SOCI 504: Quantitative Analysis I
Fall 2020

Fixed Seminar: Friday 12:35 a.m.-1:30 p.m.

Professor: Shelley Clark
(email: shelley.clark@mcgill.ca)
Lab hour: Friday 1:30-2:30
Office hours: Wednesday 1:30 p.m.-3:30 p.m.

T. A.: Daniel Sailofsky
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Lab hour: Thursday 4:00 p.m.-5:00 p.m.
Office hour: Tuesday 4:00 p.m.-5:00 p.m.

Course Content
This course provides an introduction to regression analysis. The course will begin by examining assumptions underlying regression analyses, options for building multivariate regression models, and the proper interpretation of regression results. It will then explore the consequences when these assumptions are violated. Lastly, we will provide a (somewhat cursory) overview of some of the most common methods used in sociology including logistic regression, categorical dependent variables, and fixed effects with panel data. The emphasis of this course will be on a conceptual understanding of these issues, with mathematical and technical explanations provided to aid your understanding.

Lectures will be conducted via Zoom 12:35 p.m. to 1:30 p.m. All lectures will be recorded and posted to MyCourses to ensure that all students have access to them. In addition, there will be two regular lab sessions (one led by your instructor and the other by your T.A.) held on Zoom each week. These sessions are designed as an opportunity to ask questions and to have course material re-explained. They will also offer practical experience in using these tools for your homework assignment and class project. It is strongly encouraged that you attend at least one of these lab sessions each week, as we will not be responding to individual questions outside of these lab sessions or our scheduled office hours. If you are not available for any of the five hours lab and office hours listed above, please contact me immediately and we will make alternative arrangements.

Assignments, Exams and Grading
There will be six problem sets, several of which will require the use of a statistical package. You may, indeed are encouraged to, work with classmates on the problems sets, but you must turn in
your own answers and your own code. You will find that you learn very little from this class if you simply copy your classmate’s answers or run his/her do_files.

Grades will be determined as follows:
Problem sets (6) 60%
Final project 40% (due November 27)

Problem sets must be turned in by the beginning of the class time on each day they are due. Late problem sets will not be accepted without a medical excuse or genuine emergency. You are responsible for downloading and uploading the homework assignments from MyCourses.

Reading Materials
Required:

An E-Textbook can be purchased online at Amazon or rented at VitalSource https://www.vitalsource.com/products/introduction-to-econometrics-james-h-stock-mark-w-watson-v9780134448046

Statistical Programs
This course will be taught using Stata. If you are new to regression analyses, I highly recommend that you use this statistical program as 1) it is comparatively user friendly and 2) I will be able to assist you when you run into programing/coding problems. There is also a large Stata network of users online as well as excellent instructional/coding videos and reference book.

- https://www.stata.com/links/video-tutorials/
- https://stats.idre.ucla.edu/stata/modules/
- Lawrence Hamilton Statistics with Stata: Version 12, 2013. Duxbury

During the fall of 2020, the McGill administration will provide you with free access to Stata. You may also purchase a 6-month student version of Stata for about $50.

Alternatively, you can use a free statistical package, R, which can be downloaded at http://www.r-project.org/. Although the initial learning curve with R is very steep (and can be quite frustrating), if you are intending to conduct sophisticated data visualization or take advanced statistical classes, you may wish to start with R. As with Stata, there are many useful online tutorials and a robust online user group, which can assist you in self-instruction. Your TA may also be able to provide some assistance. However, assistance from your instructor will be very limited.

(Recommended as it intended to be compatible with the assigned Stock & Watson textbook)
- https://www.econometrics-with-r.org/index.html
- https://sites.google.com/site/econometricsacademy/econometrics-models/
- Grolemund, Garrett and Hadley Wickham (2016). R for Data Science
- https://r4ds.had.co.nz/
Week 1: September 4
Two Variable Regression Analysis
Fitting lines to data; Residuals and error terms; Estimating coefficients and standard errors; Hypothesis testing; Confidence intervals; Goodness of fit (R-squared);

Assignment: Stock and Watson: Chapters 4 & 5
Assigned Homework #1 due September 18

Week 2: September 11
Properties of OLS
Assumptions of OLS; Heteroskedasticity and homoskedasticity; BLUE, Gauss-Markov Theorem;

