POL SCI 701 – Techniques of Political Science Research
Fall 2018

Tuesdays, 4:00 pm – 6:40 pm
Bolton 293

Instructor Information

Professor Patrick Kraft
Office: Bolton 658
Email: kraftp@uwm.edu
Phone: 631-371-1607
Office Hours: Wednesdays, 4:00 pm – 6:00 pm, or by appointment.

I Course Description

This course is a first graduate course for political methodology. You will be learning the nuts and bolts behind statistical inference as well as the statistical software R. This ultimately will prepare you for POL SCI 702, in which you learn more specific models. The topics that we will intensively discuss include:

1. Math review
2. R and LaTeX
3. Data visualization
4. Probability theory
5. Statistical inference
6. Introduction to OLS.

II Textbooks and Additional Materials

There is one required textbook for the course and it is available at the bookstore:
Imai, Kosuke. 2017. *Quantitative Social Science: An Introduction*. Princeton University Press

In addition, we have online resource dedicated for the first three weeks:

- Kieran Healy. 2018. *The Plain Person's Guide*: http://plain-text.co
- Harvard University, Department of Government. 2018. *Math (P)refresher for Political Scientists*: https://projects.iq.harvard.edu/prefresher/math

Some of you might need additional information on the underlying mathematical concepts, while others may want to dig deeper into statistical programming. Below is a list of additional textbooks that you might find helpful. I recommend that you check out a few of them and choose which ones best suit your needs:

	Mathematics / Statistics	*Programming / R*
Recommended	Gill (2006) Gailmard (2014)	Verzani (2014) Monogan (2015)
Optional	Kennedy (2003) Angrist and Pischke (2008) Petersen and Pedersen (2012) Wooldridge (2013)	Fox and Monette (2002) Teetor (2011) Matloff (2011) Wickham and Grolemund (2016)

If you are looking for further resources to refresh you mathematics skills, check out Moore and Siegel (2013) as well as the accompanying website (`https://people.duke.edu/~das76/moosiebook.html`), which includes a link to a set of free video lectures on calculus, linear algebra, and related topics.

Beyond the readings, you will also complete online courses on `DataCamp`, which will be available to you for free for the duration of the course. Some of these courses will be mandatory, but I encourage you to make use of the opportunity and check out additional courses according to your interests.

Lastly, please note that Imai (2017) comes with a free set of review exercises that you can directly access through the `swirl` package in RStudio. I will provide more details about how to install the package and work on the exercises during the lecture.

III Course Requirements and Grading

Final course grades will be based upon four components:

1. **Bi-weekly problem sets ($30\% = 6 * 5\%$):** You will get bi-weekly problem sets of various lengths and types. You should consider your colleagues a resource, and I strongly encourage you to discuss the problem sets with them. However, each student must turn in their own, original answers that need to be typed with all the R codes/results accompanied. Of the 7 problem sets, I will take the average of the 6 highest grades, meaning that you can do poorly on 1 problem set without it impacting your grade. Problems sets have to be submitted in print by the beginning of each assigned class. Late submissions will not be accepted. Exceptions are made only in the most severe and extraordinary circumstances.
2. **DataCamp courses ($30\% = 6 * 5\%$):** Every two weeks, you will also be expected to complete an assigned DataCamp course (see schedule below). Note that you will receive full credit for completion of each course independent of your performance. The `DataCamp` courses are supposed to be a useful learning resource to practice your skills, they are not a direct form of assessment. Please let me know if you are already familiar with the programming language `R`, in which case I will adjust your individual course schedule to cover more advanced topics.
3. **Final exam (30%):** The final exam will test you on materials from the entire course. It will be primarily a closed-book exam, but you will be allowed to bring ONE piece of paper (letter-size, 8.5‘ x 11‘), with whatever types of information you want written on either side. You will obviously need to know which formulas apply to which problems, but that is not a task that requires memorization so much as it is a task that requires understanding of which procedures are appropriate for which types of problem.
4. **Class Participation (10%):** Even though this course is largely lecture-based, we learn from discussion. Note that quality is more important than quantity.

Students who take this course under the Pass/Fail option must receive a grade of C or higher in order to obtain a Pass on their final grade. A final grade of Incomplete will only be given under exceptional circumstances and is solely at the discretion of Professor Kraft.

