Course: MPA 805 – Quantitative Analysis

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Classes: Wednesdays 5:00pm – 7:00pm   **Office Hours:** Thursdays 1:00pm – 2:00pm

COURSE OVERVIEW

This is a course designed for graduate students who anticipate the future use of quantitative methods for policy analysis. The growing use of quantitative data in the development of public policy in healthcare, agriculture, finance, education, immigration, and many other areas is making data literacy a requirement in a growing number of positions. This course is an introduction to empirical methods commonly used in analyzing public policy. We will discuss how social scientists – policy practitioners and public administrators – use statistical tools to answer questions about the world.

Example: Does sending nonviolent criminals to prison (instead of, say, putting them on probation) create a stigma that will reduce their chances of finding legitimate work when they are released? Can we answer this question by taking a national survey of former inmates and people who have never been to prison, and comparing their unemployment rates?

Prerequisites: This is an introductory course and therefore a background in statistics is not assumed. Please be mindful of the fact that we all learn at different paces. I encourage you to be patient while we introduce concepts that your colleagues may not be familiar with. We will focus on the kinds of data and analysis that are common in the public sector.

Goals: The three main goals of this course are:
1) To provide the statistical background necessary to read and understand quantitative analyses.
2) To give students the conceptual foundation necessary to learn more advanced techniques in the workplace.
3) To teach practical skills in data analysis using Excel statistical software.

Website: Additional information, lecture outlines, links to readings, the calendar/reading list, and other useful information about this class can be found on OnQ.

LEARNING OUTCOMES

The overarching objective of Quantitative Analysis is for students to describe data and make inferences based on well-reasoned statistical arguments. By the end of the course, you should be able to perform basic empirical analyses and critically evaluate and explain basic empirical work done by other people. The specific learning outcomes are to:

- describe data with descriptive statistics;
- describe the nature of randomness and variation in data;
- demonstrate your ability to frame a testable research question;
- understand the meaning of analyses using confidence intervals, test statistics, and p-values.
- perform statistical analyses;
- interpret the results of statistical analyses;
- make inferences about the population from sample data;
- summarize and interpret the data and regression results presented in a report;
- demonstrate your ability to use Excel to produce results and your capacity to write about those results in a manner that is easily understood by a non-technical audience;
- understand the meaning of jargon used to describe empirical methods and statistical assumptions in policy and government reports;
- realize that quantitative analysis has many practical applications.

COURSE READINGS

Specific readings for each class will be posted on OnQ prior to class. Please complete all readings prior to the class in which they will be discussed. The lectures will also cover material not included in the readings. The readings and lectures are not substitutes; they are designed to complement each other.

Textbook: Michael Sullivan, III (2021) Statistics Informed Decisions Using Data. Pearson. 6th Edition.
Required: This textbook will be available as an e-text with access to MyLab. The link to buy codes for the e-text and access to MyLab from the Queen's University campus bookstore is:
https://www.campusbookstore.com/textbooks/access-code-search-engine. Search for MPA805 from the list of courses. The purchase price is listed as $107.95.
Optional: Once you have registered into the MyLab course, you can choose to purchase the $65 loose leaf text from Pearson (free shipping in Canada). The link to purchase the loose-leaf text is under 'Purchase Options' on the left-hand menu.

Software

We will use Excel for many of the statistical methods and Microsoft Word for some of the homework assignments. We will have demonstration session on how to analyze data and construct graphs in Excel in some of our classes and in the additional tutorials.

While the majority of MPA graduates do not conduct statistical analysis for a living, some knowledge of statistical software has been important in helping past students gain employment in both government agencies and the private sector.

GRADING SCHEME

Grading for Quantitative Analysis will be based on:

Weekly review questions	40%
Attendance and participation	10%
Individual mid-term exam	25%
Group final exam	25%
Total	100%

Weekly review questions: 40%. I will post weekly review questions on the MyLab platform that should be completed before we cover the topic each week. This is meant to encourage students to read and review the course videos, and textbook material before they come to the class sessions. The weekly review will start in the second week of the semester to give students time to purchase the e-text and access to MyLab.

Attendance and participation: 10%. This grade will comprise of the average of an evaluation of your active participation in class and your self-evaluation based on the effort you put in the course during the semester. The self-evaluation is due on **Wednesday 8 December 2021.**

Individual midterm exam: 25%. The exam will be taken on **Wednesday 20 October** 2021 in week 7.

Group final exam: 25%. The final exam will be a group take home exam that will be released on Wednesday 1 December 2021 in week 13 and it will be due a week after it is issued, on **Wednesday 8 December 2021**. I will randomly assign the class to groups of 6 individuals.

I will not accept late work except in cases of medical or family emergency. If you require accommodations for a disability, please see me as soon as possible. If you are unable to write the exam (i.e. if you are sick, personal issues, etc.), you must let me know BEFORE the exam time.

Excel workshops and TA office hours: Our TA office hours will be Thursdays 5:30pm – 6:30pm. We will have 5 optional (but highly recommended) Excel workshops led by our TA on the following dates during office hours: 1) September 16th, 2) September 23rd, 3) October 28th, 4) November 11th and 5) November 18th.

Attendance and lateness: All students are expected to attend all class sessions. Although attendance will not be taken each and every class, be warned that you are responsible for all material covered in class including that, which is not in the text. You are expected to make every effort to be on time to class sessions.

Teaching style: There are many ways to learn. And different styles are more effective for some students than others. Therefore, we will utilize several different approaches: lectures, PowerPoint slides, problem sets, and discussions.

