PHYS 481/581  DESIGN OF EXPERIMENTS  WINTER 2007

Class Times: MW 5:00-6:20p  Location: Willamette Rm.318
Instructor: Steve  Office: Will
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Thu 2:15-3:15p
Tue 4:00-5:00p
Or by
arrangement

COURSE OUTLINE

Text

The main text is "Engineering Statistics" by Montgomery, Runger and Hubec, 4th Edition (Wiley 2006) which should be available at the bookstore. A more-advanced version of this book is "Design and Analysis of Experiments" by Montgomery, 5th Edition (Wiley 2001) but it is very difficult to read. (Runger and Hubec obviously are the human interface for Montgomery and they do a fine job.) In fact I think our course text is so much better than any other book on the subject that I am not putting any books on reserve in the Science Library.

Problem-Solving Session

If people think it is a good idea, we will try to figure out a time for a problem-solving session, particularly for trying out Mathematica (see below). We'll discuss possible times in the first class period.

Homework, Grades, Project

Homework is an important part of this course and should be taken seriously, but the kinds of problems we are working on often require the use of a computer and are not really suited to exams. We will, however, have a single midterm exam, testing some basic knowledge. The grades for the course will be based on homework (40%), the midterm (20%) and a final project (40%). Homework will be assigned weekly, on Wednesday, and collected on the following Wednesday.

I'll discuss the project in class. The basic idea is that you will choose some set of data which either is already available (e.g. on the Internet) or which you collect yourself and then use it to demonstrate your understanding of methods we have learned in class. You'll be surprised at how much interesting analysis you can do on fairly simple sets of data. The project is written up and turned in at the end of term. It is important that you start thinking about the project as soon as possible.

Software

Many of the homework problems will be solved using statistical analysis software. Although Excel can be used for some early material in the course, it is limited.

The major statistics packages available on campus are SAS, Minitab and SPSS. In the past, students in this course attempted to use SAS, but the user interface is incredibly counter-intuitive, at least for people from physical science backgrounds. (A major issue is that SAS is database oriented.) SAS certainly is popular with economists, social scientists etc. and you may like it. There also is the open-source package "R", which runs on Windows and Linux machines.

Instead, I think we should use Mathematica - for at least three reasons. Firstly it can do everything we might ever want to do with statistics. Secondly, the interface and syntax of Mathematica should make sense to people in the physical sciences. Thirdly, if you don't already know how to use Mathematica it is well worth finding out, because you can do all kinds of mathematics and

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engineering with it and its extension packages. Its error messages are really obscure, but you soon get a feel for things that you might be doing wrong. Mathematica is installed on all the campus machines you might use and you can also get a set of disks from the Computing Center for Windows, Mac or Linux. (We have a site license.)

At least later in the course I'll be expecting to see stuff generated by Mathematica, but you are welcome to try other software.

Course materials will appear on this Web site. They will often be in the form of PDF files, so get yourselves copies of the Adobe Acrobat Reader.

http://www.adobe.com/products/acrobat/readstep2.html