PPL 801: QUANTITATIVE METHODS I FOR POLICY ANALYSIS
Fall 2017—Wednesday: 6:00-8:50pm
Berkey Hall—Room 112A and 216 (for Labs)

I. Course Instructor:

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Department of Political Science, MSU   Office Hours: Tues (3:00-5:00pm) or by Appointment

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(*When emailing, please include PPL 801 in the subject line)

II. Course Objectives:

Consider these questions:

➢ Does enrollment in an after-school program improve test scores and academic performance?
➢ What is the optimal tax credit that will spur economic investment in low-income communities?
➢ Do watersheds in the Midwest have higher levels of pollution than those located elsewhere?
➢ What is the probability that a given individual will use the Emergency Room in a given year?

While you may have general intuitions about how to answer these questions, one of the broad goals of quantitative policy analysis is to seek a more rigorous and systematic answer to these and similar types of inquiries. This course is designed to introduce you to the scientific study of policies and make you aware of some of the tools policy analysts use to design, implement, and evaluate policies and programs. As the first half of a sequential course on quantitative methods, it provides an introduction to the practical application of statistical analysis in public policy. It also builds a foundation for more advanced quantitative methods and statistical analyses by discussing key elements such as basic research design, data collection, measurement, descriptive statistics, sampling and distributions, hypothesis testing, Analysis of Variance (ANOVA), visual representations of data and results, and statistical software programs, among other topics.

Although this course emphasizes and relies on statistics and numbers, it is not a "math" class (although you should be familiar with basic algebra and geometry). Rather, this course is about logic, critical thinking, scientific analysis, and the use of statistics and numbers as tools to organize information, understand and assess sociopolitical phenomena, and solve policy puzzles. The goal is for you to learn about developing research questions, setting up a test of those questions (research design), gathering relevant information (data), and making sense of that information (analysis). The course will foster comprehension of theoretical aspects of statistical analysis and the use of computer software for conducting analysis.

The overarching goal of the course is to provide you with an understanding of how policy analysts use statistical techniques, as well as how to effectively consume and critically assess the use of policy analyses. These skills and techniques will be essential to pursuing professional careers in policy analysis, program management, and advocacy within the public, non-profit, and for-profit sectors.

III. Course Materials:

➢ Textbook and Readings:

Please purchase, rent, borrow, or check out from the library the following:

• Ross, Sheldon. 2017. *Introductory Statistics, 4th Edition.* Academic Press. Hardcover ISBN: 9780128043172; eBook ISBN: 9780128043615

Using an earlier edition, such as the 3rd edition, is also acceptable. However, if you decide to use an earlier edition, it is your responsibility to match the assigned chapters to the corresponding pages / chapters in earlier editions. There will also be additional assigned reading materials—e.g., book chapters, research articles, news articles—that I will make available via the course website on D2L.

➢ Software and Calculator:

We will use the software program, Stata, for this course. Stata is available in both the computer labs and the library on campus. You can also purchase your own copy of Stata at: https://www.stata.com/order/new/edu/gradplans/student-pricing/. In addition, you may want to have a scientific calculator for use on problem sets and exams. Any calculator with power functions, root functions, logarithms and exponential functions is sufficient. Graphing calculators are not allowed.

➢ Poll Everywhere:

We will also use the free interactive platform, Poll Everywhere, to enhance your participation and engagement during lecture. Poll Everywhere will allow you to submit answers to multiple choice and survey questions during lectures in real time via your cellphone or computer. I will provide instructions on how to participate using Poll Everywhere on the first day of class.

IV. Course Requirements:

NINE PROBLEM SETS: (25% Total). One problem set will be given nearly each week (see the course schedule for the details). Your assignment with the lowest grade will be dropped before calculating your final grade for these exercises. Problem sets will be handed out in class on Wednesdays and posted to D2L; they are due at the start of the next week's class. I will not accept late problem sets, as we will review the solutions in class. Some of the questions will require hand calculations and interpretation of results, while others will require statistical software and interpretation. You will be asked to turn in a card copy of your answers, including detailing the steps or software code needed to complete the questions. I care more about how you get to the answer than whether you get the "right" answer. The problem sets are important, as they expose you to the types of questions likely to show up on exams. I encourage you to work with classmates on these homework exercises and to ask me any questions you might have. However, students must turn in their own homework assignments.

