Physics 323, Spring 2007 Quarter, 10am MWF

Lecture times/location: 10am MWF in CF 314
Lab times/location: Thursdays 9-11:50am or 1-3:50pm in CF 311
Instructor: Milton From (Office CF377, 650-6593, from@physics.wwu.edu)
Website: follow the links from http://newton.physics.wwu.edu/from/

Reference Materials: The main text for the course is *Principles of Electronic Instrumentation* by Diefenderfer and *Advanced LabView Labs* by John Essick. A few other reference materials are as follows:

Source	Author	Nature of text
1.) Electronics for Inventors	Paul Scherz	Hands-on textbook with lots of practical advice on building circuits
2.) The Art of Electronics	Horowitz and Hill	Graduate level reference book.
3.) TTL Cookbook	Lancaster	Spec sheets for ICs, lots of ideas and schematics for simple circuits.
4.) The web!	**Many sites!**	**Often you can go straight to spec sheets and example schematics for individual transistors/ICs by simply googling their part number. For example try looking up the "2N3905" transistor.**

The course website contains useful links including weekly assignments, assignment and test solutions, and comments on laboratories. The computers in the electronics lab have *Electronic Workbench* installed on them. This software will allow you to "wire up" virtual circuits and test them before going to the laboratory and doing your experiment with real electronic components. Please familiarize yourself with this software early in the quarter. I suggest that you do laboratory exercises using electronic workbench as a way of preparing for the actual laboratory sessions.

Approximate Schedule:

Week	Date	Topics	Dief.	Horowitz and Hill	LabView Chapter	Lab exercise	Tests
1	Apr 4-6	Transistors (BJTs)	8	2	1	11 Transistors	
2	April 9-13	Transistors (FETs), Op-Amps	8,9	3	2	12 Op-Amps I	
3	April 16-20	Op-Amps, Oscillators, the 555 timer	9,10	4, 5	3	13 Op-Amps II	
4	April 23-27	Digital basics (gates, logic, simple circuits)	11	8	4	14 Oscillators	Monday Apr 23
5	April 30-May 4	Digital circuitry (flip-flops,counters)	11, 12	8	5	15 Digital I	
6	May 7-11	Digital circuitry (counters, multiplexing)	12	8	6	16 Digital II	
7	May 14-18	Microprocessors, A/D & D/A converters	12, 13	9	7	17 LabView, chapter 10	
8	May 21-25	A/D & D/A converters Labview PID controllers	13, 14	9	10	18 LabView, chapter 11	Monday May 21
9	May 28- June 1 (Holiday on Monday)	Experiment/computer interfaces, GPIB, RS 232	14	10	11	19 LabView, chapter 12	
10	June 4-8	Noise, lockin amps, signal averaging	15	7	12	Lab test	
	Thurs June 14 (10:30-12:30)						Final Exam

LabView: LabView is a Graphical programming language that is used widely in industry and in research labs for data acquisition and control, data analysis, and data presentation. We will go through our LabView textbook at a rate of roughly one chapter per week. The first 7 chapters do not require use of any hardware other than a computer. I will expect you to work through this material outside of class and do one or two LabView programming assignment problems per week. The last 3 chapters of the LabView text are considerably more difficult than the first 7 and involve interfacing your computer to data acquisition boards, voltmeters, power supplies, etc. We will work on these chapters together during the last three lab exercises before the lab test. For example in Chapter 10 we will build a digital oscilloscope and in Chapter 11 we will construct a precision digital temperature controller capable of holding an object at a given temperature to within approximately 0.01 K.

Homework: There will be an assignment of 8-10 problems each week. The assignments will *not* be graded however it is extremely important that you do them. Many of the problems on course tests will be modeled after those in the assignments. Solutions to the assignments will be posted on my webpage. I encourage you to give the problems a serious try before looking at the solutions. Feel free to see me for hints or further explanations on problem solutions. In most cases what is important in the solution to a problem is the *reasoning* you use and not simply a numerical answer.

Tests: There will be two Monday tests, and a final exam. Tests may include material from the text, assignments, *and/or labs*. Tests will be open textbook (however class notes, lab sheets/notes, problem solutions, computers may not be used during tests). Only the final exam is cumulative. In general, missed tests will be assigned a mark of zero. However if you miss a test for medical reasons and bring in a note from a doctor, a makeup test will be arranged.

Quizzes: There will be five 10-minute long quizzes given at random times throughout the course. Quizzes will consist of a single question/problem which is related to material covered in the previous one or two lectures.

Laboratory: You will be doing a lab each week of the course. The first 6 Laboratory exercises will follow guide sheets posted on my webpage before the lab. I suggest that you do laboratory exercises using electronic workbench as a way of preparing for the actual laboratory sessions. I will assign a grade of 1 or 0 to each of your labs based on your attendance and performance. (Be sure to show me your lab results as you go along. Provided I see that you are taking the lab seriously and doing the required work you will get a 1.) You will be working with a lab partner. It is very important that both students in a lab group be actively engaged in laboratory work. Remember, tests and final exam questions may include material from the labs.

The last 3 laboratory exercises will be done using LabView. Descriptions of the exercises are given in the final three chapters of the LabView textbook. Your mark for these exercises will be based on your demonstration of a working program and on a documented hardcopy of your LabView code.

Labs start the first week of classes on Thursday, April 5.

Labtest: During the last week of classes there will be a lab test in which you are required to design and build several simple analog and/or digital circuits using transistors and analog/digital chips. You will be able to use your lab sheets/notes and textbook for this test.

Grades:

2 Tests	40% (20% each)
Final Exam	35%
weekly lab exercises	5%
lab exam	10%
Quizzes	10% (average of best 7)

LETTER GRADE SCALE

Percentage	90-100	85-89	80-84	77-79	73-76	70-72	67-69	63-66	60-62	57-59	53-56	<53
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F