

ELECTRIC DRIVES IN HYBRID VEHICLE

Module-I : (11 Hours)

Introduction: History of hybrid vehicles, architectures of HEVs, series and parallel HEVs, complex HEVs. Hybridization of Automobile: Fundamentals of vehicle, components of conventional vehicle and propulsion load; Drivecycles and drive terrain; Concept of electric vehicle and hybrid electric vehicle; Plug-in hybrid vehicle, constituents of PHEV, comparison of HEV and PHEV; Fuel Cell Vehicles and its constituents.

Module-II : (10 Hours)

Plug-in Hybrid Electric Vehicle: PHEVs and EREVs, blended PHEVs, PHEV Architectures, equivalent electric range of blended PHEVs; Fuel economy of PHEVs, power management of PHEVs, end-of-life battery for electric power grid support, vehicle to grid technology, PHEV battery charging.

Module-III : (10 Hours)

Power Electronics in HEVs: Rectifiers used in HEVs, voltage ripples; Buck converter used in HEVs, non-isolated bidirectional DC-DC converter, regenerative braking, voltage source inverter, current source inverter, isolated bidirectional DC-DC converter, PWM rectifier in HEVs, EV and PHEV battery chargers.

Module-IV : (11 Hours)

Electric Machines and Drives in HEVs: Induction motor drives, Field oriented control of induction machines; Permanent magnet motor drives; Switched reluctance motors; Doubly salient permanent magnet machines.

Text Books/References:

1. Pistoaa G., "Power Sources , Models, Sustainability, Infrstructure and the market", Elsevier 2008
2. Mi Chris, Masrur A., and Gao D.W., " Hybrid Electric Vehicle: Principles and Applications with Practical Perspectives" 1995