RO8004 SPECIAL MACHINES AND CONTROLLERS

DETAILED SYLLABUS

OBJECTIVES:

- To know about stepper motors.
- To know about switched reluctance motors
- To know about permanent magnet brushless d.c. Motors
- To know about permanent magnet synchronous motors
- To know about linear motors

UNIT I STEPPER MOTORS

Types - Constructional features – principle of operation – variable reluctance motor – single and Multi stack configurations – Permanent Magnet Stepper motor – Hybrid stepper motor. Different modes of Excitation - theory of torque predictions – Drive systems and circuit for open loop and closed loop control of stepper motor.

UNIT II SWITCHED RELUCTANCE MOTORS

Constructional features – principle of operation –Torque Equation - Power Converters for SR Motor – Rotor Sensing Mechanism & Logic Controller – Sensor less Control of SR motor - Applications.

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 – Applications.

UNIT IV PERMANENT MAGNET SYNCHRONOUS MOTORS

Principle of operation, EMF, power input and torque expressions, Phasor diagram, Power Controllers, Torque speed characteristics, Self-control, Vector control, Current control Schemes – Applications.

UNIT V LINEAR MOTORS

Linear Induction motor (LIM) classification – construction – Principle of operation – Concept of current sheet – goodness factor – DC Linear motor (DCLM) types – circuit equation - DCLM control applications – Linear Synchronous motor (LSM) – Types–Applications SERVOMOTORS: Servomotor – Types – Constructional features, principle of operation - control applications

TEXT BOOKS:

1. K. Venkataratnam," Special Electrical Machines", Universities Press (India) Private Limited, India, 2009.

2. Kenjo, T and Naganori, S "Permanent Magnet and brushless DC motors", Clarendon Press, Oxford, 1989

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1. Kenjo T, “Stepping Motors and their Microprocessor Controls”, Clarendon Press London, 2003.

2. Miller T J E, “Brushless Permanent Magnet and Reluctance Motor Drives”, Clarendon Press, Oxford, 1989.

3. Naser A and Boldea L, “Linear Electric Motors: Theory Design and Practical Applications”, Prentice Hall Inc., New Jersey 1987.

4. Floyd E Saner, “Servo Motor Applications”, Pittman USA, 1993.

5. WILLIAM H YEADON, ALAN W YEADON, Handbook of Small Electric Motors, McGraw Hill, INC, 2001