



MRPE 9300B · Statistics

Winter Term 2024
The University of Western Ontario

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Economics

Class: Tuesday 8:30-11:30, SSC 1316A
Office Hours: Thursday 9:00-11:00am, students should reserve an
appointment slot (office hours will be held in-person in SSC 4061)
Contact Details: rmcgee4@uwo.ca (please put "MRPE 9300B" in
the subject line)

Course Description

Overview.

This course is designed to equip students with the tools necessary to analyze policy- and practice-related questions either on their own or as a member of a team, to critically consume statistical information, and to communicate their findings in effective and appropriate ways. We focus on the fundamental building blocks of statistical analysis in order to address practical problems in policy and practice. We will start with simple statistical concepts for describing and summarizing data, and build towards more sophisticated tools for making decisions and predictions about the social world. Topics covered include: measures of central tendency and variation, probability, hypothesis testing, correlation, and regression. Students will also use the statistical software program Stata to develop their data analysis skills. This course presumes students have little mathematical background beyond high school algebra. By the end of the course, students will be able to conduct their own descriptive analyses of real data, as well as read and interpret statistical analyses conducted by others.

Learning Outcomes

- Students will be able to:
Use real-data and appropriate statistical methods to answer quantitative questions in social science and policy analysis
- Understand issues facing researchers when analysing nonexperimental data

- Understand common statistical concepts and analytical techniques, including practical considerations such as when and how to appropriately use them, their underlying assumptions, and how to interpret results.
- Read and thoughtfully evaluate published statistics in social science and policy-relevant research
- Use a popular software package to apply the concepts learnt in class to real data and produce their own analysis
- Understand and provide valid interpretations of their results

Course Materials

Readings.

Textbook. The course material will primarily be delivered through in class lectures as well as problem sets. However, a list of optional resources will be provided on OWL. These are recommended if you are looking for additional background, other explanations, more examples, or more problems to practice.

Stata. STATA is available on computers in our classroom (Room SSC 1316A) and the Interdisciplinary Graduate Computing Labs (SSC 6300 and SSC 1038). We will dedicate class time for students to work on hands-on exercises in the classroom. The Graduate computing labs are open 24/7 for students to work on take-home assignments.

- If you would like to work on STATA for a course project from home, it is also available via MyVLab (<https://myvlab.uwo.ca/>), free of charge for the students registered in this course. You can find access information at: https://myvlab.uwo.ca/using_mfa_on_myvlab.html
- You can also purchase a personal license of Stata to install on your computer. This provides more reliable access than MyVLab. Be sure to purchase the Stata/BE version of the program (the SE or MP versions are only necessary for very large datasets, which we won't be using in this class). To purchase Stata, visit <https://www.stata.com/order/new/edu/profplus/studentpricing/>.
- No prior knowledge of STATA is required and the lab sessions in this course will cover basic procedures for analyzing data. Students may find it useful to explore the UCLA's Stata website to learn more of the STATA operation (<https://stats.idre.ucla.edu/stata/>).

Additional Materials. Additional readings and materials will be made available through the course website on OWL.

Course Evaluation

General Expectations. Each class will include a hands-on practice session, which is designed to help you practice what we are learning—including what we do on Stata.

- Students are expected to attend class in-person, as this will make it a lot easier to provide technical instructions and to resolve possible glitches due to software errors or misuses.
- Students who must miss class or participate online are responsible for getting notes from classmates and follow-up with the instructor at office hours to catch up on the lab exercises.

In class presentation of existing data (25%) Presentations will take place on the following dates: Jan 23, Jan 30, Feb 6, Feb 13 I will provide a list of secondary data sources relevant to policy research and the areas you express interest in.

Each student will choose a data set for which they will develop a short presentation (5 minutes + 5 minutes Q&A) that addresses and answers the following topics and questions:

- An overview of the data set
- What types of methodological approaches are typically used with the data set?
- What types of research questions is the data set particularly well-suited to answer?
- What types of research questions is the data set poorly suited to answer?
- What would be an innovative use of the data set that prior people have infrequently done?
- Could you potentially use this data source for your own research?

The grade for presentation will be given based on two components:

- a) Individual Presentation (15%) Students will be graded based on their understanding of the chosen data set and the quality of their oral presentation.
- b) Engagement & Feedback on other's presentation (10%)

The purpose of this exercise is to expose students to a variety of secondary data sources. As such, you should become familiar with all of them, not just the one you will present on.

Students are expected to read about all data sets and engage during the Q&A of other's presentations. The more you participate, the more you will get from the class, and the more interesting it will be for everyone involved.

Midterm Exam (25%). In-class, open-book exam on Feb 27th. Students are allowed to work in a group up to four members. That means you can choose to work alone, or work with a smaller group.

Students must inform the instructor of any group formation and membership by Feb 13th. The exam questions will be posted on OWL and the submission will be made there also. For each group, only one submission is required by the end of class time (11:30pm).

Quantitative Research Paper (50%). To demonstrate your knowledge of and ability to use statistics in research, you will be asked to develop a research paper using the data discussed in class. Students are encouraged to select a research topic which can be addressed by one of these datasets.

Any student whose research project requires an alternative dataset should seek permission from the instructor.

