



# STAT 302

## Analysis of Experimental and Observational Data

Spring 2007  
Day Course  
Statistics Workshop

*Students requiring accommodations as a result of disability, must contact the Centre for Students with Disabilities 604-291-3112 or csdo@sfu.ca*

**Instructor: Carolyn Huston**  
**Lab Instructor: [Robin Insley](#)**

### **Prerequisite:**

Any STAT course, or BUEC 232, or ARCH 376. Students cannot obtain credit for STAT 302 if they already have credit for STAT 350, or if they are simultaneously registered in STAT 302 and STAT 350. Stat major and honors students may not use this course to satisfy the required number of elective hours of upper division statistics. However, they may include the course to satisfy the total number of required hours of upper division credit.

### **Textbook:**

*Applied Regression Analysis and Other Multivariate Methods* (3rd ed) by Kleinbaum, Kupper and Muller, publisher Nelson.

### **Calendar Description:**

The standard techniques of multiple regression analysis, analysis of variance, and analysis of covariance, and their role in experimental research.

### **Outline:**

This is a practical course in the use of major statistical packages for multiple regression, analysis of variance, analysis of covariance and related methods.

## **TOPICS**

### **1. Introduction to Regression Analysis**

Simple regression, regression and causality, assumptions of linear regression, measuring adequacy of assumptions, estimation of error variance, inferences concerning slope and intercept, inferences concerning the simple regression line, interpretation of estimated regression lines, prediction with regression line.

### **2. Correlation and its Relationship to Regression**

Definition of the correlation coefficient,  $r$ , measures of association, and the bivariate normal distribution, what  $r$  does not measure, estimation and testing with  $r$ .

### **3. Analysis of Variance**

One- and two-way analysis of variance, the analysis table and related tests, fixed and random effects, multiple comparison procedures and contrasts.

### **4. Multiple Regression Analysis**

Using more than one independent variable, graphical considerations for this problem, assumptions, collinearity, estimation of the best regression equation, analysis of variance table, overall and partial F tests.

### **5. The General Linear Model**

Multiple Regression and analysis of variance as special cases of the general linear model. The general procedure for constructing F-tests by fitting restricted models. Applications to analysis of covariance and comparison of two regression model.

### **6. Correlations: Multiple, Partial and Multiple-Partial**

Correlation matrix, multiple correlation coefficient, the multivariate normal distribution, partial correlation coefficient, F-tests for multiple and partial correlations.

## **7. Analysis of Residuals**

Checking on the assumptions of regression and analysis of variance models, effects of departures from the assumptions, transformations.

### **Grading Scheme:**

Assignments – 20%

Midterm 1 – 20%

Midterm 2 – 20%

Final – 40%

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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. Please consult the General Guidelines of the calendar for more details.*

Revised January 2007