SOCIOLOGY 252H1S:

INTERMEDIATE QUANTITATIVE METHODS IN SOCIOLOGY

Instructor: Chang Z. Lin

Department of Sociology

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E-mail: *chang.lin@utoronto.ca*

Web Site: Quercus

Class: Mondays and Wednesdays 12:10 PM-2 PM via **Synchronous on BB Collaborate in Course Website**

Tutorials: Mondays and Wednesdays 2 PM-4 PM **(**Note: we will only have 5 tutorials throughout the semester****), via **Synchronous on BB Collaborate in Course Website**

T.A.s: Julia Ingenfeld, julia.ingenfeld@mail.utoronto.ca

Office hours: Online, by appointment

Calendar Description

Provides students with the opportunity to develop an understanding of the logic of multivariate analysis by applying various strategies for the analysis of complex multivariate data.

Prerequisites:

***SOC202H1** or equivalent. **Students without this prerequisite will be removed at any time discovered and without notice**.*

Overview

Statistics is a powerful tool to make sense of our lives. We see it all around us, for example the recent polls and predictions for the 2020 U.S presidential election, as well as the modeling techniques used by the provincial government to predict increase in COVID cases in Ontario. Think of statistics as a new language that will allow you to communicate with other scholars, and more importantly, support the arguments you want to make.

This course builds on the knowledge from SOC202 or other equivalent introductory statistics courses. We will further explore using statistical methods to answer sociologically relevant questions. My hope is that, by the end of the course, you will be equipped to ask and answer new and more sophisticated sociological questions using the appropriate statistical methods you will learn in this course.

We begin with simple comparisons of tables and means to build a foundation for further analysis which would require choosing appropriate control variables. We will cover techniques such as ordinary least squares (or linear regression) with multiple independent variables, logistic regression, interaction effects, hierarchical linear models, and a brief introduction to other advanced statistical methods.

Required Work

There will be two data analysis assignments, in which you will analyze data I provide. The first assignment will be on cross-classification and tables; the second will use multiple regression. I will teach the use of Stata® and describe the data you can analyze in scheduled tutorials. There will be some minimal programming you will do, depending on your choice of variables from the data provided, but I will post very specific templates for what you need to do, so that you can just edit these template programs with the specifics of the variables you choose.

We will not hold tutorials every week. Tutorials will be held on various weeks throughout the semester. In general tutorials are held on weeks prior to due assignments and before tests. The purpose of tutorials is to introduce you to the software to be used in this class (Stata®), the data to be used in class and for assignments, and to review assignment questions and test questions in the weeks before required work is due.

Assignments are written up as short papers meant to analyze a specific research question, following the requirements of the question(s) in the assignment. Results from your Stata® analyses as well as the syntax you used ***should*** be embedded into your assignment as part of your work.

There will be two in class term tests. The term tests will focus on questions designed to test your knowledge of interpreting various statistical output and some important conceptual questions (*there will be no essays on either the term test or final exam*). ***Both term tests will be held during regular class time on Quercus***.

Attendance

It goes without saying that your attendance is required. The lecture will provide clarification to the course reading ***and it will include additional information not found in the course reading.*** Tutorials attendance is also required, and to ensure this, we will have 5 short quizzes (less than 30 minutes) which are to be held during tutorial on various dates. You are allowed to miss one of these quizzes without an excuse.

Software

This class will use Stata®, which can be accessed remotely by students via Remote Desktop software. In some cases, you will need to add support@remotepc.com to your "safe sender" list in order to receive the invitation to register.
As an alternative the UofT Maps and Data library also allows students and faculty to remote access their 10 PC. Information: https://mdl.library.utoronto.ca/using-mdl-lab-computers-remote-desktop. Remote Access site: https://cafstatus.icicle.utoronto.ca/remotelab/
Should you want to get your own copy of Stata®, you can visit https://www.stata.com/order/gradplan-sites/?country=Canada for details.

Data

This year we will use General Social Survey (GSS), Cycle 27: Giving, Volunteering, and Participation.

Due Dates and Weights for Required Work:

Electronic copies of assignments will be submitted to Quercus on or prior to the indicated due date. These assignments are **not** to be submitted by email. A note regarding "corrupted file": it is your responsibility to ensure the file you upload can be viewed by the TAs when they get to it. If we discover a file that is corrupt and cannot be opened, you will be asked to upload a correct version and the submission date will be the day you provide us with the correct version (late penalties will apply).

Provisional due dates for required work are as follows:

Work	Date	Weights
1. Tutorial Quizzes (attendance)	Various tutorial dates	10% (4 x 2.5%)
2. First Data Analysis Assignment	Friday, July 23	20%
3. Term Test 1	Monday, July 26	20%
3. Second Data Analysis Assignment	Friday, August 13	25%
4. Term Test 2	Monday, August 16	25%

Please note: Late assignments will be given a 10% reduction in the grade immediately, and 10% per day starting from the 2nd day past the due dates. This means that the assignment will be given a weight equal to .90 of the assigned weight. Assignments will not be accepted if they are more than a week late. Your grade will be zero on that part of the course.

