



# STAT 850-4

## Linear Models and Applications

Fall 2013  
Day Course

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

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Instructor: [Dr. Boxin Tang](#)

### **Prerequisite:**

STAT 350 or equivalent

### **Textbook:**

*No Textbook required*

### **Calendar Description:**

A modern approach to normal theory for general linear models including models with random effects and "messy" data. Topics include experimental units, blocking, theory of quadratic forms, linear contrasts, analysis of covariance, heterogeneous variances, factorial treatment structures, means comparisons, missing data, multi-unit designs, pseudoreplication, repeated measures, mixed model formulation and estimation and inference.

### **Course Outline:**

1. Introduction; scope of linear models.
2. General theory; least squares and Gauss-Markov theorem; normal linear models; quadratic forms.
3. Anova models; design issues; block designs; fractional factorial designs.
4. Model selection; diagnostics; algorithms; selection criteria.
5. Multicollinearity; ridge regression; robust estimation; the bootstrap.
6. Mixed linear models; generalized linear models; nonparametric regression.

### **Grading Scheme:**

Assignments:	10%
Midterm 1:	25%
Midterm 2:	25%
Presentation:	20%
Written Report:	20%

*Grading is subject to change.*

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*Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester. Students are reminded that Academic Honesty is a cornerstone of the acquisition of knowledge. Scholarly integrity is required of all members of the University. Students are encouraged to review policies pertaining to academic integrity available on Student Services webpage at <http://students.sfu.ca/academicintegrity.html>*

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