Cleveland State University
Department of Electrical Engineering and Computer Science

EEC 673/773 Power Electronics and Electric Machines, Spring 2015

Catalog data: EEC 673/773. Electronics and Electric Machines (4-0-4).
Prerequisite: EEC 574 or equivalent
Power electronics converters in the combination with electric machines. Field-oriented induction machine control, stability of an induction machine under the sine-wave supply, voltage source inverter drives, current source inverter drives, d, q modeling of induction and synchronous machines.

Textbook: **D. W Novotny and T. A. Lipo, "**Vector Control and Dynamics of AC drives", Oxford University Press, Inc, 1998.
Class Notes

Reference:

- Stephan Chapman, " **Electric Machinery Fundamentals**", McGraw – Hill, 1999.
- Ned Mohan, "**Electric Dives – an integrative approach",** University of Minnesota printing services, 2000.
- N. Mohan, T. M. Undeland and W. P. Robbins, **Power Electronics: Converters, Applications and Design,** Second Edition, McGraw-Hill,1995.

Coordinator: Dr. A. V. Stankovic, Professor
Phone: 687 2513
Email: a.stankovic@csuohio.edu

Goals: To deepen the understanding of power electronics converters in combination with electric machines.

Prerequisite by Topic:
Power electronics converters, steady state operation of electric machines.

Course Outline:

Week	Topics	Reading
1(Jan 12-16)	Basic Induction Machine Concepts (Review)	Chapman 7.1-7.5
2(Jan 19-23)	Basic Induction Machine Concepts	Chapman 7.6-7.11
3(Jan. 26-30)	Measurement of Induction Machine Parameters Using an Inverter Supply	Class Notes

4(Feb.2-6)	**Lab 1**- Measurement of Induction Machine Parameters Using an Inverter Supply	
5(Feb 9-13)	A Novel Method for Measuring Induction Machine Magnetizing Inductance Review Session and Discussion	Class Notes
6(Feb 16-20)	**MIDTERM EXAM**	
7 (Feb 23-27)	Voltage Source Inverter Drive (Six-step Inverter)	Class Notes
8 (Mar 2-6)	LAB 2- VSI Drive	
9(Mar 8-15)	**Spring Recess**	
10(Mar 16-20)	Voltage Source Inverter Drive LAB 3 – Speed Control	
11(Mar. 23-27)	(DC and Synchronous Motors) Review	Chapman
12(Mar 30- Apr 3)	Introduction to variable Torque Drives	Class Notes
13(Apr 6-Apr 10)	Field-Oriented Induction Machine Control	Class Notes
14(Apr 13-17)	Field-Oriented Induction Machine Control	Class Notes
15(Apr 20-24)	Renewable Energy Sources Review- Lecture on writing a paper and doing research	
16(Apr 27- May1)	Student Presentations	

Projects: Laboratory experiments and simulation.

Grading: Midterm - 45%
Final Exam - 40%
Lab Reports and Projects – 15%

Homework: Has to be turned in on time**.**

Computer Usage: PSpice
Software: MATLAB, Simulink, Saber

Prepared by: Dr. A. V. Stankovic **Date: 01 12 2015**