SOC6302H: Statistics for Sociologists

Fall 2023
Classroom: Room 17146, 700 University Ave
Class Hours: 10 AM-Noon

Lab: 17198, 700 University Ave
Lab Hours: Noon-1:00 PM.

Professor: Jonathan Horowitz
Email: jonathan.horowitz@utoronto.ca
Office Hours:

TA:
Office Hours:

To book appointments on Zoom: Use Quercus Scheduling Tool
To go to office hours: Click "Office Hours" in navigation menu on Quercus.

Goals of this course

Social scientists use quantitative methods when they need to summarize patterns, when they need to know if something is larger or smaller, and when they want to know if the patterns are related to something being larger or smaller. Research topics that lend themselves well to quantitative methods include inequalities, behaviors, attitudes, culture, families, language, migration, work, the environment, and the economy (although this is not an exhaustive list).

This is not a math class, and this is not a programming class. We will do a lot of both, because the math tells you how quantitative methods "work" and programming is how we "do" quantitative methods most of the time. However, they are always in service to more important goals. These goals are:

1) To master the logic of frequentist statistical reasoning
2) To find the answers to our research questions
3) To model and interpret data using basic multiple regression techniques

The only requirements for taking this course are knowledge of basic elementary algebra (e.g., solving for x) and how to calculate the mean, median, and mode of a distribution. We will handle everything else in class.

Before the Semester Begins:

Readings
You will not be required to purchase a textbook. However, you will have a number of required readings from the several textbooks, including:
- Marascuilo, L. A., & Serlin, R. C. 1988. *Statistical methods for the social and behavioral sciences.* W H Freeman/Times Books/ Henry Holt & Co.
- Arkes, Jeremy. 2019. *Regression Analysis: A Practical Introduction.* Routledge.

Things you need to know to succeed in this class
Don't be discouraged if you find the textbook difficult at first—it takes some practice to learn how to read statistics. Try blocking off an hour to read for each assigned chapter and read carefully even if you think you already understand the material. Statistics has its own algebraic language, and the more ways you try to internalize that language, the better off you'll be down the road.

Statistical reasoning requires constant practice, and the assignments are designed to keep you consistently working at a moderate level throughout the semester. There should be a few weeks where you do lots of work at one time, but you typically need to spend a few hours each week completing reading, watching lectures, and doing homework assignments.

Additionally, statistics is not math. Statistics is logic taught in the language of algebra. The math you see at the beginning of the semester is the same math you'll see at the end. But the logic will change and become more complex because statistics is cumulative. What you learn in Week 2 will be necessary for Week 5, and what you learn in Week 5 will be necessary for Week 9. Furthermore, the deeper your understanding of the material in Week 2, the easier Week 5 will be for you. Time spent at the beginning of the semester studying your notes, running over concepts in your head, and reading the textbook can save you a lot of time down the road.

This class uses an active learning model. In-class lectures are short and complementary to working through actual statistics problems. Active learning models are superior for learning when compared to regular lecture classes, with students learning dramatically more than lecture-based courses. But it also can be a strange experience for students who are used to lectures. While active learning models are rewarding and effective, it may be less familiar at first.

Required and Recommended Materials
You will need access to the statistical package R to complete laboratory assignments. R is free, as is the integrated development environment RStudio. You can download R here and RStudio here; if you have a laptop, I strongly recommend that you download R and RStudio prior to the first class period onto it.

You will also need to have regular access to a word processor (like those found in Microsoft Office, LibreOffice, or Google Docs) and strong, reliable internet for this class. Finally, you will need a basic calculator for this class that includes the following mathematical functions: square root, addition, subtraction, multiplication, and division. The TI-30x series is good for these purposes.

While not strictly required, I strongly urge you to bring paper and pencils for note-taking during class time, and to use them when watching online lectures. Having a laptop computer will be very helpful for the tutorial sessions and class activities but is not strictly required.

