

For for 17.871
Political Science Laboratory
MIT
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E53-220
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NOTE: Because this subject is labor-intensive and has presentation requirements, there will be enrollment limitations. See below for the priority system to be used if necessary. The prerequisite (17.869) is strictly enforced.

Purpose

The purpose of this class is to introduce undergraduate political scientists to the basic quantitative tools of political science research. In particular, this class explores the key statistically-based research tools that social scientists use to frame and answer empirical questions. When you finish this subject successfully, you will be able to conduct quantitative research, be better able to read critically much of the professional literature in political science and other statistically-based fields, and have an employable skill. The most important purpose behind the political science laboratory, however, is to help you move from being a passive reader of social scientific tomes to being a creative producer of new insights.

Producing new knowledge, or systematically probing someone else's claims, can be a lot of fun. In order to get to the fun, there is a lot of stuff we have to consider. Consequently, this subject runs on three (roughly) parallel tracks.

Leaving on Track 1 is statistics. Statistical reasoning is the most important method of testing hypotheses in the social sciences. Therefore, the statistical introduction offered here forms the core of the subject. The approach I will take to statistics is informal and intuitive. The approach could be more formal and less intuitive, but that would leave us with less time to get on to the new knowledge part. If this subject piques your interest in statistical methods, or if you want a more rigorous treatment of the statistical topics addressed here, consider taking 17.846 (Multivariate Political Analysis), 14.31 (Econometrics), or 6.430J (Engineering Probability and Statistics).

Leaving on Track 2 are research mechanics. Serious scholarship requires hard work, organization, and attention to detail. Lots of people have lots of interesting ideas about how the social world works. Some of these ideas are right, others, nuts. In the long run the researchers who are taken the most seriously and who make the biggest contributions are the ones who get down and dirty with the data. And doing good empirical research involves knowing how libraries work, how to convince people to be interviewed by you, how to type numbers into a computer, how to write code in monster statistical packages, and how to craft a clear English-language sentence. We will therefore spend a good amount of time with the mundane tasks of learning how to use one statistical package

(called *STATA*) and learning how to write papers that follow a specific style book (Turabian's *Manual for Writers of Term Papers, Theses, and Dissertations*).

Leaving on Track 3 is a project of your own making. There is an old Chinese proverb that says, "I hear and I forget; I see and I remember; I *do* and I *understand*." It is this philosophy that drives the Institute's lab requirement, and it is the philosophy that drives this subject. You will be responsible for finding a question that interests you and applying the skills you're learning in this subject toward learning (and understanding) something new. This is the most interesting part of this subject. It can be fun, but it's also much more difficult than it first appears. Because doing original research is so hard, I am firmly enforcing the prerequisite (17.869). You need to have a good understanding about what political science is and what political scientists do before taking this class. Otherwise, I can guarantee that you will be totally at sea the last half of the semester.

Subject organization

We will meet twice each week. During the first half of the semester the primary purpose of these meetings will be to review materials in two formats: lecture and discussion. The subject schedule that begins on page 4 delineates what will happen each class meeting. **I expect you to be prepared for each class.** Preparation will involve different things, depending on what we will be doing in that meeting. During some meetings I will be presenting material from one of the textbooks. For those, you will be expected to have done the textbook reading before the class. I will pay attention to who seems prepared and who is not. If you are unprepared for a particular class meeting, come to class any way, because I will grade down people who are regularly absent.

During the second half of the semester we will meet twice each week to talk about your research projects. You will be required to make two class presentations during this period. At the first presentation, you will be responsible for introducing the class to the problem you wish to address, how you plan to address it, and your preliminary findings. At the second presentation you will be responsible for presenting your findings. These will be brief presentations, probably no more than 10-15 minutes apiece. Because you will be graded on these presentations, you should practice them beforehand.

Subject requirements

1. *Class attendance and discussion of assigned readings.* (20% of grade) See the comments in the first paragraph of the section on **Subject Organization**. Come to all the regularly-scheduled class meetings. We may hold *ad hoc* review and workshop sessions during the term, which are optional. **Attending the oral presentations that your colleagues give about their research is *not* optional; your constructive participation in these sessions from the perspective of the audience will be a major aspect of this part of the grade.**

2. *Data analysis exams and problem sets.* (20% of grade) There will be two short (30-minute), in-class exams, that cover material from the text book, along with three take-home exercises. These are intended to make sure you have been serious about mastering the most basic technical and mechanical aspects of conducting quantitative research.

3. *Group project.* (20% of grade) There will be a group project assigned the first month of the semester, to give you a short introduction to doing quantitative social science research. The final product of each project will be graded, with you assigned a grade that is a linear combination of your own effort and the effort of the group.

4. *Write-up of the final research project.* (40% of grade) The final project is the culmination of this subject. You should start on the first day of the semester in thinking about what you want to research and getting together your data. Keep in mind that there is an old adage about estimating the amount of time it takes to gather and analyze data for an original project: Take your original estimate. Double it. Double it again. And again. You will still be wrong by a factor of two. In writing up your research project, you must organize the paper using a style book, preferably Kate Turabian's. The final write-up must be delivered to me at the *start* of the last class meeting. Do not assume that I will grant you an extension.

