FALL 2018 - STAT 605 G100

BIOSTATISTICAL METHODS (3)

Class Number: 6482   Delivery Method: In Person

COURSE TIMES + LOCATION:

Mo 12:30 PM – 2:20 PM
SWH 10081, Burnaby

We 12:30 PM – 1:20 PM
SWH 10081, Burnaby

EXAM TIMES + LOCATION:

Oct 15, 2018
4:30 PM – 6:20 PM
Location: TBA

Nov 19, 2018
4:30 PM – 6:20 PM
Location: TBA

Dec 13, 2018
8:30 AM – 11:30 AM
GYM CENTRAL, Burnaby

INSTRUCTOR:

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1 778 782-3155
Office: SC-K10553

PREREQUISITES:

Any course in Statistics. Open only to students in departments other than Statistics and Actuarial Science.

Description

CALENDAR DESCRIPTION:

Intermediate statistical techniques for the health sciences. Review of introductory concepts in statistics and probability including hypothesis testing, estimation and confidence intervals for means and proportions. Contingency tables and the analysis of multiple 2x2 tables. Correlation and regression. Multiple regression and model selection. Logistic regression and odds ratios. Basic concepts in survival analysis. Students with credit for STAT 305 may not take this course for further credit.

COURSE DETAILS:

**Please note that the two midterms will start at 16:45.

Lab Instructor: Marie Loughin

Outline:

This graduate course provides an opportunity for the further development of analytic skills acquired in basic courses in statistics and the health sciences. It concentrates on the relatively few techniques that are currently most used in health research, but it also seeks to provide a conceptual basis for understanding other techniques. This course focuses on unifying principles and widely applicable methods as opposed to rote memorization of an array of unrelated ad-hoc procedures. The material is presented descriptively, from the point of view of understanding and practical use.

The emphasis of the course is on analysis (rather than design) of observational studies where there is one outcome variable of primary interest and where the data are made up of multiple independent observations. Important areas not covered are: classical multivariate analysis (e.g., factor analysis, discriminant analysis, etc.), longitudinal data analysis, time series, random effects models, and experimental design considerations (e.g., Latin squares, etc.).

Objectives:

By the end of the course the participant should:

1. understand the concept of a statistical model and how such models correspond to specific hypotheses or questions,
2. be able to interpret the results of an analysis in relation to the original questions or hypotheses that motivated the analysis,
3. be familiar with data analysis methods commonly used in health sciences and understand the basic limitations of competing methods,
4. understand and be able to critique the analysis methods described in published health research papers,
5. be able to communicate effectively with statistical consultants.

Topics:

The scheduling of the following topics is approximate:

1. Review of introductory statistics from the prerequisite course: Hypothesis testing, estimation and confidence intervals for means and proportions.
2. Review of basic concepts of probability with applications including diagnostic testing, sensitivity and specificity, the relative risk and the odds ratio.
3. Contingency Tables: The Chi-square test, r x c tables, multiple 2x2 tables, Simpson's paradox, Mantel- Haenszel method.
4. Correlation and simple linear regression: Regression concepts, estimation and testing for regression coefficients, evaluation of the model.
5. Multiple linear regression: Inference for regression coefficients, confounding and interaction, indicator variables, model selection, prediction, model assumptions and checking.
6. Logistic regression: Odds ratios, inference for regression coefficients, model assumptions, case-control studies.
7. Time permitting: Survival analysis including life tables, censoring, Kaplan-Meier method, log-rank test.

Grading

Assignments	10%
Midterm 1 - Oct 15th - 16:45-18:20	20%
Midterm 2 - Nov 19th - 16:45-18:20	20%
Final Exam	50%

NOTES:

Above grading is subject to change.

Assignments:
Assignments are intended to provide practical experience analyzing and interpreting health data. Students are encouraged to work in the Statistics Workshop, where one-on-one help is available. To mark assignments, the Workshop uses Crowdmark, an online system which requires uploading your completed assignments in advance. Please be sure to leave enough time for assembling and uploading your assignment to Crowdmark and for seeking help from the Workshop if necessary. Working with other students is encouraged. You should, however, come to your own conclusions, and write them up in your own words. Methods used should be described and shown, and brief computer output should be included with the answer. The freely-available, statistical-computing environment, R, is supported by the Statistics Workshop and will be used in the course. Students doing poorly on an assignment, turning in a late assignment or missing an assignment will have the final examination used in its place. There will be no late or makeup assignments.

Examinations:
Students will be permitted one 8.5x11 sheet of notes and a calculator for exam. Exam questions will emphasize conceptual understanding and the interpretation of analysis results rather than formula calculations. Any Academic Dishonesty (see below) on midterms and final examinations will be prosecuted and result in an expulsion from this class. Students missing or doing poorly on a midterm examination will have the final examination used in its place; there will be no make-up midterm examinations.

Use of cell phone and computers in class:
Cell phones should be turned off and put away during classes and exams. Use of computers in class should be limited to active participation in taking notes.

Materials

RECOMMENDED READING:

Recommended Textbook:

Principles of Biostatistics (2nd ed.) by M. Pagano, K. Gauvreau. Publisher: Brooks/Cole

ISBN: 9780534229023

The e-book is also available for purchase from the CRC press website:
https://www.crcpress.com/Principles-of-Biostatistics-Second-Edition/Pagano-Gauvreau/p/book/9781138593145

GRADUATE STUDIES NOTES:

Important dates and deadlines for graduate students are found here: http://www.sfu.ca/dean-gradstudies/current/important_dates/guidelines.html. The deadline to drop a course with a 100% refund is the end of week 2. The deadline to drop with no notation on your transcript is the end of week 3.

REGISTRAR NOTES:

SFU's Academic Integrity web site http://students.sfu.ca/academicintegrity.html is filled with information on what is meant by academic dishonesty, where you can find resources to help with your studies and the consequences of cheating. Check out the site for more information and videos that help explain the issues in plain English.

Each student is responsible for his or her conduct as it affects the University community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the University. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the University. http://www.sfu.ca/policies/gazette/student/s10-01.html

ACADEMIC INTEGRITY: YOUR WORK, YOUR SUCCESS