

POL SCI 363: QUANTITATIVE POLITICAL METHODOLOGY

Washington University in St. Louis
L32 Political Science
Summer Session 2, 2014 (06/19 - 07/11)
Monday-Friday, 11:00-12:45
Cupples II, 200

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COURSE DESCRIPTION. This course provides an introduction to research methods used by social scientists to draw conclusions from data. The purposes of the course are to equip you to evaluate and criticize empirical arguments that you encounter in social science and policy debates, improve your ability to ask and answer research questions, and to give you the skills to employ quantitative research methods to analyze your own data.

The central concept underlying the research methods in this course is *inference* – the process of reaching conclusions about unknown relationships from a set of known facts. Two kinds of inferences are covered in this course: descriptive and causal. *Descriptive inferences* identify quantities and patterns in the data. Descriptive inferences provide answers to questions such as: What percentage of St. Louis County residents identify as Democrats? What is the President's approval rating among likely voters in the midterm election? Do democracies go to war more or less often than non-democracies? *Causal inferences* draw conclusions about cause and effect from data. Causal inferences provide answers to questions such as: Do universal health care policies reduce infant mortality? How much do online get-out-the-vote campaigns increase voter turnout? Does campaign spending affect election results?

After completing this course, you will be well-equipped to critique descriptive and causal inferences that you encounter in your substantive political science courses, in the news media, and in policy debates. You will also be able to apply basic research methods to real datasets to answer new descriptive and causal questions.

DON'T PANIC. Many concepts in quantitative methods are expressed in mathematical symbols. However, the mathematical content of the course is very light and a high school algebra course is more than enough preparation to succeed in this course. All of you are capable of mastering this material. Please ask questions when concepts are unclear, complete the readings prior to class, and attend my office hours early and often.

COURSE MATERIALS.

- Paul Kellstedt, Guy Whitten. 2013. *The Fundamentals of Political Science Research*. 2nd Edition. Cambridge University Press.
- Selected readings to be distributed online.

LAPTOPS AND SOFTWARE. To complete the in-class exercises, you will need to bring your laptop to class every day. If you do not own a laptop, please let me know as early as possible and I will make alternative arrangements. We will make use of the R statistical computing language. The necessary software is free, and can be downloaded at <http://cran.us.r-project.org/>.

No prior computing knowledge beyond basic computer literacy is assumed. Some students may find learning the software to be frustrating at first, but it is worth the investment. First, statistical computing is an extremely marketable skill.¹ R is used heavily in the federal government², in the financial services industry and at companies such as Google³. Second, knowing a flexible statistical language gives you the power to answer your own research questions and satisfy your own intellectual curiosity.

COURSE REQUIREMENTS AND GRADING. I do not believe that listening to me lecture for two hours and then going home to work on problems by yourself is the best way to learn research methods. To that end, my goal is to minimize lecture and homework and maximize time spent on in-class activities. To make this model work **it is absolutely essential that you complete the reading assignment every day before class**. It is also essential that you visit me during office hours to clarify any concepts from the readings that are not clear to you. To that end, a significant portion of your grade in this course is devoted to participation. Your grade is determined in the following way:

Exam 1	20%
Exam 2	20%
Exam 3	20%
In-Class Assignments	20%
Participation	20 %

Participation consists of (1) making it clear to me that you completed the reading assignment and attempted to engage with the material, (2) meaningfully contributing to group exercises (which will constitute more than half of our time in class), and (3) attendance, which is actually implied by (1) and (2). In-class assignments are due at the end of each class period and will be completed under my supervision. Therefore, I expect that students who come prepared to fully participate in class will do very well on the in-class assignments. Students who neglect the reading assignments will receive low participation score and are unlikely to receive high scores on in-class assignments or on examinations.

GRADING SCALE. The course will follow as standard grading scale:

¹See <http://www.nytimes.com/2009/08/06/technology/06stats.html>.

²For examples, see: http://www.gsnmagazine.com/node/26483?c=cyber_security

³<http://nyti.ms/1619huu>

97-100	A+	77-79	C+
93-96	A	73-76	C
90-92	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	63-66	D
80-82	B-	60-62	D-

POLICIES. Several class policies are reviewed below.

ATTENDANCE Attendance is required. Unexcused absences result in a loss of participation and in-class assignment points for that day. Excused absences are allowed with advance notice, but in these cases you will be required to complete a homework assignment to make up the participation and in-class assignment points. The make-up homework will be a lot more difficult and time-consuming than attending class, so I will assume that they provide a strong enough incentive to attend class that I will not demand doctor's notes or other forms of proof for excused absences.

ACADEMIC INTEGRITY I will strictly adhere to the University's policies on academic integrity. You may review them here: <http://wustl.edu/policies/undergraduate-academic-integrity.html>.

DISABILITIES Students who are seeking support for a disability or a suspected disability should contact Disability Resources at 935-4153. Disability Resources is responsible for approving all disability-related accommodations for WU students, and students are responsible for providing faculty members with formal documentation of their approved accommodations at least two weeks prior to using those accommodations. I will accept Disability Resources VISA forms by email and personal delivery. If you have already been approved for accommodations, I request that you provide me with a copy of your VISA within the first two weeks of the semester.

OPEN BOOK EXAMS Like real research, my exams will be open book and open notes. How you take advantage of this policy is up to you, but my suggestion is that you prepare for exams in a way that minimizes your reliance on the textbook during the exam so that you do not find yourself running out of time.

SCHEDULE. The schedule of the class is outlined on the next page. Class periods last from 11AM to 12:45PM and will be divided into two sections. The Morning Session will last from 11AM to 11:45AM and will review and apply the concepts from that day's reading assignments. After a 15 minute break we will return for a Lab session from 12PM-12:45PM, which will focus on learning the R statistical programming language.

Date	Morning Session (11AM - 11:45AM)	Lab (12PM - 12:45PM)	Reading
06/09	Overview of the course	Introduction to R.	K & W Chapter 1
06/10	Theory Building I	Number and vectors in R	K & W Chapter 2
06/11	Theory Building II	Objects	Handout
06/12	Causal Inference I	Matrices and Arrays	K & W Chapter 3
06/13	Causal Inference II	Lists and Dataframes	K & W Chapter 4
06/16	Causal Inference III	Functions	Handout
06/17	Measurement and Description	Importing and manipulating data	K & W Chapter 5
06/18	Data Management	Graphics and Descriptive Statistics	None
06/19	Recap/Review	Recap/Review	Study Guide
06/20	Exam 1		
06/23	Inference, Samples, and Populations	Probability distributions	K & W Chapter 6
06/24	Hypothesis tests I	Simulation	K & W Chapter 7 (7.1, 7.2, 7.3)
06/25	Hypothesis tests II	Hypothesis tests in R	K & W Chapter 7 (7.4.1, 7.4.2)
06/26	Correlation	Correlation in R	K & W Chapter 7 (7.4.3)
06/27	Recap/Review	Recap/Review	Study Guide
06/30	Exam 2		
07/01	Linear Regression I	Linear regression in R	K & W Chapter 8 (to 8.3)
07/02	Linear Regression II	Linear regression in R	K & W Chapter 8 (8.3 to end)
07/03	Linear Regression III	Multiple regression in R	K & W Chapter 9
07/04	Independence day. No class.		
07/07	Linear Regression V	Regression diagnostics in R	K & W Chapter 10
07/08	Time Series and Limited Dependent Variables	Generalized linear models	K & W Chapter 11
07/09	Review/Recap	Review/Recap	Study Guide
07/11	Final Exam		