In general, make-ups for any course requirements will not be given. Students who miss any requirements because of scheduled activities of an official University student organization, a religious holiday, or a verifiable illness should contact me in advance so that alternative arrangements can be made.

IV Course Schedule

Date	Topics	Readings / `DataCamp` course	Assignment
09/04	Introduction	Plain Person's Guide	Textbooks
09/11	Math Review	Math (P)refresher	
09/18		`Introduction to R`	PS 1
09/25	Causality	Chapter 1 & 2	
10/02		`Intermediate R`	PS 2
10/09	Measurement	Chapter 3	
10/16		`Introduction to the tidyverse`	PS 3
10/23	Prediction	Chapter 4	
10/30		`Correlation and Regression`	PS 4
11/06	Discovery	Chapter 5	
11/13		*Choose your own DataCamp course!* ($\geq 4,000$ XP)	PS 5
11/20	Probability	Chapter 6	
11/27		`Foundations of Probability in R`	PS 6
12/04	Uncertainty	Chapter 7	
12/11		`Inference for Linear Regression`	PS 7

Note: Schedule may be subject to change according to the progress of the course.

V Expected Time Commitment

This is a three-credit course, so the expected time commitment from students is approximately 144 hours. Students will spend 40 hours in class over the course of the semester. Approximately 30% of the remaining time will be spent preparing for class by doing assigned readings and taking notes. 40% will be spent working on coding assignments and problem sets. A further 30% will be spent preparing for exams.

VI Office Hours

Feel free to stop by my office during regularly scheduled office hours (Wednesdays 4:00 pm – 6:00 pm). If you are unable to attend office hours, contact me via email to arrange an appointment. I usually work in my office during work hours, but I unfortunately cannot guarantee that I will be able to meet with people who come to my office without first scheduling a time to see me.

VII Academic Integrity

No form of academic dishonesty will be tolerated. The University of Wisconsin-Milwaukee has detailed its policies on academic integrity (http://uwm.edu/academicaffairs/facultystaff/policies/academic-misconduct/). You should acquaint yourself with policies concerning cheating, fabrication, plagiarism, and academic interference. Any submission of work in this course constitutes a certificate that the work complies with university policies on academic integrity.

VIII Student Disabilities

The University of Wisconsin-Milwaukee supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12)

require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform me of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. I, will work either directly with you or in coordination with the Accessibility Resource Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. Please also see http://uwm.edu/arc/ for further information.

IX University Policies

The University of Wisconsin-Milwaukee has several additional policies concerning issues such as accommodations for religious observances, students called to active military duty, discriminatory conduct, or sexual harassment available for you here: https://uwm.edu/secu/syllabus-links/. I strongly encourage you to access this link and familiarize yourself with these policies and procedures.

References

Angrist, Joshua D, and Jörn-Steffen Pischke. 2008. *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.

Fox, John, and Georges Monette. 2002. *An R and S-Plus companion to applied regression*. Sage.

Gailmard, Sean. 2014. *Statistical modeling and inference for social science*. Cambridge University Press.

Gill, Jeff. 2006. *Essential mathematics for political and social research*. Cambridge University Press.

Imai, Kosuke. 2017. *Quantitative Social Science: An Introduction*. Princeton University Press.

Kennedy, Peter. 2003. *A guide to econometrics*. MIT press.

Matloff, Norman. 2011. *The art of R programming: a tour of statistical software design*. No Starch Press.

Monogan, James E. 2015. *Political analysis using R*. Springer.

Moore, Will H, and David A Siegel. 2013. *A mathematics course for political and social research*. Princeton University Press.

Petersen, KB, and MS Pedersen. 2012. "The matrix cookbook." https://www.math.uwaterloo.ca/~hwolkowi/matrixcookbook.pdf.

Teetor, Paul. 2011. *R cookbook*. O'Reilly Media, Inc.

Verzani, John. 2014. *Using R for introductory statistics*. CRC Press.

Wickham, Hadley, and Garrett Grolemund. 2016. *R for data science: import, tidy, transform, visualize, and model data*. " O'Reilly Media, Inc.".

Wooldridge, Jeffrey M. 2013. *Introductory econometrics: a modern approach*. Cengage Learning.