

Course Type	Course Code	Name of the Course	L	T	P	Credits
DC	EEC312	Electric Drives and Applications	3	0	0	9

Course Objective
The objective of the course is to understand the background of the electrical drives. It also helps to understand the speed control mechanism with suitable power electronic converter. The course also covers the discussion on drives powered from renewable energy sources.
Learning Outcomes
<p>Upon successful completion of this course, students will:</p> <ul style="list-style-type: none"> ● understand the various drive mechanisms and methods for energy conservation; ● be able to use power electronic converters to control the speed of DC motors and AC motors; ● be able to evaluate the motor and power converter for a specific application.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction to Electric Drives: Advantages of Electric drives, Parts of Electrical Drives, Electric Motors, Power Modulators, Sources, Choice of Electric Drives and selection of drives for various applications.	3	Understanding the basic need and choice of electric drive.
2	Dynamics of electrical drives and Selection of Motor rating: Fundamental torque equation, speed-torque convention & multi-quadrant operation. Equivalent values of drive parameters. Components of load torque, speed-torque characteristics of loads. Nature and classification of load torques, and steady state stability, Basic principles of closed-loop control. Thermal model of motor, power rating of motor for different loading conditions.	11	Understanding the various drive mechanisms and methods for energy conservation.
3	DC Motor Drives: starting and braking methods .Speed control of DC motors using single-phase half and full controlled rectifiers in continuous and discontinuous mode of operation. Speed control of DC motors using Three phase controlled drives, chopper controlled drives. Multi quadrant operation of DC motor.	12	Understanding the speed control of dc motor with different converter configuration.
4	AC Motor Drives: Starting and braking methods. Speed control of cage induction motor with v/f control, slip power recovery scheme, static Scherbius and Kramer methods. Variable voltage control and variable frequency control using VSI and CSI. Introduction of synchronous motor drive	10	Understanding the speed control of ac motor with different converter configuration.
5	Solar and Battery powered drives: Solar panels, solar powered pump drives and battery powered vehicles.	6	Understanding the solar and battery fed drives.

Text Books

1. Fundamentals of Electrical Drives by G. K. Dubey
2. Electric Drives Concepts & Applications – Vedam Subramanyam

Reference Books

1. Modern Power Electronics and AC Drives by B. K. Bose.