Electric Drives

1.1 Course Number: EEV312

1.2 Contact Hours: 3-0-0 Credits: 9

1.3 Semester-offered: 4th Year-Even

1.4 Prerequisite: Electrical Machines, Power Electronics

1.5 Syllabus Committee Member: Dr. Umakant Dhar Dwivedi, Dr. Vijay Kumar Singh, Dr. Saptarshi Ghosh, and Dr. Saurabh Pandey.

2. Objective: The course aims at giving a broad overview of Electrical Drive Systems. It is assumed that the students have prior exposure to Electrical Machines and Power Electronics. The course content provides the control principles of various DC and AC motors using solid state converters, Principles of selection of Electric Motors, and some of the applications of Electrical Drives.

3. Course Content:

Introduction to Electrical Drives, Dynamics of Electrical Drives, Review of Torque-Speed Characteristics of DC Motor Drives; Solid-state Control of DC Motor Drives Controlled Rectifier-fed DC Drives; Chopper Controlled DC Drives; Reference Frame Theory, Induction Motor Drives, Operation of Induction Motor with Unbalanced Source Voltages, Analysis of Induction Motor from Nonsinusoidal Voltage Supply, Starting and Braking of Induction Motor; Variable Voltage/ Current, Variable Frequency Control of Induction Motor Fed from VSI and CSI Control of Slip-ring Induction Motor; Synchronous and Brushless DC Motor Drives; Traction Drives; Stepper Motor and Switched Reluctance Motor Drives

4. Readings

4.1 Books

i. *G. K. Dubey, Fundamentals of Electric Drives, Narosa Publishing House, Second Edition.*
ii. *G.K. Dubey, Power Semiconductor Controlled Drives, PH-New JersyI*
iii. *V. Subrahmaniyam, Electric Drives Concepts and Applications, TMH*
iv. *Ned Mohan, Tore M. Vndeland and William P. Robins Power Electronics: Convertors Application and Design, John Wiley and Sons*
v. *K. Malarvizhi, Solid State Drives, Scitech Publication Pvt Ltd.*
vi. *S.K. Pillai, A first course in Electric Drives, Wiley Eastern*
vii. *B. K. Bose, Modern Power Electronics and AC Drives, PHI.*

5. Outcome of the Course:

After successful completion of this course, students will be able to:

1. Recall theory of power electronics DC and AC machines.
2. To understand the application of power electronics into electrical machines.
3. Apply the concept of dc and ac drives into the industrial traction applications.
4. Determine the performance of the electrical drives system used for industrial applications.