

Course Information

Time: MWF, 10:40 a.m. – 11:30 p.m.

Location: 230 FLO (Griffin-Floyd Hall)

Instructor: Dr. Brett Presnell

Office: 220 FLO

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Office Hours: See instructor's web page.

Phone: 392-1941 Ext. 236

Web Page: <http://www.stat.ufl.edu/~presnell>

Text: P. McCullagh and J. A. Nelder, *Generalized Linear Models, Second Edition*. Chapman & Hall/CRC, Boca Raton, 1989.

Prerequisites: STA 6327 and STA 6208, or permission of instructor.

Course Content and Objectives

This course will focus on the theory and application of generalized linear models and related statistical topics. Questions on this material appear on the PhD qualifying exam in statistics.

Generalized linear models (GLMs) are a very broad family of statistical models, loosely described as follows. The response variable has a distribution in an exponential dispersion family and the mean response is related to covariates through a link function and a linear predictor. GLMs allow a unified theory for many of the models used in statistical practice, including normal theory regression and ANOVA models, loglinear models, logit and probit models for binary data, and models for gamma responses and survival data. The statistical package GLIM was specifically designed to fit generalized linear models using the iteratively reweighted least squares algorithm. However, similar model fitting capabilities are now standard in statistical packages such as R, Splus, and SAS.

The core material for the course is covered in Chapters 2–9 of the course text. Other topics will be covered if time permits.

Chapter 2. An outline of generalized linear models

Chapter 3. Models for continuous data with constant variance

Chapter 4. Binary data

Chapter 5. Models for polytomous data

Chapter 6. Log-linear models

Chapter 7. Conditional likelihoods

Chapter 8. Models with constant coefficient of variation

Chapter 9. Quasi-likelihood functions

Grading

There will be two exams (a midterm and a final). Exact exam dates will be announced at least two weeks in advance, but the first exam will be near the end of February. Exams will count for at least half the course grade.

Homework will also be assigned periodically and graded. Homework assignments may involve data analysis and computations requiring the use of a statistical package and/or programming language.

Students may also be required to give a presentation on a topic related to the course material but not covered in class. If so, the instructor will provide a list of potential topics, but the student may also choose their own. Each student's topic must be approved in advance by the instructor. In lieu of presentations, the instructor may decide to give a third exam; this will be decided after the first exam.

Other References

Besides the course text, other sources for course materials include:

The Theory of Exponential Dispersion Models and Analysis of Deviance, by Bent Jørgensen.

Statistical Modelling in GLIM, by M. Aitkin, D. Anderson, B. Francis, and J. Hinde.

Generalized Additive Models, by Trevor Hastie and Robert Tibshirani.

Multivariate Statistical Modeling Based on Generalized Linear Models, Second Edition, by Ludwig Fahrmeir and Gerhard Tutz.

Generalized, Linear, and Mixed Models, by Charles E. McCulloch and Shayle R. Searle.