The University of Western Ontario
SOCIOLOGY 9001
Introduction to Multivariable Analysis
Fall 2025
Tuesdays 1:30pm-4:30pm

Professor: Yoko Yoshida

Enrollment Restrictions

Enrollment in this course is restricted to graduate students in Sociology, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

Course Description

This course provides an introduction to statistical concepts and techniques commonly used in social science research. It is designed to give students insight into how quantitative data are collected and analyzed to answer research questions. The course emphasizes practical application, focusing on (1) the use of statistical techniques to address empirical questions and (2) the interpretation of quantitative evidence.

After a brief discussion of quantitative research and basic types of multivariable relationships, the course covers foundational statistical operations, including descriptive statistics, sampling distributions, statistical inference, correlation, and linear regression. We will explore how these methods are applied to real-world research questions. Lab sessions will develop students' skills in data management, processing, and statistical analysis using STATA, a widely used statistical software.

This course is designed to provide the foundational knowledge needed for Advanced Multivariable Statistical Analysis (Sociology 9007) in the winter term.

Learning Outcomes

By the end of this course, students will acquire a foundational skillset to design and execute an original quantitative research project. Specifically, they will be able to:

- Formulate an empirical quantitative research question;
- Understand how quantitative social science data are collected and used, and critically assess how data collection and measurement decisions can affect estimates and conclusions;
- Master statistical tools, including univariate, bivariate, and introductory multivariate techniques;
- Develop practical skills to manage and process survey data using the statistical software Stata;
- Interpret statistical results to support arguments and draw evidence-based conclusions.

Textbook/Course Material(s)

Required text:

General Textbook on statistics:

- Agresti, Alan (2018). Statistical Methods for the Social Sciences, Fifth Edition. Pearson. (Ebook version is also available)

Students are welcome to purchase second-hand or earlier editions of this textbook.

You can find information on the textbook purchase for this course at the Western bookstore's website at: https://bookstore.uwo.ca/textbook-search?campus=UWO&term=32025&courses%5B0%5D=001/SOC9001

Empirical Readings: Throughout the course, we will explore a set of journal articles that apply the statistical methods covered in class to Canadian national survey data. In the lab, we will work with the Public Use Microdata Files (PUMFs) from these surveys, among others, discussing how researchers process the data to generate statistical results and interpret them to answer research questions. These readings also provide valuable guidance for developing research questions for the course project. All articles are available on Brightspace.

In addition to the required texts, there are optional texts to provide alternative explanations and additional examples or problems.

General:

- Moore, David, S., W.I. Notz, and M. Fligner. 2021. *The Basic Practice of Statistics* (9th edition)
- Noack, Andrea. 2018. *Social Statistics in Action: A Canadian Introduction*. Oxford.

Using Stata:

- Longest, Kyle C. 2019. *Using Stata for Quantitative Data Analysis*, Third Edition. Sage.
- Long, J. Scott. 2009. *The Workflow of Data Analysis Using Stata*. Stata Press.

Statistical Software of Instruction: STATA will be used throughout the course.

STATA is available on computers located in the Social Science computing labs 1014, 1020, 1038, and 6300 (see also the Social Science Technology Services website).

For software purchases, visit the STATA Corp website. Student pricing starts at $48 USD for a 6-month license.

No prior knowledge on STATA is required and the lab sessions in this course will cover the basic data handling process. However, 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/).

Methods of Evaluation / Evaluation Breakdown

There are three main components for this course.

1. **Lab Exercise (5%*3=15%):**

To reinforce the statistical methods, three exercise sets will be offered throughout the term. Exercises require producing and interpreting statistical results using the techniques introduced in lab. Students may work in groups of up to four. Each set will be announced during lab and is due the night before the following week's class. (Monday night at 11:55pm).

2. Statistical Exercise Assignment (25%): Take-home assignment

The questions will be posted on the OWL after the class on October 28th and the submission should be made on the OWL due on **Monday, November 10th** at 11:55pm.

