

PLS211

Quantitative Methods in Political Science

Spring 2018 | TR 12:00–13:15 | Room 8.305

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Course Description

Whether we like or not, we are living with data, living in data, and living by data. From your GPAs and facebook data to the energy consumption of Kazakhstan and the global population growth, statistics is everywhere. Statistics (note that ‘statistics’ is not a plural form of statistic) is a technique to deal with those data. In a word, the ultimate goal of statistics is to make inference from what we have observed so that we can prepare ourselves for what’s coming in the future. The use of statistics is very common in political science as well, from simple descriptions of political phenomena to predictions of election winners, foreign policy strategies, chances of terrorist attacks, and so on. This course is designed to acquaint students with statistical concepts and skills so that they can produce as well as consume materials of statistical analyses. Students will learn how to think (observe, analyze and interpret) in terms of statistical models and how to apply such thinking to social problems.

This course has no prerequisites and assumes no knowledge of calculus or computer programming. However, the content of the course include some basic (highschool level) math. We will also use real data taken from in-class polls and other public data of various topics.

Course Learning Objectives (CLOs)

By the end of this course, student will be able to:

- Present their ideas and the information in an appropriate format (PLO 3)
- Describe and interpret basic quantitative data and evidence (PLO 1, 2)
- Develop a research question in and answer it using appropriate source (PLO 1,2,3,4)
- Make their own evidence-based arguments (PLO 1,2)
- Listen to and be tolerant of different ideas (PLO 5)

Textbook

We will use following books for the main textbooks of this course. I also list recommended books for further studies on statistical analysis. All the required readings are accessible electronically on the Moodle (❖=required; ⌘=recommended).

- ❖ Kellstedt, P.M. and Whitten, G.D. (2009) *The Fundamentals of Political Science Research*. Cambridge University Press (ISBN: 978-1107621664).
- ❖ Kaplan, Daniel. (2012) *Statistical Modeling: A Fresh Approach* (2nd edition). Project Mosaic (ISBN: 978-1448642397).
- ❖ Journal articles will be available on Moodle.
- ⌘ Wong Dona M. (2010) *The Wall Street Journal Guide to Information Graphics: the Dos and Don'ts of Presenting Data, Facts, and Figures*. W.W.Norton & Company (ISBN: 978-0393072952). This book provides practical guidelines for visualizing data and statistics.
- ⌘ Gonick, Larry and Smith, Woollcott. (1993) *The Cartoon Guide to Statistics* (revised and updated edition). Harper Perennial (ISBN: 978-0062731029). This book is a cartoon that walks you through basic concepts of statistics.

Statistical Package

The course is mainly taught in the form of lecture. However, there will be a few lab sessions that we use STATA (a statistical package). I will introduce the package and some basic commands to use it. We will only use the package for basic and simple functions and will not do any programming tasks. STATA has built-in help function with detailed instructions in case you need assistance. However, there are many online sources you can consult:

- UCLA Institute for Digital Research and Education (www.ats.ucla.edu/stat/stata)
- UNC Carolina Population Center (www.cpc.unc.edu/research/tools/data_analysis?statatutorial/)
- Princeton Data and Statistical Services (www.princeton.edu/~otorres/Stata)
- Stata Tutorial by Torres Reyna (available on Moodle).

Course Requirements

Attendance (5%) Attendance will be taken at the beginning of each session. I usually start taking attendance 3 minutes before the class begins. If you showed up over 5 minutes passed the time of class beginning, you will be counted absent. An excused absence is only granted for cases specified in the *Attendance Policy*.

Team Project Tasks (20%) In this course every five students will form a group and conduct a team project. The theme of projects is “The Best X in Town,” in which each team must demonstrate their research design skills and understandings of concepts of quantitative methods. Grading of a project will be based on both team-wise performance (scores of project tasks) and individual efforts (contribution to projects). A detailed guideline will be provided in the class.

Homework Assignments (25%) There will be several take-home assignments. Homework questions will be based on reading assignments, core statistical concepts, applications of those concepts, exercise problems, and lab assignments. These assignments will help students understand the material and prepare for exams. Unless otherwise noted, all homework assignments must be typed (using 12 point size font in standard margined pages). Students are responsible for turning in a hardcopy of the completed assignment or uploading the document on Moodle before the due date. Late assignments will be accepted with penalties. I don’t grant extensions, make-up or extra assignments.

Exams (50%) There will be three exams (10%+15%+25%) in this course. All of exams are *cumulative*, meaning that the exam will cover everything that was taught up to the point of the exam dates. Exam schedules are listed in the *Course Schedule* section. Any changes of schedule will be notified in class as well as via Moodle. Before each exam we will have a review session, in which students must participate. A detailed study guide will be provided in the class.

