

# Phys 152: Introduction to Engineering Design

(Winter 2009)

Professor: Keith Schubert  
Office: JB 348  
Phone: 537-5328  
Email: schubert@csusb.edu  
Web: www.csci.csusb.edu/schubert  
Prerequisites: Phys 150 and (Math 120 or satisfactory score on ELM)

Text: Salt and Rothery,  
Design for Electrical and Computer Engineers  
Lab: JB-356, TR 9:00-11:50 AM  
Office: MW 3:00-5:00 PM  
and by appointment

## 1 Objective:

Physics 152 is an introduction to engineering design, therefore, it must accomplish a range of objectives. First, it will introduce you to the methodologies and structure of the design process. Second, it will teach you the tools and skills commonly used in design. Third, and most importantly, it will allow you to learn engineering design by doing it.

It is our expectation that, upon the successful completion of this course, you will be prepared to meaningfully contribute to the work of your project team and will be well on your way towards becoming a professional engineer.

Tentative Course Coverage:

1. What is engineering?
2. Requirements Analysis
3. Documenting a design objective
4. System design
5. Managing Design
6. Model analysis and simulation
7. Design validation
8. Testing evaluation and verification
9. Reporting
10. Ethics of design
11. Economics of Design

## 2 Grading:

Weekly status reports, your lab notebook, and your oral presentation will be graded upon a 100 point scale. Keep a backup copy of your notebook in case you lose it; your notebook grade will be based upon

what you hand in at the end of the quarter. The grade will be calculated as follows: Reports 20%, Lab Notebook 50%, and Oral Presentation 30%.

The grading scheme is listed below.

Ltr	Percent	Ltr	Percent
A	94 - 100	C	73 - 76
A-	90 - 94	C-	70 - 73
B+	86 - 90	D+	66 - 70
B	83 - 86	D	63 - 66
B-	80 - 83	D-	60 - 63
C+	76 - 80	F	00 - 60

## 3 Reading

The reading assignments listed cover the material that will be discussed in class. You are to read it in advance for each class (except the first, which would not be possible). There are two main reasons for reading the material ahead of time.

1. Reading the text before class gives you the basic ideas, so the deeper truths can be covered in class.
2. Even the best of textbooks will cause most people to get confused on some aspects. If you read the book before the class, your confusion will get cleared up and make the course easier for you.

I know that reading before class is not frequently done, but I encourage you to do it. You are here to get a top quality education, but in order to get it you must do more than just show up. Graduate students must be motivated to learn and succeed. Don't sell yourself short.

## 4 Status Reports

Each person in class will submit a brief weekly status report by email. It should state where you are, what you have done, etc, see the chapter on communication

in my online notes “KOED” for more information. Reports are due by Friday noon. Late reports will lose points per day it is late.

## 5 Lab Book

Each person will maintain their own lab book. The book must not have removable pages or torn out pages. You may only write in blue or black ink. Nothing may be erased, whited-out, or scribbled out, rather a single thin line through the text is to be used to indicate removal. It must be in order with no blank pages (unless a note saying “This page left intentionally blank” is included). Each page must be numbered in the upper outside corner. Each new topic is to start on a new page. Each page must be titled and dated. You must clearly indicate every step of the designs you are doing in the in-class designs. See the chapter on communication in my online notes “KOED” for more information.

## 6 Oral Presentation

During the final time (Thursday, March 26 8:00 A.M.-9:50 A.M.), you and your group will have to give a 30 minute oral presentation on your final design project. You will have to present your findings, and perhaps a demonstration, using a computer-based overhead projector system. After your presentation, the floor will be opened to questions for 5 minutes.

## 7 Getting Help

Everything always seems easier when I am walking you through it. The goal of this course is to prepare you to do engineering design, not to frustrate or confuse you. You will not know what is hard or confusing until you try it without me though. When you hit that problem that you can't figure out, don't get frustrated, get help. You are highly encouraged to take advantage of office hours. Office hours are the premiere assistance methodology of all classes. You are also encouraged to discuss problems and methods with each other. Study groups can be very helpful. Do not cheat yourself though by getting solutions and not understanding! All work must be your own. You can discuss and help, but may not copy someone else's work, or allow your work to be copied. That is plagiarism and is treated very severely.

The class website also has my notes. You are encouraged to avail yourself of the help this provides.

## 7.1 Support for Student with Disabilities

If you are in need of an accommodation for a disability in order to participate in this class, please see the instructor and contact Services to Students with Disabilities at (909)537-5238.

## 8 University Policies

Students are referred to the “General Regulations and Procedures” in the CSUSB Bulletin of Courses for the university's policies on course withdrawal, cheating, and plagiarism.

**Dropping and Adding** You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. found at (CSUSB Bulletin, pages 46-48).

**Plagiarism and Cheating** Students are expected to be familiar with the University's Policy on cheating and Plagiarism. Please review this at (CSUSB Bulletin, pages 51-52). Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University.

## 9 Other Information:

The student is responsible for all material covered in class, and also for all announcements made therein. Students are referred to the “General Regulations and Procedures” in the CSUSB Bulletin of Courses for the university's policies on course withdrawal, cheating, and plagiarism. If you are in need of an accommodation for a disability in order to participate in this class, please let me know ASAP and also contact Services to Students with Disabilities at UH-183, (909)537-5238.

## 10 Schedule

Date	Topic	Reading
1/13	Engineering and Personality	1, KOED 1,2
1/15	MatLab/SciLab	KOED B
1/20	SPICE	KOED C
1/22	Modelsim III and Verilog	-
1/27	Implementing a Verilog design on FPGA	-
1/29	Design Process & Methodologies	2, KOED 3
2/5	Requirements Analysis	3
2/7	Systems Designs, ASM Charts, and Block Diagrams	4, KOED A
2/12	Project Management & Scheduling	5.1-4
2/14	Budgeting	5.5
2/19	Engineering Economics	KOED 5
2/21	Managing, Detailed Design, Testing	5.6-6.3
2/26	Engineering Ethics	KOED 6
2/28	Quality Programs	KOED 4
3/5	System Design	B
3/7	System Design	B
3/12	System Design	B
3/14	System Design	B
3/19	System Design	B
3/21	System Design	B
3/26	Final (8:00 am)	-

## 11 Prerequisite Knowledge

I expect that you have taken Phys 150 and either passed Math 120 or you have received a satisfactory score on ELM. Basically this means you should be familiar with the basics concepts of math, and have some exposure to electronics.