

**Applied Quantitative Reasoning I (UST601)**  
Cleveland State University  
Fall 2017  
Class Schedule: Wednesdays 6-9:50 p.m.  
UR 040

Instructor: Dr. Meghan E. Rubado  
Office: UR321  
Office hours: Tues./Wed. 3-4:30 p.m., and by appt.  
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### **Course Description**

This class introduces students to research methodology and quantitative analysis as it applies to the fields of public administration, planning, and policy. Practitioners and scholars in these fields regularly use quantitative methods to answer important questions about human behavior and public problems, programs, and policies. This methodology requires use of statistical tools, the basics of which will be introduced in this class. While many of you may plan *not* to use statistical methods in your day-to-day work in the field, having the ability to comprehend and critique such methods is an important skill for government leaders, bureaucrats, planners, and those working in the non-profit sector.

Students will learn to analyze substantive social questions related to their fields of interest using statistical analyses, including: descriptive statistics, correlation, graphical analysis, hypothesis testing, confidence intervals, and regression analysis. Throughout the course we will learn key statistical concepts and methods, and we will consider the various ways in which these can help us learn about social phenomena.

The content in this course builds upon itself as we progress. It will be difficult to grasp current material if you've fallen behind on past material. All assessments, therefore, are inherently cumulative, though each will focus on the more recently covered material. Lectures will include introduction of new material, as well as practice problems and familiarization with statistical software required for completion of the term research paper. Regular attendance at lecture and lab is critical to success in this class.

### **Course Materials**

The main required textbook for this course, which should be brought to class each week, is:

- Berman, Evan M. and XiaoHu Wang. 2012. *Essential Statistics for Public Managers and Policy Analysts*, 3<sup>rd</sup> Edition. CQ Press. [B&W]

Additional textbook will be used for methodological readings, as well as homework and practice problems:

- Agresti, Alan and Barbara Finlay. 2009. *Statistical Methods for the Social Sciences*, 4th Edition. Upper Saddle River, NJ: Prentice Hall. [A&F]

*Additional required readings from academic journals and other sources will regularly be announced and provided on Blackboard.*

*Standard calculators (no phones or graphing calculators) should be brought to class and must be used during quizzes.*

## **Course Requirements and Evaluation**

Student evaluations will be based on homework assignments, a research paper, three quizzes, and participation/attendance.

Homework assignments: 25% of course grade. See schedule below for assignments and due dates. All homeworks are posted on Blackboard one week before the due date. Completed assignments are due at the start of class on the assigned due date. Because solutions to the homeworks are posted at the end of the day on homework due dates, late homework will not be accepted.

Research Project: 30% of course grade. This project, completed in pairs, will require students to write an original research paper that uses appropriate statistical methods to address a research question related to public administration, planning, or your specific field of interest. Each pair of students will submit one paper. See schedule below for due dates.

Quizzes: 30% total, 10% per quiz. There will be three in-class quizzes throughout the semester to test mastery of the course material. See schedule below for quiz dates.

Participation: 15% of course grade. Attendance and speaking up in class will contribute to your participation grade. For a solid A here, you would need near perfect attendance and to contribute very regularly in lectures by answering questions and/or asking them. Missing more than one class will negatively affect your grade.

Grading criteria for course are as follows:

A	= 94-100%	C+	= 77-79%
A-	= 90-93	C	= 70-76
B+	= 87-89	D	= 60-69
B	= 83-86	F	= 59 and below
B-	= 80-82		

## **Course Policies**

Late work: Assignments are to be handed in at the beginning of class. If you are unable to attend class, you remain responsible for handing in assignments before the time that class begins. Only under extraordinary circumstances, in which students have made previous arrangements with me, will I accept late work. If previous arrangements are not made, students will receive no credit for

late assignments. Similarly, students will not be granted additional time to prepare for quizzes, except where there is compelling reason for doing so. A request for an extension must be arranged in advance, and must be accompanied by a recommendation from a recognized authority (e.g., physician or an academic dean). Grades of incompletes will only be granted for the most severe and documented circumstances (e.g., death in family, health complications, etc.) that prevent students from completing the course as scheduled.

