Economics 83a: Statistics for Economic Analysis  
Fall 2015

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Office location: Lemberg 124B  
Office Hours: Tuesday, Friday: 10:00 – 11:30 a.m. and by appointment  
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Lecture: Tuesday, Friday 8:00 a.m. – 9:20 a.m. in Lemberg 054  
Teaching Assistant: Amanda Yang  
Recitation: Wednesday 6:30 – 8:20 in Lown 2

Overview

This course provides an introduction to the statistical techniques that are used in analyzing quantitative problems in economics. Topics covered include mean, variance, probability, sampling, estimation, hypothesis testing, and regression analysis. We will also learn how to use STATA. Recitation for this class meets on Wednesdays. Success in this four-credit course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (problem sets, readings, recitation sections, preparation for exams, etc.)

Pre-requisites

Econ 2a or Econ 10a. Calculus requirement: You must have either completed Math 10A with a grade of C- or higher, obtained a 4 or higher on the AP Math AB test, obtained a 3 or higher on the AP Math BC test, or passed the calculus placement exam given by the Economics department.

Learning Goals:

Upon successful completion of the course, you will:

1. Describe data in terms of measures of central tendency (average, median and mode) and variation (variance and range).  
2. Apply the basics of probability theory, set theory and probability rules.  
3. List and explain the difference between continuous and discrete data and some of the distributions that can be used to approximate such types of data.  
4. Estimate measures of central tendency and variation for a population given a limited data set.  
5. Perform hypothesis testing of values for specific population parameters given a data set.  
6. Use methods of fitting data to a linear form

Requirements:

Course requirements include timely completion of assigned readings, mandatory attendance at lectures, problem sets, in-class quizzes, two midterms, and a final exam. The midterms and final exam (cumulative) are closed-book closed-notes exams. Six problem sets will be assigned. You may discuss your problem sets with other students but answers must be written individually. You may work with one to two other students on problem sets but if you work with someone please write the name(s) of the person you worked with on the assignment.
Problem sets are due first thing in class and no late problem sets will be accepted without a valid excuse (as in family emergency or illness.) There will be three in-class quizzes.

No makeup exams or quizzes will be offered during the semester unless there are family emergencies or serious illnesses. Absence from an exam or quiz is excused only if the student has a serious illness or family emergency that has been previously documented. A student who is unable to take the final exam for a legitimate reason must obtain advance authorization from the Office of Undergraduate Academic Affairs.

The weighting scheme for course requirements is as shown below:

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<tbody>
<tr>
<td>Final Exam</td>
<td>30%</td>
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<tr>
<td>Midterm Exam I</td>
<td>20%</td>
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<tr>
<td>Midterm Exam II</td>
<td>20%</td>
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<tr>
<td>Three In-class quizzes</td>
<td>15%</td>
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<tr>
<td>Six Problem Sets</td>
<td>15%</td>
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Attendance data may be used to determine borderline grades.

If your final exam improves upon your lowest midterm grade, then the final exam will be weighted 40% and the lowest midterm will be weighted 10%.

The lowest quiz and lowest problem set score will be dropped at the end of the semester. This policy only applies if you have tried all 3 quizzes and submitted all homeworks.

Important Dates (Tenative Dates for major assignments. May be adjusted depending on pace of course):

Exams:
- Midterm Exam I – Friday, October 9, in class
- Midterm Exam II – Tuesday, November 10, in class
- Final Exam – December 15th

Quizzes:
- In-class quiz I – Friday, September 25, in class
- In-class quiz II – Tuesday, November 3, in class
- In-class quiz III – Friday, December 4, in class

Problem Sets:
- Problem Set 1 – Assigned on September 4, due on September 11
- Problem Set 2 – Assigned on September 15, due on September 22
- Problem Set 3 – Assigned on October 6, due on October 13
- Problem Set 4 – Assigned on October 16, due on October 23
- Problem Set 5 – Assigned on October 30, due on November 6
- Problem Set 6 – Assigned on November 17, due on November 24

Textbook + Materials:

The text is Wonnacott and Wonnacott, *Introductory Statistics* (5th edition). Weekly assigned readings from the text are as highlighted below. It is also helpful to have access to a calculator which performs basic arithmetic.

Special Accomodations:

If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me immediately. Please keep in mind that reasonable accommodations are not provided retroactively.
Teaching Style:
My lecture style uses a combination of board notes, going over problems and lecture slides. If I use lecture slides and post them online be aware that they are not a substitute for class attendance. We will cover some things in class that are not on the slides and not everything on the slides may be covered in class!
**Academic Honesty:**

You are expected to be honest in all of your academic work. Please consult Brandeis University Rights and Responsibilities (http://www.brandeis.edu/studentlife/srcs/rr/) for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university.

**Outline of Lectures and Recommended Readings**

This schedule may be adjusted as the course proceeds

**Week “1” (August 28, September 1, 4):**

*The Nature of Statistic* - W&W, Chapter 1 - Random sampling and randomized experiments.

*Descriptive Statistics* - W&W, Chapter 2 - Mean, variance, frequency tables and graphs.

**Week 2 (September 8, 11):**

*Probability* - W&W, Chapter 3 - Probability models, conditional probability, independence, and Bayes theorem.

**Week 3 (September 18):**

*Probability Distributions* - W&W, Chapter 4 - Discrete random variables, the Binomial distribution, the Normal distribution.
Week 3 & 4 (September 18, 22):

Two Random Variables - W&W, Chapter 5 - Functions of two random variables, covariance, linear combination of two random variables.

Week 4 & 5 (September 25):

Sampling - W&W, Chapter 6 - Random sampling, shape of the sampling distribution.

Week 5 & 6 (October 2, 6):

Point Estimation - W&W, Chapter 7 – Populations and samples, efficiency of unbiased estimators, consistent estimators.

Week 7 (October 9):

Confidence Intervals - W&W, Chapter 8 – A single mean, small sample t, difference in two means.

Week 7 & 8 (October 13, 16):

Confidence Intervals - W&W, Chapter 8 – A single mean, small sample t, difference in two means.

Hypothesis Testing - W&W, Chapter 9 – Hypothesis testing using confidence intervals, p-values.

Week 8 & 9 (October 20, 23):

Fitting a Line - W&W, Chapter 11 – Ordinary Least Squares.

Week 9 & 10 (October 27, October 30):

Simple Regression - W&W, Chapter 12 – The regression model, confidence intervals, prediction.

Multiple Regression - W&W, Chapter 13 – The regression model and its OLS fit, confidence intervals and statistical tests.
Week 10 & 11 (November 3, 6):

Multiple Regression - W&W, Chapter 13 – The regression model and its OLS fit, confidence intervals and statistical tests.

Week 11 & 12 (November 10, 13):

Regression Extensions, Correlation - W&W, Chapters 14 & 15 – Dummy variables, correlation and regression.

Week 12 (November 17):

Regression Extensions, Correlation - W&W, Chapters 14 & 15 – Dummy variables, correlation and regression.

Week 13 & 14 (November 20, November 24):

STATA Sessions

Week 14 & 15 (December 1, December 4):

Analysis of Variance - W&W, Chapter 10 – One way ANOVA.

Review

Final Exam: TBD

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