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TWO EXAMS: (20% EACH). There will be both a midterm and a final exam administered during the semester. Both the midterm and the final exams will be administered in class. The format of each exam will be described in a class session before the exam, but, in general, the midterm exam will consist largely of problems to be solved by hand, while the final exam will ask you to solve problems by hand *and* using statistical software. The exams will assess your knowledge of material derived from the assigned readings, from lecture, and from your problem sets. The first exam will cover material from the first half of the course. The final exam is not necessarily cumulative, although information from the beginning of the semester will certainly apply as we discuss material from the latter portion of the class.

RESEARCH PROJECT: (20% TOTAL). You will be asked to complete a research project with a partner (although if you choose to work on your own, that is fine too). This project will build on the concepts and practices that you learn from this course. I will provide more details in a few weeks, but in general, you will be asked to come up with a research question of interest to you (and related to a public policy), derive applicable hypotheses, find relevant data, provide descriptive statistics, conduct preliminary statistical analyses, write a 2-page memo summarizing the results, and present your question and findings (8 - 10 minutes) to the class on Wednesday, December 6, 2017. Your 2-page memo should contain the main research question, why it is important, your developed hypotheses to test those theories, the data and methods you relied on to assess your question, your preliminary results and interpretation of those findings, as well as any potential limitations of your research. The course schedule below provides the intermediate dates to turn in certain portions of research project for credit.

"POLICY ANALYSIS IN THE NEWS" BRIEF: (5% TOTAL). You will also be asked to find a news article that uses or discusses statistics and probability for a policy issues, and provide the article to the class via D2L by 6:00pm on Tuesday (the day before we meet). You will then be asked to present the policy issue to the class, identify the key ideas / arguments of the article, discuss the statistics used and the implication of those statistics, making sure to point out the relevance to the concepts covered in the course. Two presenters will be asked to provide this "Policy Analysis in the News" Brief each week.

PARTICIPATION AND ATTENDANCE: (10%). The final portion of your grade is based on your ability and willingness to contribute to our class. What does this require of you?: (1) Preparation, (2) Regular Attendance, and (3) Meaningful Participation.

(1) Preparation: I expect you to complete the assigned readings and problem sets for each class as scheduled and come prepared to answer questions or discuss. (2) Regular Attendance: I also expect you to attend class on a regular basis. You will not do well in this course if you do not show up. If you miss a class, you bear the responsibility of getting notes, information about assignments, or changes to the syllabi from a classmate. See the section below on how to deal with Late Work, Make-Ups, Missed Quizzes or Exams.

(3) Meaningful Participation: Meaningful participation comes in a number of forms: asking questions to clarify course topics, answering questions that I pose in class, drawing connections between course topics and policy issues, and offering comments during class. Meaningful

participation is not checking your cellphone, surfing the web, or chatting with your neighbor during class conversations or activities. In other words, good participation is simply being a good member of our class community. Everyone's experience in this course is enhanced by regular attendance and active participation; conversely, everyone's experience suffers if individuals do not attend and participate. Remember that a sincere question often adds as much (if not more) to our understanding of the course material. So, don't be afraid to speak up or seek out help if you do not understand course content!

V. Student Evaluation and Grading:

Grading Weights—your grade will be determined using the following weights:

- Problem Sets (9):   25%
- Midterm Exam: 20%
- Final Exam: 20%
- Research Project: 20%
    - Research Question and Dataset (2%)
    - Preliminary Analyses (5%)
    - Final Presentation and Memo (13%)
- "Policy Analysis in the News" Briefing: 5%
- Attendance and Participation: 10%
- **TOTAL:**   **100%**

Grading Scale:

4.0	90 – 100	**2.5**	75 – 79	**1.0**	60 – 64
3.5	85 – 89	**2.0**	70 – 74	**0.0**	Below 60
3.0	80 – 84	**1.5**	65 – 69		

*This is the grade scale that I will use to guide my grading decisions. If you earn the percentage listed above, you are assured at least that grade. However, I reserve the right to curve the final grades upward should I deem it necessary.

VI. Course Outline:

The outline below is subject to changes; students are responsible for any changes I announce in class. The readings and activities assigned to a particular date will be discussed in class. You should be prepared to answer any questions about the material for that day.

