PSC 5020 Advanced Topics in Research Methods

Office: McGannon 123
Class Time: T R 7:15-10:00
Office Hours: MWF 10:00-11:00 & W 2:15-3:45
Class Location:

Instructor: Matt Millard Contact: matthewcmillard@gmail.com

Course Description:

This course focuses on the application of statistical methods to issues found in political science. The goal of this course is to provide graduate students with the necessary skills to critically read, interpret, and replicate the quantitative content of academic articles. Additionally, students should become familiar with how to use statistical methods to answer their own research questions. Completing this course provides students with the foundation to understand more complicated methods such as most likely estimator techniques.

The field of statistics is a crucial area of study for graduate students who either wish to continue their studies, have research questions of their own, or plan on entering either the government or private sectors. Understanding research design and quantitative methodology are perhaps the easiest ways to succeed in both graduate school and in your career afterwards. That being said, there is an enormous investment of time outside of class required to succeed in such a course. This course will most likely hold extra meetings outside the appointed course times in an effort to ensure students are extremely well-prepared for the rigors of graduate study. I will work with students to ensure that a mutually agreeable time is found.

Required Materials:

Argesti, Alan and Barbara Finlay. Statistical Methods for the Social Sciences, 4th edition. Upper Saddle River, NJ: Prentice Hall.

King, G., Keohane, R. O., & Verba, S. (1994). *Designing social inquiry: Scientific inference in qualitative research*. Princeton university press.

Stata statistical software package, version 14 or 15.

Course Objectives:

At the conclusion of this course, students should be able to:

Understand the logic of inquiry into the social sciences and the basics of research design
Generate descriptive statistics
Describe the sampling processes by which data can be collected

Understand the logic of probability theory.

Write, test, and develop inferences about empirical hypotheses.
Explain the logic of statistical inference.
Construct and interpret OLS regression models.
See the beginning steps of more advanced techniques, such as logit and probit.
Increase proficiency using statistical software packages.

Policies:

As graduate students, you are expected to attend class every time we meet. Additionally, you are expected to do all your readings and turn your work in on time. Attendance at each class session is encouraged as the easiest way in which to succeed in the class. If you miss class for any reason, speak with a classmate to obtain the notes.

The notes will be posted online. I will most likely post the notes online a day or more prior to the class.

Throughout the semester we will have lab sessions outside of our normal class time. These labs are optional, but are absolutely crucial to doing well on problem sets and developing the skills you need to succeed with statistical computing packages. The dates, times, and locations for the lab sessions will be posted later this semester after an in-class discussion.

Emailing: When emailing the professor, students must write a formal, grammatically correct email. This means having a subject line title, a greeting, and a salutation (your name), as well as correct punctuation, etc. This is designed to familiarize students with the correct way to communicate in the "real" world (i.e.-how you would send an email to your boss at work). **Students who send an email without a subject line, a greeting (Professor Millard, Mr. Millard, Professor, etc.), or a salutation (just your name is fine) will not receive a response from me and I will not read their email.**

Cell phones: Students are prohibited from using their phones for texting, browsing the internet, or making phone calls once class has begun.

Newspapers/magazines, etc.: Students are prohibited from reading non-course related materials during class.

Cheating: As with all classroom policy, the university's policy with regards to submitted work by students will be followed to the letter. All work that is submitted will be checked for plagiarism. STUDENTS WILL BE REQUIRED TO SUBMIT BOTH A HARDCOPY AND DIGITAL COPY TO THE INSTRUCTOR.

If you require an accommodation, I am happy to work with you to make the appropriate arrangements; however, you do need to let me know right away.

Grading:

Your grade will be based on two components: the satisfactory completion of six problem sets and two exams.

Problem Sets (6 @ 10% each): The problem sets are assigned throughout the semester. The due dates are listed in the dates section on the syllabus. Problem sets will be posted one week before the due date. These are to be completed outside of class. I advise you to begin working on the problem sets as soon when they are posted. Do not wait until the last minute to start the work. In this way you are more familiar with the material that is covered on the problem sets. I also encourage students to get together outside of class to work on the problem set together, though this is entirely up to each of you. That being said, each student is expected to do all of the work on the problem sets and not rely on others to do your work for you.

Problem sets 1-5 grades are graded on a pass/fail basis. Each problem set will be returned to you within two class sessions, possibly sooner. If you do not receive a passing grade on a problem set, you will have one week after the problem set has been returned to redo the problems that were incorrect and to turn in the assignment again. If you do not redo a problem set that you failed you will receive a grade of 0. If you redo the failed problem set you will receive a grade of 100. If you fail to turn in a problem set on its due date, you will not have an opportunity to redo that problem set but you will receive a 0. The point of the problem sets is not necessarily to "get a good grade" but to learn the material in such a way that you are better able to understand research and to develop your own research questions.