<p align="center">**In Between Each Class:**</p>

Preparing for Class

Prior to most class periods, you will fill out a "Reading Notes" worksheet. The purpose of the worksheet is to draw attention to the most important aspects of the reading, to give you the opportunity to clarify what you do not understand, and to build connections between what you have already learned and the current course material. These are not marked, but do not skip the required readings or the reading notes. You will probably regret it.

Most lectures will be delivered asynchronously via Quercus. You will watch the lectures before coming to class. When you are watching the lectures (and when you come to class), I encourage you to take notes *with a pencil and paper*. There is evidence that taking notes with a pencil and paper is better for learning. I highly encourage you to go back to the reading notes and required readings after watching the lectures as well.

Contact Information

Email

You can reach me by email at jonathan.horowitz@utoronto.ca. Feel free to contact me with requests, problems, or simple questions, but please read the syllabus before asking questions. You should send all emails from your utoronto email account and should have SOC6302H in the subject line. For more difficult questions, please come sign up for office hours.

I have a policy of trying to answer every email within 48 hours. I am sometimes much faster than that, but sometimes I need all 48 hours to respond to an email. Thus, if you need to get in touch with me within 48 hours, I suggest asking me before or after class, or during office hours.

Office Hours

Office hours via Zoom are listed on the first page of this document. You are not burdening me by utilizing office hours—I have carved out that time specifically so you can come find me. Note that due to the pandemic, I am holding virtual office hours. Please sign up for an appointment on Quercus using the following guide: https://qstudents.utoronto.ca/why-the-calendar-tool-is-useful-for-students/. You can access office hours by clicking the "Office Hours" link in the left-hand navigation menu on our course Quercus page.

The primary purpose of office hours is to help you better understand the course content. To make the best use of your time, you should be prepared with specific questions. For example, you might have a question about a reading you don't understand, or a concept we've covered in class. Be as specific as you can about how we can help you. However, you are welcome to drop by for other reasons too we are happy to talk to you more about sociology, quantitative methods, research, or just about anything else that crosses your mind.

Week One

Take note of the fact that you have readings, lectures, and reading notes for the first day. We have a lot of ground to cover this term, so please make sure you read and take notes on them. If not, you will start the semester behind.

Academic Integrity (Short Version)

In general, you are expected to do your own work, attribute sources using appropriate citation practices, and not provide unauthorized help to other students. However, there are other issues that you should be familiar with, and you are expected to read the Code of Behaviour on Academic Matters to make certain you understand and adhere to it. Clarifying questions (as they pertain to this class) are welcome. You also need to internalize what constitutes plagiarism and how to avoid it, and you can start by reading the content at this link.

During Each Class:

Rules of the Game

1. We start and end class on time. No packing up early.
2. Turn off cell phones, music players, and other hand-held devices.
3. You may use computers for course materials only. In general, you are on the honor system for this rule.
4. Check your utoronto email account daily.
5. You must abide by all university regulations regarding coronavirus, including (if specified by the university) a multi-layer mask that (tightly) covers your mouth and nose. You are strongly encouraged to wear masks even if they are not mandated.
6. Give all other students respect for their efforts.

Attendance

Achieving success in this class requires consistent attendance. Please don't schedule any appointments, trips, meetings, or other activities that would require you to miss class. If you know you'll be out of town and must miss a class, please let me know ahead of time. Also, if an emergency comes up, please send me an email as soon as you can to let us know the reason for your absence.

Students who don't show up to class and who don't contact me are often dealing with extenuating circumstances that may require outside assistance. I tend to err on the side of caution in these situations; if you tend to miss class without explanation, I may ask the graduate office to check in on you.

Format

We will mostly be working through statistics problems in class in small groups. The readings help direct your attention to the most important themes in each day's reading, and thus you should bring them to class. Please fill out the reading notes to the best of your ability, as these will be invaluable resources for you later in the semester.

