STATISTICS 602-4
GENERALIZED LINEAR AND NONLINEAR MODELLING

Spring 2002
DAY COURSE

Instructor: C. Dean

Prerequisite:

A Practical Knowledge of Multiple Regression and ANOVA.

Text:

An Introduction to Generalized Linear Models by A. Dobson Chapman and Hall, 1990

Reference:

Statistical Modelling in GLIM Aitkin, Anderson, Francis and Hinde Oxford Science Publications

Course Outline:

Note: This course extends the concepts, methods and approach of standard regression and ANOVA to cover a wide variety of types of outcome data. It employs a modern unified approach to a broad array of non linear regression problems.

1. Brief Review of Fundamental background.
2. Overview: Empty model, link function, simple examples of structuring a mean value vector with link function and design matrix, and of structuring variance with a variance function; iterated reweighted least squares estimation.
3. Examples from exponential-type likelihood models: Normal, including classical linear regression and other links; Poisson, including log-linear regression; Binomial, including logit, probit, and dilution assay. Examples allowing over dispersion.
4. Other Examples.
5. Inference: The variance-covariance matrix of the estimated regression vector and confidence intervals for linear predictors, fitted values, other relevant estimated quantities; comparative evaluation of models, deviance, Pearson statistic, residuals.
6. Logistic Regression.
7. Contingency tables and log-linear models.
8. Ordinal-type outcome: Proportional odds model, proportional hazards model.
9. Survival data.

(or as much of the above as time permits)

Grading:

A grading scheme will be announced by the instructor at the beginning of the semester.

Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester.

Revised October 2001