

PS 4010/7010: Computing Methods in Introductory Statistics for Political Science

University of Missouri

Fall 2016

W, 3:00 - 4:15 PM, Middlebush 7

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Office hours: M W 1:30 - 3:30 PM (or by appointment)

General: This course provides an overview of elementary descriptive and inferential statistics, with an emphasis on applications in political science. It introduces the student to statistical techniques that are both common and useful for social science research. All political science students should be able to read and criticize statistics frequently presented in academic, media, and governmental reports. You will acquire skills at formulating measures for concepts and variables, collecting evidence, creating testable hypotheses, and using basic statistical tools to identify patterns and evaluate data. A competitive job market makes skills and experience with statistics, programming, and numerical data analysis a distinguishing asset for social science graduates. More importantly, students will acquire the writing skills necessary to produce political science research.

Use of computers for research is a central feature of contemporary social science in academia as well as the private sector. This course is offered concurrently with PolSc 4010/7010, *Computing Methods*, and enrollment in this lab is mandatory. Throughout the semester, each of these courses will complement the other. In *Computing Methods*, you will learn computer applications for fast calculations of solutions to problems encountered in the statistics class. PolSc 4010/7010 is offered on an S/U basis only. Students will use the Stata programming package on machines in a computing lab and/or “Software Anywhere” computer system to answer problems in PolSc 4000/7000. However, the grade earned in one course may be independent of the grade earned in the other.

Grades: Course grades will be based on:

- midterm and final examinations (worth 20% each, 40% total)
- research reports 50% total (more on this below and in class)
- attendance and participation in lecture, periodic quizzes, homeworks and in-class assignments (10% total)

Final class grades will be assigned with the following grading scale:

A+ = 97.0 - 100

A = 90.0 - 96.99

B+ = 87.0 - 89.99

B = 80.0 - 86.99

C+ = 77.0 - 79.99

C = 70.0 - 76.99

D+ = 67.0 - 69.99

D = 60.0 - 66.99
F = 0 - 59.99

All assignments must be turned in at the beginning of class on the assigned date (or the day of the lab in which you are registered). Late work will be deducted a letter grade for each calendar day late. I encourage you to turn in the assignments late rather than not at all. A grade of 0 can be fatal to your final grade. During the semester, we will have several unannounced quizzes, in-class assignments and short homeworks on the course materials. Attendance in the lectures, as well as labs, is mandatory.

Graduate students in POLS 7000/7010 must complete the same course requirements, although the quality of performance and depth of political science reasoning is expected to be greater.

Readings: There will not always be perfect unity between the course lectures and assigned readings. Thus it will be necessary to attend all lectures and to read the assigned materials in order to be exposed to all of the material that you are responsible for in this course.

The following textbooks are required for the class. All other readings will be distributed in class.

- Kellstedt, Paul M. and Guy D. Whitten. 2013. *The Fundamentals of Political Science Research*, 2nd Edition.
- Miller, Jane E. 2013. *The Chicago Guide to Writing about Multivariate Analysis*, 2nd Edition.
- McCloskey, Deirdre. 1999. *Economical Writing*, 2nd Edition. Waveland Press.

Class Requirements

Two exams, a midterm and a final, will contain multiple choice, short answers and/or essays. There will be a series of research reports. There will also be weekly exercises in labs, some of which will have a writing component. You are expected to attend the lectures, your lab, and to participate in weekly exercises in the labs.

Since this class is intended to teach you how to conduct quantitative political science research, a fundamental component is how to write for a political science audience. As such, there will be a number of research reports that you will prepare. The research reports will involve the calculation of statistical tests and models, interpretation of the results, and in-depth exploration of the substantive effects through generation of quantities of interest. The student should also relate the findings back to the hypotheses to state whether they find support for their theory. Since each research report will involve different data and requirements, it is crucial to carefully read and understand the requirements of each assignment.

The paper will be graded on the quality of the empirical analysis, proper interpretation, and exploration of the results in the best manner to test the hypotheses. These papers will be expected to conform to the submission standards of the *American Journal of Political Science*. While the undergraduate students are free to use whatever document processing software they like, the graduate students are required to produce their documents in L^AT_EX.

Blackboard: We will be using Blackboard (courses.missouri.edu) to display grades, post additional readings, and for announcements.

Other Considerations

- Out of respect for fellow students, each person will refrain from talking, whispering, eating, making offensive remarks, newspaper reading, and other disruptive behavior during lecture. Cell phones and laptops must be turned off and may not be used during class time. Inappropriate classroom behavior may result in the student being requested to leave the classroom. **I will discuss my electronics policy in-depth the first day of class.**
- In this class, students may not make audio or video recordings of course activity. Those students who are permitted to record are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded.
- Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. In this course, you are expected to submit original work and behave in a respectful manner toward both the professor and other students in the class. Breaches of the academic integrity rules are extremely serious matters. Sanctions for such a breach range from instructor-imposed academic sanctions, such as a failing grade for the course, to University-imposed disciplinary sanctions, such as probation or expulsion. If you have questions, please consult the University's academic integrity website, <http://academicintegrity.missouri.edu/>, and the University M-book, www.missouri.edu/~mbook. **Plagiarism will not be tolerated. Any student plagiarizing (or cheating on tests) will receive an automatic grade of 0 for that assignment.**
- Final Examination: Each student must take the final examination at the time assigned in the University's schedule of classes. You **MUST NOT** make any travel arrangements for holidays, family occasions, or the like that would require you to miss this examination. There will be no exemptions from the final or early final examinations given.
- Teaching Assistant: The role of the Teaching Assistant is to serve as an assistant to me. When a student needs help or clarification, the first step is to consult their lecture notes or readings. If that doesn't clear up the misunderstanding, then the student should contact the TA.
- If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible. If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the Disability Center (<http://disabilitycenter.missouri.edu>), S5 Memorial Union, 573-882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Make-up Exams/Excused Absences

