Course Description

This course is designed to provide basic knowledge about descriptive and inferential statistics. Descriptive statistics involves organizing and summarizing the characteristics of the data. Statistical inference involves making informed guesses about the unknown characteristics of a population based on the known characteristics of a sample. This course does not assume a prior knowledge on statistics.

The course focuses on the techniques of bivariate analysis (i.e., analysis of relationships between two variables), including cross-tabs, analysis of variance, correlation, and linear regression. Using the linear regression model, it will also provide an introduction to multivariate analysis (where there are two or more explanatory variables in predicting a dependent variable). The LAB sessions are held in computer LAB, and will focus on data analysis using SPSS (Statistical Package for Social Sciences).


Course Requirement

Attendance: Attendance to all classes and lab sessions is mandatory. Class attendance will comprise 5% of the final grade.

Problem Sets: There will be about 5 problem sets, basically bi-weekly except exam weeks, intended to make sure students understand the class lecture. Each set has about 10 questions, and will be mostly from the textbook exercises. The exam questions will be very similar to these problems. All sets combined will comprise 10% of the final grade. Meeting the deadlines is as important as correctness of the answers.

Exam: There will be 2 in-class non-cumulative exams, mid-term and final. The two exams comprise 40% of the final grade. For each exam, one sheet of paper with hand-written formulas will be allowed.

Lab Assignment: In LAB, you will learn how to use SPSS, based on GSS data (General Social Survey). If you do not finish the class project on time, the work may be given as an assignment. LAB grades, including LAB attendance and assignments, will comprise 15% of the final grade.

Course Paper: Based on LAB practice, you will write a research paper—10 pages long, double-spaced—by the end of the semester. Based on GSS data, you choose your research question(s) and choose any statistical method(s) discussed in this course to answer your questions. A research proposal—about 3 pages—is due by the 6th week. Toward the end of the semester, you will have an opportunity to present your paper in class, for about 10 minutes including questions and answers. The final paper is due by the last class. The term paper will comprise 30% of the final grade (proposal, oral presentation, and written paper for 5%, 5%, and 20%, respectively).
It is very important to read the relevant chapters before each class!

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<th>Course Schedule</th>
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<td><strong>Week</strong></td>
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| 1 Aug 24-26 | Introduction (CH 1)  
Sampling and Measurement (CH 2)  
--Variables and Measurements  
Descriptive Statistics (CH 3)  
--Tabular and Graphical Description  
--Measures of Central Tendency |
| 2 Aug 31-Sep 2 | Descriptive Statistics (CH 3)  
--Measures of Central Tendency  
--Measures of Variation |
| **Problem set #1: due Sep 7** |
| Chapter 1: 1.2, 1.8  
Chapter 2: 2.4, 2.8, 2.20  
Chapter 3: 3.2, 3.4, 3.8, 3.14, 3.34, 3.36 |
| 3 Sep 7-9 | Probability Distributions (CH 4)  
--Probability Distributions for Discrete and Continuous Variables  
--Normal Probability Distribution |
| 4 Sep 14-16 | Probability Distributions (CH 4)  
--Sample Distributions of a Sample Mean  
--Central Limit Theorem  
Statistical Inference: Estimation (CH 5)  
--Point Estimation  
--Confidence Intervals |
| **Problem set #2: due Sep 21** |
| Chapter 4: 4.4, 4.10, 4.14, 4.18, 4.22, 4.24, 4.52  
Chapter 5: 5.6, 5.10, 5.16, 5.28, 5.40 |
| 5 Sep 21-23 | Statistical Inference: Significance Test (CH 6)  
--Elements of Significance Test  
--Significance Test for a Mean  
Statistical Inference: Significance Test for a Proportion (CH 6) |
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| 6    | Sep 28-30 | Comparison of Two Groups  
                 --Quantitative Data: Comparing Two Means  
                 --Qualitative Data: Comparing Two Proportions  
                 --Comparing Dependent Samples |
| 7    | Oct 5-7   | Analyzing Association between Categorical Variables  
                 --Contingency Tables  
                 --Chi-Squared Test of Independence |
| 8    | Oct 12    | Analyzing Association between Categorical Variables  
                 --More on Testing Independence |
|      | Oct 14: MID-TERM EXAM (20 %): Chapters 1-7 |
| 9    | Oct 19-21 | Analyzing Association between Categorical Variables  
                 --Measuring Association in 2 X 2 Tables  
                 --Association between Ordinal Variables, etc.  
                 Linear Regression and Correlation  
                 --Linear Relationships |
| 10   | Oct 26-28 | Linear Regression and Correlation  
                 --Least Squares Prediction of Equation  
                 --Linear Regression Model  
                 --Measuring Linear Association –The Correlation |
| 11   | Nov 4     | Linear Regression and Correlation  
                 --Inference for the Slope and Correlation |
| 12   | Nov 9     | Linear Regression and Correlation  
                 --Model Assumptions and Violations |
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| 13   | Nov 16-18 Comparing Group Means: Analysis of Variance  
--Comparing Several Means: One Way ANOVA  
Problem set #5: due Nov 23  
Chapter 12: 12.2, 12.6, 12.10, 12.12 |
| 14   | Nov 23 Introduction to Multivariate Relationships  
--Association and Causality |
| 15   | Nov 30-Dec 2 Introduction to Multivariate Relationships  
--Controlling for Other Variables  
Multiple Regression and Correlation  
--Multiple Regression Model |

STUDENT PAPER PRESENTATIONS

16   Dec 7-9 Multiple Regression and Correlation  
--Example with Multiple Regression Computer Output  
--Inference for Multiple Regression Coefficients  

STUDENT PAPER PRESENTATIONS

Due Dec 9, Thursday: RESEARCH PAPER (10 pages)

Dec 16 (R) 9:45-11:45 FINAL EXAM (20 %): Chapters 8, 9, 12