Quercus

Quercus will be used in this course mainly for two purposes: 1) I will post data, assignments, Stata® examples, and course readings there; and 2) I will post most lecture Power Point materials there – when they are presented in class.

Required Reading:

We will use a collection of academic articles, select book excerpts, and a set of class notes throughout the course**. All of the course readings will be provided to you free of charge.** you are not required to buy a textbook, instead we will use a few online text for some of the topics covered:

- Barbara Illowsky and Susan Dean. Collaborative Statistics. 2008. Connexions: Online (uploaded to Quercus)

Readings:

Besides the required readings, the class schedule includes references to online sources and to posted articles which will supplement the notes used in class. You should especially read introductory articles for multiple regression and logistic regression. They are intended as basic introductions for audiences who know nothing about these topics. There are also various useful YouTube videos that explain important statistic concepts with real life examples. You are welcome and to consult them, but use at your own discretion.

Missed Deadlines or Tests

In case of illness, you must supply a completed Declaration of Absence from ACORN and provide the instructor with a reference number **on the day of the missed submission deadline or test**. If you are registered with Accessibility Services, your counselor will need to send an email message on your behalf (a one-week extension being the norm), directly to the instructor.

Term Test

If you miss the term test, you must follow one of the procedures above to qualify for a make-up test. The T.A. will ***not*** run a make-up test separately for each individual. There will be one sitting arranged for all qualified students for a make-up test.

Academic Integrity

Cheating and misrepresentation will not be tolerated. Students who commit an academic offence face serious penalties. Avoid plagiarism by citing properly: practices acceptable in high school may prove unacceptable in university. Students are expected to know and adhere to the University's principles of academic integrity. Any act of plagiarism or other unethical behavior will be addressed in accordance with University guidelines. Students should be aware that turning in an old paper, or large parts thereof, for credit in a second course, is considered an academic offense. Please see the "Code of Behaviour on Academic Matters" (http://www.governingcouncil.utoronto.ca/policies/behaveac.htm) for specific information on academic integrity at the U of T.

Accessibility

If you require accommodations or have any accessibility concerns, please visit http://studentlife.utoronto.ca/accessibility as soon as possible.

Appointments

I encourage you to email me or the TAs should you need to speak with us. Appointments will be online via Microsoft Teams. I will designate special office hours in the weeks before assignments and term test.

Make-up Tests

Missing a test will result in receiving a mark of zero, UNLESS within **five business days** the missed test, students who wish to write the make-up test give the instructor a written request for special consideration which explains why the test was missed, accompanied by proper documentation – see above; you may also contact your college registrar if the reason is personal. A request should be accompanied by contact information (the student's telephone number and email address) so the date and time of the make-up test can be communicated to the student. A student who misses a test and the subsequent make-up test for a valid reason will not have a third chance to take the test. Instead, the grade assigned for the missed test will be the same as the grade the student earns for the other test in this course.

Re-marking

We will use specific marking keys for both assignments and tests. Those keys define the universe of possible answers and possible variations in those answers. In a course such as this, the only

issue that may come up is a mistake in applying the key to the answers in specific cases. If there is a mistake in an assignment or test you get back, you should contact the T.A. ***within two weeks of your receipt of the test or assignment.*** In general, we will not consider work for re-grading after feedback on a later test or assignment, unless it is in this two-week period.

Class Schedule and Readings

Date	*Topic*	*Readings*
July 5	Introduction: • Levels of measurement, • Sample & Population, • Descriptive Statistics, Probabilities, • Central Limit Theorem, Estimations, and Models ****Tutorial****	**Required**: - Raftery, A. E. (2001). Statistics in Sociology, 1950-2000: A Selective Review. Sociological Methodology, 31, 1-45. (1) - Wheaton, B. 2003. "When methods make a difference". Current Sociology. 51(5) 543-72. *Recommended***:** - Xie, Yu. 2007. "Otis Dudley Duncan's Legacy: The Demographic Approach to Quantitative Reasoning in Social Science." Research in Social Stratification and Mobility 25(2):141–56.
July 7	Descriptive Statistics: • Central tendencies, • Central limit theorem, • Tests for means and proportions	**Required:** - Collaborative Statistics (7.1, 7.2, 7.4) - Class notes (P. 37-39) *Recommended***:** - Fisher, M. J., & Marshall, A. P. (2009). Understanding descriptive statistics. Australian Critical Care, 22(2), 93-97. - Rees, D. I., Argys, L. M., & Brewer, D. J. (1996). Tracking in the United States: Descriptive statistics from NELS. Economics of Education Review, 15(1), 83-89.
July 12	Linear Regression I: • Normal distribution, • Association/correlation/ causation • Bivariate tables/bivariate regression	**Required:** - Collaborative Statistics (6.1 – 6.4) - Class Notes (P. 40 – 55, 69 - 80) *Recommended***:** - Normal distribution (https://www.mathsisfun.com/data/standard-normal-distribution.html)