COVID-19 and Masking

Although university policy and the rest of Canadian society has mostly moved away from masking, I urge you to wear multi-layer masks covering your mouth and nose at all times during the course. Two-way masking is an incredibly effective method for stopping the spread of coronavirus—if both you and the person you are with are wearing a basic surgical mask, it can reduce the spread of COVID by up to 90%. It is important that individuals who have underlying health risks in this class (or such individuals who live with students in this class) are safe. Wearing a mask in enclosed spaces like classrooms is a sign of respect for others and an indication that you want everyone to participate regardless of underlying health conditions, and an important component of inclusion in the present public health context. If you have trouble obtaining masks for use in the classroom, feel free to let me know and I can provide basic surgical masks free of charge; simply let me know and I will bring them.

Course Expectations and Evaluation

Course Assignments

Note that there is no final exam for this course. All assignments must be submitted on Quercus.

1. Expectations Agreement (Mandatory)

On the first day of class, you will return the expectations agreement, indicating that you have read this syllabus thoroughly and agree to abide by the expectations within it. This is marked complete / incomplete but is mandatory, and you will be docked **up to 1% of your final mark** if you do not submit it.

2. Lab Assignments (60%)

There will be an assignment posted on Quercus each week that will allow you to review key concepts and practice data analysis. Assignments typically include a computing component using R.

When you open an assignment for a given week, you will see two things. The first is a PDF file of the assignment, including any instructions, labeled "Assignment # - questions," where # is replaced by the assignment number. The second is a link that allows you to submit your answers. All answers must be submitted via this link (unless otherwise noted in the assignment instructions).

Each week, a portion (or all) of the assignment will be graded by Quercus, and so the score will be immediately available on Quercus. Students who are not satisfied with their score are permitted to correct their work and resubmit it (one time only per assignment). Any corrections must be resubmitted by the original due date. Sections of the assignment that are graded by the instructor or TA (not Quercus) may be submitted only once.

Each assignment has equal weight in the calculation of the final grade.

3. Final Research Report (40%) **Due December 11th** (with other deadlines at various points during term)

In addition to your weekly assignment, you will also complete a small portion of your final research paper in many weeks. These intermediate steps are not marked; however, there are two advantages of completing them throughout the term. The first is that you have to do all of this work anyway, and by doing it throughout the term you will have a lot of things prepared for the end of the course. The second is that I can give you feedback on each of these steps throughout the course, which will help you internalize the course information and (hopefully) help you define your research objectives in the course and program.

The final assignment brings all of these intermediate steps into a complete research report: The research question (Week 3), Theory (Week 7), case selection (Week 5), descriptive statistics and frequency distributions (Weeks 1 and 2), Multiple Regression (Weeks 8, 9, and 10), and Interpretation (Week 12).

<u>**Terms and Conditions That Apply**</u>

<u>**Late or Missed Assignments**</u>

There will be no extensions on weekly in-class worksheets or homework assignments. I will consider an extension for the final paper on a case-by-case basis, but you should not count on it. Assignments with an extension will get full credit; those without will not be accepted.

Written assignments must be submitted in a format I can read (.doc, .docx, .pdf, .odf, and .rtf format). It is your responsibility to ensure that the file itself is readable, which can be confirmed by downloading the file once it is uploaded to the assignment submission page on Quercus. Unreadable files are missed assignments.

<u>**Academic Integrity (Long Version)**</u>
Copying, plagiarizing, falsifying medical certificates, or other forms of academic misconduct will not be tolerated. Any student caught engaging in such activities will be referred to the Dean's office for adjudication. Any student abetting or otherwise assisting in such misconduct will also be subject to academic penalties. Students are expected to cite sources in all written work and presentations. See this link for tips for how to use sources well: (http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize).

