

QUANTITATIVE TECHNIQUES

POLS 2400
DEPARTMENT OF POLITICAL SCIENCE
COLLEGE OF SOCIAL SCIENCES AND HUMANITIES
NORTHEASTERN UNIVERSITY

Summer Marion, MALD
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Spring 2019
Tuesday and Friday
1:35 – 3:15 p.m.
Robinson Hall 107

Office Hours: Tuesdays and Fridays 3:30 – 5:00 p.m. (**sign up:** <http://bit.ly/2CUqFZV>) or by appointment

COURSE OVERVIEW

This course covers basic statistical techniques and methods for social science, emphasizing applications of value to policymakers and researchers alike in the fields of political science, public policy, and international affairs. Topics covered include descriptive statistics, basic probability, binomial and normal probability distributions, hypothesis testing, differences-between-groups tests, correlation, linear regression, and multiple regression. In addition, students will learn how to generate and interpret statistical analyses using SPSS. This course will be taught primarily in SPSS, with occasional workshops introducing students to statistical programming using R.

COURSE DESCRIPTION AND OBJECTIVES

This course assumes no prior knowledge of statistics, guiding students through skill-building exercises from an elementary level through advanced techniques for running and interpreting multivariate analysis. Students will develop familiarity with a variety of quantitative methods for describing distributions and analyzing the nature, significance, and strength of relationships between variables. By the end of the semester, students should have acquired the tools to develop and test their own research hypotheses as well as read and critique published social science research employing quantitative methodologies.

STUDENT LEARNING OUTCOMES

- Understand the math underlying the use of statistics in the social sciences
- Identify data appropriate for answering social science research questions
- Develop and test research hypotheses using statistical techniques
- Explain statistical results in a manner intelligible to a general audience without statistical training

- Critically analyze the use of quantitative methodologies in social science research
- Apply statistical concepts in professional settings

TEXTBOOKS AND ADDITIONAL MATERIALS

Required Text:

- Theresa Marchant-Shapiro, *Statistics for Political Analysis: Understanding the Numbers* (Sage Publications, 2015).

Additional Readings posted on Blackboard, including selections from (purchase not required):

- Christopher D. Howard, *Thinking Like a Political Scientist: A Practical Guide to Research Methods* (University of Chicago Press, 2017).

Also Required:

- A calculator with basic functions (add, subtract, multiply, divide, square root)
- SPSS statistical program, downloadable for free from Northeastern University's online resources (Download instructions here: <https://its.northeastern.edu/services/available-software/spss/>)
- R (<https://www.r-project.org/>) and R Studio (<https://www.rstudio.com/products/rstudio/download/>) software, downloadable for free online.

STUDENT EVALUATION

Student grades will be determined based on the following components:

20%	<i>First Exam</i>
20%	<i>Second Exam</i>
30%	<i>Assignments</i>
20%	<i>Final Project</i>
10%	<i>Class Participation</i>

Attendance: Attendance is mandatory and will be taken at every class. More than two (2) unexcused absences will result in a one-point deduction from a student's final grade for each subsequent absence. Students must notify the instructor in advance if they need to miss class.

Assignments: Students should expect several homework assignments (1-2 per week) over the course of the term. These will be based on exercises from the textbooks and instructor-created problem sets. **They are not listed individually in the syllabus but due dates will be announced in advance.** Homework assignments must be turned in at the **beginning of class on their due date**, as we will review the answers in class. Please keep all assignments for reference later in the class in case of questions about the subject or the grade.

Assignments will take 2 forms:

- **Exercises:** Much of this course is focused on the math behind statistical techniques. As a result, students will have exercises to complete as homework before most classes. Keeping up with these is imperative, as each class period will build on what you learned in the previous class. In the Marchant-Shapiro book, these are called "Your Turn."
- **Memos:** These less frequent assignments are focused on the practical skills of using statistics in a work environment. Students will be provided with a dataset to analyze with SPSS in order to answer a political question. The goal of these exercises is to answer a practical question using statistical analysis, and explain your answer in a professional policy memo. In the Marchant-Shapiro book, these are called "Apply it Yourself."

Exams: There will be a total of two (2) non-cumulative exams in this class. Each will cover all course material up to the exam day. For each exam, you will be allowed one sheet of paper (back and front) on which you may note statistical formulas. Exams will require students to interpret statistical tables, provide calculations, and draw conclusions.