Assignment: Stock and Watson: Chapter 4 & 5

Week 3: September 18
Introduction to Stata and Replication Project

Submit Homework #1
Assignment: Freese & Peterson “Replication in Social Science”
Assigned Homework #2 due October 2 (requires Stata)

Week 4: September 25
Multivariate Regression Analysis
Estimation, hypothesis testing, and confidence intervals of single coefficients; Joint hypothesis testing; Omitted variables; Adjusted R-squared

Assignment: Stock and Watson: Chapter 6 & 7

Week 5: October 2
Building models with nonlinear regression functions (functional forms), part 1
Dummy variables; Interactions

Submit Homework #2
Assignment: Stock and Watson: Chapter 8
Assigned Homework #3 due October 16 (requires Stata)

Week 6: October 9
Building models with nonlinear regression functions (functional forms), part 2
(Recorded Lectures)
Levels and logs; Polynomials

Assignment: Stock and Watson: Chapter 8

Week 7: October 16
Problems When OLS Assumptions are Violated
Heteroscedasticity; Multicollinearity; Model misspecification; Omitted variable bias; Simultaneous causality; Sample selection; Measurement errors; Non-linear dependent variables

Submit Homework#3
Assignment: Stock and Watson: Chapter 9
Assigned Homework #4 due October 30 (requires Stata)

Week 8: October 23
Non-linear Dependent Variables
Logits; Probits;

Assignment: Stock and Watson: Chapter 11

Week 9: October 30
Ordered logits; Multinomial logits

Submit Homework#4
Assignment: Stock and Watson: Chapter 11
Assigned Homework #5 due November 6 (requires Stata)

Week 10: November 6
Fixed Effects using Panel Data
Longitudinal data; First differences; Fixed effects

Submit Homework#5
Assignment: Stock and Watson: Chapter 10
Assigned Homework #6 due November 20 (requires Stata)

Week 11: November 13
Random intercepts; Hierarchical models
Project completion work period

Assignment: Reading TBA

Week 12: November 20
Random coefficients

Submit Homework#6

Week 13: November 27
Replication debrief or missing data
Replication projects due
Course Policies:

Extraordinary Circumstances:
In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in this course is subject to change.

Copyright:
All slides, video recordings, lecture notes, etc. remain the instructor’s intellectual property. As such, you may use these only for your own learning (and research, with proper referencing/citation) ends. You are not permitted to disseminate or share these materials; doing so may violate the instructor’s intellectual property rights and could be cause for disciplinary action.

Instructor generated course materials (e.g., handouts, notes, summaries, exam questions, recorded lectures, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

Recording Statement:
By enrolling in a remote course, you accept that fixed sessions will be recorded. You must consent to being recorded if you are attending a lecture or participating in a component of a course that is being recorded. You will be notified through a “pop-up” box in Zoom if a lecture or portion of a class is being recorded. If you are not comfortable being in a class that is recorded, you may decide to not take part by logging off Zoom. Students who log off will be able to later watch the video recording in MyCourses.

For pedagogical reasons and for the enrichment of the experience of all students, attendance may be monitored and/or active participation may be expected or required during fixed (synchronous) class time. As such, you may be asked to turn on your camera and audio. If you do not have the necessary resources (e.g., adequate Internet bandwidth or equipment) to do so, inform your instructor at the beginning of term so that appropriate accommodations can be made.

In addition to the recording of your image and voice, your name (or preferred name) may be displayed on screen, and your instructor may call your name during the lecture. As such, this personal information will be disclosed to classmates, whether during the lecture or in viewing the recording. By remaining in classes that are being recorded, you accept that personal information of this kind may be disclosed to others, whether during the lecture or in viewing the recording.

Netiquette Statement:
The University recognizes the importance of maintaining teaching spaces that are respectful and inclusive for all involved. To this end, offensive, violent, or harmful language arising in contexts such as the following may be cause for disciplinary action:

1. Username (use only your legal or preferred name)
To maintain a clear and uninterrupted learning space for all, you should keep your microphone muted throughout your class, unless invited by the instructor to speak. You should follow instructors’ directions about the use of the “chat” function on remote learning platforms.

Inclusive Learning Environment:
As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009

Language of Submission:
In accord with McGill University’s Charter of Students’ Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Academic Integrity Policy:
McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information).

Note that to support academic integrity, your assignments may be submitted to text-matching or other appropriate software (e.g., formula-, equation-, and graph-matching)."