STATISTICS 201-3
STATISTICS FOR THE LIFE SCIENCES

Summer 2003
DAY COURSE
STATISTICS WORKSHOP

Instructor: G. Chui
Lab Instructor: R. Insley (SSC K 10552)

This course may be applied to the Certificate in Liberal Arts

Prerequisite:

The student must have 30 semester hours of credit. Students with credit for STAT 101, 102, 203 (formerly 103), 270 (formerly MATH 272) or 301 may not take STAT 201 for further credit.

Textbook:

Mind on Statistics by Jessica M. Utts & Robert F. Heckard, publisher: Duxbury/Thomson Learning.

Course Description:

An introductory course in research methodology and associated statistical analysis techniques for students with training in the life sciences. (3-1-0)

Outline:

Aimed at a non-mathematical audience, this course discusses procedures that are most commonly used in the summary of statistical surveys and in the interpretation of experimental data. The rationale for these procedures is explained in detail, but the use of mathematical formulas is kept to a minimum. Either STAT 101 or STAT 201 is a satisfactory prerequisite for STAT 302.

1. **Data summaries and displays:** Graphical displays, measures of central tendency, measures of dispersion, percentiles, the normal curve, computer-generated graphs and data summaries.
2. **Summarizing the relationship between variables:** Scatterplots, the regression line, correlation, and causation.
3. **The research process:** Assembling background information, formulating hypotheses, generating informative data with controlled experiments and randomized surveys, and using the data to reassess hypotheses.
4. **Case studies** involving happenstance data, randomized surveys, and controlled, randomized experiments.
5. **Basic probability calculations:** The addition and multiplication rules, and independence.
6. **Distributions for count data:** The binomial and Poisson distributions; where they arise, and their basic properties.
7. **Hypothesis tests and confidence intervals:** p-values, confidence levels, and their interpretation; inferences on a proportion and a mean based on the standard normal and t-distributions, underlying assumptions, and a mention of alternatives.
8. **Comparing two treatments:** Completely randomized and paired designs; associated standard normal and t-tests.
9. **Inference on the relationship between two variables:** Simple linear regression and correlation analysis, plus, if time permits, comparing two lines and basic analysis of covariance.
10. **Comparing several treatments:** Completely randomized and randomized block designs; one- and two-way analyses of variance.
11. **Analyzing Frequency Counts:** tests for homogeneity and independence.

Grading

A grading scheme will be announced by the instructor at the beginning of the semester.

Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester. Students are reminded that Academic Honesty is a cornerstone of the acquisition of knowledge. Scholarly integrity is required of all members of the University. Please consult the General Guidelines of the calendar for more details.

Revised April 2003