SYLLABUS

The New School
Quantitative Methods | Spring 2011

Tuesdays & Thursdays 6:00pm – 7:50 | Room 910

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Course Description
This core graduate course prepares students to compute, apply, and interpret descriptive and inferential statistics. Some hands-on lectures will be given in a computer lab classroom, where students will learn basic functions in SPSS—statistical analysis software popular in the social sciences.

Course Materials
Text: Healey, Joseph F. Statistics: A Tool for Social Research, 7th *or* 8th Edition. It is not important that you buy the newest edition.

SPSS: This course requires that you access a fully functioning version of SPSS software. This software is available in New School computer labs, on nearly all of the PC's. You may also seek to purchase your own license, but if you do so you must purchase this version: *IBM® SPSS® Statistics Base GradPack 19 for Windows*; a 6-month license is available at www.onthehub.com for $35. The Mac version is *IBM® SPSS® Statistics Base GradPack 19 for Mac*, also $35 for a 6-month license at OnTheHub. **The Student Version of SPSS is not fully functioning, and is not approved for use in this class.**

Calculator: A basic scientific hand calculator.

Communication and Resources
Communication outside of the classroom will be conducted by email and BlackBoard. **Emails will be sent through Blackboard, so if you do not regularly check your New School account, be sure to set your account to have them forwarded to your preferred email.** Notes, resources, and assignments will also be posted on BlackBoard. The instructor is available by appointment.

The graduate teaching assistant is available as a resource throughout the semester. The teaching assistant is available by appointment and in special sessions for help with specific areas of course material and SPSS assignments.

Course Requirements
Attend all classes. Absences must be excused in advance. Three absences may result in a grade reduction and four or more absences may result in failure of the course.

The assigned readings are an important component to this course and are required. All lecture notes posted on BlackBoard are required reading.

Three SPSS assignments will be given. Assignments must be submitted on time, in hard copy.

Grading

Midterm exam: 30%, final exam: 40%, and SPSS assignments: 30% (10% each assignment).

Date	Topic	Reading*/Notes
1/25 T	Introduction	
1/27 R	Fundamental Concepts & Math Review	
2/1 T	Basic Descriptive Statistics	Chapters 1 & 2
2/3 R	Measures of Central Tendency	Chapter 3
2/8 T	Measures of Dispersion	Chapter 4
2/10 R	Lab 1: Intro to SPSS	Lab
2/15 T	The Normal Distribution	Chapter 5
2/17 R	Inferential Statistics: Sampling and the Sampling Distribution	Chapter 6
2/22 T	Estimation Procedures	Chapter 7
2/24 R	Lab 2: Univariate Statistics, Tables, and Graphs	Lab
3/1 T	Hypothesis Testing: One-Sample	Chapters 8 & 9
3/3 R	Hypothesis Testing: Two Sample	SPSS Assignment 1 Due
3/8 T	Exam Review	
3/10 R	Midterm Exam	
	SPRING BREAK	
3/22 T	Hypothesis Testing: ANOVA	Chapter 10
3/24 R	Lab 3: Hypothesis Testing 1	Lab
3/29 T	Hypothesis Testing: Chi Square	Chapter 11
3/31 R	Lab 4: Hypothesis Testing 2	Lab
4/5 T	Measures of Association: nominal and ordinal	Chapters 12, 13, & 14
4/7 R	Measures of Association: interval-ratio	Chapter 15
4/12 T	Simple Regression	Chapter 17, Sections 17.3, 17.4, 17.6, & 17.7 only
4/14 R	Lab 5: Correlation and Simple Regression	Lab; SPSS Assignment 2 Due
4/19 T	Multivariate Techniques	
4/21 R	Multiple Regression	
4/26 T	Multiple Regression 2	
4/28 R	Lab 6: Multiple Regression	Lab
5/3 T	Interpreting Statistics	
5/5 R	Interpreting Statistics	SPSS Assignment 3 Due
5/10 T	Exam Review	
5/12 R	Final Exam	

Reading assignments should be completed before the class on the date assigned. For example, when you come to class on 2/1, you should have already read chapters 1 and 2.

