EE601 Advanced Electric Drives

Credit: 2.5-0.5-0-3 Approval: Approved in 2nd Senate

Prerequisite: EE 201 Electromechanics and Power Electronics

Students intended for: B.Tech. and MS/Ph.D.

Elective or Core: Elective Semester: Odd/Even

Course objective:

Electrical drives play an important part as electromechanical energy converters in transportation, materials handling and most production processes. The course tries to give unified treatment of complete electrical drive systems, including the mechanical parts, electrical machines, and power converters and control.

Course content:

Introduction: Definition of electric drive, type of drives; Speed torque characteristic of driven unit/loads, motors, joint speed-torque characteristic; Classification and components of load torque; Review of power converters used in drives, multi-quadrant operation of electric drive, example of hoist operation in four quadrant.

Closed loop control of solid state DC drives, Scalar and vector control of induction motor, Direct torque and flux control of induction motor, Self controlled synchronous motor drive, Vector control of synchronous motor, Switched reluctance motor drive, Brushless DC motor drive, Permanent magnet drives, Industrial drives.

Harmonic reduction techniques, PWM inverters, Space Vector Modulation

Text & Reference Books:

Mohan N., Underland T.M. and Robbins W.P., “Power Electronics –Converters, Applications and Design”, 3rd Ed., Wiley India. 2008

Bose B.K., “Power Electronics and Variable Frequency Drives –Technology and Applications”, IEEE Press, Standard Publisher Distributors. 2001

B.K.Bose, Power Electronics & A.C. Drives, Prentice Hall, 1986

Rashid M., “Power Electronics- Circuits, Devices and Applications”, 3rd Ed., Pearson Education.

Dubey G. K., “Power Semiconductor Controlled Drives”, Prentice Hall International Edition. 1989

Murphy J. M. D. and Turnbull F. G., “Power Electronics Control of AC Motors”, Peragmon Press.

G.K.Dubey, Fundamentals of Electric Drives.