Each problem set is worth 10% of your cumulative grade.

Note that problem set 6 is an in-class presentation. This cannot be redone. It will be graded on the traditional 0-100 grading scale. I will provide you with a grading rubric for the assignment and am available for any questions you may have regarding the topic you will study.

Exams (2 @ 20% each): There are two exams (a mid-term and a final). Each is take home, open-note, open-book. The exams will address areas that we cover in class, and they will be similar in format to the assigned problem sets. Exams, however, cannot be redone and the grade is final. Additionally, students cannot cooperate, coordinate, or otherwise discuss the exams with their fellow students. These will be graded on the traditional 0-100 scale. If you keep up with the readings, lectures, and problem sets there is no reason you will not do well. Together, these two exams will be worth 40% of your final grade.

The final and mid-terms have due dates and times They must be turned in by this time or there will be a late penalty assessed. The late submission policy is that a late assignment loses 10% for each hour it is turned in late. If you turn in an assignment 5 minutes late there is a 10% policy, if you turn in an assignment 3 hours late there is a 30% penalty, 4 hours late 40%, and so forth.

Grades:

Six Problem Sets: 60%
Mid-Term Exam: 20%
Final Exam: 20%

Grading Scale

Below is the grading scale for graduate student grades. Note that graduate student grades do not have minus or plus options.

A+	97-100
A	93-86.9
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9
D	60-69.9

Key Dates:

September 24: Problem Set 1 Due
September 28: Problem Set 2 Due
October 19: Problem Set 3 Due
November 2: Problem Set 4 Due
October 23: Take Home Mid-Term due by midnight in campus mailbox
November 16: Problem Set 5 Due
November 20: Problem Set 6 Presentations
December 17: Take Home Final Due at 5 pm in my email inbox

Course outline:

The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments. You should plan to do the scheduled readings before coming to class on the day they are assigned. Additionally, I recommend reviewing the lecture notes the day after the class. Readings from outside the required textbook are available on the course website.

September 7: **Introduction to Research Design**
KKV, Ch.1

Introduction to Statistical Methods
King, Gary. 1995. "Replication, Replication." PS: Political Science and Politics 28: 443-452. (on course website)

Outside lab session: TBD

September 14: **Sampling**
Argesti and Finlay, Ch. 2

Sampling, Pt. 2
Argesti and Finlay, Ch. 2

Problem Set 1 Due

Outside lab session: TBD

September 21: **Measurement and Descriptive Statistics**
Argesti and Finlay, Ch. 3
KKV, Ch. 2

September 28: **Measurement and Descriptive Statistics, II**
Argesti and Finlay, Ch. 3
KKV, Ch. 3

Introduction to Probability Theory
Argesti and Finlay, Ch. 4

Problem Set 2 Due

October 5: **Probability Theory**
Argesti and Finlay Ch. 4
Statistical Inference:
Argesti and Finlay Ch. 5

October 19: **Hypothesis Testing, Part I:**
Argesti and Finlay, Ch. 6
KKV, Ch.5

Problem Set 3 Due

Take home Mid-term due by midnight, October 23.

October 26, 2016: **Hypothesis Testing, Part II:**
Gill, Jeff, 1999. "The Insignificance of Null Hypothesis Significance Testing." Political Research Quarterly 52: 647. (on course website)

Difference of Means Tests
Argesti and Finlay Ch. 7

Outside lab session: TBD

November 2: **Relationships between Categorical Variables**
Argesti and Finlay Ch. 8

ANOVA analyses

Argesti and Finlay, Ch. 12

Problem Set 4 Due

November 9-**Linear Regression: Assumptions & Residuals**
Argesti and Finlay, Ch. 9
Wooldrige, Jeffrey. “Introductory Econometrics." pp. 44-54. (on course website)

Bivariate Relationships
Argesti and Finlay, Ch.9

Multivariate Regression
Agresti and Finlay, Ch. 10

November 16-**Multivariate Regression**
Agresti and Finlay, Ch. 11
Item: Wooldridge, Chapter 4 (on course website)

Multivariate Regression: Statistical Inference
Argesti and Finlay, Ch. 11

Problem Set 5 Due

Outside lab session: TBD

November 20: **Multivariate Regression: Interactions**
Brambor, Thomas, William Roberts Clark, & Matt Golder. “Understanding Interaction Models: Improving Empirical Analysis." Political Analysis 14: 63-82. (on course website)

KKV, Ch. 6

Problem set 6 in-class presentations

December 7-**Conclusion and introduction to advanced methods**

Take home final due NLT Midnight, Sunday, December 17.