Instructors: M. Klein, N. Neerchal, and D. Park

Website: Use Blackboard at http://my.umbc.edu

Textbooks: *Linear Regression Analysis* by Seber and Lee.

*Classical and Modern Regression with Application* by Myers.

Objectives: Stat 601 is an introductory graduate level course in the theory and application of linear regression model. Both theory and application will be on the exam.

Software: SAS Code and Output may appear on the exam.

Topics:

- Simple Linear Regression (SLR): the SLR model; least squares estimation; maximum likelihood estimation; partitioning variability; hypothesis testing (slope and intercept); SLR through the origin; assessing quality of fit; confidence interval and prediction intervals.

- Review: vectors; matrices; random vectors.

- Multiple Linear Regression (MLR): the MLR model; least squares estimation; hypothesis testing in MLR; confidence intervals, prediction intervals, simultaneous inference; multicollinearity; categorical/indicator variables.

- Model Selection: model selection criteria; Mallow’s Cp, cross validation; sequential variable selection procedure and all possible regressions.

- Residual Analysis: Plotting and interpreting residuals; Studentized and deleted residuals; outlier detection; diagnostic plots and normal residual plots; transformations; weighted least squares.

- Influence Diagnostics: Sources of influence, residuals and the hat matrix; determining extent of influence on fit; determining influence on model performance; dealing with high-influence points.

Additional Material: If you are interested to review homework and exam materials from Spring 2011, you can email Dr. D. Park (dhpark@umbc.edu) to enroll you to the blackboard on Stat 601 (2011).