**Academic honesty:** Students are expected to submit only their own work with their original ideas and proper citations of outside sources. Students are encouraged to study together and discuss their ideas with one another. However, all work submitted for this course must be completed individually. According to the CSU Writing Center, the CSU Student Handbook describes plagiarism as stealing and/or using the ideas or writings of another in a paper or report and claiming them as your own. This includes but is not limited to the use, by paraphrase or direct quotation, of the work of another person without full and clear acknowledgment.

**Contacting the professor:** Students are encouraged to use e-mail and Blackboard to contact me regarding any questions or concerns. They also should feel free to drop into office hours. If you have a more complicated question that you feel will take some time to work out, it is a good idea to make an appointment to see me in the office. I will make every effort to accommodate students' schedules.

## **University Policies**

**Students with Special Needs:** Educational access includes the provision of classroom accommodations, auxiliary aids and services to ensure equal educational opportunities for all students regardless of their disability. Any student who feels he or she may need an accommodation based upon the impact of a disability should immediately contact the Office of Disability Services at 216-687-2015. The office is located in MC147. Accommodations need to be requested in advance and will not be granted retroactively. Students should notify the instructor as soon as possible if they have been granted an accommodation through the Office of Disability Services.

**Writing Assistance:** Students with difficulty writing may contact the Writing Center located in the Main Classroom 321 for assistance. Students should use the American Psychological Association (APA) format for citations and reference pages, unless agreed upon otherwise in advance with the professor.

## **Tentative Course Schedule of Topics, Readings, and Assignments (subject to change):**

### **Week 1: Wed. 8/30**

Introduction to the course, getting to know each other, some stats basics

Reading due: "How big data is transforming public services – expert views," from The Guardian. 2014. <https://www.theguardian.com/public-leaders-network/2014/apr/17/big-data-government-public-services-expert-views>. Link available on Blackboard [BB].

Recommended Reading: B&W Chapter 1

**Week 2: Wed. 9/6**

Topics: Social Inquiry and Statistics, Program Evaluation, Variables and Measurement, Sampling and Bias

Reading due: B&W Chapters 1-3; A&F Chapters 1 and 2

**Lab 1: Basics of Excel****Week 3: Wed. 9/13**

Topics: Descriptive Statistics, Central Tendency, and Variation

Reading due: B&W Chapters 5-7; A&F Chapter 3

**HOMEWORK 1 (available on BB) DUE – bring hard copy to class****Lab 2: Basics of SPSS****Week 4: Wed. 9/20**

Topics: Contingency Tables; Probability Distributions, Z-Scores and Percentiles, Sampling and Inference

Reading due: B&W Chapter 8, A&F Chapter 4

**HOMEWORK 2 (available on BB) DUE – bring hard copy to class****Week 5: Wed. 9/27**

Quiz 1 Review, Workshop/Practice; Explanation of Research Project

**HOMEWORK 3 (available on BB) DUE – bring hard copy to class****Week 6: Wed. 10/4**

**\*\*Quiz 1\*\***, *bring standard calculator*. No phones or graphing calculators permitted

**Lab 3: Using Data in Excel and SPSS****Week 7: Wed. 10/11**

Quiz 1 results reviewed

Topics: Estimation (Point and Interval), Proportion Estimators, Sample Size Choice

Reading Due: A&F Chapter 5 (all)

**Research Paper Topic Proposal DUE – via Blackboard assignment****Week 8: Wed. 10/18**

Topics: Significance Testing: 5 Steps of Significance Testing, Tests for Means and Proportions

Reading due: Reading due: B&W Chapter 12; A&F Chapter 6

**HOMEWORK 4 (available on BB) DUE – bring hard copy to class****Week 9: Wed. 10/25**

Topics: Comparing Means and Proportions, Small Sample Comparisons

Reading due: A&F Chapter 7

**HOMEWORK 5 (available on BB) DUE – bring hard copy to class****Week 10: Wed. 11/1**

Quiz 2 Review, Workshop/Practice, Research Paper Brainstorming/Data Session

**HOMEWORK 6 (available on BB) DUE – bring hard copy to class**

**Week 11: Wed. 11/8**

**\*\*Quiz 2\*\***, *bring standard calculator*. No phones or graphing calculators permitted  
Topics: Research Paper Development; Data Analysis in Excel

**Week 12: Wed. 11/15**

Quiz 2 results reviewed  
Topics: Associations with Categorical Variables  
Reading due: B&W Chapter 10  
Recommended: A&F Chapter 8  
**DUE: Paper Draft 1 - lit review, theory, data**

