



STATISTICS 301-3

STATISTICS FOR THE LIFE SCIENCES

Summer 2001
DAY COURSE
STATISTICS WORKSHOP

Instructor: DR. B. McNENEY
Lab Instructor: R. Insley

Prerequisite:

Either the student must have 45 semester hours of credit or a minimum of 30 semester hours including MATH 152 or MATH 155. Students with credit for STAT 101, 102, 103 or 270 (formerly MATH 272) may not take STAT301 for further credit. Mathematics minor, major and honors students may not use this course to satisfy the required number of semester hours of upper division mathematics. However, they may include the course to satisfy the total number of required hours of upper division credit.

Textbook:

The Basic Practice of Statistics (2nd ed) by David S. Moore, publisher: WH Freeman & Co.

Course Description:

An introductory course in research methodology and associated statistical analysis techniques for students with training in the life sciences.

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 301 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

Homework - 20%
Midterms - 30%
Final Exam - 50%

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.

Revised March 2001 math_www@math.sfu.ca