

POL232H1S: Introduction to Quantitative Reasoning II

University of Toronto

Winter 2022

Meeting Room: SS 561

Lecture Time: L0101: Monday, 2:00-4:00pm
L0201: Thursday, 10:00am-12:00pm
L5101: Tuesday, 6:00-8:00pm

Tutorial Time: L0101: Monday, 1:00-2:00pm or 4:00-5:00pm
L0201: Thursday, 9:00-10:00am or 12:00-1:00pm
L5101: Tuesday, 5:00-6:00pm or 8:00-9:00pm

Instructor: Kenichi Ariga
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Office: SS 3047
Office Hours: Tuesday, 10:00am-12:00pm

Teaching Assistants: L0101: Jacob Winter jacob.winter@mail.utoronto.ca
L0201: Justin Savoie justin.savoie@mail.utoronto.ca
L5101: Marc-Antoine Rancourt marcantoine.rancourt@mail.utoronto.ca

Course Description and Objectives

Quantitative empirical analysis has become increasingly an important part of political science research — and social sciences in general — and public policy debates. The results of statistical analysis on quantitative data, such as opinion polls, election results, frequency of armed conflicts, and incidence of violence, can be seen in many research articles and books on political science and various reports on divergent policy issues published by governments, think tanks, non-profit organizations, and news media. Ability to properly understand and critically assess the results of quantitative statistical analysis has become an invaluable asset for any individuals who are interested in a wide range of political, economic, social, and policy issues.

For political science students, two consecutive introductory courses on quantitative empirical methodology are offered (POL222 & 232). This course, “POL232 Introduction to Quantitative Reasoning II,” is the second course and continues to introduce important foundations of quantitative empirical methodology. POL232 is required for political science specialists and elective for majors.

Students taking this course will learn:

1. Theoretical foundations of *statistical inference* to learn about the characteristics and relationships in a large population from sample observations;
2. *Linear regression* analysis, which is one of the most basic yet widely used methods to

empirically investigate the relationship between political, economic, social and policy phenomena; and

3. Very basics of statistical computing to conduct simple quantitative analyses of social science data.

The objective of the class is to better prepare the students to become educated readers and active participants in social science research and public policy debates.

Required Textbook

Paul M. Kellstedt and Guy D. Whitten, *The Fundamentals of Political Science Research*, 3rd Edition (Cambridge University Press, 2018) or 2nd Edition (2013).

The 2nd edition is available online in *Scholars Portal Books* through the University of Toronto Libraries. All other readings on the syllabus will be made available on Quercus.

Computer Software

Quantitative social science research requires the use of computer software. In this class, you will learn an elementary use of a software package called R, which is free to download at <http://www.r-project.org>.

Quercus

Quercus (<https://q.utoronto.ca/>) is the primary means through which class announcements and assignments will be distributed. Readings other than the textbook, lecture slides, and assignments will be made available on the class Quercus site. Discussions Board on the class Quercus site will be the primary method by which you will ask simple questions about the course materials and get them address.

Please note that all important announcements and updates will be posted on the class Quercus site. It will be your responsibility to obtain access to Quercus and regularly check it. There will be an important update to the class Quercus site at least once a week.

Lecture Slides

Lecture slides will be made available on the class Quercus site. Some slides, such as graphics and in-class problems/exercises, may be taken out from the set made available on Quercus; however, all information essential for review will be kept in these slides.

Teaching Assistants

There is a teaching assistant for each lecture section (Jacob Winter for L0101, Justin Savoie for L0201, and Marc-Antoine Rancourt for L5101), whose main duties are leading tutorial sessions, grading assignments and other student contacts. There will also be office hours held by the teaching assistants during a couple of weeks before paper assignments are due. When you contact the teaching assistants, please follow the specific guidance set forth later.

Tutorials

There will be weekly tutorial sessions led by teaching assistants starting in Week 2 of the semester (the week of Jan. 17th). Tutorials are scheduled before and after each week's lecture at SS 561. Normally, weekly homework assignments are due at the beginning of the tutorial sessions. However, the schedule during when classes remain online may be different. Make sure you regularly check the announcements on the class Quercus site for more details about your tutorial sessions.

If you cannot attend any one of the tutorial sections for a legitimate reason, you need to send an email to your tutorial instructor to make an alternative arrangement for the tutorial participation marks and the submission of homework assignments at the beginning of the semester. Official documentation, which verifies the specific reason given, will be required. Unless you make an alternative arrangement, you will lose participation mark for homework assignments and tutorial sessions.