This assignment consists of two components:

- a) Paper proposal (Literature review and Research question) (10%) Due on Friday, March 15th at 5:00PM
- b) Final paper (40%) Due on Monday, April 8 at 5:00PM

Students should use the paper proposal as a part of the final paper. In doing so, you are encouraged to modify and improve the final paper based on the instructor's feedback. Both components of the paper should be submitted on the OWL site.

How to Contact Me

If you have course-related questions that may be relevant for the whole class, it is best to ask the questions in class. If you have a specific question for me, you can send me an email (see above)

You can also meet with me individually or in small groups during office hours. Please email me to schedule a time if you have a conflict with the designated office hour time.

Important Policies

Assignment Deadlines. Students must submit their assignments by the date and time stated in the course outline and on the OWL website. Late assignments will be penalized 10% for each day they are late. Any assignment not received within 5 days of the due date will not be accepted, except in the event of a documented medical or family emergency. If a student anticipates an issue with an assignment, they are recommended to speak to the professor as early as possible to make alternative arrangements.

Plagiarism. Students must write their assignments in their own words. Whenever students take an idea from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major scholastic offence (the Scholastic Offence Policy can be viewed in the Western Academic Calendar). All required assignments may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (www.turnitin.com).

Standards of Professional Behaviour. It is the responsibility of all to adhere to and promote standards of professional behaviour that support an effective learning environment. These include:

- Respect for others both in and out of the classroom through words and actions (be professional, fair, and respectful in interactions with people on-line and in-person; understand and respect differences among classmates and colleagues; avoid disrupting the learning environment; respect others' expectations of confidentiality and privacy).
- Active engagement in learning and commitment to quality (being prepared for classes; participating and listening actively to other; using technology and social media appropriately, striving to do your best). Take responsibility for your own learning by: relating course content and projects to your own professional interests; monitoring your own understanding; seeking clarification and assistance when necessary.
- Personal integrity (following through on commitments; doing one's own work).

Students should also be aware of the UWO Student Code of Conduct found at:
<https://www.uwo.ca/univsec/pdf/board/code.pdf>

Copyright of Lectures and Other Course Materials. Any materials created by the instructor (e.g., videos, notes, handouts, summaries, slide decks, assignments, exams, etc.) are protected by copyright law and may not be copied or distributed in any form without the explicit permission of the instructor. Any non-authorized use of these materials constitutes an academic offence.

Scholastic Offences. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence (www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

Accommodation. Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program. Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are encouraged to register with Student Accessibility Services, a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate

documentation, the student will work with both SAS and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction. For more information, see <http://www.sdc.uwo.ca/ssd/>.

Completion of Course Requirements. Course requirements must be completed by the end of the term in which the course is offered (Fall–December 31; Winter–April 30, Summer–August 31). Only in exceptional circumstances may a student take additional time to complete the course requirements. In such a case, the student must first meet with the Graduate Chair to request permission to carry the incomplete. Medical documentation, where required, will be kept on file in the graduate program office. More details regarding incompletes are outlined in the Graduate Handbook: http://www.sociology.uwo.ca/graduate_handbook/course_information.html.

Accessibility Options. Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2111, x82147 for any specific question regarding an accommodation. Information regarding accommodation of exams is available on the Registrar's website: www.registrar.uwo.ca/examinations/accommodated_exams.html.

Mental Health. Students in emotional/mental distress should refer to Mental Health@Western (http://uwo.ca/health/mental_wellbeing/index.html) for a complete list of options how to obtain help.

Health and Wellness. As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. The Wellness Education Centre (lower level UCC) assists students in finding mental health and other related resources best suited to their needs (<http://se.uwo.ca/wec.html>). Western's School of Graduate and Postdoctoral Studies' Living Well website provides tips for thriving at grad school and other helpful information (http://grad.uwo.ca/current_students/living_well/index.html). Western provides several on-campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year. Also, we encourage you to check out the Faculty of Music webpage (<http://www.music.uwo.ca/>), and our own McIntosh Gallery (<http://www.mcintoshgallery.ca/>).

Disputing a Grade. Students who wish to dispute an assignment, exam, or course grade must write a one-page explanation justifying why their work should be re-evaluated. Work will not be re-evaluated on the basis that students were sick or feeling stressed when completing the assignment. Please be advised that a student's mark may go up or down upon re-evaluation.

Extraordinary Circumstances. The content and/or evaluation of this course is subject to change in the event of extraordinary circumstances beyond the University's or instructor's control.

Course Schedule

Please note: This schedule is subject to change over the course of the term in order to meet the needs of the class. Any changes will be announced through our OWL course website.

1. Overview and Introduction To Statistics [Jan. 9]
2. Sampling & Measurement [Jan. 16]
3. Probability Distributions [Jan. 23]

4. Variability, Dispersion and Central Tendency [Jan. 30]
5. Populations and Estimates [Feb. 6]
6. Hypothesis Testing [Feb. 13]
7. Reading Week [Feb. 20]
8. Mid-Term Exam [Feb. 27]
9. Correlation and Simple Linear Regression [Mar. 5]
10. Multivariate Regression and Inference [Mar. 12]
11. Model Specification and Heteroskedasticity [Mar. 19]
12. Causal Inference I [Mar. 26]
13. Causal Inference II [April 2]