNIT VI
Congestion management methods- market splitting, counter-trading; Effect of congestion on LMPs. Outline of Transmission pricing scheme

UNIT VII
Ancillary Services – Introduction – Describing Needs – Compulsory and Demand-side provision – Buying and Selling Ancillary Services – Standards.

UNIT VIII
Ancillary Services and Auction market models. Classifications and definitions, AS management in various markets. Technical, economic, &
regulatory issues involved in the deregulation of the power industry.

Reference Books:
1. Power System Economics: Designing markets for electricity - S. Stoft
2. Power generation, operation and control, -J. Wood and B. F. Wollenberg

3. Operation of restructured power systems - K. Bhattacharya, M.H.J. Bollen and J.E. Daalder
4. Market operations in electric power systems - M. Shahidehpour, H. Yamin and Z. Li
5. Fundamentals of power system economics - S. Kirschen and G. Strbac
6. Power system Restructuring & deregulation-LoiLeiLai, John wiley &sons Ltd
7. Competition and Choice in Electricity - Sally Hunt and Graham Shuttleworth