Grading and Evaluation

Your grade of the course will be based on the following materials with the weights given:

1. Quantitative Empirical Research Paper Assignments

First Paper:	25%	Due: Friday, Feb. 11 th , 5:00PM, EST
Second Paper:	30%	Due: Friday, Mar. 11 th , 5:00PM, EST
Final Paper:	30%	Due: Friday, Apr. 8 th , 5:00PM, EST

Over the course of the semester, you will learn how to conduct a quantitative empirical analysis of political science data using R and the datasets provided in class. For the first two paper assignments, you will apply what you will have learned by that time and write a research paper based on it. In the final paper assignment, you will write a quantitative empirical research paper based on a linear regression analysis which addresses a causal theory of your interest.

2. Participation Mark: 15%

Your participation mark will be based on the following four subcomponents.

(1) Lecture Participation: 5%

There will be lecture participation exercises every week, whose completion will count toward 5% of your final mark. These lecture participation exercises may vary from week to week, and they will be announced at the beginning of each week. During the time when classes remain online, these exercises will be completed in surveys or quizzes on the class Quercus site. When the class goes back to in-person, there will be in-class exercises, which students may submit to the class Quercus site or use classroom response systems. Depending on the week, partial credit may be possible; for example, there may be multiple modules of a participation exercise, and if you do not complete all of these modules, you may get a partial credit. Each week's lecture participation will be weighted

equally.

(2) Tutorial Participation: 5%

There will be weekly tutorial sessions starting in Week 2 of the semester, and your participation in tutorial sessions will count toward 5% of your final mark. During some of these tutorial sessions, there will be tutorial exercises which you are required to submit. In these cases, the completion and submission of these tutorial exercises will also be part of that week's tutorial participation mark. Therefore, depending on the week, partial credit may be possible; for example, in the week you are required to complete and submit the tutorial exercise by the end of your tutorial session, if you participate in the tutorial but do not submit the tutorial exercise, you may only get partial credit. Each week's tutorial participation will be weighted equally.

(3) Weekly Homework Assignments: 4%

There will be weekly homework assignments, which are normally due at the beginning of your tutorial session. The first homework assignment will be posted in Week 2 (the week of Jan. 17th) and due by your tutorial session in Week 3 (the week of Jan. 24th). Completing weekly homework assignments is considered as class participation as the number of correct answers will not be counted but the extent to which you gave effort to complete the assignments will be evaluated. Accordingly, all homework assignments will be graded on a pass/fail basis. If it is determined that you gave it a reasonable effort to answer all the questions, you will be given full credit for that homework, regardless of the number of correct answers. If you do not show a reasonable amount of effort, however, your homework will be given a fail or a marginal pass. You will receive no credit in the former case and will receive half the credit in the latter.

(4) Feedback Survey: 1%

There will be an online feedback survey on the class through the class Quercus site at the end of the semester. Your participation in the survey will count toward 1% of your final mark.

Plagiarism Detection Tool

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

Students who wish to not use the University's plagiarism detection tool may make an alternative arrangement. If you want to make an alternative arrangement, you need to send an email to the teaching assistant who will grade your essay (normally, your tutorial instructor) at least one week before the deadline of the assignment and ask for an alternative way to submit the essay. If you choose an alternative arrangement, you may be asked, for example, to submit all your rough work for an assignment and to have a short meeting with

the teaching assistant or the instructor in which you will be asked about your essay.

Late Penalties and Extension

All work is late if submitted after the date and time specified as due. To ensure fairness, the late-penalty policy specified below will be strictly enforced. Conflict with other class's assignment/exam schedule, leaving for a non-academic trip, or vacation is not an acceptable reason to miss the assignments or request an extension.

➤ Empirical Research Paper Assignments

Extension for the empirical research paper assignments may be made only when there is a legitimate reason, such as an unforeseeable medical emergency, an accessibility issue, religious observances, and a family emergency, and there is an acceptable official documentation, which verifies the specific reason given, such as the UofT Verification of Student Illness or Injury form, the Accessibility Services Letter, and the College Registrar's Letter. If you need an extension for accessibility reasons, the extension may be granted based on your Accessibility Services Letter. Given the current COVID-19 situation, the Verification of Illness or Injury form (or "doctor's note") is not required in 2021-22. Instead, if you need an extension for a legitimate reason except for accessibility (e.g., COVID, cold, flu and other illness or injury, family situation, religious observances), you should record your absence through the ACORN online absence declaration and then make a request for an extension to the teaching assistant who will grade your essay (normally, your tutorial instructor).

