

Lane Department of Computer Science and Electrical Engineering

EE 336: Electro-mechanical Energy Conversion Lab

Fall 2013

1 - Credit hour

Instructor:	Rehan Fazal Office: 901 ESB - Desk 11 Email: rfazal@mix.wvu.edu Office Hours: Wednesday, 3.00-5.00 PM or by appointment
Class Location:	G-75 G, ESB
Class Time:	001 W 1700-1950 002 T 1730-2020
Reference Book:	Electrical Machinery and Power System Fundamentals, By Stephen J. Chapman, McGraw Hill
	Handouts will be provided in the Lab
Course Objective:	To acquaint the students with the performance and characteristics of magnetic devices, single-phase transformers, DC and AC machines and synchronous generator connected to a large power system by a Power system simulator, Modeling and simulation of Induction and DC machine and DSP based Drive System.
Expected Learning Outcome:	By the end of this course student's will be able to: Understand Faradays Law in Coil with permanent magnet. Analyze the excitation magnetizing and core losses and calculate the parameters of the transformers by conducting short circuit and open circuit tests. Analyze the voltage current characteristics of the DC generator and learn how to start the motor in the laboratory and simulate the DC motor using MATLAB/Simulink. Perform open loop control of DC motor Understand the voltage characteristics of the Synchronous generator under different loading conditions and in Parallel with a large power system. Perform simulation of electric drives and switch mode DC converter.
Grading Policy:	Attendance 10% Prelabs 10% Lab Report 50% Portfolio 10% Project 10% Final Exam 10% Grading will be on a scale of 100

1 Lab Guidelines

1.1 Class Policy

- Attendance in the lab is compulsory. You cannot perform the experiment if you miss the lab and will not be awarded grade for the missed lab. Always try to be on time.
- The grades can only be contested on the day, when the lab/pre-lab is returned.
- No grade will be awarded at the end of Semester for failing to submit lab/pre-lab in time.
- Copying of the prelabs and/or Lab reports is strictly prohibited, if found all parties involved will be awarded zero grade.
- All safety rules in the Power Laboratory Safety sheet must be strictly adhered to all the times.

1.2 Pre-lab

- Every student must submit the Pre-lab before the start of every lab, the purpose of the pre-lab is to do some individual work so late pre-lab submission cannot be accepted.

1.3 Lab Report

- Each experiment requires a **Formal Group Report**, which needs to be submitted before the start of next lab i.e. after the completion of the experiment.
- All figures and tables should be referenced in the text, and have a number and title.
- Lab reports should be according to the Lab report Format provided at the end of Lab handout.
- All students in a group will receive the same grade for the Lab report given that they were present while doing the experiment.
- Include all the calculations related to the experiment in your lab report.

1.4 Portfolio

- Each Group should maintain a Lab Portfolio, which should contain a record of all the Handouts and Calculations done in the lab.
- Your lab notebook must be submitted by the end of the semester and it will be graded.
- All students in a group will receive the same grade on Lab portfolio.

1.5 Lab Project

- Topic related and complementary to the lab will be provided to simulate.

1.6 Final Exam

- Final exam will be comprehensive, closed book and closed notes. The exam will cover lab discussions, experiments and prelabs.

List of Experiments:

<i>Week</i>	<i>Date</i>	<i>Experiment</i>
1-2	Aug 20/21 Aug 27/28	Faradays Law in Coil with Permanent magnet and DC excitation.
3-4	Sep 03/04 Sep 10/11	Introduction to the DSP Based Electric Drives System. Simulation and Real-Time Implementation of a Switch Mode DC Converter.
5-6	Sep 17/18 Sep 24/25	Voltage and Current characteristics of Single Phase Transformer, Open Circuit and Short Circuit Tests.
7-8	Oct 01/02 Oct 08/09	Voltage and Current characteristics of DC generator, Starting and Speed control of DC motor.
9	Oct 14 - 15	Fall Break Recess
9-10	Oct 16 Oct 22/23	Characterization of DC Motor DC Motor Speed Control
11-12	Oct 29/30 Nov 5/6	Voltage Regulation of an AC Synchronous for balanced and un-balanced loads.
13-14	Nov 12/13 Nov 19/20	Operation of a Synchronous generator in parallel with a large Power system.
15	Nov 25 - 29	Thanksgiving break
16	Dec 03/04	Torque Speed Characteristics and Speed Control of 3-Phase Induction Motor.

This is a tentative schedule of the experiments and is not finalized and depends on the course schedule.

Social Justice:

West Virginia University is committed to the Social Justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect and non-discrimination. Our University does not discriminate on the basis race, sex, age, disability, veteran status, religion, sexual orientation, color and national origin. Any suggestions as to how further and open the environment in this class, will be appreciated and given serious consideration.

If you are a person with disability and anticipate any type of special accommodation for the participation in the class please advice me and make appropriate arrangements with Disability services (293-6700).