According to Section B.I.1.(e) of the Code of Behaviour on Academic Matters it is an offence "to submit, without the knowledge and approval of the instructor to whom it is submitted, any academic work for which credit has previously been obtained or is being sought in another course or program of study in the University or elsewhere." By enrolling in this course, you agree to abide by the university's rules regarding academic conduct, as outlined in the Calendar. You are expected to be familiar with the Code of Behaviour on Academic Matters (https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) and Code of Student Conduct (https://www.viceprovoststudents.utoronto.ca/students/#codeconduct) which spell out your rights, your duties and provide all the details on grading regulations and academic offences at the University of Toronto.

All of your submitted assignments will automatically be run through a new plagiarism detection tool, Ouriginal, for a review of textual similarity and detection of possible plagiarism. (Ouriginal replaces Turnitin.) In doing so, you will allow your assignments to be included as source documents in the Ouriginal reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Ouriginal service are described on the Centre for Teaching Support & Innovation website: https://uoft.me/pdt-faq

<u>**Accessibility Services**</u>
It is the University of Toronto's goal to create a community that is inclusive of all persons and treats all members of the community in an equitable manner. In creating such a community, the University aims to foster a climate of understanding and mutual respect for the dignity and worth of all persons. Please see the University of Toronto Governing Council "Statement of Commitment Regarding Persons with Disabilities" at https://governingcouncil.utoronto.ca/secretariat/policies/statement-commitment-regarding-persons-disabilities-february-25-2021.

In working toward this goal, the University will strive to provide support for, and facilitate the accommodation of individuals with disabilities so that all may share the same level of access to opportunities, participate in the full range of activities that the University offers, and achieve their full potential as members of the University community. We take seriously our obligation to make this course as welcoming and accessible as feasible for

students with diverse needs. We also understand that disabilities can change over time and will do our best to accommodate you.

Students seeking support must have an intake interview with a disability advisor to discuss their individual needs. In many instances it is easier to arrange certain accommodations with more advance notice, so we strongly encourage you to act as quickly as possible. To schedule a registration appointment with a disability advisor, please visit Accessibility Services at http://www.studentlife.utoronto.ca/as, call at 416-978-8060, or email at: accessibility.services@utoronto.ca. The office is located at 455 Spadina Avenue, 4th Floor, Suite 400.

Additional student resources for distressed or emergency situations can be located at distressedstudent.utoronto.ca; Health & Wellness Centre, 416-978-8030, http://www.studentlife.utoronto.ca/hwc, or Student Crisis Response, 416-946-7111.

Equity and Diversity Statement
All members of the learning environment in this course should strive to create an atmosphere of mutual respect. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment and hate speech will not be tolerated; please alert me to any behaviour that undermines the dignity or self-esteem of any person in this course or otherwise creates an intimidating or hostile environment. You'll find additional information and reports on Equity and Diversity at the University of Toronto online at http://equity.hrandequity.utoronto.ca.

TENTATIVE COURSE SCHEDULE AND READING LIST

Readings and assignments are listed on the day they are due. Bolded assignments are graded or mandatory.

	Content	Before Class	Assignments
9.11	Class Expectations Levels of Measurement Central Tendency	• Marasculio & Serlin: Chapters 1, 2, & 4 • Lecture: Welcome to Statistics • Lecture: Levels of Measurement • Lecture: Central Tendency • Research Interests Instructions • Reading Notes & Pre-Class Preparation	• Expectations Agreement 9.09 by 9 AM • Research Interests Worksheet Due 9.09 by 11:59 PM • Assignment 1 due 9.15 by 11:59 PM
9.18	Deviations & Dispersion Frequency Distributions Standardization	• Vassar Stats, Chapter 2 Part I o Distributions Part I • Marasculio & Serlin: Chapters 5 and 6 • Lecture: Dispersion / Spread • Lecture: Frequency Displays, Tables, and Distributions • Lecture: Standardization & Normalization • Reading Notes & Pre-Class Activities	• Assignment 2 due 9.22 by 11:59 PM
Part I: Sampling, Distributions, and Confidence Intervals			