Students who know in advance they will need an extension for a legitimate reason should contact the teaching assistant in charge of grading your assignments as early as possible before the deadline. Those who missed the deadline for a legitimate, unforeseeable reason should contact the teaching assistant as soon as possible and no later than one week after returning to class.

Empirical research paper assignments handed in late will result in a penalty of 2-percentage-point reduction per day (e.g., from 72% to 70%). Submitting the assignments within 24 hours from the due date and time will be considered one day late; submitting after 24 hours but before 48 hours will be two days late, and so forth.

Since you will submit your assignments to Quercus, your submission must be accepted and recorded on Quercus before the due date and time. Note that the date and time recorded on Quercus will be your submission date and time. If this is after the deadline even only by one minute, then your submission will be considered late. In other words, completing your paper and start uploading it to Quercus before the due date and time is not enough. Your upload must be complete before the due date and time.

Computer-related problems, such as the crash of your computer, a slow Internet connection, and an occasional slow response of the server, will not be considered as an acceptable reason to request for extension or waiver of a late penalty. Also sending your assignment to the instructor and/or the teaching assistants via email will not be

considered as a submission. For these reasons, I strongly suggest you avoid a last-minute completion or submission of assignments. I also suggest you frequently take a backup of the electronic files of your draft essay in an electronic storage other than your computer. If you have a UTmail+ account, you have access to 1TB of storage in your OneDrive at the UofT. You may take a backup in your OneDrive.

➤ **Lecture Participation, Tutorial Participation, and Weekly Homework Assignments**

If you have to miss a lecture or tutorial participation for a legitimate reason, the participation in that lecture or tutorial session may be waived. If you cannot complete a homework assignment by their due date for a legitimate reason, the homework assignment in question will be waived rather than being given an extension, as it is also a participation mark.

If these are for accessibility reasons, the waiver may be granted based on your Accessibility Services Letter. If this is for a legitimate reason except for accessibility (e.g., COVID, cold, flu and other illness or injury, family situation, religious observances), you should record your absence through the ACORN online absence declaration and then make a request to your teaching assistant.

The request of a waiver for the lecture participation, tutorial participation, and homework assignments must be made to the teaching assistant leading your tutorial section via email.

Grade Appeals on Empirical Research Paper Assignments

There are two stages in the process of grade appeals on the empirical research paper assignments in this class. First, you may appeal to your grader, who is normally a teaching assistant for your lecture section. You are required to raise specific and substantive questions regarding the grades and feedback you received, so that your grader may double check their assessment based on them and address your questions. The grader may adjust the grade if they found it appropriate. Second, if you still believe the grade you received is not appropriate after appealing to the grader, you may request a regrading to the instructor. You are required to submit a brief documentation substantiating why you believe your grade is not appropriate. The justification you gave for regrading will be used by the instructor to consider if there are reasonable grounds for regrading. If your regrading request is considered reasonable, another teaching assistant who did not give your original mark will be assigned to regrade your paper with fresh eyes. This second grader will regrade your paper without knowing your original mark, the feedback given by the first grader, and the justification you gave for regrading. This is because your paper should be marked only on its quality based on the paper requirements and evaluation criteria. The regraded mark may go up or down from the original mark. The new mark will be your final mark whether it goes up or down from the original. Both the grade appeal to the first grader and the regrading request to the instructor must be made within two weeks from when the original grade is assigned.

Outside Class Communication Policy

Please follow the policy specified below when you contact the instructor or teaching assistants outside class.

1. Office Hours

- You are welcome to visit the instructor's office hours, if you have any questions on the class subjects and materials. Details of the instructor's office hours will be posted on Quercus.
- There will also be office hours held by teaching assistants before the essay assignments' due dates. Details of the teaching assistants' office hours will also be posted on Quercus.

2. Discussion Board

- We will also use the Discussion Board on the class Quercus site as the main medium through which you can ask questions and get them addressed. Given the nature of the course subjects and a large size of the class, others may have the same question as yours and they would benefit from your posting your questions and getting them addressed through the Discussion Board.
- You are also encouraged to post an answer to the questions posted by your classmates on the Discussion Board so that we can maintain a mutually-supporting learning community from which all of you will benefit.
- Questions posted on the Discussion Board will be normally addressed within 24 hours except on weekends by one of the teaching assistants in charge of addressing questions posted on the Discussion Board on that day.

