

## Statistics for Sociologists

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**Office Hours:** by appointment

**Class** Tue 11 a.m. - 1 p.m.  
**Location:** Rm 240  
**Tutorial** Wed 11 a.m. - 1 p.m.  
**Location:** FE-36, Basement  
725 Spadina Ave.

**Quercus** <https://q.utoronto.ca/courses/137319>

### Course Description & Learning Objectives

Quantitative methods represent one set of tools in sociologists' methodological toolbox to answer questions about the social world. This course is designed to introduce you to basic statistical techniques for analyzing quantitative data, laying the groundwork for more advanced classes you may take in the future. The course focuses on understanding statistical techniques, learning how to apply them and how to interpret the findings.

We will cover descriptive and basic inferential statistical techniques, including regression analysis. You will examine how these techniques have been applied in sociological research. You will also get hands-on experience preparing and analyzing data yourself using Stata, a statistical software popular in Sociology. And you will also have the opportunity to practice how to communicate statistical findings effectively to audiences who may not be familiar with statistical analyses.

Statistics seems like a daunting subject for many students. Especially if you haven't used your math skills in a while, you might feel apprehensive about taking this course. But learning statistics is not just numbers; it includes more generally problem-solving and logic. While you are expected to be familiar with basic algebraic operations, we will not use derivations and advanced mathematical concepts in this class.

In order to learn and master statistics, you will need to devote a considerable amount of time outside of class working through the course material and practicing the techniques. The ability to solve problems and get information out of a group of numbers requires not just the memorization of the techniques but centrally learning through practice. The class provides a range of opportunities to practice through the weekly homework, the research assignments, and the examples we will work on in class and during lab sessions.

### Course Goals

1. Introduce you to basic statistical techniques, both descriptive and inferential, and to provide you with a foundation for more advanced courses in statistical methods
2. Develop your ability to interpret and to write about statistical results
3. Develop your practical skills using Stata to manage and analyze data
4. Provide you with the experience of exploring and working with large secondary data
5. Connect the course material to the practice of sociological research: Practice evaluating studies applying the statistical techniques covered in class

## Learning Components & Course Requirements

**Readings.** The readings for this class include chapters from the assigned textbook, supplemented by additional readings. The additional readings will be available on Quercus, or they are available in electronic form from the library website. Ideally, you should read the assigned texts **before each class period** and **review the chapters after the lecture**. Please bring a copy (paper/electronic) of the readings to class/the lab.

**Lectures and Class Participation.** The lectures will highlight the central concepts in the assigned texts and illustrate these concepts with examples. We will also use class time to do practice examples. It is easy to get lost in a course where a considerable amount of material is covered each week, and where each week's content builds on the material of previous weeks. Regular attendance is therefore crucial. Keeping up with the readings, coming to class, and the lab session regularly is important and will help you to stay on track. More than two absences at either lecture or lab may result in a reduction in a student's final grade, usually one-half grade per absence beyond the two (e.g., from A to A-). These grade reductions will be at the instructor's discretion.

**Weekly Homework Assignments.** There will be ten homework assignments over the course of the semester. For the most part, you will be able to complete these online (on Quercus). These assignments will be posted before class on Tuesdays, and they are due 24 hours before the next class period the following week on Mondays at 11 a.m. For the parts of the homework that cannot be completed online, please upload a picture or a scan of your answer. These homework assignments provide you with the opportunity to practice the material in a relatively low-stakes environment (*each homework assignment worth 4% of the final grade, 40% in total*).

**Research Assignments.** Over the course of the semester, you will complete three research assignments (see table listing different grade components). These assignments will vary somewhat in content, i.e. you will be asked to complete one or more of the following tasks: 1) Find 1-2 published articles in your area of interest that use the statistical techniques covered during the preceding weeks and evaluate how they were employed; 2) Complete a set of analyses using a given data set and interpret your findings; 3) Formulate your own research question(s) and answer this question(s) using survey data of your own choosing and the statistical techniques covered in class. Instructions for these research assignments will be posted on Quercus.

**Choosing your data set.** In the first couple of weeks of the class, you will be asked to find a data set you wish to work with for your 2<sup>nd</sup> and 3<sup>rd</sup> research assignments. You will also find several suggested data sets on Quercus. To get to know each other, and to learn a little about your research interests and the data you plan to use, please make an appointment with the instructor (if your last name starts with A-I) or the TA (if your last name starts with K-Z).

**Tutorials.** The lab sessions are designed to help you learn the practical data management and analytical skills you need to complete these research assignments.

**Paper Presentations.** For the last class session, students will prepare short presentations on their work for the 3<sup>th</sup> research assignment.