Final Project: A final project statistical analysis project will take the place of a final exam for this course. Students will be asked to craft a research hypothesis, find relevant data, and test their hypothesis using SPSS. The final project is due on the last day of class.

GRADING STANDARDS

Students who complete the course can expect to earn one of five possible letter grades. The grading standards are determined in accordance with the Northeastern University Undergraduate Catalog, 2018-2019. See <http://catalog.northeastern.edu/pdf/2018-2019-undergraduate.pdf>, or pages 25 to 30 of the Catalog, for additional information regarding the Academic Policies and Procedures of the Grading System. Note that plus and minus grades are proportioned fractionally such that, for example, 80% to 83.9% is a B-; 84% to 86.5% is a B; and 87% to 89.9% is a B+. Note that an "A" grade is 94% or higher.

The following descriptions of grades serve as general benchmarks:

- A grade of “A” means excellent work, which demonstrates comprehensive command of course content, exceptional ability to apply concepts, superior ability to organize and express ideas, critical thinking, and excellent attendance and class participation. Further, an “A” grade represents “outstanding achievement” and ranges from 90% to 100%.
- A grade of “B” means good work, which demonstrates solid command of course content, good ability to apply concepts, good organization and expression of ideas, and regular attendance and class participation. Further, a “B” grade represents “good achievement” and ranges from 80% to 89.9%.
- A grade of “C” means fair work, implying barely acceptable command of course content, limited ability to apply concepts, moderate organization and expression of ideas, and sparse attendance and class participation. Further, a “C” grade represents “satisfactory achievement” and ranges from 70% to 79.9%.
- A grade of “D” means marginal work, with little command of course content, very limited ability to apply concepts, very limited ability to organize and express ideas, irregular attendance and class participation. Further, a “D” grade represents “poor achievement” and ranges from 60% to 69.9%.
- A grade of “F” means unacceptable work and implies lack of command of course content, inability to apply concepts, to organize and express ideas, and lack of attendance and class participation.

ACADEMIC HONESTY AND INTEGRITY

Warning: The Department of Political Science takes very seriously the issue of academic honesty. Any student who appears to violate the University’s Academic Honesty and Integrity Policy (see <http://www.osccr.neu.edu/policy.html>) may be referred to the University’s Office of Student Conduct and Conflict Resolution. If a proven violation involves an exam or course assignment, the student shall receive a failing grade for the assignment, in addition to sanctions imposed by the Office of Student Conduct and Conflict Resolution. Individual faculty, with the support of the Department, can impose harsher penalties as they deem necessary.

The Academic Honesty and Integrity Policy includes cheating, fabrication, plagiarism, and other types of dishonest activities. Plagiarism is defined broadly as taking ideas, concepts, or actual words of another person and passing them off as your own work. Of particular note in recent years is the increase in cut-and-paste plagiarism, which involves downloading phrases from websites or other Internet sources. Your instructor will clarify specific guidelines on fair use of material for this class, but you should regard this as your official warning.

POLICIES

- All assignments are due at the beginning of class on the due date unless otherwise specified. Since homework assignments will often be reviewed in class on the day when they are due, late assignments will be penalized 50%. **Homework submitted more than two days late will not be accepted—so, please plan ahead.**
- You may bring a drink to class for consumption, but please do not consume food while class is in session. Please do not leave personal belongings or trash of any kind in the classroom.
- Students may not use cellular phones or any other electronic equipment that rings or makes noise while class is in session. You may use a laptop (or similar device) to take notes and participate in class activities; however, you will be asked to leave if you are “multitasking” with unrelated work.
- I maintain a classroom policy of mutual respect. In the political science classroom, we will engage in substantial discussion, both collectively and in smaller groups. Undoubtedly, philosophies and interpretations of the issues will vary; and as a result, it is important to maintain an open forum, where a diversity of perspectives will be welcomed and explored.
- Students are expected to attend class regularly, and they should have already completed all of the assigned homework and readings prior to the class meeting. The course participation grade will be partially based on the quality of discussion and its intellectual merit.
- **Policy on Incompletes:** Except under extenuating circumstances, Incompletes in this course are not possible.

