Quantitative Analysis in Social Science Research

Instructor: Irene Boeckmann, PhD
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Office Hours: Wed 9-10 a.m. & 4-5.30 p.m.
Office: Rm 388 at Sociology Department,
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Teaching Assistants: TBA

Class	Tue 6-8 p.m.
	Location: RW 110
Tutorials	Wed 4-5 p.m. & 5-6 p.m.,
	Thu 6-7 p.m. (Tut 5101 to 5103)
	Location: FE-36, 725 Spadina Ave., Basement
Blackboard	https://portal.utoronto.ca
Aplia	TBA

Course Description, Learning Objectives, & Prerequisites

This course is designed to introduce basic statistical techniques for analyzing data used in sociological research and social sciences in general. The course focuses on understanding and applying statistical techniques, as well as interpreting findings of analyses based on quantitative data. You will be introduced to descriptive statistics, and basic inferential statistical techniques, including regression analysis. Furthermore, you will get hands-on experience using SPSS software to analyze quantitative data. While you are expected to be familiar with basic algebraic operations, derivations and advanced mathematical concepts will not be used in this class.

Statistics seems like a daunting subject to many students. It is not just numbers, but includes more generally problem solving and logic. The focus in this course is on how to use statistical techniques to answer questions and provide information. The skills and techniques that you learn in this class are used in a wide variety of other classes and with provide background for many professional problems you may be confronted with.

In order for you to learn and master statistics (and get a good grade in the class) you will need to spend a considerable amount of time outside of class studying the material and practicing the techniques. Your ability to solve problems and get information out of a group of numbers requires you to learn through practice and not just memorize the techniques. You will practice through homework and lab assignments, and practice examples given in class.

Course Goals

1. Introduce you to basic statistical techniques, both descriptive and inferential
2. Develop your ability to interpret and to write about statistical results
3. Develop your ability to use SPSS effectively, the statistical software used in this class and in many other settings
4. Provide you with the experience in exploring and working with large secondary data

Prerequisites

The prerequisite to take this course is 1.0 SOC at the 100 level (SOC100H1 & SOC150H1 or SOC101Y1 or SOC102H1 & SOC103H1). Students without this/these prerequisite/s will be removed at any time discovered and without notice.

Learning Components & Course Requirements

Introductory math and syllabus quizzes. During the first two weeks of class, complete the math self-assessment test and the syllabus quiz on Blackboard. If you haven't practiced your math skills in a while, please review the "Prologue: Basic Mathematics Review" (pages 1-9) in the textbook. There are 10 questions on each of these quizzes and you have 30 minutes per quiz to complete it. The deadline for these assignments is Friday, 09/22 at 8:45 p.m. (each *worth 0.5% of the final grade, in total: 1%*)

Readings. Each week, we will read one or two chapters in the textbook. You are expected to read the assigned texts before each class period. Take notes and jot down any questions you might have, so you can ask them in class or on the discussion board on the class website. Please bring the textbook with you to each class and tutorial session.

Short video lectures and self-check quizzes. Each week, there will be one or two short video lectures that introduce some of the basic concepts of the week. You are expected to watch these lectures before class and test your understanding of this material by completing a brief 5-question quiz online (due before class). You will be able to access these online lectures and quizzes on Blackboard one week ahead of class. Please note: Because the self-check quizzes will be available for a week, and are only worth a very small fraction of your final grade, there will be no make-up opportunities for these quizzes. (*10 self-check quizzes, each worth 0.2% of the final grade, in total: 2%*)

Lectures and Class Participation. The lectures will highlight the central concepts in the assigned chapters and illustrate these concepts with examples. We will also do practice examples in class. While attendance is not mandatory, it is highly recommended that you come to class regularly. Statistics is not a subject that you can study for a day or two before a test. The material from each week builds on the material from previous weeks. Keeping up with the readings and coming to class regularly is important and will help you to stay on track.

