STATISTICS FOR THE LIFE SCIENCES (3)

Class Number: 2632   Delivery Method: In Person

COURSE TIMES + LOCATION:

We 1:30 PM – 2:20 PM
SSCB 9201, Burnaby

Fr 12:30 PM – 2:20 PM
SSCB 9201, Burnaby

EXAM TIMES + LOCATION:

Jun 12, 2019
6:00 PM – 8:00 PM
Location: TBA

Jul 10, 2019
6:00 PM – 8:00 PM
Location: TBA

Aug 8, 2019
3:30 PM – 6:30 PM
SSCC 9001, Burnaby

INSTRUCTOR:

Rachel Altman
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Office: SC-K10551

PREREQUISITES:

Recommended: 30 units.

Description

CALENDAR DESCRIPTION:

Research methodology and associated statistical analysis techniques for students with training in the life sciences. Intended to be particularly accessible to students who are not specializing in Statistics. Students cannot obtain credit for STAT 201 if they already have credit for - or are taking concurrently - STAT 101, 203, 205, 285, or any upper division STAT course. Quantitative.

COURSE DETAILS:

This course may be applied to the Certificate in Liberal Arts

Lab Instructor: Marie Loughin

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. This course covers Chapters 1-9, 11, 12, 15-22, and 24-27 of the textbook. Chapters 7, 11, 19, and 24 are section reviews (and thus are optional). Details of the other chapters are as follows:

1. **Descriptive Statistics (Chapters 1, 2, and 4 of text)** Basic graphical statistics (e.g. bar graphs, pie charts, histograms, time plots, scatterplots) and basic numerical statistics (e.g. mean, median, mode, quartiles, standard deviation, correlation) are discussed. Scales of measurement are distinguished (e.g. nominal, ordinal, ratio and interval).
2. **Probability (Chapters 3 and 12 of text)** The normal distribution is introduced along with probability rules.
3. **Sampling (Chapter 8 of text)** Various sampling designs such as simple random sampling are discussed. The implementation of sampling procedures is also presented.

4. **Experiments and Observational Studies (Chapters 8 and 9 of text)** The design of experiments is introduced with an emphasis on randomization, treatments, subjects, factors, pairing and controls. Comparisons are made with observational studies.
5. **Inference (Chapters 15, 16, 17, 18)** Concepts related to the construction of confidence intervals (e.g. sampling distributions, confidence level, width, interpretation, the effect of sample size) are discussed. Also basic concepts related to the testing of hypotheses (e.g. hypotheses, p-values, statistical significance) are presented.
6. **Estimation and Testing for One Sample Problems (Chapters 20 and 22 of text)** Procedures for means and proportions are discussed with an emphasis on the use of statistical software and the interpretation of results.
7. **Estimation and Testing for Two Sample Problems (Chapters 21 and 23 of text)** Procedures for means and proportions are discussed with an emphasis on the use of statistical software and the interpretation of results.
8. **One Way ANOVA (Chapter 27 of text)** One way analysis of variance procedures are discussed with an emphasis on implementation using statistical software and the interpretation of results.
9. **Chi-Square Tests (Chapters 6 and 25 of text)** Procedures for testing in contingency tables are discussed with an emphasis on the use of statistical software and the interpretation of results. Measures of association are discussed.
10. **Regression (Chapter 5 and 26 of text)** Simple linear regression is introduced with an emphasis on carrying out regression on actual data using statistical software and the interpretation of results. Related concepts including residuals, least squares fit, testing and the construction of confidence intervals is addressed.

Grading

Assignments	10%
Midterm 1	25%
Midterm 2	25%
Final Exam	40%

NOTES:

Above grading is subject to change.

Students must pass the final exam in order to pass the course.

Materials

MATERIALS + SUPPLIES:

iClickers will be used during this course

R can be accessed via Jupyter, an online platform, at https://sfu.syzygy.ca/. Alternatively, R Studio and R statistical software can be downloaded free of charge from https://www.rstudio.com/ and https://cran.r-project.org/, respectively.

REQUIRED READING:

Required Textbook:

The Basic Practice of Statistics (8th ed.) & Sapling Plus (Sapling Plus i reccommended but not required)by D. S. Moore, W. I. Notz, and M. A. Fligner. Publisher: W.H. Freeman Publishers

Loose-leaf ISBN: 9781319188658 (available at SFU Bookstore)
Other options are available through the MacMillan Learning website.