

SPECIAL ELECTRICAL MACHINES FOR INDUSTRIAL APPLICATIONS
(Open Elective)

Subject Code: 15EE1152

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4 0 0 3

Pre requisites: Electrical Machines – I and II.

Course Outcomes: At the end of the course the student will be able to

1. Evaluate the Performance of Stepper Motor.
2. Evaluate the Performance of Switched Reluctance Motor.
3. Evaluate the Performance of Permanent Magnet Brushless DC Motor.
4. Evaluate the Performance of Permanent Magnet Synchronous Motors.
5. Evaluate the Performance of Servo Motor.

UNIT-I

STEPPER MOTORS

Stepper motor Constructional features, Principle of operation, Special features of stepper motors, Variable reluctance, Permanent magnet stepping motor, Torque versus stepping rate characteristics. (12 Lectures)

UNIT-II

SWITCHED RELUCTANCE MOTORS

Switched Reluctance Motor Constructional features, Principle of operation, Torque equation, Characteristics, Control Techniques, and Drive Concept. (12 Lectures)

UNIT-III

PERMANENT MAGNET BRUSHLESS DC MOTORS

Commutation in DC motors, Difference between mechanical- and electronic-commutators, Torque and EMF equation, Rotor position sensors, Multiphase Brushless DC motor, Square wave permanent magnet brushless DC motor drives and their torque-speed characteristics.

(12 Lectures)

UNIT-IV

PERMANENT MAGNET SYNCHRONOUS MOTORS

Principle of operation, EMF, Power input and torque expressions, Phasor diagram, Power Controllers, Torque speed characteristics. (12 Lectures)

UNIT-V

SERVOMOTORS

Servomotor, Constructional features, Principle of Operation, Types, Characteristics, Control strategies. AC Tachometer Operating principle and its schematic diagram. (12 Lectures)

TEXT BOOKS:

1. Kenjo, T, "Stepping Motors and their Microprocessor control", Clarendon Press, Oxford, 1989. (Unit-I).
2. Miller, T.J.E. "Brushless Permanent Magnet and Reluctance Motor Drives", Clarendon Press, Oxford, 1989. (Unit-II to Unit- IV).
3. S.Muralidharan, J.Gnanavadivel, J.Karthikeyan,"Principle of Special Electrical Machines" Anuradha Publications, Fourth Edition-2011 (Unit-I to Unit-V).

REFERENCES:

1. Floyd E Saner,"Servo Motor Applications", Pittman USA, 1993.
2. Kenjo, T and Naganori, S, "Permanent Magnet and brushless DC motors", Clarendon Press, Oxford, 1989.
