POLI 7962
Seminar in Research Design and Quantitative Techniques
M 6:00 - 9:00 PM
Stubbs 210

Instructor

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Phone: 225.578.6395

O ce Hours

M 1:00-4:00 PM and by appointment.

Teaching Assistant

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TA O ce Hours

T 11:00 AM-2:00 PM and by appointment.

Objectives

The purpose of this course is to introduce students to a range of basic statistical and data analytic techniques necessary to understand and conduct quantitative social science research. The development of such methodological skills has become increasingly important to social science. Social scientists are often asked to conduct quantitative research on their own, or at the very least, to

statistics, namely, how can we best describe a large dataset with only a few parameters. The second half of the course will examine how we can extrapolate, or infer, particular aspects of the population from a subsample of a population. More speci cally, we will establish the foundations for inferential statistics. Finally, we will conclude with a brief section on probability theory.

Several topics will be discussed in this course. First, we will discuss techniques common in univariate analysis { central tendencies, distributions, measures of variation and dispersion. We will then move to a more theoretical discussion of the philosophy of science, namely, hypothesis testing and operationalizing social constructs. Of primary interest in this section will be the estimation of population parameters (characteristics) based on information collected from random samples drawn from populations. Various techniques will be presented to compare samples, such as z-test, t-tests, the chi-squared statistic, and the F-test. In this section we will also explore the logic of experimental methods.

Next, we will transition to bivariate and multivariate statistical techniques. We will explore how to quantify relationships between two or more variables. Because social science often focuses upon the relationship between variables, special emphasis will be placed on establishing the direction and magnitude of relationships in populations and samples. At the end of the course, we will examine the basis of probability theory { speci cally, sets, combinatorial methods, and Bayes' theorem. Please note that I reserve the right to make modi cations to the syllabus, as well as administer in-class exams and extra readings/homework assignments. All assignments, projects, and tests should be done independently, unless otherwise noted.

Two major points need to be emphasized about this course. First, one of the best ways to learn about statistical techniques is to practice them as much as possible. Statistics does not come \naturally" to everyone (perhaps anyone), but with practice you will become well-versed in the topics explored in this class. Only by going through the process of computing the answers to statistical problems, will you develop the skills necessary to understand and conduct empirical research. A second point is that this class should give you the ability to e ectively evaluate and communicate statistical research. Many have heard the phrase, \You can prove anything with statistics." Social scientists who are well-versed in statistics are able to di erentiate good arguments from bad. If nothing else, my hope is to provide you with the tools necessary to make this important distinction.

Textbooks

David Knoke, George W. Borhnstedt, and Alisa Potter Mee. *Statistics for Social Data Analysis (4th Edition)*. Thompson Wadsworth. ISBN 0-87581-448-4.

Pollock, Philip P. 2011. *A Stata Companion to Political Analysis (2nd Edition*. CQ Press. ISBN 978-1-60871-671-5.

Additional Required Readings

The University provides free software, Moodle, upon which I will rely in this class. Updates, additional readings, and other course material can be found here. I will also post grades here.

Please check this site regularly for course information. I will frequently send emails to the entire class through Moodle, so be sure you have the correct email on record.

Optional Readings

Je Gill. 2006. *Essential Mathematics for Political and Social Research.*

Timothy M. Hagle. 1995. *Basic Math for Social Scientists: Concepts*

knowledgeable social scientist.

Understanding the foundations of statistics is a skill that is important in evaluating the trustworthiness and credibility of existing social science research. My job is to work with you to develop the skills necessary for you to critically and objectively evaluate scienti c information. Throughout the semester I will reiterate this, but I am always available should you have any comments or concerns about the class. In addition to my o ce hours, I practice an \open door" policy. If my door is open, feel free to stop by. If I am not in, email me and I will get back to you in a timely manner. The concepts in this class may be di cult to grasp. It is your job to work hard this semester. It is my job to facilitate your learning of the material.

Expectations

Students must read all assignments in the text and readings available on Moodle and emailed. There will be several in class exercises to illustrate research techniques. Quizzes on readings and notes may be administered at the professor's discretion.

