CATEGORICAL DATA ANALYSIS (MATH 5354)

Instructor: D.L. Hawkins  (817-272-3261, hawkins@uta.edu)
Prerequisites: Linear regression analysis and some Mathematical Statistics
Texts: There is no single book which covers all the material in the course.

Useful books are:
1. Public Program Analysis by Forthofer and Lehnen
2. Applied Categorical Data Analysis by Freeman

Course Coverage

1. Logistic regression
   - maximum likelihood methods
   - weighted least squares methods

2. Weighted least squares methods for response / factors multinomial data
   - the wls estimation strategy, asymptotic theory, delta method, etc
   - parameterizations for experimental designs
   - scalar parameters: probabilities, mean scores, logits, association measures
     (rank correlation), ordinal data methods
   - vector parameters: multiple logits, mean scores, kappa statistics
   - applications to factorial designs with one response, repeated measures designs,
     multivariate responses

3. Maximum likelihood methods for multinomial data
   - maximum likelihood theory and methods
   - log-linear models for association structure of multivariate responses
   - log-linear models for association modeling for ordinal variables

4. Poisson data
   - poisson process model
   - linear and log-linear models for poisson rate
   - wls and ml methods for inference
   - multiple poisson streams

5. Randomization Methods
   - testing methods valid for non-random samples (Fisher exact test, Mantel-
     Haenzel test) for comparing treatments
   - extensions to multivariate responses, association measures

The theory covered in the course will be at the operational level. The emphasis will be
on applying the methods to real problems, the choice of such methods being informed by
a working knowledge of statistical theory. As such, the course should be accessible to
any student having a good working knowledge of linear regression analysis. Grades will
be based on homework and projects.