Grading Policy

Grading scale The final grade is determined by the student’s overall performance of all course requirements in absolute terms, not relative. Following the University’s grading scale, a student’s final grade will be given by taking the percentage of points earned by the students as follows:

Exams (I+II+Final)	50%		A	95-100	A⁻	90-94.9	
Homework assignments	25%	B⁺	85-89.9	B	80-84.9	B⁻	75-79.9
Team project tasks	20%	C⁺	70-74.9	C	65-69.9	C⁻	60-64.9
Attendance	5%	D⁺	55-59.9	D	50-54.9	F	<50

Late submission I accept late submissions *only with penalties and some conditions*. A late submission will be penalized by a 10% deduction of the original points for each day (or part of a day). If you turn in your assignment 2 days late, the highest point you can receive is 80%. If your submission is late five or more days, it will *not be accepted*.

Cheating This will never be tolerated. During exams, students will receive a warning if they behave or are suspected to behave abnormally. Students who receive a second warning will receive *zero point* for that exam.

Re-grading Students can request re-grading of their assignment within one week after it is returned. Such a request must be made by a *written* request (a letter of re-grading request), describing reasons of re-grading. Note that the entire of the requested assignment, not a specific part, will be re-graded and that the new grade may be lower than the original one. There will be no re-grading of once re-graded assignments.

Academic Integrity Policy

Official documents Students must become familiarized with the NU Student Code of Conduct and Disciplinary Procedures, which is the official document outlining policies and procedures about academic misconduct. Here are links to important NU policies:

- Academic policies and procedures for undergraduate programs (English/Russian).
- Student code of conduct and disciplinary procedures (English/Russian).
- Undergraduate attendance policy and procedures (English).

Fraud This refers to any attempts to deceive the student's original status of works and/or efforts, including cheating during any types of tests, forgery of documents, and fake attendance. Punishment for fraud and cheating is as follows:

- **Fraud check-in** will result in a zero point for the student's entire attendance score after one class-wise warning.
- **Cheating** refers to a use and/or a suspected use of unauthorized assistance or an intentional noncompliance with in-class test rules. For instance, chatting with a classmate also constitutes an act of cheating, regardless of the content of the conversation.
- **Forgery** is a serious crime. This may result in a police investigation. If a forgery or an attempt of forgery is found, I have to report to the authority to prevent further consequences. This will result in a course failure and a possible expulsion from the University.

Plagiarism This is a crime. A plagiarism is defined as "an act of using someone else's ideas or words as if they were your own without appropriate acknowledgement or quotation marks." Following the NU guidelines and the Student Code of Conduct, I use three categories of punishment.

- **Category A** is to be filed when minor plagiarism is suspected (e.g. one paragraph, or 3-4 consecutive sentences). For category A, the student will get zero point for that assignment.
- **Category B** is to be filed when a significant amount of the student's assignment/work is suspected to be plagiarized (e.g. one page, or more than two paragraphs). For category B, the student will fail this course and possible disciplinary actions will be enforced by the University.
- **Category C** is to be filed when the entire work of the students is suspected. For this type of misconduct, the student may be expelled from the University.

Attitude Students are responsible for their behavior, which often have a significant impact on the entire class. Use your common sense before you act to judge if your action to be taken is appropriate. I expect all student in this course will follow Some basic rules as illustrated in below. A serious violation of any of those will result in a course failure.

- The official language of teaching/learning is English across the NU.
- Students must show proper respect to each other.
- Physical and/or verbal violence is never tolerated under any circumstances.
- Both the instructor and students should comply to course policies as well as the University regulations

Attendance Policy

Attendance The instructor will take attendance on a random basis. There is no ‘late check-in’ or ‘tardy.’ If you show up five minutes after the attendance is taken, you are considered as *absent*.

Excused absence Absence is excused only for reasons in below. Students are responsible for providing proper documentations and notification. If proper documentations are not provided, it will not be excused.

- Medical excuses (students’ own illness)- Required is proper medical notes or documents. It must be submitted through the student services within one week from the (last) date of absence. Otherwise, absence will not be excused.
- University events - The student must notify me (not TA) of any preplanned activities imposed by the NU or other equivalent entities, *excluding* works and internship. Such notices must be delivered to and cleared by me at least one week prior to the date of absence.
- Family emergencies - In cases of *accidents* that have direct influence on the student’s immediate family member(s) or co-residing member(s), the student’s absence will be excused only after proper documents are provided through the student services.
- Other occasions (e.g. family gatherings, wedding ceremonies, vacations) will *not* be excused.

Minimum attendance rate If a student’s attendance rate is below *85%*, the student will *fail* this course. Excused absences are not counted for computing the student’s attendance rate.

Check-in fraud If there is an evidence of fake check-in or a suspicious record of fraud, your attempt to cheat will be punished of an academic misconduct. See the *Academic Integrity Policy* for further information.

Other Policies

Technologies in class Unless you are instructed otherwise, the use of following items are *prohibited* during the class: cellphones, tablets, laptops, and other sound-producing devices. Use pens and notebooks for note taking, which indeed enhances the learning process in a longer-term. There is a scientific proof that handwriting makes you smarter. Here is a link to [an article from the Wall Street Journal](#).

Communications If you need to meet me in person, you can visit during office hours, or write an email to make an appointment. All appointment must be made through email, not verbally. No walk-in meetings are allowed.