Weekly Homework Assignments. Over the course of the semester, you will complete 10 homework assignments in the Aplia learning environment (there are no homework assignments during mid-term test weeks 4 and 10). The assignments will be available from 11.45 p.m. on Tuesdays and can be completed until Friday of each week at 11:45 p.m., i.e. you will have a 72-hour window to complete these assignments. These homework assignments provide you with the opportunity to practice the material in a low-stakes environment.

To access the Aplia learning environment, create an online account through the Aplia course website (different from the Blackboard course website!) (url: TBA). You must have an access code from the textbook to register your account. To complete the weekly homework, you will log in using the ID and the password you created during online registration.

Each homework will consist of 10 to 15 problem sets. After answering a problem, you will receive instant feedback, and you will know which questions you answered correctly. You will then have two more opportunities to complete the problem set before proceeding to the next (the system will generate a new problem set focused on the same concepts). Your homework grade will be based on the highest of the three attempts (if you are satisfied with the score of your first attempt, you do not have to complete further attempts).

Because there is such a long window of time to complete the homework assignments (72 hours), there will be no opportunities for make-up assignments. Each homework is worth only a small fraction of your

final mark (1.5%), so missing one or two homework assignments will not drastically lower your final grade. (*each homework assignment worth 1.5%, in total 15% of the final grade*).

Tutorials & Lab Assignments. Tutorials/labs for this class will take place every week in FE-36 (with the exception of weeks in which tests are given, i.e. week 4 and week 10). Please bring your textbook to each tutorial session.

During tutorials, the teaching assistants will help you with the exercises in the textbook, provide guidance on how to interpret the results and get you started on the lab assignments using SPSS. The tutorials also provide the opportunity for you to discuss any questions you might have about the class material with your fellow classmates and the teaching assistants.

You will work on the lab assignments during each tutorial. **Hard copies of these assignments are due** at three points during the semester **during tutorials in week 3, week 9, and <u>during class in week 13</u>** (each based on work completed in tutorials during the preceding weeks). Please DO NOT email or put any lab assignments, under the door to my office or the TA offices.

We encourage students to complete these lab assignments during tutorial sessions. If you find that you need more time to complete the assignments, SPSS is also available on computers in the Robarts Map and Data Library (5th floor of Robarts Library). This computer lab is open most hours during regular Robarts Library hours (https://onesearch.library.utoronto.ca/library-info/ROBARTS). During some hours, the lab may be booked for special events. Please check the weekly schedule posted by the lab doors (not available online) if you plan to use the computer there. You can also check the availability of computers online (http://caf.icicle.utoronto.ca/CAFStatus/Web/Summary/MD).

Mid-term Tests. There will be two in-class tests in weeks 4 and 10 of the semester. The tests will consist of multiple choice and short answer questions. The first mid-term on Wednesday, February 1st will cover material from weeks 1-3. The second test on Wednesday, March 15th will cover content from weeks 5-9 (*each mid-term test worth 21% of final grade, in total 42%*)

Final Exam. The final exam will cover material from the entire semester. The date, time and location of the final exam TBA. (2*5% of final grade*)

Overview of grade components

		Each worth	Fraction of final grade
1 x	Syllabus quiz	0.5%	0.5%
1 x	Math-self assessment test	0.5%	0.5%
10 x	Self-assessment quizzes	0.2%	2%
10 x	Homework assignments	1.5%	15%
3 x	Lab assignments	5.0%	15%
2 x	Mid-term tests	21%	42%
1 x	Final exam	25%	25%
	Total		100%

Percentage grades will translate to letter grades as follows (standard university grade scale):

Percentage	Letter Grade	Grade Point Value	*Percentage*	Letter Grade	Grade Point Value
90-100	A+	4.0	*67-69*	C+	2.3
85-89	A	4.0	*63-66*	C	2.0

80-84	A-	3.7	*60-62*	C-	1.7
77-79	B+	3.3	*57-59*	D+	1.3
73-76	B	3.0	*53-56*	D	1.0
70-72	B-	2.7	*50-52*	D-	0.7
			0-49	F	0.0

Required Materials

Textbook: Healey, Joseph F. and Steven G. Prus. 2016. Statistics: A Tool for Social Research, 3rd Canadian Ed. Nelson Education Ltd.