## Overview of grade components

		Each worth	Fraction of final grade
10 x	Weekly homework assignments	4%	40%
2 x	Research Assignments 1 and 2	15%	30%
1x	Proposal Research Assignment 3		3%
1 x	Research Assignment 3		17%
1 x	Poster & Presentation		10%
	Total		100%

## Grade Scale

Percentage grades will translate to letter grades as follows (Truncated Refined Letter Grade Scale):

Percentage	Letter Grade	Percentage	Letter Grade
90-100	A+	77-79	B+
85-89	A	73-76	B
80-84	A-	70-72	B-
		0-69	Fail

### Preparing for the course: Do I know enough math?

This course does not require more than knowledge of basic algebra. However, it does require you to be comfortable using formulas and to understand mathematical notation. I will post an optional math quiz, materials that will help you to review basic algebra and mathematical notation, as well as practice problems on Quercus ahead of the start of the course.

### Course Materials

#### Required Readings

- Agresti, Alan & Barbara Finlay (1997). *Statistical Methods for the Social Sciences*, 3<sup>rd</sup> edition. Pearson. (Used copies can be found online for around CAD25-30 or less. Please order your textbook early. A lot of used copies are shipped from the U.S. and might take a while to arrive.)
- Miller, Jane E. 2004. *The Chicago Guide to Writing about Numbers*. Chicago: University of Chicago Press. [Available as a digital holding in U of T Libraries: <http://go.utlib.ca/cat/11570628>]
- Plus selected readings from additional texts (available on Quercus)

#### Supplemental Texts

- Longest, Kyle C. 2012/2015. *Using Stata for Quantitative Analysis* (1<sup>st</sup> or 2<sup>nd</sup> editions). [Available as a digital holding in U of T Libraries: <http://go.utlib.ca/cat/8965089>]
- Menard, Scott. 2002. *Applied Logistic Regression Analysis*, 2nd Ed. Thousand Oaks, CA: Sage

#### Optional Texts

- Acock, Alan C. 2006-2014. *A Gentle Introduction to Stata*. College Station, TX: Stata Press.
- Long, J. Scott. 2009. *The Workflow of Data Analysis Using Stata*. Stata Press: College Station, TX: Stata Press.

These optional books will be available for you to look at during the first couple of weeks of class to help you decide whether you would like to purchase a copy for yourself.

- An excellent resource for finding solutions to Stata problems is the website maintained by the Institute for Digital Research and Education at the University of California, Los Angeles [<https://stats.idre.ucla.edu/stata>].

## Computing and Labs

This course includes a lab component in which we will work through analyses using the Stata statistical program. Data and computer code for the labs will be posted ahead of the lab sessions on the Quercus course page.

**Stata** is a user-friendly program, ideal for data management, for statistical analysis, and for creating graphical representations of your findings.

- The program is available in the department's computer labs.
- If you would like to use Stata on your own computer, the company offers a "GradPlan" which provides software and manuals at a reduced price for enrolled students (see <https://www.stata.com/order/new/edu/gradplans/student-pricing>). The standard version of Stata (Stata/IC 16) is available for as little as ~CAD63 (USD48) for a 6-month license, CAD123 (USD94) for a 1-year license, or CAD294 (USD\$225) for a perpetual license.

The lab session will offer a first introduction to Stata. Beyond this necessarily cursory introduction, numerous resources for learning and mastering Stata are easily available on the web or through published books (see the optional course reading texts). Lab sessions will draw heavily from the supplemental text, *Using Stata for Quantitative Analysis* (Longest, 2015).

Though all labs will be conducted in Stata, feel free to complete your assignments in alternative programs (e.g., R, SAS, SPSS), so long as you include reproducible syntax scripts in your assignments. That said, we can best support you and your work if you use Stata.

**Optional Stata Data Management Workshops.** Effective and systematic data management is a skill that forms the basis of any careful data analysis. Depending on demand, I will offer optional workshops a few times of the semester outside of the tutorials to help you with the preparation of the data for your research assignments.

## Communication & Getting Help

**Email.** Please use your **University of Toronto email** to communicate with me about **personal matters**. I will do my best to respond to your emails within 36 hours from Monday to Friday between 9 a.m. and 5 p.m.

**Asking questions about the course material on Quercus.** To clarify questions regarding the **syllabus**, **assignments**, as well as substantive questions about **assigned texts** and the **material discussed in class**, please use the designated **discussion boards on the course website** outside of class time or tutorials. If something is unclear to you, chances are good that other students may have the same or a similar question! Using discussion boards rather than email ensures that everybody has access to the same information.

**Office hours.** Please do not hesitate to come and talk to us if you have questions about the class material, the assignments or if you have any other concerns about the class.

