Statistics 600

Applied statistics and data analysis I

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Course description: Statistics 600 is an advanced introduction to regression analysis. The course is fast-paced, and focuses on the motivation, construction, and statistical properties of classical and modern regression procedures.

The following topics will be covered: (1) a comprehensive treatment of linear models for independent observations using least squares estimation, with some discussion of non least-squares approaches; (2) regression methods for dependent data, including generalized least squares, estimating equations, and mixed models; (3) generalized linear models and generalized estimating equations (GEE); (4) alternative approaches to regression, including quantile regression, dimension reduction regression, and smoothing-based methods; (5) issues related to data collection and study design, including missing data handling, handling non-representative samples, and designing experiments.

The class includes a lab that meets each week. The lab will focus on computing and data analysis skills.

Regular attendance at the lecture and lab is expected.

Prerequisites: A solid background in linear algebra; knowledge of regression at the level of Statistics 500; knowledge of probability and statistical theory at the level of Biostatistics 601/602; basic programming skills.

Coursework: There will be two in-class exams, one on October 21st, and one on December 9th. Problem sets will be given roughly bi-weekly during the semester. Problem sets will be posted to the course web page, and will be due in class approximately two weeks after being posted. A capstone project covering the whole course will be due on December 14th.

Grading: The final course grade will be weighted 25% from the regular problem sets, 25% from each of the two exams, and 25% from the capstone project.