Cell phones must be set to silent. For your safety, I will bring my phone to every class, which I have subscribed to the LSU emergency text message service.

Students should always bring a calculator to course. The calculator should handle square roots and ex yl5(y)361(a) 11.4s

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Depending on where we are in the class, I may decide to alter a due date. Any changes will be announced in class. Makeup exams or assignments will be allowed only in the case of university excused absences. Documentation must be provided.

Grades

Grades will be determined as follows

There will be an in-class midterm and comprehensive final exam. Both exams will be open book/open notes. In-class projects will be conducted throughout the semester and students will be asked complete these. Some of these projects might be made up outside of class if you have an excused absence, but others cannot be given outside of class. You need not prepare for these projects, but you should have paper, pens, and calculators available every class.

Course Outline

Please read all assigned readings prior to the listed meeting times. Please note that the course schedule is subject to change at my discretion. You are responsible for announced changes.

August 22. Introduction

Knoke et al., Chapter 1.

August 29. Univariate Statistics and an Introduction to Stata

Knoke et al., Chapter 2.

Pollock, Chapter 1.

September 5. Labor Day. No Class.

September 12. Distributions and Sample Estimation of Population Parameters

Knoke et al., Chapter 3.

Pollock, Chapters 2 and 3.

! Problem Set 1. Complete Exercise #1 in Chapter 2 of Pollock. Please type your answers to Parts A through D. Also, please include the Stata output. Note: You will need the disc that accompanies the Pollock text. In Knoke et al., chapter 2, complete problem # 1 and # 6 (p. 65). This problem set is due next week, September 19.

September 19. Pairwise Tests and Analysis of Variance

Knoke et al., Chapter 4.

! Problem Set 2. Complete Exercise #1 in Chapter 3 of Pollock. Please type your answers to Parts A through E. Also, please include the Stata output. Note: You will need the disc that accompanies the Pollock text. This problem set is due next week, September 26.

September 26. Simple Bivariate Relationships and Stata lab

Knoke et al., Chapter 5.

Pollock, Chapter 5.

Please bring your computer to this class (if you have stata on a laptop), as we will review stata syntax to analyze bivariate categorical data.

October 3. Bivariate Relationships and Midterm Review

Pollock, Chapter 6.

! Problem Set 3. On p. 107 of of Knoke et al., complete problem # 10. On pp. 136-137 of Knoke et al., complete problems # 1, 4, and 9. Problem set 4 will be due next week (October 10) and should be handed in prior to starting the midterm.

October 10. Midterm Exam

The exam will be open book and will cover chapters one through ve of the Knoke et al text. You may use your textbook and notes. The exam will be done individually. You will have the entire course period to complete the exam. You should bring a calculator, blue book, and scratch paper to the exam.

October 17. Continuous Bivariate Relationships

Knoke et al., Chapter 6.

! Problem Set 4. Generate a research question, hypothesis, and propose a way to test this hypothesis. Find a dataset to explore this hypothesis. Explain what variables you will examine and what methods you will use. Please see me for comments or suggestions. This will be due on October 31.

October 24. Multivariate Relationships

Knoke et al., Chapter 7.

Pollock, Chapter 7

October 31. Ordinary Least Squares

Knoke et al., Chapter 8.

! Problem Set 5. In this problem set, please complete exercise #1 in Chapter 7 of Pollock (pp. 146-147). Also, answer question #3, chapter 7 in Knoke et al (p. 229). This problem set is due on November 14th.

November 7. Multiple Regression in Stata: Some Practical Considerations

Knoke et al., Chapter 9.

November 14 An Introduction to Probability Theory

John E. Freund, *Probability Theory and Applications*. (pp. 1-85). Available on Moodle.

November 21. Probability Theory and Bayes' Theorem

John E. Freund, *Probability Theory and Applications*. (pp.86-165). Available on Moodle.

! Problem Set 6 Complete the [illegible] and turn in your homework [illegible]