- The **instructor's office hours** are by appointment. Please use the Quercus Calendar tool to book a time slot. Time slots are 15 minutes each, but you can book as many adjacent time slots as you like. Drop-in office hours will be offered periodically during the semester as needed.
- **TA office hours:** TBA

## Late Submission of Assignments & Grade Appeals

**Late Submission of Assignments.** All assignments are due at the beginning of class (see class schedule). Unless you have a documented reason beyond your control (e.g., family emergency, illness) late submission will result in a 5% deduction for each 24-hour period the assignment is late (starting with the day the assignment is due).

If you must miss the deadline for an assignment, please notify me in advance or as soon as possible to arrange for the submission of the assignment together with the necessary documentation. Please note that under university regulations, extensions are only required to be provided in circumstances where students inform the instructor of their circumstances within 7 days of the missed assignment due date.

**Grade Appeals.** I do my very best to grade work fairly, consistently, and accurately. Nevertheless, unintentional errors may occasionally occur. If you believe that your assignment has been mismarked, please adhere to the following rules:

- Please **wait for 24 hours** after the assignment has been returned to the class before submitting your request. All requests for re-grading should be made **within two weeks** of the date the assignment was returned. Re-grading requests submitted at a later date will not be considered.
- Submit a **short memo** that clearly states specific reasons to justify the request and backs up these reasons with evidence from your assignment.
- For simple mathematical errors, simply alert me of the mistake.

If your appeal is deemed appropriate, the entirety of your assignment will be re-graded. Please note that upon re-grade your mark may go up, stay the same, or go down.

## Academic Integrity and Working With Other Students

**Academic integrity** is required of all students at the University of Toronto. If you are unsure about some aspects of academic integrity, please do not hesitate to talk to me. Plagiarism or other violations will be addressed in accordance with University guidelines. Please be cautious in this matter, as the penalties for academic misconduct can be quite severe. Know where you stand by reading the "[Code of Behaviour on Academic Matters](#)" in the Calendar of the Faculty of Arts and Science. **It is your responsibility to read this material and comply fully with it.**

**Working together.** Statistics is a course where many students find it useful to work together. Explaining aspects of the course materials to others can help you to more fully understand the statistical techniques discussed in class, identify unclear points, and work through challenging material. Students may work together on assignments, but the submitted work must be unique (e.g., interpretations must be written independently and not copied, research questions for student-selected data should not be

identical). For assignments requiring analyses using Stata, all syntax must be included (please upload a separate Stata do-file with each assignment). **Students who work together on classwork should also indicate who they worked with on each assignment (if anyone).** This will guard against situations where a student's academic integrity might be called into question.

## Use of Electronic Devices

- Please set your mobile phone on silent before class.
- **Mentimeter.** Occasionally, we will use an interactive audience engagement app. You can use Mentimeter by downloading the app to your phone from your favorite app store, or by going to [menti.com](https://www.menti.com) if you prefer using your laptop. Mentimeter does not require you to create an account. You will use a code to access the questions for a given class.
- Students who are using the electronic version of the assigned texts may bring their laptops to class for the purpose of working with the textbook. Please do not check your email/social media or browse the web during class. This is not only distracting to you but also the students around you.

## Accessibility Services

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 [http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppno\\_v012004.pdf](http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppno_v012004.pdf).

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](mailto:accessibility.services@utoronto.ca).

The office is located at 455 Spadina Avenue, 4<sup>th</sup> Floor, Suite 400.

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

## Equity & Diversity

The University of Toronto is committed to equity and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect. As a course instructor, I will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment and hate speech will not be tolerated.

Additional information and reports on Equity and Diversity at the University of Toronto is available at <http://equity.hrandequity.utoronto.ca>.

## Course Schedule & Due Dates

(Please note: We are going to do our best to stick to this schedule.  
That said, this schedule may be subject to change.)