Books to purchase

The following books are available for purchase at the Coop or Copy Tech.

Ulrich Kohler and Frauke Kreuter. *Data Analysis Using Stata*. Stata Press, 2005.

Edward Tufte. *Data Analysis for Politics and Policy*. Prentice-Hall, 1974. (Purchase from Copy Tech 11-0004)

[Also available online](#)

Edward Tufte. *Cognitive style of Power Point*. Graphics Press, 2nd edition, 2006.

Edward Tufte. *Visual-Statistical Thinking: Displays of Evidence for Decision Making*. Graphics Press, 1997

Enrollment limitation

This is a labor-intensive subject and one that is constrained by the requirement that people present their work. Experience has demonstrated that sixteen is the maximum number who can take this subject profitably at one time. Therefore, if more than sixteen attend the first class meeting, I will assign everyone who attends a priority number, ranging from 1 to n , n being the number of people who attend. The priority system operates in the following order:

- Political science majors, seniors
- Political science majors, juniors
- Political science minors, seniors
- Political science minors, juniors
- All other seniors
- All others.

I will stringently enforce the published prerequisite for this class, and I will know if you have taken the subject. If you are a freshman, sophomore, or junior and have not taken 17.869, you may not take 17.871. If you are a senior and haven't taken 17.869 (formerly 17.197), you will be placed in whichever category above you belong in.

Overall structure

	Mon.		Wed.
Feb.			Introduction and research design 6
	Introduction to Stata 11		Data Resources and Library Research 13
	Class meets Tuesday Descriptive statistics I 19		Descriptive statistics II 20
	Bivariate relationships I 25		Bivariate relationships II 27
Mar.	Multivariate regression I 3		Multivariate regression II 5
	Presentation of group projects 10		Workshop/individual meetings 12
	Workshop/individual meetings 17		Sampling & inference I 19
	Spring break 24		Spring break 26
	Sampling & inference II 31		Workshop 2
Apr.	Individual presentations I 7		Individual presentations I 9
	Workshop 14		Workshop 16
	Patriots' Day 21		Workshop 23
May	Workshop 28		Workshop 30
	Individual presentations II 5		Individual presentations II 7
	Individual presentations II 12		Individual presentations II 14

Assignments

Topic	Date(s)	Assigned readings (suggested readings in parentheses)	Notes
Introduction and research design	Feb. 6	None	Introductions, assignments, and overview of political analysis.
Introduction to STATA	Feb. 11	Kohler & Kreuter, <i>Data analysis</i> , chs. 1-3, 5 Handouts: "How to use the <i>STATA</i> infile and infix commands" and "How to use the <i>STATA</i> 'merge' command."	Do the readings before class so that you will be prepared for the hands-on Stata exercises. Hand out problem set 1. Hand out group projects
Data Resources and Library Research	Feb. 13		
Descriptive statistics I	Feb. 19	Freedman, et al, <i>Statistics</i> , chs. 3, 4	
Descriptive statistics II	Feb. 20	Kohler & Kreuter, <i>Data analysis</i> , ch. 7	Hand out problem set 2
Bivariate relationships I	Feb. 25	Tufte, <i>Data analysis</i> , ch. 1 (Gujarati, <i>Basic Econometrics</i> , Introduction)	
Bivariate relationships II	Feb. 27	Tufte, <i>Visual and Statistical Thinking</i> Kohler & Kreuter, <i>Data analysis</i> , ch. 6 (Utts and Heckard, <i>Mind</i> , ch. 2)	
Multiple regression I	Mar. 3	Tufte, <i>Data analysis</i> , ch. 3 Kohler and Kreuter, <i>Stata</i> , pp. 177-192 (Gujarati, chs. 1-3, 6)	Short exam.
Multiple regression II	Mar. 5	Tufte, <i>Data analysis</i> , ch. 4 (Achen, <i>Interpreting and Using Regression</i>)	Hand out problem set 3
Presentation of group projects	Mar. 10		Each group will have 15 minutes to make presentations
Workshop/individual meetings	Mar. 12, 17		I will meet individually with you to discuss your final project.
Sampling and inference I	Mar. 19	Utts and Heckard, <i>Mind</i> , chs. 14 (Freedman, et al., <i>Statistics</i> , 17, 18, 20, 21, 23, 24, 26, 27, 29)	
Sampling and inference II	Mar. 31		Hand out problem set 4
Informal work session	Apr. 2		
Preliminary presentations	Apr. 7, 9	Tufte, <i>The Cognitive Style of PowerPoint</i>	Each student will have five minutes to present preliminary findings.
Informal work sessions	Apr. 14, 16, 23, 28		These sessions are for you to work on your project and seek help.
Final presentations	May 5, 7, 12, 14		Short exam on May 7. Write-ups due May 14 @ 5pm.

I will occasionally supplement the readings with short articles describing intriguing studies.