3. Email Communications

- If you have any questions of personal nature (e.g., grade appeal, deadline extension for a legitimate reason), you may email the teaching assistants or the instructor and expect a response within two working days. Please start the subject heading of your email with "POL232:..."
- If your questions are of substantive nature, please post these questions on the Discussions Board of the class Quercus site or visit office hours or tutorial sessions to get them addressed.
- If you want to ask questions of substantive nature anonymously, you may send your questions via email to the teaching assistants or the instructor, but note that your questions will be posted by them on the Discussion Board without your name, and that these questions will be addressed by the teaching assistant in charge of addressing questions posted on the Discussion Board on that day. If you don't mind asking questions non-anonymously, you are best advised to post your questions directly on the Discussion Board rather than sending them to the teaching assistants or the instructor by email, as your questions may be addressed more quickly if you post them directly on the Discussion Board.

4. Empirical Research Paper Assignments

- You may post your relatively simple questions on the paper assignments on the Discussion Board of the class Quercus site. If you have detailed questions on your

paper idea, you are best advised to visit office hours of the teaching assistants or the instructor.

- Please note that neither the instructor nor teaching assistants will be able to review your draft essay when you seek advice.

5. Non-response

- Please note that the instructor and teaching assistants will not be able to answer email or questions posted on the Discussion Board of the class Quercus site during weekends.
- Please also note that the instructor and teaching assistants may not be able to answer last minute questions on the assignments on their due date.
- In the case of your questions of substantive nature on the Discussion Board of the class Quercus site or those of personal nature over email not answered within two working days (excluding weekends), send the instructor or the teaching assistants an email to let them know they have not been addressed. Please include “POL232: Unanswered Question” in the subject heading of your email.

Accessibility

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting <http://www.studentlife.utoronto.ca/as/new-registration>. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

Academic Integrity

Academic integrity is fundamental to learning and scholarship at the University of Toronto. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T degree that you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

You are expected to be familiar with the Code of Behaviour on Academic Matters, available at <https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity>, which is the rule book for academic behaviour at the U of T. Another website (<https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity/academic-misconduct>) lists nine categories of academic offences defined in the Code. Potential offences include, but are not limited to, plagiarism, cheating on tests and exams, misuse of iClickers (e.g., using someone else's iClicker during lectures to earn a participation credit for that student), fraudulent medical documentation and improper collaboration on marked work.

For specific examples of the potential academic offences, please read *The Scope of Academic Integrity* (<https://www.academicintegrity.utoronto.ca/perils-and-pitfalls/>). Please note that, in general, not knowing the University's expectations cannot be an excuse. **Under the Code, "the offense shall likewise be deemed to have been committed if the person ought reasonably to have known"** (*Code of Behaviour on Academic Matters*, web version, p.2).

For further information on plagiarism, visit the pages available from the links listed at <http://advice.writing.utoronto.ca/using-sources/>. This list is part of *the Advice on Academic Writing* at the University of Toronto (<http://advice.writing.utoronto.ca/>). You may also find other resources available on this website helpful.

To learn more about how to cite and use source material appropriately and for other writing support, also see the U of T writing support website at <http://www.writing.utoronto.ca>.

The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be examined following the procedures outlined in the Code. The consequences for academic misconduct can be severe, including a failure in the course and a notation on your transcript. If you have any questions about what is or is not permitted in this course, do not hesitate to contact the instructor or teaching assistants.

Class Schedule and Readings

Class schedule and the assigned readings for each lecture are specified below. During the semester, the lecture schedule may be adjusted according to the actual progress of the class. If this is the case, the due dates of assignments may also be modified. In addition, some assigned readings may be replaced by others, and there may be additional readings. If these are to happen, you will be given an advance notice at the class Quercus site.

Due to the last-minute change in the instruction mode to an online delivery method during January 2022, it was necessary to adjust the class structure and assignments accordingly, which may necessitate further changes to the class schedule later in the semester. If such changes become necessary, they will be announced on the class Quercus site. Please check the class Quercus site regularly to not miss these announcements.

Jan. 10 (L0101), 11 (L5101) & 13 (L0201)
Week 1. Introduction

PART I. DESCRIPTIVE STATISTICS: ANALYSIS OF SAMPLE DATA

How Can We Describe a Variable or the Relationship between Variables?

