

FALL 2018 - STAT 350 D100

**LINEAR MODELS IN APPLIED STATISTICS (3)**

Class Number: 3031 Delivery Method: In Person

**COURSE TIMES + LOCATION:**Tu 11:30 AM – 1:20 PM  
WMC 3210, BurnabyTh 11:30 AM – 12:20 PM  
SWH 10041, Burnaby**EXAM TIMES + LOCATION:**Dec 6, 2018  
12:00 PM – 3:00 PM  
EDB 7618, Burnaby**INSTRUCTOR:**Gamage Perera  
gperera@sfu.ca  
778.782.9975  
Office: SC-K10557**PREREQUISITES:**

STAT 285, MATH 251, and one of MATH 232 or MATH 240.

## 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

Homework	15%
Midterm	20%
Projects	30%
Final Exam	35%

**NOTES:*****Above grading is subject to change.***

## Materials

**RECOMMENDED READING:**

**Introduction to Linear Regression Analysis, 5th ed.** by Montgomery, Peck, Vinning. Publisher: Wiley

Available online for free through the [SFU Library](#)

ISBN: 978-0-470-54281-1

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**DEPARTMENT UNDERGRADUATE NOTES:**

**Students with Disabilities:**

Students requiring accommodations as a result of disability must contact the Centre for Accessible Learning 778-782-3112 or [csdo@sfu.ca](mailto:csdo@sfu.ca)

**Tutor Requests:**

Students looking for a Tutor should visit <http://www.stat.sfu.ca/teaching/need-a-tutor-.html>. We accept no responsibility for the consequences of any actions taken related to tutors.

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