Make-up exams will only be given for university-excused absences. For any of these absences to be "excused," you must provide me with written documentation. To be excused the student must notify me in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible (in particular in times of university-excused absences). In cases where advance notification is not feasible (e.g. unanticipated illness, accident, or emergency) the student must provide notification by the end of the second working day after the absence by 5:00 PM. This notification should include an explanation of why notice could not be sent prior to the class.

The student must also provide satisfactory documentation substantiating the reason for the absence prior to taking the make-up exam. Failing to take a make-up exam at a previously agreed-to time will result in a zero. The make-up exam must be taken within one week of the original test date listed in the syllabus, except under extreme circumstances approved by the instructor. For illness, documentation should include an official note from a doctor or clinic.

Also, keep in mind that an exam proctored outside of the normal exam time may be of a different format than the original exam. If you do not have an excused absence you will receive a zero for the exam. **No exceptions.**

Course Schedule

Class Schedule: We will spend as much time as necessary on each topic for this course. Because I am unable to predict in advance how long each topic will take, the schedule below is only a rough guideline. *I expect that you will have read the assigned readings **before** the class period for which they are assigned. I will announce additional required readings during class meetings.*

August 22: Placing Quantitative Methods in a Research Program

- Kellstedt and Whitten: Chapters 1 and 2
- Introduction to Stata

August 29: Research Design

- Kellstedt and Whitten: Chapters 3 and 4; also p. 273-286
- Data management I using Stata

September 5: NO CLASS or LAB

September 12: Measurement

- Kellstedt and Whitten: Chapter 5 (92-114)
- Data management II using Stata: "Programming in Stata.do"
- *Writing* Reading: Miller Chapter 2
- *Writing* Lecture: Seven Basic Principles
- **Research Report #1 due**
- **Graduate students: plan on attending Sheena Greiten's workshop: *Writing for Political Science*: Friday, September 16, 12:00-2:00PM (Professional Building 104).**

September 19: Descriptive Statistics

- Kellstedt and Whitten: Chapter 5 (115-128)
- Descriptive statistics using Stata: "Descriptive Statistics-Lab.do"

- Tables and Figure in Latex
- *Writing* Reading: Miller Chapter 5 (p. 77-89); Chapter 6 (p. 113-120); Chapter 14 (p. 297-302)
- *Writing* Lecture: Displaying Quantitative Information

September 26: Logic of Statistical Hypothesis Testing

- Kellstedt and Whitten: Chapter 6
- Understanding Z-Score, Central Limit Theorem.do, Normal Distribution Basics.do, Distributions Example.do
- *Writing* Lecture: Writing with Clarity
- **Research Report #2 due**

October 3: Bivariate Hypothesis Testing I

- Kellstedt and Whitten: Chapter 7
- Bivariate Hypothesis Tests: crosstabs and difference of means
- *Writing* Reading: Miller Chapter 3
- *Writing* Lecture: Writing about Causality

October 10: Bivariate Hypothesis Testing II

- *Writing* Reading: Miller Chapter 5 (p. 90-91); Chapter 6 (p. 120-156); Chapter 14 (p. 302-306)
- Bivariate Hypothesis: “Correlation Coefficient. do”
- *Writing* Lecture: Writing about Associations

October 17: Midterm Examination

October 24: Multivariate Hypothesis Testing I

- Kellstedt and Whitten: Chapter 8
- “Fair Confidence Intervals. do, One vs Two tails.do, Regression with FDR.do”
- *Writing* Reading: Miller Chapter 5 (p. 92-112)
- *Writing* Lecture: Displaying Multivariate Relationships
- **Research Report #3 due**

October 31: Multivariate Hypothesis Testing II

- Kellstedt and Whitten: Chapter 9
- Introduction to Simulations.do
- Influence Simulation.do
- Omitted Variable Bias.do
- Functional Form.do
- Multicollinearity.do
- Nebraska Penalties.do

November 7: Multivariate Hypothesis Testing II (continued)

- Kellstedt and Whitten: Chapter 10
- Interpreting Multivariate Regression

November 14: Multivariate Hypothesis Testing III

- King, Gary, Michael Tomz and Jason Wittenberg. 2000. "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science* 44:2. **Read only the following: 347-351, 354-355, 359-360!**
- Generate some expected values via Clarify
- **Research Report #4 due**

November 21: NO CLASS

November 28: Multivariate Hypothesis Testing IV

- Brambor, Thomas, William Roberts Clark and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses", *Political Analysis* 14: 63-82.
- Interactions Analysis in Stata
- *Writing* Lecture: Writing about Interactions
- **Graduate students: plan on attending Sheena Greiten's workshop: *Presentations in Political Science*: Friday, December 2, 12:00-2:00PM (Professional Building 104).**

December 5: Clean Up and Review

- **Review**
- **Research Report #5 due**

December 12: Final Examination

- Monday, 3-5:30