



**EE 254**

## **ELECTRICAL MACHINERY - I**

### **UNIT-I**

**Principles of Electromechanical Energy Conversion:** Energy in magnetic system – Field energy and mechanical force – Direction of mechanical force developed – Flow of energy in electro mechanical devices – Singly excited and multiply excited systems – Basic concepts of magnetically induced e.m.f. and force.

### **UNIT-II**

**D.C. Machines:** Brief description of constructional features – Armature windings-simple lap and wave windings – Brush position – Classification of D. C. Machines.

**D.C. Generators:** Generated E.M. F. – Methods of excitation – Armature reaction – Theory of commutation – Types of Generators and their characteristics – Series and Parallel operation.

### **UNIT-III**

**D. C. Motors:** Generation of Electromagnetic torque – Types of motors and their characteristics – Application of motors – Starting and speed control of D.C.Motors – testing of D.C. Motors : Losses and efficiency – Temperature rise and Swinburne's Test – Hopkinson's Test – Field's Test for series motors – Retardation test – Separation of losses.

### **UNIT-IV**

**Single phase Transformers :** Constructional Features, principle of operation-ideal transformer transformer on 'NO' load and 'ON' load – Vector diagrams – Equivalent circuit – losses – Testing – Polarity test, O. C. and S. C. tests – Sumpner's test – regulation and efficiency – All day efficiency – Separation of losses – Excitation phenomena of Transformers.

## UNIT-V

**Three Phase Transformers :** Three Phase Transformers Connections Y-Y, D - D, D - Y, Y- D, V- V and Scott connections.

**Stepper Motors:** Types of Stepper Motors – parameters – characteristics – drive circuits and applications.

### ***Suggested Reading:***

- 1.Nagrath I. J. and Kothari D. P., *Electrical Machines*, Tata McGraw Hill, 1985.
- 2.H. Cotton, *Advanced Electrical Technology*, Wheeler & Co., 1995.
- 3.Kingsley Jr., *Electrical Machinery*, Tata McGraw