ECE 3600

Introduction to AC Power Engineering
Fall 2009 Class Syllabus

Instructor: Arn Stolp
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Office hours: My "office hours" are the problem sessions at the end of class. Otherwise it's catch me if you can. To increase your chances, talk to me after class to. I'm usually around between 11 a.m. & 2 p.m. T & Th. Before class is best, since I want to sit in on another class directly after ours. If I'm not in my office, check the lab.

Web Site: http://www.ece.utah.edu/~ece3600/

Required and Recommended books and lab supplies:
Textbook: *Electrical Machinery and Power System Fundamentals*, by Stephen J. Chapman
Lab notebook (bound or spiral) and standard ECE lab supplies

Prerequisites:
ECE 2210 or ECE 2260 (2260 may be taken concurrently)

Introduction:

Why do people care about electricity? Basically for two reasons-- information and energy. Computers, TVs, wireless devices, ipods and control systems all process, present, store and use information in the form of electrical signals. The circuits and theories behind these activities occupy the majority of your studies in Electrical Engineering. These circuits also require some energy to function and often need to control some energy to produce outputs. These power supplies and power amplifiers would be subjects of a power electronics class and are not covered in this class. Here we cover will electrical energy in a more primal form– the energy that lights your house, washes your clothes and moves you up the ski lift, all of which is done with AC power.

This class will introduce you to AC power use and generation, AC and DC machines, and AC power systems. We will study single-phase and 3-phase power, power factors and corrections, transformers, synchronous and induction machines, DC motors, power transmission lines, and introduce the concepts used to analyze power flow and faults.

I teach concepts and the use of those concepts to solve problems, not formulas and memorization. The hands-down easiest way get a good grade in this class is to learn the concepts.

This class consists of:

Lectures: T & Th 2:00 - 3:20 pm in MEB 1208 (The lecture will be the first 60 to 65 minutes)

Lectures set the direction and tone of the class and cover more than the written material. You will be held accountable for everything discussed in the lectures, so your attendance is important.

Problem Sessions: the last 15 to 20 minutes of each class period

I will use this time to work examples and to answer your questions in detail. I will not cover new material in the problem session times, so you can leave after the lecture time, but I think you'll find it worth your while to stay.

Textbook:

Electrical Machinery and Power System Fundamentals, by Stephen J. Chapman. We will follow this text quite closely. Buy your copy from me or on line. An International edition will be fine and much cheaper.

Handouts:

There will be a number of handouts for, homework, labs, notes, etc.. I will hand these out before class and/or place them by the doors, look for them as you enter class. I will leave any extras outside my office until they are all gone (my virtual web site). Finally, many of the handouts may be downloaded from the class web site; http://www.ece.utah.edu/~ece3600/.

Homework, homework, and more homework: 80 pts.

I will assign a lot of homework, it will be your main study tool. As such, I'll give you all the numeric answers so that you can check your work immediately. In fact, you'll have to self-correct your homework. If you can't get the answer, check the web site for corrections, study some more, come to the problem session, ask for help, or see the posted solutions. Sometimes I even post solutions *before* the homework is due. So, you might ask, "Why is it handed in and 'graded'?". Well, to answer a question with a question, "Would you even do it otherwise?"

Your homework should be neat and clear and show all your work. For most problems the grader will simply check to see that you've done it and that your paper shows the necessary work to get the answer. Only a few problems will be checked in greater detail. You may collaborate with others to learn how to do the homework, but will need to hand in your own work. Copying or allowing another student to copy your work is considered cheating.

You will probably learn more from doing the homework than any other part of this class. If you thoroughly understand the homework, you will know what the class is about, and the exams should give you no trouble.

Near the ECE office on the 3rd floor of MEB you'll find some lockers with slots in the doors. Drop your homework in the ECE 3600 locker by 5:00 p.m. of the due date. I will accept *some* late homework for *some* credit. Bring it directly to me, and don't do it habitually. Solutions will be posted in a glass case, also near the office. Graded homework, lab notebooks and exams will be returned to your mailbox unless you have not signed a permission slip. In that case come see me.

Midterms: 200 pts.

You will take two one-hour midterms throughout the semester. They will cover material up to the time of the test. These exams will be in two parts, a closed-book section where I may ask for items straight from the book or homework, and an open-book section where I will ask you to solve problems. The second section will be designed to see if you learned concepts and problem solving strategies and whether you can work with them, sometimes in new and different ways. Don' t try to memorize formulas or specific problems. Exams also cover what you learn in the labs and field trips.

Final: Thursday, 12/17/09, 1:00 - 3:00 pm (We'll go late give you more time) 160 pts.

The final will be comprehensive with greater emphasis on the most recent material. It will also be in two parts.

Labs: MEB 2365 60 pts.

Lab will be held every other week, beginning Monday, 9/14/09. Before the first lab you will split into two groups with alternating lab weeks. Many of the subjects covered in lab aren't covered anywhere else in class, so make sure you pay attention and read the lab instructions. You will have to keep a laboratory notebook as a requirement of the lab. Your lab TA will collect and grade these notebooks.

Labs are **not optional.** For each lab that you miss or fail (< 60% score), your final grade will suffer a **half letter drop** (5% of possible points). Be sure to make-up any labs you miss or fail.

Field Trips: scored as labs

I'm planning three field trips which will take place during lab time (approximately); Gadsby power plant, Rocky Mountain Power, and U of U cogeneration plant. You will be responsible for your own transportation. If you cannot make a field trip you will have to make it up with some personal field investigation. Field trip reports will be graded with your labs.

Grades:

	Pts
Homework:	80
Labs:	60
Midterms:	200
Final:	160
Total:	500
Failed lab or field trip:	-25
Cheating:	-500

% of total	Grade
> 93	A
90-93	A-
87-90	B+
83-87	B
80-83	B-
77-80	C+
73-77	C
70-73	C-
67-70	D+
63-67	D
60-63	D-
< 60	E