WRITING

Written assignments must be of high quality. This means carefully editing and proofreading all written work for intellectual merit, cohesive arguments with evidence, and mechanics such as spelling and grammatical accuracy. Writing quality will affect your grade. Research paper assignments must conform to a standard format used in the social sciences, such as the American Psychological Association Style Manual (see <http://www.apastyle.org/>) or the University of Chicago Manual of Style (see <http://www.chicagomanualofstyle.org>). Policy memo assignments must conform to the standards introduced in class. If you need help, please do not hesitate to seek out the professor’s help or utilize many of Northeastern University’s learning resources.

AMERICANS WITH DISABILITIES ACT (ADA)

If you are a student who requires accommodations in compliance with the ADA, please consult with me at the beginning of the semester. Faculty members and instructors are required by law to provide “reasonable accommodation” to students with disabilities, so as not to discriminate on the basis of that disability. Your responsibility is to inform me of the disability at the beginning of the semester and provide Northeastern with documentation authorizing the specific accommodation. Please consult the Northeastern University Disability Resource Center, located at 20 Dodge Hall, 617.373.2675, or <http://www.northeastern.edu/drc>, for verification and implementation of accommodations to ensure equal opportunity in all courses, programs, and activities.

TITLE IX OF THE EDUCATION AMENDMENTS OF 1972

The Title IX of the Education Amendments of 1972 protects individuals from sex or gender based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern’s Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, and faculty and staff.

If you or someone you know has been harassed or assaulted, confidential support and guidance can be found through University Health and Counseling Services staff and the Center for Spiritual Dialogue and Service clergy members. By law, those employees are not required to report allegations of sex or gender-based discrimination to the University.

Alleged violations can be reported non-confidentially to the Title IX Coordinator within The Office for Gender Equity and Compliance at: titleix@northeastern.edu and/or through NUPD (Emergency 617.373.3333; Non-Emergency 617.373.2121). Reporting Prohibited Offenses to NUPD does NOT commit the victim/affected party to future legal action.

Faculty members and instructors are considered “responsible employees” at Northeastern University, meaning they are required to report all allegations of sex or gender-based discrimination to the Title IX Coordinator. In case of an emergency, call 911. Please visit <http://www.northeastern.edu/titleix> for a complete list of reporting options and resources both on- and off-campus.

STUDENT SUPPORT SERVICES

Northeastern sponsors and supports a variety of student success programs to help you connect with the community and achieve academic success. These programs include, among others, learning assistance, developmental education, advising and mentoring, career assistance, and campus life programming. Students are encouraged to become engaged citizens on campus to enhance the academic experience at Northeastern.

You should become familiar with the following resources:

- Writing Center, at <http://www.northeastern.edu/writing-center/>
- Libraries, at <http://library.northeastern.edu>
- Tutoring, at <http://www.northeastern.edu/csastutoring/cas-tutoring/tutoring-services/>
- Career Services, at <http://www.northeastern.edu/careers>
- Experiential Learning, at <http://www.northeastern.edu/experiential/index.html>
- Center of Community Service, at <http://www.northeastern.edu/communityservice/>
- Student Government Association, at <http://www.sga.neu.edu>

COURSE CALENDAR

Due dates and reading requirements are subject to change at the professor's discretion. Reading assignments, exams, and final project due dates are listed here. Students should expect regular homework exercises and memos to be announced in class.

WEEK ONE: THE POLITICAL USE OF NUMBERS—LIES AND STATISTICS

Tuesday, January 8: Introduction and Course Logistics

No readings due

Friday, January 11: The Role of Quantitative Methods in Research Design

Reading Assignment Due: Syllabus; Howard, Ch. 4 on research design; focus on pp. 105-109 (Blackboard); Marchant-Shapiro Ch. 1

WEEK TWO: MEASUREMENT & CENTRAL TENDENCY

Tuesday, January 15: Measuring Social Concepts with Numbers

Reading Assignment Due: Marchant-Shapiro Ch. 2

Friday, January 18: How to Find the Mid-Point of Your Data (and why your method matters)

Reading Assignment Due: Marchant-Shapiro Ch. 3

WEEK THREE: DISPERSION & DATA VISUALIZATION

Tuesday, January 22: Measuring and Understanding the Range of Your Data

Reading Assignment Due: Marchant-Shapiro Ch. 4

Friday, January 25: Visualizing Patterns in Your Data

Reading Assignment Due: Marchant-Shapiro Ch. 8; Dunlap, McCright, and Yarosh, “The Political Divide on Climate Change” (Blackboard)

