



Western University
SOCIOLOGY 9001A
Introduction to Multivariate Statistics
Fall 2017
Date: Wednesdays 1:30-4:30pm

Instructor: Kate H. Choi
Office Hours: Wednesdays 4:30-6:30pm
SSC 5331
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Course Description: The course will provide an introduction to statistical concepts and techniques used in social science research. It is designed to provide you insights about how quantitative data is collected and how these data are then analyzed for information. This is an applied course where the focus will be on (1) the application of statistical techniques to answer empirical questions and (2) the interpretation of quantitative evidence.

During class, I will provide you with an introduction to the underlying statistical theory behind each statistical method and provide you with several examples about how to apply each statistical technique.

Learning outcomes:

- Learn how data used in quantitative data analysis is collected
- Develop an understanding of different statistical tools used for quantitative data analysis
- Thoughtfully evaluate published research using quantitative data analysis
- Acquire basic skills necessary to conduct empirical analysis using quantitative analysis

Prerequisite(s): Sociology 2205A/B and 2206A/B or the former 231 (or equivalent) and enrollment in fourth year of an Honors Specialization or Honors Double Major in Social Science. 60% in Sociology 2205A/B and 2206A/B or the former 231. If not in an Honors Specialization, a minimum grade of 70% in Sociology 2205A/B and 2206A/B or the former 231 or written permission from Department.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. The decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Aniterequisite(s): Former Sociology 3300A/B

Required Text(s): There is one required texts for the course and several strongly recommended books. The required books are available at the Book store at Western.

Alan Agresti and Barbara Finlay. 2009. *Statistical Methods for the Social Sciences* (4th edition). Prentice Hall.

Kyle C. Longest. 2011. *Using Stata for Quantitative Data Analysis*.

STATA 15 *-- Do not purchase ahead of time

Strongly recommended but optional

Lawrence C. Hamilton. 2009. *Statistics with Stata: Version 10*.

Jane E. Miller. 2005. *The Chicago Guide to Writing about Multivariate Analysis*. University of Chicago Press. – It provides advice about how to interpret quantitative data.

Donald Treiman. 2009. *Quantitative Data Analysis: Doing Social Research to Test Ideas*. John Wiley & Sons, Inc. – It includes examples using STATA commands.

Recommended Supplementary Readings

A number of other books cover the material in this course, and will serve as an useful resource:

David S. Moore. 2010. *The Basic Practice of Statistics* (5th edition).

J. Scott Long. 2009. *The Workflow of Data Analysis Using Stata*. Stata Press.

John Fox. 1997. *Applied Regression Analysis, Linear Models, and Related Methods*. Sage Publications, Inc.

Sophia Rabe-Hesketh and Brian Everitt. 2007. *Handbook of Statistical Analyses Using Stata* (4th edition). Chapman and Hall: <http://www.stata.com/bookstore/statanalyses.html>

Method of Evaluation:

The final grade is computed using the following weights:

(1) *4 problem sets (75 % of your grade):*

You can work on it alone or in groups of no more than 3 people. Groups can rotate. I will give you some time during class to solve the problems, but a considerable portion of the problem sets should be solved outside of class. As producers of knowledge, you need to learn how to tackle problems on your own. The instructor will provide hints on how to proceed but not solve the problems for you. Best way to think about these problem sets is open book, take home problem sets that can be solved in groups.

(2) *General participation (25 % of your grade)*: I expect professional behavior in class. You need to be respectful to all members of the class; focus on class activities; be ready to engage in the course; and follow all university and class rules. The participation grade will be computed as follows: $G = \left(\frac{1}{2}\right)^n f(R, T)$

where n is number of unprofessional conduct during class; f(R, T) is a grade computed on the basis of T (number of tries to contribute to class) and R (share of correct answers).

This class is grade on a curve. The average grade is 84 percent with a standard deviation of roughly 3 points (subject to some variability depending on skill heterogeneity). In a typical class, less than 10 percent of students score below 78 percent in this class.

EXPECTATIONS AND RULES ABOUT THE COURSE

Workload: Statistics is an elegant and applied science with beneficial effects for your long-term professional career. It is, however, a science that requires considerable investment when you are first learning it. I expect you to put **at least 7 hours to the course/week**. Anything short of this will make it hard for you to follow the course. If you have a weak mathematical foundation, you will have to put in considerably more time than the 7 hours. ***Take this requirement in serious consideration before you make the decision to enroll in the course.***

Recommendations for how to excel in this class: (1) Read the relevant chapters of the textbooks before class; (2) listen carefully during lecture and ask questions; (3) do the laboratory assignment making efforts to see the interconnections between the lecture and lab material; (4) read again the lecture notes and the relevant chapters within 1 or 2 days of lecture; (5) do problem sets; and (6) come to office hours. There is no substitute to steady, hard work for the mastery of statistical techniques. **Remember, statistics is an elegant and thoughtful science –With the right dedication, you will learn how to appreciate it; reap its benefits for long periods of time; and some of you may even learn to love it.**

Presentation of in-class work: The purpose of the class is to increase statistical reasoning and quantitative acumen. Therefore, I expect the answers to include the following: (1) The formula; (2) Appropriate numbers inserted to the formula; and (3) Answers. If (1) and (2) are missing, the TA/I will deduct points even if the answer is correct.

