

Stat 689: Biostatistics and Data Analysis

Fall 2010

Time and Place: MWF 3:00pm-3:50pm BLOC 411; Question and Answer Session T 6pm-7pm BLOC 163

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Office Hours: By appointment only

Course Description: This course will present a survey of many important topics in biostatistics. The goal is for each student to gain an understanding of the statistical issues underlying these topics, as well as existing methods and their use in R. This will be a Masters-level course, suitable for students in their second year of studies. Students from disciplines other than statistics are encouraged to enroll. Whereas the existing two-semester STAT 643-644 biostatistics sequence focuses on the mathematical details of biostatistics methods, this course will be geared toward preparing Masters-level statisticians for real-world data analysis.

We will spend some time initially on getting familiar with R. We will then spend approximately 2 weeks on each of the following topics: (1) Applications of regression in biostatistics, (2) Analysis of correlated data, (3) Logistic and Poisson regression for binary or count data, (4) Survival analysis for censored outcomes, (5) The design and analysis of clinical trials, and (6) Special topics (including sample size calculations by simulation, and the bootstrap for assessing statistical significance in general testing situations).

Course Material: No textbook required, although material will be representative of that in books like *Applied Survival Analysis* and *Applied Logistic Regression* by Hosmer and Lemeshow, *Fundamentals of Clinical Trials* by Friedman, Furberg, and DeMets, and *Analysis of Longitudinal Data* by Diggle, Liang, Zeger, and Heagerty, among others.

Prerequisites: STAT 651, 652, and 659, or equivalent. Or prior approval by the instructor.

Computing: All computing will be done with R.

Grading: Your grade will be computed as follows:

- **Homework:** 30% - There will be periodic homework assignments. The assignments will typically involve the analysis of real datasets.
- **Exams:** 30% - There will be two midterm exams (Monday Oct. 4, and Monday Nov. 22), each counting 15% of your grade.
- **Research Project:** 40% - You will be assigned a research project requiring a comprehensive analysis of a real biostatistics dataset. Reports due Friday, Dec. 10.

Incomplete Grade: A temporary grade of I (Incomplete) at the end of a semester indicates that the student has COMPLETED THE COURSE WITH THE EXCEPTION OF A MAJOR QUIZ, FINAL EXAM, OR OTHER WORK. The instructor shall give this grade only when the deficiency is due to an authorized absence or other cause beyond the control of the student.

Statement on Disabilities: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Support Services for Students with Disabilities in Cain Hall. The phone number is 845-1637.

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