9.25	Random Sampling
	Sampling Distributions
	Central Limit Theorem
	Research Questions
		• Singleton and Straits, Chapter 6 p150-172 only
		• Sampling variation and sampling distributions
		• Marasculio and Serlin, Chapters 11, 19 and 20; also review Section 2-4 (Ch 2)
		  o Skip: 11-4, 19-5, and 19-6
		  o Arkes, Chapter 12
		• Research Questions Instructions
		• Reading Notes & Pre-Class Preparation
		• (Note: No video lecture this week)
			• Research Questions Report due 9.28 by 11:59 PM
			• Assignment 3 due 9.29 by 11:59 PM

10.02	Degrees of Freedom The Normal Curve Case Selection	• Z-Table, from Statistics by Jim • Lecture: Degrees of Freedom • Reading Notes & Pre-Class Preparation • Lecture: The Normal Curve & T-Distribution	• Assignment 4 due 10.13 by 11:59 PM
NO CLASS 10.09 FOR THANKSGIVING HOLIDAY			
10.16	Alpha and Beta Confidence Intervals	• Marasculio and Serlin, Chapters 11 & 12 • Excerpt from Lane, Chapter 10 on "Characteristics of Estimators," "Confidence Intervals Introduction," "Confidence Interval for the Mean," and "t Distribution." • Marasculio and Serlin, Chapter 32 (Sections 32-1 and 32-2 **only**) • Lecture: Hypothesis Testing; Alpha and Beta • Lecture: Confidence Intervals • Reading Notes & Pre-Class Preparation	• Assignment 5 due 10.20 by 11:59 PM

		Part II: Bivariate Association	
10.23	Hypothesis Testing T-Tests	• Lane, Chapter 11 • Lane, Chapter 12 on "Differences Between Two Means" **only** • Marasculio and Serlin, Chapter 32 (Section 32-4 **only**) • Lecture: The T-Test • Reading Notes & Pre-Class Preparation	• Assignment 6 due 10.27 by 11:59 PM
10.30	Statistical & Substantive Significance Correlation Path Diagramming and Theorizing	• Marasculio and Serlin, Chapter 7 • Lecture: Correlation and Covariance • Reading Notes & Pre-Class Preparation	• Assignment 7 due 11.3 by 11:59 PM • Path Diagramming Report due [] by 11:59 PM
11.06	Linear Regression Dummy Variables Sum of Squares Inference	• Marasculio and Serlin, Chapters 8 and 9 • Arkes, Chapter 2 (Sections 2.1-2.5 **only**) • Lecture: Introduction to Linear Regression • Lecture: Sum of Squares and Inference • Lecture: Dummy Variables & Predicted Scores • Reading Notes & Pre-Class Preparation	• Assignment 8 due 11.10 by 11:59 PM
		Part III: Multiple Regression	
11.13	Multiple Regression Elaboration (Mediation, Spuriousness, Suppression)	• Arkes, Chapter 2 (Sections 2.8-2.10 **only**) • Arkes, Chapter 4 (Sections 4.1-4.2 **only**) • Lecture: Omnibus and Specific Tests • Lecture: Elaboration • Reading Notes: Multiple Regression, Omnibus Tests, and Elaboration	• Assignment 9 due 11.17 by 11:59 PM
11.20	Interactions	• Arkes, Chapter 3 (Sections 3.1 and 3.2.1 only) • Brambor et al. 2006 • Lecture: Interactions • Reading Notes: Interactions	• Assignment 10 due 11.24 by 11:59 PM • Multiple Regression Report due 11.25 by 11:59 PM
11.27	Elaboration Elaborated	• Excerpt from Bollen (1989) • Arkes Chapter 6 (Sections 6.1-6.5 only) • Clogg et al (1995) • Paternoster et al (1998)	
12.04	Communicating Results	• Arkes Chapter 12	• Final Research Paper due 12.11 by 11:59 PM