

## EE416 SPECIAL ELECTRICAL MACHINES (Dept. Elective - V)

### **Course Description & Objectives:**

*This course enable to understand the working principle and construction of commutator motors, stepper motors and switched reluctance motors. To gain knowledge in principle of operation and characteristics of permanent magnet brushless dc motors and synchronous motors.*

### **Course Outcomes:**

- I Able to understand working principle of special machines
- I Able to know constructional features of special machines
- I Able to analyze characteristics of various special machines
- I Able to suggest any special machine for specific application

### **UNIT I - Stepper Motors:**

Constructional features – Principle of operation – Variable reluctance motor – Hybrid motor – Single and multi stack configurations – Theory of torque predictions – Linear and non-linear analysis – Characteristics – Drive circuits.

### **UNIT II - Switched Reluctance Motors:**

Constructional features – Principle of operation – Torque prediction – Power controllers – Non-linear analysis – Microprocessor based control – Characteristics.

### **UNIT III - Permanent Magnet Brushless D.C. Motors:**

Principle of operation – Types – Magnetic circuit analysis – EMF and torque equations – Power controllers – Motor characteristics and control.

**UNIT IV - Permanent Magnet Synchronous Motors:**

Principle of operation – EMF and torque equations – Reactance – Phasor diagram – Power controllers - Converter - Volt-ampere requirements – Torque speed characteristics - Microprocessor based control.

**UNIT V - Commutator Motors:**

Construction – Principle of operation - Characteristics – Applications – Universal, repulsion motors and linear induction motors.

**TEXT BOOKS:**

1. Bimbhra.P.S “Generalized Theory of Electrical Machines”, Khanna Publishers, Fifth edition, 2013.
2. Sen.P.C “Principles of Electrical Machines and Power Electronics”, John Willey & Sons, Second edition, 2008.

**REFERENCE BOOKS:**

1. Dubey.G.K. “Fundamentals of Electric Drives”, Alpha Science International Limited, Second revised edition, 2008.
2. Cyril G. Veinott, “Fractional and Sub-fractional horse power electric motors”, McGraw Hill International Limited, Fourth edition, 1986.
3. Say. M.G “Alternating current Machines”, John Willey & Sons, Fifth edition 1983.
4. Rai. H.M “Electrical Machine Design”, Satya Prakashan Publications, Third edition, 2004.