**Week 13: Wed. 11/22**

Topics: Linear Regression and Correlation: relationships and testing  
Reading due: B&W Chapter 14; A&F Chapter 9.1-9.4  
**HOMEWORK 7 (available on BB) DUE – bring hard copy to class**

**Week 14: Wed. 11/29**

Topics: Linear Regression and Correlation: inference and interpretation  
Quiz 3 Review  
Reading due: A&F Chapter 9.6-9.7  
Recommended reading: B&W Chapter 15  
**HOMEWORK 8 (available on BB) DUE – bring hard copy to class**

**Week 15: Wed. 12/6**

**\*\*Quiz 3\*\***, *bring standard calculator*. No phones or graphing calculators permitted  
Research Paper working session

**\*\*\*Dec. 13: Final Research Paper Due via Blackboard\*\*\***

**Research Paper**

The task: In pairs, students will complete a major project that consists of an original research paper. The project aims to assess your ability to relate research questions to data and to determine and implement appropriate statistical analysis methods. Each pair of students will select a research question (or a couple related questions) to examine over the course of the semester. You should choose a topic related to your area of interest in public administration, planning, environmental policy, etc. You must find a dataset (or datasets) that can help answer your question and conduct appropriate statistical analysis. You will present your question, literature review, theory, and results in a research paper (one paper per pair).

All assignments must be submitted in 12-point font, double-spaced, 1-inch margins, and must be uploaded to the Blackboard assignment. No late work will be accepted. If you miss one of the deadlines, you will lose the associated points on your final grade for the project.

**Due Oct. 11: Research Question and Partnership Memo (one memo per pair)**

In a 250-500-word memo, tell me with whom you are working, what question/s you are interested in researching, and what sort of data might help you answer the question/s. Your question should involve a relationship between two variables, for example: Do people's *political beliefs* affect their *attitudes* toward genetically modified foods? If you are debating between a couple of options, tell me about both so I can help you narrow it down. In the memo, explain why you think the question is worth asking, and if you have any expectations about what the answer might be. Indicate whether you have an idea of where to find data on this question. **(5 points)**

**Due Nov. 15: First draft of front end of the paper (Introduction, Literature Review, Theory, and Data) - (one per pair)**

In at least 4 full pages (~1000 words), provide the major sections that will begin the paper (everything except the actual data analysis, results, and conclusion).

Include a review of existing literature on and/or related to your research question. The articles, documents, and websites you consult will be guided by your topic. Whenever possible, you should cite scholarly articles and/or books, though news stories and online sources (such as think tanks, research centers, etc.) are acceptable. You should briefly summarize relevant sources, explaining what they contribute to our understanding of your research topic, as well as their limitations. How many sources you should cite depends on your topic, but citing fewer than three sources will result in a loss of points.

In a separate section, explain the theory that underlies the relationship you plan to examine in your project. Here, it is important to establish a causal relationship that moves in one direction. For example, if you are investigating the relationship between home ownership and self-reported happiness levels, you would need to map out *how* home ownership *affects* happiness. Tell me whether you think the relationship is positive or negative and why. You can lean on the literature here, or develop a theory that stands apart from existing research. You should clearly note the hypotheses you draw from your theory (i.e., null and alternative hypotheses).

Finally, include a section in which you discuss the data you will use to answer your research question. This section should explain where the data comes from, how it was collected, and where it can be accessed. Discuss the relevant variables in the dataset and explain how they relate to your research question. Provide appropriate descriptive statistics (e.g. mean, standard deviation, range of the data) on the variables of interest. **(15 points)**

**Due Dec. 13: Final paper (one per pair)**

In 1,750-2,250 words, present your project in five sections:

- 1) Introduction: Explain your question and its relevance.
- 2) Literature Review: Synthesize existing research regarding your question.
- 3) Theory: Explain the underlying causal mechanism and your hypotheses.
- 4) Data and Methods: Describe your data, where it comes from, and how you will use it. Which tests will you perform?
- 5) Results and Discussion: Present the results of your analysis and interpret them, and draw conclusions about how these findings relate to your theory (i.e., reject the null, fail to reject). What do your findings *mean* in terms of the original research question?

A strong paper will connect the research question to relevant literature, develop a causal theory, select appropriate data and methodology, and compute and interpret the results accurately. **(80 points)**