Assistance for physical/mental needs If a student needs a special attention due to his/her own physical or mental conditions, the student is responsible for notifying the instructor in the beginning of the semester. If necessary, the instructor can demand official documentation on the student’s condition. Upon such requests, the student should provide appropriate records/proofs of the condition. If not provided, the requests may not be considered at all.

Changes to syllabus The instructor reserves the right to make changes to the syllabus. Any changes will be communicated in class and via Moodle.

Course Schedule

Course schedules are subject to change. Any changes will be notified at least one week prior to the original schedule. All assigned readings are available on Moodle. Students must complete reading assignments.

Week 1. Model Thinking

Kaplan, chapter 1; Kellstedt & Whitten, chapter 1

- Course introduction
- Scientific Research (review of PSRM)
- Models of Politics
- Causation and correlation

Week 2. Data, Variables and Research Design

Kaplan, chapter 2; Kellstedt & Whitten, chapter 4

- Types of variables
- Unit of analysis
- Experimental versus observational design
- Population, samples and sampling
- **Project team due (Th, in-class)**

Week 3. Descriptive Statistics

Kaplan, chapter 3; Kellstedt & Whitten, chapter 5 [5-6 for the earlier edition]

- Coverage intervals
- Means, medians, percentiles
- Variance, standard deviations
- Histogram, box plots, scatter plots
- **Homework 1 due (Tu, in-class)**
- **Project task 1 due (Th, Moodle)**

Week 4. Explaining Variation

Kaplan, chapter 4; Kellstedt & Whitten, chapter 5 [5-6 for the earlier edition]

- Partitioning property of variance
- Group-wise models
- Spurious relationships and confounding variables
- Intervening variables
- **Homework 2 due (Tu, in-class)**
- **Project task 2 (Th, Moodle)**

Week 5. Confidence Intervals

Kaplan, chapter 5; Kellstedt & Whitten, chapter 6 [7 for the earlier edition]

- Sampling distribution
- Bootstrapping
- Standard error
- Confidence levels and intervals
- **Homework 3 due (Tu, in-class)**
- **Project task 3 (Th, Moodle)**

Week 6. Review & Exam I

Kaplan, chapters 1 through 5; Kellstedt & Whitten, chapters 1 and 4 through 6 [1, 4-7 for the earlier edition]

- Review of material between week 1 and 5
- **Homework 4 due (Tu, in-class)**
- **Exam I (Th, in-class)**

Week 7. Building a Statistical Model

Kaplan, chapters 6 and 7; Kellstedt & Whitten, chapter 8 [9 for the earlier edition]

- Model formula (coefficients, terms, model values)
- Conditional relationships
- Interactive models
- **Project task 4 (Tu, Moodle)**

Week 8. Model Fitting and Total/partial Relationships

Kaplan, chapters 8, 9 and 10; Kellstedt & Whitten, chapter 8 [9 for the earlier edition]

- OLS
- R-squared, root-MSE
- Nested models
- Correlation
- **Homework 5 due (Tu, in-class)**
- **Project task 5 (Th, Moodle)**

Week 9. Quantifying Confidence in Estimates and Models

Kaplan, chapter 12; Kellstedt & Whitten, chapter 9 [10 for the earlier edition]

- Standard error
- Measurement error
- Multicollinearity problem
- **Homework 6 due (Tu, in-class)**

Week 10. Review & Exam II

Kaplan, chapters 6-10 and 12; Kellstedt & Whitten, chapters 8 and 9 [9-10 for the earlier edition]

- Review of material between week 7 and 9
- **Homework 7 due (Tu, in-class)**
- **Exam II (Th, in-class)**

Week 11. Spring break

- No class meetings in this week.
- Happy Nauryz!

Week 12. The Logic of Hypothesis Testing

Kaplan, chapter 13; Kellstedt & Whitten, chapter 7 [8 for the earlier edition]

- Null and alternative hypotheses
- p -value
- Type I and II errors
- Significant level
- **Project task 6 (Th, Moodle)**

Week 13. Interpreting Statistical Models

Kaplan, chapters 14 and 15; Kellstedt & Whitten, chapter 9 [10-11 for the earlier edition]

- R -squared and F statistics
- Significance and substance
- Conditional relationships
- Interactive models
- **Homework 8 due (Tu, in-class)**
- **Project task 7 (Th, Moodle)**
- **No class on Thursday (a make-up class will be scheduled)**

Week 14. Linear Probability Model

Kaplan, chapter 16; Kellstedt & Whitten, chapter 11 [not available in the earlier edition]

- Linear probability model
- Predicted probabilities
- Link values and functions
- Maximum likelihood estimation
- **Homework 9 due (Tu, in-class)**
- **Project task 8 (Fr, Moodle)**

Week 15. Review III

Kaplan, chapters 13 through 16; Kellstedt & Whitten, chapters 7 through 11 [8, 10-12 for the earlier edition]

- Review of materials between week 12 and 14
- **Homework 10 due (Tu, in-class)**
- **Project presentations (Th, in-class)**

Final exam

The date and location for the final exam will be posted on the Moodle.