FALL 2014 - STAT 350 D100

# LINEAR MODELS IN APPLIED STATISTICS (3)

*Delivery Method: In Person*

**COURSE TIMES + LOCATION:**

Tu 11:30 AM – 1:20 PM
AQ 3159, Burnaby

Th 11:30 AM – 12:20 PM
AQ 3149, Burnaby

**EXAM TIMES + LOCATION:**

Dec 13, 2014
8:30 AM – 11:30 AM
AQ 3149, Burnaby

**INSTRUCTOR:**

Boxin Tang
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778-782-4898
Office: SC-K 10560

**PREREQUISITES:**

Prerequisite: : STAT 285 and MATH 251.

## Description

**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.

**COURSE DETAILS:**

**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 contrasts. Factor and interaction plots. Multiple comparison procedures.
9. Introduction to weighted least-squares and generalized linear models.

## Grading

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| Homework | 20% |
| Midterm | 30% |
| Final Exam | 50% |

**NOTES:**

*All grading is subject to change.*

## Materials

**REQUIRED READING:**

**Required Textbook:**

*Applied Linear Regression (4th ed.)* by Sanford Weisberg. Publisher: Wiley

**DEPARTMENT UNDERGRADUATE NOTES:**

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

**Tutor Requests:**
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 (contains people external to the University). We accept no responsibility for the consequences of any actions taken related to tutors.

**REGISTRAR NOTES:**

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Each student is responsible for his or her conduct as it affects the University community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the University. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the University. http://www.sfu.ca/policies/gazette/student/s10-01.html

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