ELECTRICAL ENGINEERING & CONTROL SYSTEMS 3 0 0 3

OBJECTIVE

To impart knowledge on Network analysis, principle of electrical machines, different system representation, block diagram reduction and Mason's rule, time response and frequency response analysis of LTI systems, and State variable analysis.

UNIT – I ELECTRIC CIRCUITS 9

Dependent and independent sources - Kirchhoff's laws - mesh current and node voltage methods - theorems - Thevenin's - Norton's - superposition - maximum power transfer-(DC Analysis only) Phasors - sinusoidal steady state response of simple RLC circuits.

UNIT – II DC MACHINES 9

Construction of DC machines - Theory of operation of DC generators – Characteristics of DC generators- Operating principle of DC motors - Types of DC motors and their characteristics - Speed control of DC motors- Applications.

UNIT – III AC MACHINES 9

Principles of single phase transformers; EMF equation-Operation of three-phase induction motors-single-phase induction motor - double field revolving theory – starting methods. Principles of synchronous machines -Equation of induced EMF.

UNIT – IV MATHEMATICAL MODELS OF PHYSICAL SYSTEMS 9

Definition & classification of system - terminology & structure of feedback control theory - Differential equation of physical systems - Block diagram algebra - Signal flow graphs.

UNIT – V TRANSFER FUNCTION and STATE VARIABLE ANALYSIS 9

Time Response analysis of II order system -Frequency response - Bode plots – Concept of state variable - State models for linear & continuous time systems.

TOTAL: 45

TEXT BOOKS:

1. Smarajit Ghosh, 'Fundamentals of Electrical and Electronics Engineering', 2nd Edition, Prentice-Hall, New Delhi, 2007.

2. Richard C Dorf and Robert H.Bishop, " Modern Control Systems", 8th Edition, Prentice-Hall, (pearson Education, Inc.), New Delhi, 2005.
3. V.K.Mehta, Rohit Mehta, 'Principles of Electrical Engineering' S.Chand.

REFERENCES:

1. Vincent Del Toro, 'Electrical Engineering Fundamentals', 2nd Edition, Prentice-Hall, (Pearson Education Inc.), 2007.
2. John Bird, 'Electrical and Electronics Principles and Technology', 3rd Edition, Elsevier, New Delhi.
3. B. S.Manke, 'Linear Control Systems', Khanna Publishers.