140.754 ADVANCED METHODS IN BIOSTATISTICS IV

(Biostatistics – 4th term, 3 units)

COURSE SYLLABUS

Instructor: Jeffrey Leek

Contact

Office: 615 N. Wolfe St., Rm. E3624
Office hours: Drop by, make an appointment or email a question
              (please copy Jennifer on questions)
Office Phone: 410-955-1166
Email: jleek "at " jhsph.edu
Course page: http://www.biostat.jhsph.edu/~jleek/teaching/2011/advmeth4

TA: Jennifer Bobb
TA's Email: jfeder "at" jhsph.edu

Class times
Tuesday: 10:30 - 11:50am
Thursday: 10:30 - 11:50am
Lab Session: TBA

Location
Class: Wolfe W4007
Lab: TBA

Description

Advanced Methods in Biostatistics IV covers topics in modern multivariate regression from estimation theoretic, likelihood-based, and Bayesian points of view. The course will cover extensions of these methods to correlated data using generalized estimating equations. The course will also cover more advanced topics for modern high-dimensional analysis, including sparse regression (Lasso), methods for higher order interactions (CART), and high-dimensional multiple testing.

Course Learning Objectives

574 is a course in "statistical methods" – practically this means that the course focuses on understanding, implementing, and interpreting statistical analyses. At the end of the course, students should be able to:

- Describe methods for modern regression analysis

- Implement regression methods and interpret point estimate, interval, and hypothesis-testing output from statistical software in language appropriate for collaboration.

- Identify scientifically appropriate regression models taking into account plausible sources of confounding and effect-modification.

- Numerically evaluate the adherence of methods to their nominal properties, to relate their findings to known theoretical properties, and use these tools to critically appraise regression analyses

- By the end of the course, the student should be able to explain the differences in interpretation between linear, log-linear, and logistic-linear regression methods

- Read, critique, and write papers that develop or apply statistical methods

Prerequisites

Biostatistics 140.751-753

Texts

Course slides and journal papers. Recommended texts will be described in lecture notes.

Grading policy

3 Homeworks (45%)
Weekly Paper Responses (20%)
Final Project (35%): Due electronically: Friday, May 20th at 5pm

Homework, Exercise and Project Rules

- **Homework:** You may discuss with other students, but what you turn in must be your own work (your own write-up, your own computing, ...). By the due date, email electronic copy to Jennifer (jfeder@jhsph.edu) with file name "hw#-last_first.pdf" (# is 1, 2 or 3). "last" is your family name.
- **Weekly Paper Responses :** Must be done completely independently. By the due date, email electronic copy to (jtleek@gmail.com) with file name: "reading##-last_first.pdf" (## is 01, etc.).
- **Take-home final:** Must be done completely independently. By the May 20th deadline, email electronic copy to (jtleek@gmail.com) with file name "project-last_first.pdf". The final project should be in the form of an academic paper – complete with title, abstract, introduction, methods, results, conclusions, and references. The project will be graded on whether:
    o The paper answers the question of interest
    o The statistical methods are appropriate
    o The interpretation of statistical output is accurate
    o The paper conforms to the format/standards of an academic paper