STATISTICS 141  
(same as Biology 141)  
Fall 2004

Lectures:  TTh 11-12.15, 380-380c  
Discussion Section:  TBA  
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Office Hours:  Th 3-4, in Sequoia 102 and by appointment.

Required Texts:  Statistics for the Life Sciences (Samuels and Witmer) 3rd edition. Please bring to class. They will also be on reserve in the Math. Library.

Complementary:  Introduction to the Practice of Statistics (Moore and McCabe) 3rd edn. Introduction to Statistics with R (Peter Dalgaard)

Topics:  The course is an introduction to some methods of data analysis used in biology and medicine. The list below is tentative – we may not cover all topics, and the later topics will be covered in less detail than in the corresponding book chapters.

Teaching Assistants:  (Office Hours TBA)
Brit  Sequoia Hall 108  bkatzen@stat.Stanford.EDU
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Requirements for 4 units
One graded homework set each week. These comprise 30% of grade.
One midterm. If you succeed at it, it counts 20% of grade.
Otherwise it doesn’t count.
One take-home final exam. Due 11.30 a.m. Thursday December 12. 40% of grade.
Attendance evaluated by quick quizzes. 10% of grade.
The course may be taken for a regular grade or for Credit/No Credit.

Additional unit (to make 5) requirement
Come to 9 discussion sections (1 per week except 1).

Miscellaneous Remarks

Is this the right course for me?  If in doubt, compare with other Stat Courses this Fall:
Stat 60:  Introduction to Statistical Methods: Precalculus  No prerequisite; no computing.  MTWThF 9.00.
Stat 110:  Statistical Methods in Engineering and Physical Sciences:  Engineering orientation: MTWTh 11.00 Prerequisite: one year of calculus.
In depth:  Stat 116 (Theory of Probability, MTWTh 10.00) then Stat 200 (Winter, Introduction to Statistical Inference) Prerequisite: Math 52+.
Math needed for this course: Prerequisite: at least a quarter of calculus; not used a lot, mostly exponential, logarithm, summation and integral notation. See the handout “Some math questions to test background”.

Nature of course: Lots of homework No in-class final, instead a take-home. There will be 3-4 non compulsory labs in the PC room for those who wish to have help getting started with R, there will be a signup sheet every week for the first 3-4 weeks.

Advantage: Don’t have to focus on “what do I have to know for the final”, but rather concentrate on understanding and being able to apply the material.

Challenge: Will cover more material, more quickly

Has elements of a “cookbook” course, since we will not give mathematical derivations for everything we do. But, will get flavor of a wider variety of types of data and questions that statistical thinking can address.

Homeworks: About three - seven problems per week, usually taken from the textbook. Will be a mix of questions testing conceptual and statistical understanding, along with some analyses of data sets.

Rules: Collaboration on the mechanical aspects of getting software to do what you want is o.k. Write-ups must explain what you did and why and must be your own work!

Finals: The take home final will consist of questions on a number of small data sets similar to those analyzed in the homeworks, except that you will have to decide which of the methods we cover will be the appropriate ones.

Rules: Must be your own work! Can use books, notes etc. No collaboration!

Computing: The main goal of the course is to gain, by experience, an appreciation of some of the basic statistical methods used in biology and medicine. While you will do a fair amount of analyzing of data in the homeworks and final, this is not a course about learning a particular piece of statistical software. So, we do not require that you use any one package, and so you are free to choose and use what you prefer. Why? No one program that is best for all purposes.

The “high” road: If you know you will use a certain program later for other reasons, feel free to use it/learn it in this course. However, learning a really serious stat language (e.g. R/S-PLUS, SAS) for this course alone would really be worthwhile. If you will be doing serious statistics or bioinformatics and have no prior preference as to package/language, then try R. I will be doing all the examples in R on my computer in class.

The “middle” road: Packages based on a windows graphic user interface: e.g. StatView on Macintoshes.

“Keep it simple”: Although it is likely possible to find a canned program for what you need, or to write a program, bear in mind that for the data sets in this course, it may be easier and faster to just do it the old-fashioned way, by hand (or by spreadsheet). This is no bad thing to do once or twice, as it builds numerical understanding. [Obviously to do something on a routine basis, or on a larger scale, one would
A remark on the use of *Tables*: In a certain sense, quaint and old fashioned since calculated by computer programs. **BUT**: convenient for learning! If you understand tables, you can better use (check, evaluate!) the answers produced by your software!