The textbook is available in the U of T bookstore. **IMPORTANT**: with the purchase of the text, you will receive a password for Aplia, the online system this class uses for homework assignments. You may also purchase an Aplia account bundled with an electronic book.

Calculator: You will need a calculator **for the mid-term tests and the final exam**. You may not use any type of phone as a calculator for the tests or the final exam. All you need is a calculator with basic mathematical functions (addition, subtraction, multiplication and division) and a square root function (preferably with a 10-digit display).

Laptop, tablet or smartphone (*not required*): Occasionally, we will use "Kahoot!" – a free game-based learning platform - to do practice examples in class. If you do not have access to a laptop, tablet or smartphone, you will still be able to complete these practice examples. If you plan to use your smartphone, accessing "Kahoot!" through the app is recommended (available for Android phones and iPhones).

Communication

Email. Please use your University of Toronto email to communicate with me with regard to **personal matters**, or to communicate with the TAs. I will do my best to respond to your emails within 24 hours from Monday to Friday between 9 a.m. and 5 p.m.

Discussion boards. 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 equal access to the same information.

Office hours. Please do not hesitate to come and talk to us if you have any questions or concerns about the class, or if you need assistance. The instructor's regular office hours are on Wednesdays from 9-10 a.m. and from 4-5.30 p.m. Extra instructor office hours and optional test-prep study sessions will be held before mid-term tests (see class schedule).

The TAs will also hold office hours (time TBA). All TA office hours will be held in the Sociology Department, 725 Spadina Ave, on the second floor in Rm 225.

Late Work, Missed Deadlines, Grade Appeals, and Late Enrollment

Lab assignments will be collected by the TAs <u>during the tutorial sessions and during the last week in class</u> (please bring a hard copy). Late submission will result in a 5% deduction for each day the assignment is late (starting with the day the assignment is due, up to a maximum of 50% of the grade) <u>unless</u> you have a documented reason beyond your control (e.g. family emergency, illness) and provide the necessary documentation (see below). If you miss the deadline for a lab assignment, please notify me promptly to arrange for the submission of the lab assignment with the necessary documentation.

Make-up tests will only be given for legitimate, documented reasons. Please let me know ahead of time if you are going to miss a test and provide official documentation (see below) as soon as possible. Make-up tests will be held during office hours on one occasion for everybody who needs to write a make-up test. It is your responsibility to bring the necessary documentation (see below).

<u>Please note</u>: Under university regulations, make-up tests or extensions are only required to be provided in circumstances where the student informs the instructor of his/her circumstances **within 7 days of the missed assignment due date or test**.

Documentation. If you miss a deadline or a test, you must provide one of the following types of documentation:
1. **Verification of Student Illness or Injury form**, available at:
   http://www.illnessverification.utoronto.ca/index.php
   Please provide the form to your Physician, Surgeon, Nurse Practitioner, Registered Psychologist, or Dentist for completion.
2. **College registrar's letter**. This documentation is useful in cases of personal or family crisis, or any other problem that is not possible to document through the Verification of Student Illness or Injury form.
3. **Letter from Accessibility Services**. This documentation is useful for ongoing medical issues that require special accommodation.

Grade Appeals. We do our very best to grade work fairly, consistently, and accurately. Nevertheless, one of us may unintentionally err in our grading duties. If you believe that your assignment or test has been mismarked, please adhere to the following rules:

- For simple mathematical errors, simply alert your TA of the mistake.
- All requests for re-grading the term tests or course assignments should be made to your TA. Please <u>wait for 24 hours</u> after the assignment has been returned to the class and submit your request **within two weeks of that date**. Re-grading requests submitted at a later date will not be considered.
- A <u>short memo</u> that clearly states specific reasons to justify the request and backs up these reasons with evidence from your assignment must be submitted to your TA.

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

Late Enrollment. If you enrolled late in the class, please get in touch with me so we can make sure that you have all the necessary information.