	Date	Lecture	Lab	Assignments & Due Dates
1	07/01	<ul style="list-style-type: none"> <li>Introduction to the course &amp; the role of statistics in sociology</li> <li>Data, variables, samples &amp; populations, level of measurement</li> </ul> <p><b>Readings</b></p> <ul style="list-style-type: none"> <li>Agresti &amp; Finlay: 1.1., 1.2, 1.4, 2.1.</li> <li>Miller: Ch. 1</li> </ul>	<p>Introduction to Stata: basic commands, codebook, missing data, do-files</p> <p><b>Optional text</b></p> <ul style="list-style-type: none"> <li>Longest Ch. 1, 2, 3</li> <li>Treiman: Ch. 4 (on Quercus)</li> </ul>	Nothing due
2	01/14	<p>Describing data and analyzing distributions: Central tendency and variability</p> <p><b>Readings</b></p> <ul style="list-style-type: none"> <li>Agresti &amp; Finlay: Ch. 3</li> <li>Miller: Ch. 2, 4 and 9 (up to the top of page 190)</li> </ul>	<p>Summarizing and describing variables in tabular and graphical form, basic data preparation commands</p> <p><b>Optional text</b></p> <ul style="list-style-type: none"> <li>Longest Ch. 4</li> </ul>	<p><b>Homework 1</b> due Mon 01/13, 11 a.m.</p> <p>Find data set you wish to work with this semester (go to "Data" Module on Quercus)</p>
3	01/21	<p>Describing data and analyzing distributions (continued) &amp; Descriptive bivariate associations</p> <p><b>Readings</b></p> <ul style="list-style-type: none"> <li>Agresti &amp; Finlay: Ch. 9.4 &amp; 10.1</li> <li>Miller: Ch. 3 (section on Causality, up to top of p. 40)</li> </ul>	<p>Correlation, scatterplots, bivariate tables</p> <p><b>Optional text</b></p> <ul style="list-style-type: none"> <li>Longest Ch. 7 (up to/including the section on "Scatterplots")</li> </ul>	<p><b>Homework 2</b> due Mon 01/20, 11 a.m.</p> <p>Meet with instructor or TA before 01/28</p>
4	01/28	<p>Descriptive bivariate associations (continued)</p> <p><b>Readings</b></p> <ul style="list-style-type: none"> <li>Agresti &amp; Finlay: rest of Ch. 9 (all but 9.4)</li> <li>Miller: Ch. 9 (p. 190-199)</li> </ul>	<p>Bivariate regression</p> <p><b>Optional text</b></p> <ul style="list-style-type: none"> <li>Longest Ch. 7 (section on "Linear Regression")</li> </ul>	<p><b>Homework 3</b> due Mon 01/27, 11 a.m.</p> <p><b>Research Assignment 1</b> due before class 01/28, 11 a.m.</p>



	<b>Date</b>	<b>Lecture</b>	<b>Lab</b>	<b>Assignments &amp; Due Dates</b>
5	02/04	Overview of sampling, probability theory, and sampling distributions <b>Readings</b> <ul style="list-style-type: none"><li>• Haan &amp; Godley: Ch. 4</li><li>• Agresti &amp; Finlay: Ch. 4</li></ul>	Sampling distribution simulation exercise	<b>Homework 4</b> due Mon 02/03, 11 a.m.
6	02/11	Introduction to statistical inference: confidence intervals and hypothesis testing <b>Readings</b> <ul style="list-style-type: none"><li>• Agresti &amp; Finlay: Ch. 5 &amp; 6</li></ul>	Support session for research assignment 2	<b>Homework 5</b> due Mon 02/10, 11 a.m.
7	02/18	<i>READING WEEK</i>		
8	02/25	Using inference to make comparisons: means <b>Readings</b> <ul style="list-style-type: none"><li>• Agresti &amp; Finlay: Ch. 7</li><li>• Miller: rest of Ch. 3 (starting on p. 40)</li></ul>	Hypothesis test: two-sample test	<b>Homework 6</b> due Mon 02/24, 11 a.m.  <b>Research Assignment 2</b> due before class Tue 02/25, 11 a.m.
9	03/03	Using inference to make comparisons: proportions <b>Readings</b> <ul style="list-style-type: none"><li>• Agresti &amp; Finlay: Ch. 8</li></ul>	Hypothesis test: Chi-square test	<b>Homework 7</b> due Mon 03/02, 11 a.m.
10	03/10	Using inference for simple and multiple regression <b>Readings</b> <ul style="list-style-type: none"><li>• Agresti &amp; Finlay: Ch. 10 &amp; 11</li></ul>	Bivariate and multiple regression	<b>Homework 8</b> due Mon 03/09, 11 a.m.  <b>Proposal Assignment 3</b> due before class Tue 03/10, 11 a.m.
11	03/17	Further considerations for multiple regression <b>Readings</b> <ul style="list-style-type: none"><li>• Allison: Ch. 3</li></ul>	Support session for research assignment 3	<b>Homework 9 &amp;</b> due Mon 03/16, 11 a.m.

	<b>Date</b>	<b>Lecture</b>	<b>Lab</b>	<b>Assignments &amp; Due Dates</b>
12	03/24	Logistic regression  <b>Readings</b> <ul style="list-style-type: none"> <li>• Agresti &amp; Finlay: Ch. 15</li> </ul> <b>Supplemental/optional</b> <ul style="list-style-type: none"> <li>• Menard 2002</li> </ul>	Logistic regression in Stata	<b>Homework 10</b> due Mon 03/23, 11 a.m.
13	03/31	<i>Paper presentations</i>		<b>Research Assignment 3</b> due Fri 04/03, 11.45 p.m.