**Lecture Schedule**

**Department of ELECTRICAL AND ELECTRONICS Engineering**

**FACULTY** :V.SreeVidhya **YEAR**: 2017 – 2018

**BRANCH**: IV B.Tech - II Sem  **SUBJECT**: Special Electrical Machines

**Course Objectives:**

* To explain theory of operation and control of switched reluctance motor.
* To explain the performance and control of stepper motors, and their applications.
* To describe the operation and characteristics of permanent magnet dc motor.
* To distinguish between brush dc motor and brush less dc motor**.**
* To explain the theory of travelling magnetic field and applications of linear motors.
* To understand the significance of electrical motors for traction drives.

**Course Outcomes:**

* Explain theory of operation and control of switched reluctance motor.
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| **UNIT** | **TOPIC** | **No. of Periods** |
|  | **Introduction to Special Electrical Machines** | **2** |
| **I** | **SWITCHED RELUCTANCE MOTOR** |  |
|  | Principle of operation- theory | 2 |
| Design of stator and rotor pole arc | 2 |
| Improvements in the design of conventional reluctance motor | 1 |
| Power converters for SRM-Derivation of Torque expression- characteristics | 2 |
| Rotor sensing mechanism and logic controller | 1 |
| Control of SRM for traction –load type- area of application | 2 |
|  | Numerical Problems | 1 |
|  | Total number of periods | **10** |
| **II** | **Stepper Motors** |  |
|  | Introduction- construction of Step motor | 1 |
| Principle of Operation –Essential conditions for operation under different speeds | 2 |
| Control Circuits- an open loop controller- Troque developed In the motor | 2 |
| Variable Reluctance Stepping Motor- Single stack and multi stack VR motor | 2 |
| Open loop and closed loop control of stepper motor | 2 |
| Area of application of stepper motor | 1 |
| Numerical Problems | 2 |
| Total number of Periods | **12** |
| **III** | **Permanent Magnet DC Motors** |  |
|  | Introduction- Construction Of PMDC Motors | 1 |
| Working Principle of PMDC Motor | 1 |
| Equivalent circuit of a PMDC Motor | 2 |
| Torque equation of the PMDC motor and its Performance Characteristics | 2 |
| Moving Coil Motors | 1 |
| Total number of Periods | **07** |

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| **IV** | **Permanent Magnet Brushless DC Motor** |  |
|  | Construction and Principle of operation | 1 |
| Theoretical Analysis and Performance Characteristics Of PMBL DC motors | 2 |
| Theory of BLDC motor as variable speed synchronous motor | 2 |
| Control Strategies of BLDC motor | 2 |
| Distinguish between Brush and Brushless DC Motor | 2 |
| Total number of Periods | **09** |
| **V** | **Linear Motors** |  |
|  | Construction of Linear Motor | 2 |
| Principle of Operation | 2 |
| Development of one sided LIM | 2 |
| Area of Application | 1 |
| Linear Synchronous Motor: Construction | 2 |
| Principle of Operation | 2 |
| Area of Application | 1 |
| Numerical Problems | 1 |
| Total Number of periods | **13** |
| **VI** | **Electric Motors for Traction Drives** |  |
|  | AC Motors and its significance | 2 |
| DC Motors and its significance | 2 |
| Single sided LIM for traction drives | 2 |
| Comparison of AC and DC Traction Drives | 1 |
| Total Number of periods | **07** |

**Total No. of Periods** : 02+10+12+07+09+13+07=60 Hours

# Text Books:

* 1. Special electrical Machines, K.Venkata Ratnam, University press, 2009, New Delhi.
  2. Brushless Permanent magnet and reluctance motor drives, Clarenden press, T.J.E. Miller, 1989, Oxford.
  3. Special electrical machines, E.G. Janardhanan, PHI learning private limited, 2014.