3. Course Project (CP) Assignment (60%):

To apply the statistical concepts and tools in the real-life research context, students will develop an original course project and write a brief research report, using a set of designated statistical tools. The assignment consists of three segments, where the final paper will be built on the previous assignment. The submissions should be made on Brightspace by 11:55pm of the due date.

- CP 1 (20%): Topic statement, review of literature, research question, hypothesis and method (max. 5pages - double spaced)
  Due on **Friday, October 3rd**

- CP 2 (40%): Final paper (max. 15pages double spaced)
  Due on **Friday, December 12th**

Course Schedule and Readings

(Note: This schedule is subject to change over the course of the term: and additional empirical readings will be announced throughout the course)

Week 1 (Sept. 9): Introduction

- Read Agresti Chs. 1 & 10
- Stata Lab: Sources for the Secondary Data | Intro to Stata

Week 2 (Sept. 16): Sampling and Measurement

- Read Agresti Ch. 2
- Stata Lab: Data handling with STATA

Week 3 (Sept. 23): Descriptive Statistics

- Read Agresti Ch. 3
- Stata Lab: Descriptive Statistics with STATA I

---------- Sept 30 – National Day for Truth and Reconciliation: No Class ----------

Week 4 (Oct 7): Probability Distributions

- Read Agresti Ch. 4
- Stata Lab: Descriptive Statistics with STATA II

Week 5 (Oct. 14): Statistical Inference: Estimation

- Read Agresti Ch. 5
- Stata Lab: Inferential statistics with STATA I

Week 6 (Oct. 21): Statistical Inference: Significance Tests

- Read Agresti Ch. 6
- Stata Lab: Inferential statistics with STATA II

Week 7 (Oct. 28): Comparison of Two Groups

- Read Agresti Ch. 7
- Stata Lab 4: Testing the mean difference between two groups

---------- Nov. 4 – Reading Week: No Class ----------

Week 8 (Nov. 11): Analyzing Association b/w Categorical Variables

- Read Agresti Ch. 8
- Stata Lab: Chi-square tests

Week 9 (Nov. 18): Linear Regression and Correlation

- Read Agresti Ch. 9
- Stata Lab: Scatter Plot, Regression, and Correlation

Week 10 (Nov. 25): Introduction to Multivariate Relationships and Multiple Regression

- Read Agresti Ch. 11.1, 11.2, 11.3, 12.1
- Stata Lab: Multiple regression, dummy variables

Week 11 (Dec. 2): Application of Multivariate Analysis: Statistical Control, Moderation/Interaction

- Read Agresti Ch. 11.4, 11.5, 11.6, 13.1,13.2, 13.3, 13.4
- Stata Lab: Multiple regression, interaction models, marginal effects

Week 12 (Dec. 9): TBA

*******Final paper due: Friday, December 12, at 11:55pm*******

Important Policies

Policies for Assignment Deadlines

Students must submit assignments by the deadlines specified in the course outline. In the case of a medical or family emergency that prevents timely submission, please contact the instructor at the earliest convenience. Without a contact with the instructor, late submissions will incur a penalty of 5% of the total possible weight allocated for the assignment for each day late. For example, if an assignment is worth 10% of the final grade, a one-day late submission will be prorated to 9.5% of the final grade. Unexcused assignments submitted more than 5 days after the due date will not be accepted.

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the 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 (http://www.turnitin.com).

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 Sociology graduate program office. More details regarding incompletes are outlined in the Graduate Handbook:
http://www.sociology.uwo.ca/graduate_handbook/course_information.html

Standards of Professional Behaviour

It is the responsibility of all members of the Department of Sociology 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)
- **personal integrity** (following through on commitments; doing 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

Accessible Education Western (AEW)

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 strongly encouraged to register with Accessible Education Western (AEW), a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will

work with both AEW 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.

Health/Wellness Services

Students who are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

Statement on Gender-Based and Sexual Violence:

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts at the following website:
https://www.uwo.ca/health/student_support/survivor_support/get-help.html
To connect with a case manager or set up an appointment, please contact support@uwo.ca.