- All assignments need to be typed: 12 point Times New Roman; double-spaced, and unjustified. I will deduct points for failure to follow this guideline.

Late assignments: Late assignments without a valid reason (defined by university regulations) are marked down 10% per diem.

Requests for change of grade for assignments or participation: You need to provide a short memo for why you feel like it is necessary for you to receive a higher grade. In this memo, you need to provide the accurate solution for the exam question that your requesting a change of grade; indicate how your original answer differs from the correct solution; and develop a convincing argument for why you feel

like the wrong portion of your answer should be penalized less. These steps will ensure that this process a learning experience.

Professional conduct in the course: You are graduate students or students in the honor's program. I will operate under the assumption that you will behave in a professional fashion in the course, which means (1) arriving to the course on time; (2) doing the assignments; (3) being respectful of all members of class; and (4) quietly and diligently working through laboratory assignments. Although I understand that studying statistics and adapting to graduate school may prove to be unusually stressful period for some students, disruptive behavior and unprofessional conduct will reduce your participation grade appreciably. This will ensure that students' right to learn and work in a pleasant environment is not violated because a small subset of students cannot adequately cope with stress. Remember, 20 percent of your grade is participation.

Appointments with instructor: I make an effort to really be accessible to my students and part of being *really accessible* means giving students my undivided attention to their course related problems during our meetings. I can only provide this level of attention to my students during office hours or scheduled appointment times. Furthermore, part of becoming a professional student is to learn how to anticipate and plan for future work related (or academic) needs. To give you my undivided attention and to accomplish these pedagogical goals, I will only answer questions during office hours, pre-scheduled appointments, or after class. Your behavior outside of class (i.e., ability to anticipate for course related problems and plan accordingly) is part of your participation grade.

E-mail: Allow for 48 hours during weekdays and 72 hours during weekends before you e-mail me multiple times about the same content. This rule does not change during exam period.

Course Schedule and Readings:

(Subject to change depending on student's dexterity with statistical material)

Week 1 (9/13/2017)

Introduction to the Course

Week 2: (9/20/2017)

A visit from the Math Ghosts of the Past.

Week 3 (9/27/2017)

Statistical methodology (AF: 1 and 2)

Getting to know STATA (Longest - Chapters 1-3)

Week 4 (10/4/2017)

Descriptive statistics (AF- Chapt 3)

Descriptive statistics (Longest – Chapter 4)

Problem set 1 due

Fall Reading Week (10/11/2017)

Week 5 (10/18/2017)

Probability distributions (AF - Chap 4)

Week 6 (10/25/2017)

Statistical Inference (Chapter 5 and 6)

Relationship between Different Measurements (Longest Chapter 6)

Week 7 (11/1/2017)

Categorical data analysis (Chapt 7)

Nominal and Ordinal variables (Longest - Chapter 5)

Problem set 2 due

Week 8 (11/8/2017)

Linear regression and correlation (AF- Chapt 9)

Week 9 (11/15/2017)

Introduction to Multivariate relationships (AF- Chapt 10)

Problem set 3 due

Week 10 (11/22/2017)

Multiple Regression and Correlation (AF - Chapter 11)

Week 11 (11/29/2017)

Logistic Regression

Week 12 (12/6/2017)

Conclusion

Problem set 4 due

Important Policies

A Note on 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. See **Scholastic Offences** (below) for the link to Scholastic Discipline regulations.

Plagiarism Checking:

All required papers 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 (<http://www.turnitin.com>).

Policy on Laptops and other Electronics/Phones in Class:

Laptops are permitted in class but if it is observed that students are on social networking sites such as Facebook or Twitter, they will be told to close the lid and they will not be permitted to use it for the remainder of the class. Be sure that all cell phones are turned off at the beginning of class.

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, at the following web site:

http://www.uwo.ca/univsec/appeals_discipline/index.html

Accommodation

Only in exceptional circumstances may a student be provided special accommodation in the completion of a course requirement (i.e., exams, papers). To request a one-time accommodation (brief illness, family emergency), the student should inform the professor when they are able so accommodation can be made. Accommodation for an ongoing disability may be requested through Services for Students with Disabilities (SSD) at Western. SSD is a confidential service, working with students and their programs, normally their graduate chair, to ensure that appropriate academic accommodations to program requirements are arranged. The following website provides further information - http://grad.uwo.ca/current_students/regulations/14.html Students are encouraged to consult the program graduate chair (Professor Kim Shuey) if they would like to discuss whether this option would be appropriate for their situation.

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

Mental Health

Students who are in emotional/mental distress should refer to Health and Wellness Western for a complete list of options to obtain help: http://uwo.ca/health/mental_wellbeing/

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. Western's School of Graduate and Postdoctoral Studies' [Living Well](#) website provides tips for thriving at grad school and other helpful information.

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 web page <http://www.music.uwo.ca/>, and our own McIntosh Gallery <http://www.mcintoshgallery.ca/>.