Homework Assignments

Deadline	**Assignment (from textbook, unless otherwise indicated)**
2/1	1.4
2/8	2.2, 2.4, 3.2, 3.10, 3.14
2/15	4.4 (calculate manually), 4.6 (calculate in Excel), 4.16
2/22	5.2, 5.4, 5.10, 5.14
3/1	7.4, 7.8, 7.12, 7.18
3/8	8.2, 9.4, 9.8, 9.12, Sample midterm exam*
3/29	10.6
4/5	11.4, 11.8
4/12	Interpretation of SPSS output*: measures of association
4/19	15.2
4/26	Interpretation of SPSS output*: multiple regression
5/3	Sample final exam*

*Will be posted to BlackBoard at least one week prior to deadline.

Homework assignments are required, but will not be graded. You should always bring your completed homework assignments for the entire semester to every class, TA session, and meeting with the professor or TA. They may be requested at any time, and you should be able to produce them upon request. Additionally, you may be asked at random to go through one of the problems in class.

Generally, these assignments are meant to be the ***bare minimum*** of the practice problems that you should be doing outside of class. You should also work through odd-numbered problems as needed, and any other problems that will help prepare you for exams. These assignments, along with other problems from the book will be reviewed in the TA sessions.

Proportion

$$p = \frac{f}{N}$$

Percentage

$$\% = \left(\frac{f}{N}\right) * 100$$

Mean

$$\bar{x} = \frac{\sum(X_i)}{N}$$

Ratio

$$ratio = \frac{f_1}{f_2}$$

Percent Change

$$\%\Delta = \frac{f_2 - f_1}{f_1}$$

Standard Deviation

$$s = \sqrt{\frac{\sum(X_i - \bar{X})^2}{N-1}}$$

Z-Scores

$$Z_i = \frac{X_i - \bar{X}}{s}$$

Estimation Procedures, mean (large samples)

$$c.i. = \bar{X} \pm Z\left(\frac{s}{\sqrt{N-1}}\right)$$

Estimation Procedures, proportion (large samples)

$$c.i. = P_s \pm Z\sqrt{\frac{0.25}{N}}$$

Z Scores for Common Levels of Alpha

Level of Confidence	α	Z-Score, Two Tail	Z-Score, One Tail
90%	0.10	± 1.65	+ *or* – 1.29
95%	0.05	± 1.96	+ *or* – 1.65
99%	0.01	± 2.58	+ *or* – 2.33
99.9%	0.001	± 3.29	+ *or* – 3.10

One-Sample Hypothesis Tests

Means, large sample (σ is known)

$$Z(obtained) = \frac{\bar{X} - \mu}{\sigma / \sqrt{N}}$$

Means, small sample (or, large sample when σ is unknown)

$$t(obtained) = \frac{\bar{X} - \mu}{s / \sqrt{N-1}}$$

Proportions, large samples

$$Z(obtained) = \frac{P_s - P_u}{\sqrt{P_u(1-P_u)/N}}$$

Two-Sample Hypothesis Tests

Means, large samples

$$\sigma_{\bar{x}-\bar{x}} = \sqrt{\frac{s_1^2}{N_1 - 1} + \frac{s_2^2}{N_2 - 1}}$$

$$Z(obtained) = \frac{(\bar{X}_1 - \bar{X}_2)}{\sigma_{\bar{x}-\bar{x}}}$$

Means, small samples

$$\sigma_{\bar{x}-\bar{x}} = \sqrt{\frac{N_1 s_1^2 + N_2 s_2^2}{N_1 + N_2 - 2}} * \sqrt{\frac{N_1 + N_2}{N_1 N_2}}$$

$$t(obtained) = \frac{(\bar{X}_1 - \bar{X}_2)}{\sigma_{\bar{x}-\bar{x}}}$$

Proportions, large samples

$$P_u = \frac{N_1 P_{s1} + N_2 P_{s2}}{N_1 + N_2}$$

$$\sigma_{p-p} = \sqrt{P_u(1-P_u)}\sqrt{\frac{N_1 + N_2}{N_1 N_2}}$$

$$Z(obtained) = \frac{(P_{s1} - P_{s2})}{\sigma_{p-p}}$$

Version: 1/16/2011