Jan. 17 (L0101), 18 (L5101) & 20 (L0201)
Week 2. Descriptive Statistics for Single Variable (1)

➤ Kellstedt and Whitten,

- 3rd Edition: Chapter 6.1-6.3, or
- 2nd Edition: Chapter 5.1, 5.7-5.9.

Jan. 24 (L0101), 25 (L5101) & 27 (L0201)

Week 3. Descriptive Statistics for Single Variable (2)

- Kellstedt and Whitten,
 - 3rd Edition: Chapter 6.4-6.6, or
 - 2nd Edition: Chapter 5.10-5.12

Jan. 31 (L0101), Feb. 1 (L5101) & 3 (L0201)

Week 4. Descriptive Statistics for Bivariate Analysis (1)

Feb. 7 (L0101), 8 (L5101) & 10 (L0201)

Week 5. Descriptive Statistics for Bivariate Analysis (2): Simple Linear Regression

- Kellstedt and Whitten,
 - 3rd Edition: Chapter 9.1-9.3, or
 - 2nd Edition: Chapter 8.1-8.3.

First Paper Due: Feb. 11 (Fri.), 5:00PM, EST

Feb. 14 (L0101), 15 (L5101) & 17 (L0201)

Week 6: Descriptive Statistics for Multivariate Analysis: Multiple Linear Regression

- Kellstedt and Whitten,
 - 3rd Edition: Chapter 10.1-10.4, 10.10, or
 - 2nd Edition: Chapter 9.1-9.4, 9.9.
- Alan I. Abramowitz. 2008. "Forecasting the 2008 Presidential Election with the Time-for-Change Model." *PS: Political Science & Politics* 41(4).

PART II. STATISTICAL INFERENCE FOR SINGLE VARIABLE

How Can We Learn about Population from Sample?

Feb. 28 (L0101), Mar. 1 (L5101) & 3 (L0201)

Week 7: Probability and Sampling Distribution

- Kellstedt and Whitten,
 - 3rd Edition: Chapter 7.1-7.3, or
 - 2nd Edition: Chapter 6.1-6.3.
- "Trudeau and Liberals Dip Slightly in Latest Poll," September 14, 2016, thestar.com (<https://www.thestar.com/news/canada/2016/09/14/trudeau-and-liberals-dip-slightly-in-latest-poll.html>).

Mar. 7 (L0101), 8 (L5101) & 10 (L0201)

Week 8: Point Estimation and Interval Estimation

- Kellstedt and Whitten,
 - 3rd Edition: Chapter 7.3-7.5, or
 - 2nd Edition: Chapter 6.3-6.5

- Thomas H. Wonnacott and Ronald J. Wonnacott. 1990. *Introductory Statistics, 5th Edition*. Chapter 8-1 and 8-5 (skip 8.1-E, 8.5-B, and 8.5-C).

Second Paper Due: Mar. 11 (Fri.), 5:00PM, EST

PART III. STATISTICAL INFERENCE FOR LINEAR REGRESSION

Mar. 14 (L0101), 15 (L5101) & 17 (L0201)

Week 9: Statistical Inference for Linear Regression

- Kellstedt and Whitten,
- 3rd Edition: Chapter 9.1-9.2, 10.1-10.2, 9.4's introductory paragraph (pp.195-196), or
 - 2nd Edition: Chapter 8.1-8.2, 9.1-9.2, 8.4's introductory paragraph (pp.178-179).

Topics in Chapter 9.5 (3rd Edition) or 8.5 (2nd Edition) are also covered in this lecture, but my presentation will be simpler and slightly different. Hence, this chapter is not required.

Mar. 21 (L0101), 22 (L5101) & 24 (L0201)

Week 10: Is Our Finding *Significant*? Confidence Interval for Linear Regression, Statistical Significance, and Substantive Significance

- Kellstedt and Whitten,
- 3rd Edition: Chapter 9.4.4-9.4.5, 10.5-10.6, 10.8-10.9 or
 - 2nd Edition: Chapter 8.4.4-8.4.5, 9.5-9.6, 9.8, 12.4.

Mar. 28 (L0101), 29 (L5101) & 31 (L0201)

Week 11: A Few More Topics on Linear Regression

- No Readings

Apr. 4 (L0101), 5 (L5101) & 7 (L0201)

Week 12: Consultation for Final Paper Project

- No Readings

Final Paper Due: Apr. 8 (Fri.), 5:00PM, EST

Syllabus Change Policy

The policies and contents of this syllabus may be changed by the instructor with advanced notice. If any, such a change will be announced during lectures.