Students requiring accommodations as a result of disability, must contact the Centre for Students with Disabilities 778-782-3112 or csdo@sfu.ca

Instructor: Dr. Jinko Graham

Prerequisite: STAT 285 and MATH 251. Ability to communicate clearly in written English.

Textbook: None

Calendar Description:
Theory and application of linear regression. Normal distribution theory. Hypothesis tests and confidence intervals. Model selection. Model diagnostics. Introduction to weighted least squares and generalized linear models. **Quantitative**

Outline:

1. Linear models: Definition, simple and multiple linear regression models, ANOVA models. Incorporating different types of predictor variables and their interactions in the model. Matrix notation.
2. Estimation methods: Least-squares, maximum likelihood. Algebraic and geometrical interpretations.
3. Properties of least-squares estimators: Mean, variance, and covariance of least-squares estimators. Expected value of residual sum of squares.
4. Diagnostic tools: Residual plots, multicollinearity, outliers, influential observations, goodness-of-fit tests.
5. Inference: Interpretation of the parameter estimates. Hypothesis tests, p-values, confidence intervals, prediction and intervals. Inferences for a linear function of the regression coefficients.
6. General Linear Hypotheses: Additional sum of squares principle. Test for lack of fit based on the pure error sum of squares.
7. Model selection: Effect of the question of interest on the choice of model, difficulties in model selection due to multicollinearity. Automatic variable selection procedures, warnings and recommendations.
8. Special methods for ANOVA models: Linear constraints. Factor and interaction plots. Multiple comparison procedures.
9. Introduction to weighted least-squares and generalized linear models.

Through the class project, students will have the opportunity to apply these concepts to a real data set and write up the results of their analysis and the conclusions in a statistical report.

Grading Scheme:

Assignments – 20%
Project – 30%
Final – 50%
Grading is subject to change.

Students looking for a Tutor should send an email to stat@sfu.ca with "Tutor Request" in the subject line.
Please only include information that you would like forwarded to our tutors mailing list.

Revised June 2011