Introduction to Statistics and Data Analysis II

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The focus of this course is on contingency table analysis, analysis of variance and regression. The objective is to learn the basic mechanics of these techniques and to develop an appreciation for the practical issues involved in doing data analysis. The course is a continuation of Introduction to Statistics and Data Analysis I. That course, or its equivalent, is a prerequisite.

There will be problem sets and reading assignments to accompany the lectures. The ideal way to master the material is to work through the problems sets, complete the reading assignments and participate actively in the class discussions. There will also be data analysis assignments that will give participants a chance to analyze realistic social science data and answer questions building models of their own. These assignments will account for 40% of the final grade. Although the assignments will need to be completed using a statistical analysis software package (e.g., SPSS, STATA or SAS), no prior experience with any particular statistical package is required or expected. The emphasis of these assignments is on the interpretation of statistical results and not on teaching how to use a statistical package.

A first exam towards the first half of the course will cover contingency tables, one-way analysis of variance and simple regression. There will then be a short article assignment due as indicated below. A second (and final) exam will cover all the material in the course. The exams and the article will each count 20% toward the final grade.

The required books for the course are:

1. [NW] Neil A. Weiss (2007) Introductory Statistics, 8th Edition. Addison-Wesley (the 7th edition, published in 2004, is also accepted). We will also be using the modules found on the CD-ROM that comes with the text:
   - Module A: Multiple Regression Analysis,
   - Module B: Model Building in Regression, and
   - Module C: Designs of Experiments and Analysis of Variance.


Some recommended books:


These books can be checked out of the ICPSR Library.

**Schedule (to be modified as needed)**

July 21  
Introduction to Contingency Table Analysis, Chi-Square Test of Independence  
NW: Chapter 13: 13.1, 13.3-13.4

July 22  
Introduction to One-way Analysis of Variance (ANOVA), Discussion of Model Assumptions  
NW: Chapter 16: 16.1-16.3

July 23  
One-way ANOVA: Analysis of Residuals, Multiple Comparisons  
NW: Chapter 16: 16.4

July 24  
Introduction to Regression, Regression Equation  
NW: Chapter 14: 14.1-14.2  
MLB: pp. 9-20

July 25  
Regression Model, Regression Model approach to ANOVA  
NW: Chapter 14: 14.3  
MLB: 20-30  
**COMPUTER ASSIGNMENT #1 DUE**

July 28  
Regression: Correlation, Inference for Slope of Population Regression Line, Significance Tests  
NW: Chapter 14: 14.4; Chapter 15: 15.1 – p.742-748; 15.2  
MLB: 30-38

July 29  
Inferences for the Slope of the Population Regression Line: Confidence Intervals, Prediction Intervals  
NW: Chapter 15: 15.2, 15.3

July 30  
Analysis of Residuals, Diagnostic Plots  
NW: Chapter 15: 15.1 - p.748-752  
MLB: p.38-42

July 31  
Case studies (small group meetings with regression output)  
**COMPUTER ASSIGNMENT #2 DUE**

August 1  
Review (during the first hour)  
**First exam** (during the second hour)
August 4  Multiple Regression Model, Basic Results: ANOVA, Confidence Intervals and Significance tests
NW: Module A: Sections 1-5 & Module B: page B-204.
MLB: p.47-54

August 5  Evaluation of the Multiple Regression Model, Analysis of Residuals,
NW: Module A: Section 6 & Module B: Sections 4, 7
MLB: p.58-63

August 6  Multicollinearity, Qualitative Predictor Variables
NW: Module B: Section 3 - p. 85-95
**COMPUTER ASSIGNMENT #3 DUE**

August 7  Qualitative Predictor Variables (continued), Model Specification
NW: Module B: Section 3 - p.92-101

August 8  Interaction
NW: Module B: Section 3 - p.102-112
MLB: p. 54-56

August 11 Non-linear Relationships
NW: Module B: Sections 1-2
MLB: p.43-47, 73-74

August 12  Review and further clarification of topics.
**ARTICLE ASSIGNMENT DUE**

August 13 Study Day (or Review Day as needed).

August 14 **Second exam**