**DEPARTMENT OF ELECTRICAL ENGINEERING**
**RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

**"2015-16 -- LECTURE PLAN" -- "7EE5A, POWER SYSTEM ENGINEERING"**
**IV BE, (VII-SEMESTER); ELECTRICAL ENGINEERING**
**Teacher -- Dr. Dinesh Birla**

| | Chapter Title | Lectures | Contents of the Lectures |
|---|---|---|---|
| **1** | **Economic Operation of Power Systems** | 1 | Introduction: Economic operation, stability types, power system security etc. |
| | | 2 | Optimal economic operation, economic load despatch etc. |
| | | 3 | Interconnected, Isolated Systems; reserve capacity, Heat rate, Incremental fuel rate, etc. |
| | | 4 | Constraints of economic operation, Incremental fuel rate, Incremental production cost, Incremental efficiency etc., Numerical problems |
| | | 5 | Primary constraints of economic operation |
| | | 6 | Secondary constraints of economic operation, Introduction to Unit Commitment |
| | | 7 | Economic operation with & without considering losses |
| | | 8 | Numerical problems |
| **2** | **Power System Stability-I** | 9 | Intro Stability types, Power angle equation, Derivation of Swing Equation |
| | | 10 | Equal Area Criterion explanation by Swing Equation |
| | | 11 | Equal Area Criterion applications |
| | | 12 | Equal Area Criterion applications continue |
| | | 13 | Equal Area Criterion for multi machine system, Numerical problems |
| | | 14 | Dynamic Stability considerations |
| | | 15 | Methods to improve Steady State Stability |
| | | 16 | Inertia Constant, Equal Area Criterion numericals |
| | | 17 | Problem Solving |
| **3** | **Power System Stability-II** | 18 | Introduction, Transient Stability Studies |
| | | 19 | Equal Area Criterion and Its application to Transient Stability Studies Under Basic Disturbances |
| | | 20 | Critical Clearing Angle and Critical Clearing Time |
| | | 21 | Problem Solving |
| | | 22 | Factors Affecting Transient Stability |
| | | 23 | Methods to improve Steady State Stability |
| | | 24 | Applications & Numericals |

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| **4** | **Excitation Systems; Interconnected Power Systems** | 25 | Introduction of Excitation Systems of Synchronous Machines, Types of Excitation Systems |
| | | 26 | Elements of Various Excitation Systems and Their Control |
| | | 27 | Functional Block Diagrams and Their Brief Description--DC Excitation Systems |
| | | 28 | Functional Block Diagrams and Their Brief Description--AC Excitation Systems, |
| | | 29 | Functional Block Diagrams and Their Brief Description--Brushless Excitation System |
| | | 30 | Interconnected Power Systems: Introduction To Isolated and Interconnected Powers Systems |
| | | 31 | Reserve Capacity of Power Stations, Spinning And Maintenance Reserve. |
| | | 32 | Advantages and Problems of Interconnected Power Systems, Power Systems Inter Connection In India. |
| | | 33 | Applications & Numericals |
| **5** | **Tap Changing Transformer; Introduction to Power System Security** | 34 | Tap Changing Transformer, Phase Angle Control |
| | | 35 | Phase Shifting Transformer |
| | | 36 | Series Compensation of Transmission Lines, Location and Protection of Series Capacitors, Advantages and Problems |
| | | 37 | Introduction to Power System Security |
| | | 38 | Introduction to Voltage Stability |
| | | 39 | Applications & Numerical |
| | | 40 | Remote Sensing & GIS |