

## V2EVEL04 SPECIAL MACHINES FOR ELECTRIC VEHICLES

### **MODULE-I:** Permanent Magnet (PM) Brushless Motor Drives: (11 Hours)

Structure of PM Brushless Machines, Principle of PM Brushless Machines Modeling of PM Brushless Machines, Inverters for PM Brushless Motors Motor Control, Design Criteria of PM Brushless Motor Drives for EVs, Design Examples of PM Brushless Motor Drives for EVs, Application, Advantages and Limitations for EVs.

### **MODULE-II:** Switched Reluctance Motor drive: (6 Hours)

Structure of SR Machines, Principle of SR Machines, SR Converters Topologies, SR Motor Control, Design Criteria of SR Motor Drives for EVs, Examples of SR Motor Drives for EVs, Application, Advantages and Limitations for EVs.

### **MODULE-III:** Stator-PM Motor Drives: (7 Hours)

Doubly-Salient PM Motor Drives, Flux-Reversal PM Motor Drives, Flux-Switching PM Motor Drives, Hybrid-Excited PM Motor Drives Flux-Mnemonic PM Motor Drives, Design Criteria of Stator-PM Motor Drives for EVs, Application, Advantages and Limitations for EVs.

### **MODULE-IV:** Magnetic-Geared Motor Drives: (8 Hours)

Principle of MG Machines, Modeling of MG Machines, Inverters for MG Motors, MG Motor Control, Design Criteria of MG Motor Drives for EVs, Application, Advantages and Limitations for EVs

### **MODULE-V:** Advanced Magnetless Motor Drives : (10 Hours)

Introduction of Advanced Magnetless technology, Synchronous Reluctance Motor Drives, Doubly-Salient DC Motor Drives, Flux-Switching DC Motor Drives, Design Criteria of Advanced Magnetless Motor Drives for EVs, Application, Advantages and Limitations for EVs.

### **TEXTBOOKS:**

1. K. T. Chau, Electric Vehicle Machines and Drives: Design, Analysis and Application, IEEE Press, Wiley, 2015.
2. Brushless Permanent magnet and reluctance motor drives, Clarendon press, T.J.E. Miller, 1989, Oxford.

### **REFERENCE BOOKS:**

1. Mehrdad Ehsani, Yimin Gao, Sebatién Gay and Ali Emadi, Modern Electric, Hybrid Electric and Fuel cell vehicles: Fundamentals, Theory and Design, CRC Press, 2004.
2. James Larminie and John Lory, Electric Vehicle Technology – Explained, John Wiley & Sons Ltd, 2003.
3. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London, 1988.