WEEK FOUR: USING SPSS & EMPLOYING DATA IN POLICY WRITING

Tuesday, January 29: Special Topic—SPSS Workshop in Class

Reading Assignment Due: ICPSR Student’s Guide to Interpreting SPSS Output for Basic Analyses (Blackboard)

Friday, February 1: Data Visualization in the Policy World

Reading Assignment Due: Policy Memo Writing Handout (Blackboard – under “Handouts”)

WEEK FIVE: THE NORMAL CURVE—Z-SCORES AND PROBABILITIES

Tuesday, February 5: Continuous Probability – The Normal Curve

Reading Assignment Due: Marchant-Shapiro Ch. 5; Penman and Johnson, “The Changing Shape of the Body Mass Index Distribution Curve in the Population” (Blackboard)

Friday, February 8: Review and Practice – Continuous Probability

No readings due – *Professor out of town*

WEEK SIX: MEANS TESTING

Tuesday, February 12: Means Testing and Confidence Intervals

Reading Assignment Due: Marchant-Shapiro Ch. 6

Friday, February 15: Review and Practice – Z Scores, Means Testing, and Confidence Intervals

No readings due

WEEK SEVEN: ANALYSIS OF VARIANCE (ANOVA) AND REVIEW

Tuesday, February 18: Analysis of Variance (ANOVA)

Reading Assignment Due: Marchant-Shapiro Ch. 7; Zhong, Chen, and Scheb, “Political Views from Below: A Survey of Beijing Residents”

Friday, February 22: Exam 1 Review Session

No readings due

WEEK EIGHT: EXAM 1 & R WORKSHOP

Tuesday, February 26: EXAM 1

Friday, March 1: Special Topic - R Workshop in class

Reading Assignment Due: Howard, Ch. 7 (Blackboard)

Final Project Topic Choice Due – Upload a description to Blackboard by 11:59 p.m. (PDF format)

WEEK NINE: SPRING BREAK

No class due to Spring Break

WEEK TEN: CONTINGENT PROBABILITIES – EXPECTED RELATIONSHIPS BETWEEN VARIABLES

Tuesday, March 12: Review contingency tables (Ch. 8); Chi Square and Cramer's V

Reading Assignment Due: Marchant-Shapiro Ch. 9

Friday, March 15: Review and Practice – Chi Square and Cramer's V

No readings due

WEEK ELEVEN: MEASURES OF ASSOCIATION & CORRELATION ANALYSIS

Tuesday, March 19: Measures of Association

Reading Assignment Due: Marchant-Shapiro Ch. 10

Friday, March 22: Review and Practice – Measures of Association and Correlational Analysis

Reading Assignment Due: Shah, "United States: How Has Public Confidence in News Media and Press Changed Over Past 40 Years? Statistical Inference Using R" (Blackboard)

Final Project Dataset and Hypothesis Due – Upload a description of your dataset and a link or file, as well as a statement of your hypothesis to Blackboard by 11:59 p.m. (PDF format)

WEEK TWELVE: LINEAR REGRESSION & REVIEW

Tuesday, March 26: Bivariate Regression

Reading Assignment Due: Marchant-Shapiro Ch. 12

Friday, March 29: Exam 2 Review

Reading Assignment Due: Alford, Funk, and Hibbing, "Are Political Orientations Genetically Transmitted?" (Blackboard)

WEEK THIRTEEN: EXAM 2 & CONTROL VARIABLES

Tuesday, April 2—EXAM 2

Friday, April 5: Multivariate Relationships – Control Variables

Reading Assignment Due: Marchant-Shapiro Ch. 11

WEEK FOURTEEN: MULTIPLE REGRESSION

Tuesday, April 9: Multiple Regression

Reading Assignment Due: Marchant-Shapiro Ch. 13

Friday, April 12: Review and Practice: Multiple Regression

Reading Assignment Due: Fisher, “Definitely Not Moralistic: State Political Culture and Support for Donald Trump” (Blackboard)

WEEK FIFTEEN: CONCLUSION & FINAL PROJECT DISCUSSION

Tuesday, April 16: Conclusion and Discussion of Final Projects

Reading Assignment Due: Marchant-Shapiro Ch. 14 (skim); Norris, “Does Television Erode Social Capital? A Reply to Putnam” (Blackboard)

Monday, April 22 – FINAL PROJECTS DUE – Upload to Blackboard by 11:59 p.m.