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DATE	TOPIC	ASSIGNED READINGS & ACTIVITIES / DUE DATES
September 6	Introduction to Statistics, Research Design, Data, Measurement, and Visual Representations of Data	*Read Ross, Chp. 1 (Introduction to Statistics) and Chp. 2 (Describing Data Sets)
September 13	Measures of Central Tendency, Descriptive Statistics,	*Read Ross, Chp. 3 (Using Statistics to Summarize Data Sets) **DUE: Problem Set 1** **DUE: Pick partner for final research project** **Sign up for "Policy Analysis in the News" Brief**
September 20	Probability	*Read Ross, Chp. 4 (Probability) **DUE: Problem Set 2**
September 27	Discrete Random Variables	*Read Ross, Chp. 5 (Discrete Random Variables) **DUE: Problem Set 3**
October 4	Normal Random Variables	*Read Ross, Chp. 6 (Normal Random Variables) **DUE: Problem Set 4**
October 11	Sampling Distributions	*Read Ross, Chp. 7 (Distributions of Sampling Statistics) **DUE: Problem Set 5** **DUE: Research Question and Dataset(s)**
October 18	Midterm Exam	
October 25	Inference and Estimation	*Read Ross, Chp. 8 (Estimation)
November 1	Hypothesis Testing I	*Read Ross, Chp. 9 (Testing Statistical Hypotheses) **DUE: Problem Set 6**
November 8	Hypothesis Testing II	*Read Ross, Chp. 10 (Hypothesis Tests Concerning Two Populations) **DUE: Problem Set 7**
November 15	Analysis of Variance	*Read Ross, Chp. 11 (Analysis of Variance) **DUE: Problem Set 8**
November 22	Flex Day	**DUE: Preliminary Analysis for Research Project**
November 29	Joint Distributions, Correlation, Linear Regression	*Read Ross, Chp. 12 (Linear Regression)
December 6	Research Project Presentations	**DUE: Problem Set 9** **DUE: Research Project Presentation and 2-Page Memo**
December 13	Final Exam	Currently Scheduled for 8:00 – 10:00pm, although open to change.

VII. Course Policies and Procedures:

Classroom Decorum: Politics and public policy can be controversial. And we will discuss controversial issues from time to time. I desire to create a space where meaningful and constructive dialogue is encouraged, and your opinions are shared. However, this requires from all of us mutual respect, a willingness to listen, and tolerance of opposing viewpoints. I expect that respect for individual differences and alternative points of view will be maintained at all times in this course. One's words and use of language should be tempered and within acceptable bounds of civility and decency.

Late Work or Make-up Exams: I expect students to make every effort to turn in problem sets, take required exams, or complete other activities on time and as scheduled. The only exceptions that will be made pertain to medical emergencies experienced by you or someone in your immediate family that necessitate your absence from campus, participation in a College-sponsored event or activity, or observance of a religious holiday. If you know in advance you will miss such a requirement, you must notify me in advance. If you are ill or other extenuating circumstances cause you to miss a required graded activity, notify me as soon as possible and provide appropriate documentation (e.g., doctor's note) that allows me to verify the validity of your claim.

Communication with the Instructor: I care about you and your success in this course, at Michigan State University, and beyond. I welcome suggestions, comments, questions, and conversations about the course, policy studies, political science, graduate school, or the professional arena outside academia. Feel free to stop by my office (office hours are listed above), set up an appointment, call, or email me. I will try to respond to all emails within 24 hours, although it may take longer on the weekends. I will also use email and our D2L site to frequently communicate with you about course assignments, activities, and any changes to the course schedule or syllabus.

Grade Appeals or Challenges: I am not infallible and occasionally make grading errors, including grading miscalculations, from time to time. If you have a question or concern regarding your performance on a problem set or an exam, or your standing in the course, I am happy to discuss this with you.

Academic Integrity: Plagiarism and other academic dishonesty will not be tolerated. All work is expected to be original, and not previously or simultaneously turned in for credit in another course (unless you get explicit permission from me beforehand). All students at MSU are responsible for knowing and adhering to the academic integrity policies of this institution. Violations of this policy may include: cheating, plagiarism (including "patchwriting"), aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member (including but not limited to a zero for the assignment and/or course, being reported to the Dean's office) and non-academic sanctions (including but not limited to probation, suspension, or expulsion from the university).

Accommodations for Students with Disabilities (from the Resource Center for Persons with Disabilities (RCPD): Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at www.rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.