

UEP 254 Quantitative Reasoning and Statistical Methods for Policy and Planning

Department of Urban and Environmental Policy and Planning
Tufts University
Fall 2015

Section 1: Tuesday 9:00 – 11:30 am
Lab 1: Wednesday 4:30 – 5:45 pm

Section 2: Thursday 9:00 – 11:30 am
Lab 2: Friday 12:00 – 1:15 pm

All classes and labs held in Eaton 208

Teaching Team

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Wed 3-5 pm, or by appt.

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Course Description

Planners and policy analysts frequently encounter and work with quantitative data throughout their careers. Some professionals analyze, summarize, and present original data they have collected or secondary data obtained from another source; others review, evaluate, and assess the validity of arguments in existing quantitative analyses. This course is designed to prepare students to critically read and interpret statistical analyses produced by others, as well as to conduct basic statistical analyses of data on your own.

The course emphasizes quantitative reasoning, which involves research design and the development of sound arguments, so that students appreciate both the power and limits of quantitative analysis in argumentation. Using real examples from planning and policy issues, students will become familiar with a variety of analytical tools used to describe data, generate estimates, and test hypotheses. In addition, students will learn how to use statistical software and existing data sources to conduct quantitative analyses.

Proficiency in college-level algebra is a pre-requisite for this course.

Course Objectives

By the end of this course, students will be able to:

- Identify types of arguments and evaluate their components
- Understand the components of research design
- Use computer software to perform quantitative analysis
- Conduct basic statistical analyses of data
- Understand and interpret statistical tables

Textbook

Students may use either of the following textbooks:

Pollock, P. H. 2011. *The Essentials of Political Analysis*. Washington, DC: CQ Press.

OR

Meier, K., Brudney, J. & Bohte J. 2011. *Applied Statistics for Public and Nonprofit Administration*. Belmont, CA: Wadsworth.

The basic material is similar but it is treated somewhat differently. The Pollock book uses examples from political science while the Meier et al. book offers examples from public administration.

For lab sessions and learning statistical software, we will use:

Pollock, P. H. 2011. *An SPSS Companion to Political Analysis*. Washington, DC: CQ Press.

Software

The course will provide instruction on how to use SPSS, which is a standard statistical software program. SPSS is installed on the computers in the lab and available for your use. Students wishing to purchase their own copy of SPSS can find more information here:

<https://it.tufts.edu/sw-spss>.

Course website

The website for this class provides student access to general course information, handouts, supplemental readings, homework sets, datasets, and other materials throughout the semester. It can be accessed from <http://trunk.tufts.edu>. Follow the instructions on the website for Tufts students to obtain your username and password.

Expectations

Students are expected to attend all class sessions, arrive on time, and be prepared to participate. The course is designed to be interactive so students should complete the readings and be ready to discuss them during class. In addition, students are expected to complete all assignments and submit them by the due date.

Assignments

Separate homework problem sets will be distributed throughout the course. The problem sets will focus on answering word problems, conducting statistical analyses, and practicing statistical software techniques covered during the lab sessions. Students are encouraged to work together on homework assignments but each student must submit her own work that reflects the student's understanding of the assignment.

Exams will test students' understanding of statistical concepts, problem-solving ability, and skill in applying their statistical knowledge to different situations. The exams will build on and expand beyond the material covered in lectures, labs, and problem sets.

Each student is required to write a short (5-8 double-spaced pages) research paper demonstrating their understanding of the statistical techniques covered during class. The paper should include the following sections: introduction, research questions, data, methods, results, and discussion. See class readings for examples. Students are encouraged to pursue topics that are relevant to their own interests.

Component	% of Grade
Homework assignments	30%
Exam 1	15%
Exam 2	15%
Research paper	30%
Participation	10%
Total	100%

Late assignments will not be accepted.

Please be aware that you need to obtain a grade of B- or better in order to successfully complete this quantitative core course as required by the UEP MA and MPP programs.

Course Schedule

Week	Date	Topics	Pollock book	MB&B book
1	Sep. 8 Sep. 10	Introduction to course Basics of statistics Types of arguments		
2	Sep. 15 Sep. 17	Research design and implications Measurement validity and reliability	Ch. 3, 4 Ch. 1	Ch. 3 Ch. 2
3	Sep. 22 Sep. 24	Levels of measurement Data sources Descriptive statistics	Ch. 2 -- Ch. 2	Ch. 2 -- Ch. 4, 5, 6
4	Sep. 29 Oct. 1	Basics of probability Normal distribution	-- Ch. 6	Ch. 7 Ch. 8, 9
5	Oct. 6 Oct. 8	Inferential statistics and sampling Confidence intervals	Ch. 6 Ch. 6	Ch. 11 Ch. 11
6	Oct. 13 Oct. 15	Hypothesis testing Proportions and populations	Ch. 6 Ch. 7	Ch. 12 Ch. 13
7	Oct. 20 Oct. 22	Exam		
8	Oct. 27 Oct. 29	Testing the difference between two groups	Ch. 7	Ch. 14
9	Nov. 3 Nov. 5	Nominal and ordinal data Scatterplots and correlation	Ch. 5, 7 Ch. 8	Ch. 15, 16 Ch. 18
10	Nov. 10 Nov. 12	Veteran's Day – NO CLASS Linear regression	Ch. 8	Ch. 18, 19
11	Nov. 17 Nov. 19	Linear regression Multiple regression	Ch. 8 Ch. 8	Ch. 18, 19 Ch. 21
12	Nov. 24 Nov. 26	Multiple regression Thanksgiving – NO CLASS	Ch. 8	Ch. 21, 23
13	Dec. 1 Dec. 3	Exam		
14	Dec. 8 Dec. 10	Research projects and applications	--	Ch. 24