

Political Science 1902
Directed Reading (Foundations of Quantitative Methods)
Friday, 7:30 – 10:00 AM
Fall 2020

Instructor: Jungmin Han
Email: juh85@pitt.edu
Lectures: Friday, 7:30 – 10:00 AM, through Zoom (ID: 318-760-9331, password required)
Recitations: TBD (optional)
Office Hours: Wednesday, 9:00 – 11:00 AM, or by appointment

Course Description

This course provides an introduction to mathematics, probability, and statistics one needs to know in order to do formal theoretical and quantitative empirical research in political science. These tools are crucial for analyzing data, describing theoretical and empirical relationships, and for understanding the logic of inference. After discussing the role of models in political science research, the first part of this course will focus on necessary mathematical topics such as functions, calculus, and algebra. Next, we turn to probability theory which provides a way of formally describing uncertainty. And then we finish this course with statistical inference which underlies the process of drawing inferences from the information contained in a sample of data.

Objectives

The main goals of this course are: 1) to familiarize students with the benefits of using models for theoretical and empirical research in political science, 2) to prepare students for game theory, regression and advanced methods courses, and 3) to introduce students to some math software used for implementing algorithms and making large-scale calculations. In class I will review the material for each week, work through an in-class exercise, and distribute and discuss homework assignments.

Grade Requirements

This is a ***Pass or Fail*** course, which means that, instead of an alphabetical grade, you will find Pass or Fail as your grade at the end of this semester. The cutting line for passing this class is 85 out of 100. So, once you earn 85 or above, you can pass this course. Your total grade consists of the following components:

Participation	20%
Weekly Assignments	30%
Midterm Exam	25%
Final Exam	25%

Lectures

Under the current pandemic circumstance, the lectures of this course will be synchronously provided through zoom. During this semester, the lectures will be regularly open on **Friday from 7:30 to 10:00 am** through Zoom. You can find the meeting room by the following **Zoom ID number: 318-760-9331**. However, it will be private with weekly-changing passwords which will be sent to you with an invitation e-mail every week. Your attendance to the lectures will be reflected in your participation grade. Your unnoticed or unexcused absence for one lecture will cost one out of twenty points from your participation grade. If you have a rightful excuse for your absence, please notify it to me beforehand. As every lecture will be recorded and uploaded at the CANVAS, you will have a chance to take the lectures asynchronously despite your absence.

Recitation

In addition to regular office hours, I will schedule an hour every week where we can work through additional examples, practice problems, and provide appropriate hints for the homework. The schedule of the recitation will be discussed in the first week of this semester. This additional class time is *optional*, which means that your absence of the recitation will not be reflected in your participation grades. It can be very useful for you to attend, but you are in no way compelled to do so. If you need additional assistance, I am also available by appointment.

Weekly Assignments

There will be weekly assignments starting from the second week. You will have one week to complete each assignment. There will be no assignment a week before the Midterm and Final week. As such, there will be ten homework assignments will be given to you. The assignments will be posted on the CANVAS on every Friday after the lecture, and you are required to solve and submit it through the CANVAS by Thursday of the following week. There are several ways to submit the assignments. I personally prefer to see a typed answer with Latex (more preferred) or Word. However, that will probably double your time and efforts to complete the assignments. So, your hand-written answer with a scanned PDF format will be also acceptable. When you submit the hand-written one, please put all the pages of each week's assignment into a singular file. Late assignments will be penalized by 10%. Finally, some of the assignments might require you to utilize a statistical software, *Stata*. You are expected to download the software package at Pitt's Software Download Service (<http://software.pitt.edu/>). Additional sources to learn Stata will be given to you during this semester.

Midterm and Final Exam

Students will find two exams from this course. The goal of these exams is to evaluate the cumulative knowledge and skills that the students learn from a series of lectures and practice. The format of the exams will not be so much different from that of the weekly assignments. However, the exams will include problems relevant to different topics of the previous weeks. This means that the midterm and final exam respectively cover the materials that you learn from the first and later six weeks. The schedule of the exams will be discussed during the semester. We will find the date and time that fits most of the students. Both the midterm and final exam will be open book based. On the exam day, you will find the exams in your e-mail at 9:00 am. Three hours will be given to you to finish and submit your answer. You need to submit the answer via email to me (juh85@pitt.edu). Your late-submitted answer will be penalized.

Course Materials

Moore, Will H. and David A. Siegel. 2013. *A Mathematics Course for Political & Social Research*. Princeton University Press.

Wackerly, Dennis. William Mendenhall, and Richard Scheaffer. 2008. *Mathematical Statistics with Applications, 7th edition*. Brooks/Cole Cengage Learning.

Acock, Allan A. 2016. *Gentle Introduction to Stata, 5th edition*. Stata Press.

Course Schedule

8/21	Introduction	
8/28	Algebra, and Functions	Moore and Siegel (2013), Chapters 1-4
9/4	Sample Space, Counting, and Probability	Wackerly et al. (2008), Chapters 1-2 Moore and Siegel (2013), Chapter 9
9/11	Discrete Random Variables	Wackerly et al. (2008), Chapter 3 Moore and Siegel (2013), Chapter 10
9/18	Calculus	Moore and Siegel (2013), Chapter 5-8
9/25	Continuous Random Variables	Wackerly et al. (2008), Chapter 4 Moore and Siegel (2013), Chapter 11
10/2	Multivariate Probability Distributions	Wackerly et al. (2008), Chapter 5
TBD	Midterm Exam	
10/16	Statistical Computing, Visualization, and Descriptive Statistics	Acock (2016), Chapters 1-6
10/23	Sampling Theory and the Central Limit Theorem	Wackerly et al. (2008), Chapter 7
10/30	Estimation	Wackerly et al. (2008), Chapter 8-9
11/6	Hypothesis Testing	Wackerly et al. (2008), Chapter 10, 14 Acock (2016), Chapter 7
11/13	Bivariate Regression and Ordinary Least Squares	Wackerly et al. (2008), Chapter 11 (sections 1-9) Acock (2016), Chapter 8
11/20	Linear Algebra	Moore and Siegel (2013), Chapter 12-13 Wackerly et al. (2008), Chapter 11 (section 10)
TBD	Final Exam	

Other Course Policies

During this course, you are expected to observe the standards of academic integrity (for details, see www.as.pitt.edu/fac/policies/academic-integrity). Also, if you have a disability for which you are or may be requesting an accommodation, let me know and contact Disability Resources and Services, 140 William Pitt Union (412-648-7890), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.