Travel during exams: According to university regulations, students are expected to be available to write scheduled exams at any time during the official December and April examination periods. Requests to write a make-up exam because of conflicting travel plans (e.g. flight bookings) or requests to miss an exam due to other plans will NOT be considered except under extraordinary circumstances. Students are advised to wait until the final exam schedules are posted before making any travel arrangements.

ACADEMIC INTEGRITY

Academic Integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see www.academicintegrity.org). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the   "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the   Senate Report on Principles and Priorities www.queensu.ca/secretariat/policies/senate/report- principles-and-priorities).Students are responsible for familiarizing themselves with the Academic Integrity Policy of the School   of Graduate Studies, available at http://www.queensu.ca/sgs/forstudents/policiesprocedures/SGSAcademicIntegrityPolicyas ofFeb2012.pdf.

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment or the failure of a course to the rescinding of a degree.

ACCOMMODATION FOR STUDENTS WITH DISABILITIES

Students with physical and learning disabilities must contact the instructor as soon as possible in order for accommodations/modifications for course expectations to be made.

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Queen's Student Accessibility Services (QSAS) and register as early as possible. For more information, including important deadlines, please visit the QSAS website at: http://www.queensu.ca/studentwellness/accessibility-services/

STATEMENT OF INCLUSION

In this class I will work to promote an anti-discriminatory environment where everyone feels respected, valued and welcome. It is my intent to present materials and activities that are respectful of the diversity of students and experiences in this classroom. Students in this class are encouraged to speak up and participate during class meetings. Because the class will represent a diversity of individuals, beliefs, backgrounds, and experiences, you must show respect for your colleagues in this class.

COPYRIGHT

The link below provides a brief summary of the Copyright Act of Canada (the Act) as it relates to instruction at Queen's University.
https://library.queensu.ca/help-services/copyright-fair-dealing/copyright-basics-instructors

Tentative delivery schedule

Please Note:
Any changes to this delivery schedule will be communicated in class or in writing by the professor to the students.

Week	Topic	Key Learning Objectives	Learning Activities	Resources
1 September 8	Data collection	1. Describe the need for Quantitative Analysis 2. Describe the types of data and data sources 3. Determine the level of measurement of a variable	Lecture, group discussions, classroom activities	• Course slides • Other assigned readings • Text, Chapter 1 1.1 – 1.6
2 September 15	Organizing and summarizing data	1. Organizing data in qualitative and quantitative data in tables, bar graphs, pie charts, histograms 2. Constructing frequency graphs	Lecture, group discussions, classroom activities **1. Week 2 review due September 14**	• Course slides • Other assigned readings • Text, Chapter 2 2.1 – 2.4
3 September 22	Numerically summarizing data	1. Determine the arithmetic mean, median, mode and range of variables. 2. Determine the standard deviation and variance of variables. 3. Use Excel to determine measures of central tendency for a data set.	Lecture, group discussions, classroom activities **2. Week 3 review due September 21**	• Course slides • Other assigned readings • Text, Chapter 3 3.1 – 3.5
4 September 29	Probability	1. Apply the rules of probability. 2. Recognize, compute and interpret probabilities. 3. Distinguish between discrete and continuous random variables.	Lecture, group discussions, classroom activities **3. Week 4 review due September 28**	• Course slides • Other assigned readings • Text, Chapter 5

Week	Topic	Key Learning Objectives	Learning Activities	Resources
				5.1 – 5.4
5 October 6	Normal probability distribution **Mid-term review**	1. Understand the normal distribution. 2. Graph a normal curve and understand the properties of a normal curve. 3. Describe the distribution of a sample mean.	Lecture, group discussions, classroom activities 4. **Week 5 review due October 5**	• Course slides • Other assigned readings • Text, Chapter 7 7.1 – 7.2 • **Text, Chapters 1, 2, 3, 5 and 7**
6 October 13	**FALL STUDY BREAK** **NO CLASS**			
7 October 20	**MID-TERM EXAM**			
8 October 27	Sampling distributions	1. Describe the distribution of the sample mean 2. Describe the distribution of the sample proportion	Lecture, group discussions, classroom activities 5. **Week 8 review due October 26**	• Course slides • Other assigned readings • Text, Chapter 8 8.1 – 8.2
9 November 3	Confidence intervals	1. Understand confidence intervals. 2. Identify when we use and apply some of these concepts in our real work – use examples.	Lecture, group discussions, classroom activities 6. **Week 9 review due November 2**	• Course slides • Other assigned readings • Text, Chapter 9 9.1 – 9.2

Week	Topic	Key Learning Objectives	Learning Activities	Resources
10 November 10	Hypothesis testing	1. Determine the null and alternative hypotheses. 2. Explain Type I and Type II errors. 3. State conclusions to hypotheses tests.	Lecture, group discussions, classroom activities **7. Week 10 review due November 9**	• Course slides • Other assigned readings • Text, Chapter 10 10.1 – 10.3
11 November 17	Simple linear regression	1. Find the least squares regression line and use it to make predictions. 2. Interpret the slope and the y-intercept of the least-squares regression line. 3. Explain the difference between correlation and causation. 4. Review examples of journal papers that have used least squares regression.	Lecture, group discussions, classroom activities **8. Week 11 review due November 16**	• Course slides • Other assigned readings • Text, Chapter 4 4.1 – 4.4
12 November 24	Exam review	1. Review the statistical concepts covered in the course. 2. Identify when we use and apply some of these concepts in our real work – use examples.	Lecture, group discussions, classroom activities	• Course slides • Other assigned readings • Text, Chapter 4,8, 9, and 10
13 December 1	**GROUP FINAL EXAM**			