Course Outline for Physics 380 - Fall 2008

Instructor: Dr. M. A. Khakoo  Office: Main Office or MH-665C/SLC150  
Tel: x4828 office, x5275 research lab.
Office Hrs.: 11-11.50 am. Monday and Wednesday. (MH665C or MH613).
Instruction/Laboratory Room: Room MH 606, Department of Physics
Instruction/Laboratory Hours:  
Monday 1.00 to 4.50 pm (Lecture from 1.00 to 1.30/2.00 pm)
Wednesday 1.00 to 3.50 pm (Lecture from 1.00 to 1.30/2.00 pm)

Course Outline (READ ALL).

In this course we intend to emphasize usefully practical aspects of electronic circuits and especially, the basic underlying theory so that these circuits can be made transparent. Detailed aspects of circuits will not be covered, e.g. the quantum mechanics of a transistor, etc., although a brief discussion of these devices will be made.

Physicists use electronic components for research and do not usually study these components (unless they need to make a prototype), except to make them work as part of their research equipment in a circuit. For example some of the electronic components that we use for research consist of op-amps, transistors, logic IC chips, pulse generator chips etc, even vacuum tubes! We shall not use vacuum tubes! Consequently any omissions in the detailed description of these circuits is intentional and you are expected to back up this gap by referencing to the text in Simpson (see the recommended text below). The laboratory will be structured as follow:

(1) Introductory lecture to the week's exercise including instruction on measurement equipment to be used (eg. oscilloscope).
(2) Practical(s) (putting together of the circuits and following through the required exercises in the laboratory handbook).
(3) Brief notes and data will be written in the laboratory book during the practicals.
(4) Detailed descriptions and conclusions regarding the exercise. (Also to be written in laboratory note book.)
(5) A final series of practicums using the Basic Stamp microprocessor.
(6) Maybe, an incorporation of a computer-based, CD with the ability to design/test circuits using an electronics simulation package (MULTISIM).

Grading

I will give 2 (1-hour) quizzes during the term and a 2-hour final examination. During the term I will take your laboratory book and check it for (a) Organization and clarity of laboratory work. (b) Understanding/explanation of material. (c) Diagrams and use of these diagrams. (d) Neatness.
The overall marking will be:

<table>
<thead>
<tr>
<th>2 Quizzes - 7.5% each</th>
<th>Total 15%</th>
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<tr>
<td>Final Exam</td>
<td>Total 15%</td>
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<tr>
<td>Lab Notebook</td>
<td>Total 70%</td>
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<td>Total 100%</td>
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Aims of the Laboratory and Philosophy.

The aims of this laboratory is also to make you able to keep a professional scientific laboratory record of what you did so that it can be reviewed (in this case by others) to see what was done. It is also a lab. that instructs on emergency Band-Aid electronics, which some of you will need in your future employment.

You should also "collaborate" or "brain-storm" with your colleagues to enable you to smoothly go through the exercise. This will foster a collaborative research spirit in your professional outlook. Remember, you can always learn from exchanging ideas (both parties).

Laboratory Note Book

The recommended book is the 10X7.87, 5X5 Quad (approx $3) which has grilled rule. (National #53-110, or equivalent).

IMPORTANT.: You should do all the formal exercise on the right page of the notebook leaving the other page for comments, calculations for yourself.

Keeping this laboratory note book up to date is a good strategy to succeed.

Recommended Text

The recommended text is: Introductory Electronics for Scientists and Engineers, by Robert E. Simpson, Allyn and Bacon, Ed. 2, Addison-Wesley 1987. This is a practical reference book for our particular course and will back-up the laboratory handbook.

However, there is a very large quantity of material in this book which will be impossible to cover. Nevertheless, this book is nevertheless a very good reference and you should use it often in the course.

It is recommended that you browse through the reference book and use it often to enable you to understand the basis of operation of the circuits and help you write-up your laboratory book.

Other

I do not approve of students dragging their heels and copying from others, and I expect you to put some effort to stay on schedule like most of the students in the class. Turning up late to class is going to be recorded in a register and will affect your grade. I will have the laboratory open by our secretaries Patti or Sheree on other hours, when requested, but you will not get any supervision during these alternate hours. These extra laboratory hours are meant to enable you to catch up with the scheduled exercise, or to prepare for the coming exercise. Please keep your laboratory book updated and current. If you are having problems with understanding the material, my door is wide open and you have priority.

Examination

Prior to all the exams, there will be a pre-quiz exercise i.e. you will be given an exercise to complete the test and will be using the work you did to answer the test questions, else we will discuss pertinent example problems before the quiz. You will not be graded on the pre-quiz although this is crucial to your performance in the quiz (as expected).