Academic Integrity

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. Academic dishonesty includes cheating, fabrication, plagiarism, and facilitating dishonesty. This includes sharing answers to homework assignments or lab assignments, including on social media, email, or in person. 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**.

Students who commit an academic offence face serious penalties. University policy requires cases of academic dishonesty to be reported to the department chair and the university. You find additional information on the university's rules and expectations about academic integrity here: http://www.artsci.utoronto.ca/osai/students

Accessibility Needs

If you require accommodations or have any accessibility concerns, please visit http://studentlife.utoronto.ca/as or call Accessibility Services at 416-978-8060 the as soon as possible. I will gladly work with the service on any needed accommodation.

Course Schedule & Due Dates

All readings are from the Healey and Prus textbook

Week	Class	Tutorials	Topics & Readings	Assignment Due Dates & Tests
1	09/12	Wed 09/13 Thu 09/14	Introduction, level of measurement, basic descriptive statistics I **Reading**: Chapters 1 and 2 up to (not including) section 2.5 (p. 49)	**Homework W1** due on Fri 09/15, 8:45 p.m.
2	09/19	Wed 09/20 Thu 09/21	Descriptive statistics II, measures of central tendency and spread **Reading**: Chapter 2 (section 2.5 and onward) and chapter 3	**Homework W2** due on Fri 09/22, 8:45 p.m. **Math Self-assessment Test** & **Syllabus Quiz** due on Fri 09/22, 8:45 p.m.
3	09/26	Wed 09/27 Thu 09/28	The normal curve, z-scores, estimating probabilities **Reading**: Chapter 4 *Optional test-prep study session during Week 3*	**Homework W3** due on Fri 09/29, 8:45 p.m. **Lab assignement 1** due during tutorials
4	10/03	*No tutorials*	**Midterm-test I** covers material from weeks 1-3 *Extra office hours: Mon 10/02 9-10 a.m.*	**Midterm-test I** (*no homework*)
5	10/10	Wed 10/11 Thu 10/12	Introduction to inference, sampling, sampling distribution, confidence intervals **Reading**: Chapters 5 and 6	**Homework W5** due on Fri 10/13, 8 p.m.
6	10/17	Wed 10/18 Thu 10/19	Introduction to hypothesis testing **Reading**: Chapter 7	**Homework W6** due on Fri 10/20, 8:45 p.m.
7	10/24	Wed 10/25 Thu 10/26	Hypothesis testing: Two sample hypothesis tests for means and proportions **Reading**: Chapter 8	**Homework W7** due on Fri 10/27, 8:45 p.m.
8	10/31	Wed 11/01 Thu 11/02	Hypothesis testing: Analysis of Variance **Reading**: Chapter 9 *Optional test-prep study session during Week 8*	**Homework W8** due on Fri 11/03, 8:45 p.m. **Lab assignement 2** due during tutorials
9			*READING WEEK – NO CLASS or TUTORIALS 11/06 - 11/10*	

Week	Class	Tutorials	Topics & Readings	Assignment Due Dates & Tests
10	11/14	*No tutorials*	**Midterm-Test II** covers material from weeks 5-8 *Extra office hours: Mon 11/13 9-10 a.m.*	**Midterm-Test II** (*no homework*)
11	11/21	Wed 11/22 Thu 11/23	Hypothesis testing: Chi square & bivariate measures of association at the nominal level **Reading**: Chapters 10 and 11	**Homework W11** due on Fri 11/24, 8:45 p.m.
12	11/28	Wed 11/29 Thu 11/30	Associations between interval/ratio-level variables: correlation, scatterplots and bivariate regression **Reading**: Chapter 13	**Homework W12** due on Fri 11/31, 8:45 p.m.
13	12/05	*Classes end 12/06 (no tutorials)*	Introduction to multivariate regression **Reading**: Chapter 14	**Homework W13** due on Fri 04/07, 8:45 p.m **Lab assignement 3** due during class on Tue 12/05
	Final Exam – date, time, and location TBA *Please note: The final exam will cover material from the entire semester.*			