	****Tutorial****	- The Normal distribution (http://www.stat.yale.edu/Courses/1997-98/101/normal.htm)
July 14	Linear Regression II: • Multivariable regression and inference	**Required:** - Class Notes (P. 86 – 101) - Collaborative Statistics (12.1 – 12.8) *Recommended*: - Olsen, M. E. (1972). Social participation and voting turnout: A multivariate analysis. American Sociological Review, 317-333. - McPherson, M., Smith-Lovin, L., & Brashears, M. E. (2006). Social isolation in America: Changes in core discussion networks over two decades. American sociological review, 71(3), 353-375.
July 19	Linear Regression III: • Confounding • Mediation • Moderation/interaction • Interpreting results	**Required:** - Class notes (P.135 – 146) - Umberson, D., Williams, K., Thomas, P. A., Liu, H., & Thomeer, M. B. (2014). Race, gender, and chains of disadvantage: Childhood adversity, social relationships, and health. Journal of health and social behavior, 55(1), 20-38. *Recommended*: - Thorne, H. 1991. "Modeling and testing interactive relationships within regression analysis". Historical Social Research 16, 4: 21-50. - Coulton, C., and Chow, J. 1992. "Interaction effects in multiple regression". Journal of Social Service Research 16, 1-2: 179-199.
July 21	Linear Regression IV:	**Required:**

	• Gaussian assumptions • Diagnostic • Goodness of fit	- Goodness of fit in Linear Regression (http://www.medicine.mcgill.ca/epidemiology/joseph/courses/EPIB-621/fit.pdf) - Testing the assumptions of linear regression (http://people.duke.edu/~rnau/testing.htm) *Recommended*: - Goodness-of-fit Test (https://newonlinecourses.science.psu.edu/stat504/node/60/)
July 26	**Test #1**	
July 28	Non linear relationships: • Dummy Variable approach • Quadratic ****Tutorial****	**Required:** - Class notes (P. 147 – 151, P.154 - 158) *Recommended*: - Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. Administrative science quarterly, 35-67.
August 2	**Civic holiday - University closed; no classes**	
August 4	Logistic regression I	**Required**: - Class Notes (P. 169 – 177) - Morgan, S. P., & Teachman, J. D. (1988). Logistic regression: Description, examples, and comparisons. Journal of Marriage and Family, 50(4), 929-936. *Recommended*: - Baker, J. O., & Smith, B. G. (2009). The nones: Social characteristics of the religiously unaffiliated. Social Forces, 87(3), 1251-1263.
August 9	Logistic regression II:	**Required:**

	• Ordinal logistic regression • Multinomial logistic regression ****Tutorial****	- Chapter 12	Multinomial and Ordinal Logistic Regression - In: Best Practices in Logistic Regression. By: Jason W. Osborne (https://methods.sagepub.com/book/best-practices-in-logistic-regression/i2018.xml) *Recommended*: - Johnson, D. R., & Creech, J. C. (1983). Ordinal measures in multiple indicator models: A simulation study of categorization error. American Sociological Review, 398-407. - Winship, C., & Mare, R. D. (1984). Regression models with ordinal variables. American sociological review, 512-525.
August 11	More advanced methods in sociology: • Panel/Longitudinal Analysis • HLM • Structural equations • Final test Q&A ****Tutorial****	**Required**: - Ma, X., & Klinger, D. A. (2000). Hierarchical linear modelling of student and school effects on academic achievement. Canadian Journal of Education/Revue canadienne de l'éducation, 41-55. - Bauer, T. K. (2002). Educational mismatch and wages: a panel analysis. Economics of education review, 21(3), 221-229. - Tokar, D. M., Withrow, J. R., Hall, R. J., & Moradi, B. (2003). Psychological separation, attachment security, vocational self-concept crystallization, and career indecision: A structural equation analysis. Journal of Counseling Psychology, 50(1), 3. *Recommended*: - Curtis, J. E., Baer, D. E., & Grabb, E. G. (2001). Nations of joiners: Explaining voluntary association membership in democratic societies. American Sociological Review, 783-805. - Osborne, J. W. (2000). The advantages of hierarchical linear modeling. - Bollen, K. 1989. Structural Equations with Latent Variables. New York: Wiley. (5) - Allison, Paul D. 2009. Fixed Effects Regression Models. Los Angeles, C.A.: Sage. (3)

August 16	**Test #2**