FALL 2016 - STAT 305 D100

INTRODUCTION TO BIOSTATISTICAL METHODS FOR HEALTH SCIENCES (3)

Class Number: 4140 *Delivery Method: In Person*

COURSE TIMES + LOCATION:

Mo 12:30 PM – 2:20 PM
RCB IMAGTH, Burnaby

We 12:30 PM – 1:20 PM
RCB IMAGTH, Burnaby

EXAM TIMES + LOCATION:

Dec 12, 2016
3:30 PM – 6:30 PM
GYM WEST, Burnaby

INSTRUCTOR:

Jack Davis
jackd@sfu.ca

PREREQUISITES:

Any STAT course (except STAT 100), or BUEC 232, or ARCH 376. Statistics major and honors students may not use this course to satisfy the required number of elective units of upper division statistics. However, they may include the course to satisfy the total number of required units of upper division credit.

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 cannot obtain credit for STAT 305 if they already have credit for STAT 302 or 350, or if they are simultaneously enrolled in STAT 305 and either or both of STAT 302 and 350. Quantitative.

COURSE DETAILS:

Lab Instructor: Marie Loughin

Outline:

This 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 as well. An attempt is made to focus on unifying principles and widely applicable methods as opposed to presenting an array of unrelated ad hoc methods. 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 primarily 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: 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 and checking, case-control studies.
7. Time permitting: Survival analysis including life tables, censoring, Kaplan-Meier method, log-rank test.

Grading

Assignments	20%
Midterm 1	15%
Midterm 2	15%
Final Exam	50%

NOTES:

All grading is subject to change.

Examinations:
Students will be permitted one 8.5x11 sheet of notes and a calculator for exam. Exam questions will be of a general nature and emphasize the interpretation of analysis results rather than complex formula calculations. Any Academic Dishonesty (see below) on midterms and final examinations will be prosecuted and result in an expulsion from this class.

Assignments:
In completing assignments, consultation with other students regarding computer programming methods and difficulties is allowed and encouraged. You should, however, come to your own conclusions, and be prepared to defend them in your own words. Plagiarism is a form of Academic Dishonesty (see below), will be fully prosecuted, and may result in loosing all credit for all assignments. Methods used should be described and shown, and brief computer output should be included with the answer. Some familiarity with the JMP statistical package will be helpful.

Use of cell phone and computers in class:
Use of cell phones during class is disruptive to your fellow classmates. 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 – using computers to do email, Facebook, or playing games is also disruptive to your fellow classmates. Such uses of computers should take place outside of the classroom.

Materials

REQUIRED READING:

Required Textbook:

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

DEPARTMENT UNDERGRADUATE NOTES:

Students with Disabilites:
Students requiring accommodations as a result of disability must contact the Centre for Students with Disabilities 778-782-3112 or csdo@sfu.ca

Tutor Requests:
Students looking for a Tutor should visit http://www.stat.sfu.ca/teaching/need-a-tutor-.html. We accept no responsibility for the consequences of any actions taken related to tutors.

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