

Statistical Methods II STAT 211

Lectures: Tuesday and Thursday, 9:30-10:50, Room: ICS 259

Discussion: Friday, 3:00-3:50, Room: ICS 253

Discussion section will primarily be used to cover case studies and the application of methods presented in class. In addition, homework questions will also be addressed during the discussion hour.

Course Web Site: Located at <http://www.ics.uci.edu/~dgillen/Stat211WebPage.htm>. Electronic copies of the course handouts and homework assignments as well as datasets used during the course will be posted on the web site.

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Office hours: Wednesday 11:00-12:00,
Thursday 11:00-12:00,
and by appointment

Prerequisites: Statistics 210 (Statistical Methods I) or equivalent; or permission of instructor

Description: This course will provide an introduction to the principles of generalized regression models, with an emphasis on categorical data models. Categorical data occurs extensively in both observational and experimental studies, as well as in industrial applications. The course will focus on both theory and application of methods for data analysis. Problems will be motivated from a scientific perspective.

Required Text: McCullagh P. and Nelder, J. (1989). *Generalized Linear Models, Second Edition*. Chapman & Hall/CRC.

Recommended/reference texts: (On reserve in the science library)

- Agresti, A. (2002). *Categorical Data Analysis*, Wiley-Interscience.
- Casella G. and Berger R. (2001). *Statistical Inference, Second Edition*. Duxbury Press.
- Lindsey, J. (1997). *Applying Generalized Linear Models*. Springer-Verlag.
- Kutner, M., Nachtsheim, C., Neter, J., and Li, W. (2005) *Applied Linear Statistical Models*. McGraw Hill Irwin.

Software/Computing: Examples that are presented in class are primarily done using the R statistical package, and it is recommended that R be used for homework assignments and exams. R is free software which can be downloaded from the web at <http://www.r-project.org/>. R can be installed onto Windows, Mac, or Unix machines. In addition, the student computer lab in CS 364 will have R loaded onto all Windows machines. The website also offers many

tutorials regarding the use of R. If you wish, it is possible to use other commercially available software packages such as Splus, Stata, Matlab, or SAS.

Homework: There will be a total of 8 homework assignments. Assignments will typically be due 1 to 1.5 weeks from the date they are handed out.

Midterm Exam: Tentatively scheduled for Tuesday, February 19th. The exam will be in-class (closed-book, closed-note), and will cover material through the Tuesday, February 12th lecture.

Final Exam: The final exam is scheduled for Thursday, March 20th. The final exam will be take-home and will consist of two portions. The first portion of the exam will consist of short answer questions similar to a comprehensive homework assignment. The second portion of the exam will be a complete statistical analysis and report pertaining to a particular scientific question. The final exam will be handed out on Tuesday, March 11th and due on Thursday March 20th by 3:30pm.

Grading:

Homework:	30%
Midterm:	30%
Final:	40%

Course Objectives: By the end of this course, the student should be able to do the following:

- Understand the assumptions made by OLS methods
- Formulate scientific questions involving continuous or categorical response data as regression problems
- Understand the theory underlying generalized (linear) regression models
- Fit logistic regression models and assess the scientific significance, precision, and interpretation of regression coefficients
- Fit Poisson regression models and assess the scientific significance, precision, and interpretation of regression coefficients
- Understand and fit generalized linear models in the presence of a mean-variance relationship
- Analyze multinomial response data in a regression context
- Interpret and critically evaluate regression analyses in scientific manuscripts and research presentations
- Describe regression methods and results for continuous and categorical data to a non-statistical audience

Course Evaluations: The University will run online course evaluations over a two-week period, during 9th and 10th week. This two-week evaluation window is scheduled to open at 12:01 a.m. on Monday of 9th week and close at 11:59 p.m. on Sunday before finals week.