

POL232: Quantitative Political Analysis II

Tuesdays & Thursdays, 5 – 7 pm, SS561

version 0.94

Tutorials in SS561 preceding/following class on select dates, and on Zoom on Fridays and/or Mondays (Time TBA) on Zoom

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In-Person Office Hours: before class 3-5 pm in SS 561/Sid's Café

What this course is all about:

This course introduces fundamentals of data analysis for political science and public policy. Building on foundations from POL222H1 (or equivalent), this course examines the theoretical foundations of quantitative empirical research, such as probability theory and statistical inference, and introduces students to data analysis using R, a popular open-source statistical software package. Students will gain hands-on experience with the analysis of empirical data, which should prove useful not only during the rest of their academic curriculum, but also throughout their career. By the end of the semester, students will be able to conduct basic data analysis independently.

Learning objectives:

At the end of this course, I expect all students to:

- Learn to perform and interpret statistical analyses commonly performed by political scientists and public policy analysts.
- Understand which analysis is appropriate given the research question and the data.
- Climb some of the steepest, initial sections of the learning curve for applied statistics with the software package R by:
 - Completing several common statistical analyses
 - Learning to read and interpret these analyses.
 - Composing a paper demonstrating your ability to conduct and interpret multivariate statistical research

How this class works

While there are lectures in this class, the line between lectures and tutorials will be blurred. Most of the work in this class will still be “hands-on.” During class, students will complete a series of activities, including some with self-assessment tools (Quercus calls them “quizzes”) to ensure that everyone is completing the tasks successfully. These activities only count as complete or incomplete – it does not matter how well or how poorly you do on them (and many will have options to correct your mistakes). Some office hours, tutorials and lecture time will include time for students to work, knowing that if they are stuck or confused, the professor and/or the TA is nearby to help!

These activities lead to worksheets that will be submitted for grades. These graded analyses may be multiple choice “quizzes” like the activities, or require the submission of original work with brief interpretations ranging from a few short (one-three) sentence short answers. The simple, multiple choice activities and the more complicated worksheets scaffold the completion of an original

multivariate analysis that will enable you to demonstrate your aptitude at completing and interpreting regression analyses and the presentation of descriptive statistics of key variables.

You may also complete many activities within with other students, as many students find that it is helpful to collaborate with peers in the classroom as they navigate through often-novel tasks.

Reassurance

We expect that you will succeed at this course, even (or especially) students who are not comfortable with math. The instructor has been teaching versions of this course for about 20 years, and he is still not very good at math. The key to success is completing the hands-on exercises, communicating with your instructors and/or your peers early and often whenever you *might* need help, recognizing that each new task is not very difficult as long as you do not fall behind and have to play catch up, and having the confidence that you can thrive in this course.

The work in this class often builds off previous tasks. No one week should be especially strenuous or difficult, but skipping one week or delaying the work for one week could make subsequent weeks harder to complete.

POL222 is a prerequisite for this course, but since some iterations of the course do not include any hands-on statistical training, no background is assumed. So, we will start from the very basics, the very beginning, and build upwards from there!

Evaluation and Assessments

Assessment Title	Percent (%)	Date(s)
Term Test	20	2024-07-30
Worksheet Descriptive Statistics	5	2024-07-10
Worksheet Hypothesis	5	2024-07-12
Worksheet Bivariate Statistics	5	2024-07-12
Worksheet Intro Regression	5	2024-07-19
Worksheet Multivariate Regression	10	2024-07-26
Worksheet Reading Regression	5	2024-07-26
Worksheet Logit	5	2024-08-09
Activities (In Class)	10	Multiple dates

Assessment Title	Percent (%)	Date(s)
Regression Write Up	30	2023-08-09

Assignments

Full details of the assignments can be found on Quercus.

Activities: Most every week there are one or more hands-on activities to complete as part of the class. Most activities are designed to be completed in about one hour or less. These activities are graded complete/incomplete. So, for example if the activity requires students to answer 5 multiple choice questions in a “quiz” on Quercus, it does not matter how many questions you get right, just that you have completed the task. You may even have the opportunity to resubmit your answers for a higher score. For a perfect “10” score in activities, students should plan on completing **eight** activities.

Worksheets: Worksheets contain 10-20 questions that should be answered upon completion of a set of tasks or analyses. Most worksheet questions will be multiple choice or brief, short answers. Like activities, some worksheets will be completed in the classroom during lectures and/or tutorials, but some may require completion outside of class time.

Regression Test will be an open book test on Quercus. Most, or all, of the test will be multiple choice. The test will be entirely on student’s understanding of linear (OLS) regressions. Students will need to answer questions about regression techniques and regression diagnostics, differentiate between nominal and ordinal variables, be familiar with how to modify variables to include them in regressions, how to use regressions to test hypotheses, and most importantly, demonstrate an ability to interpret regression results: coefficients, significance, r-squared and some diagnostic measures.

Regression Write-Up. The central, capstone project of this class should reflect individual student interests and aspirations. This is normally a **brief** paper that should showcase students’ abilities to present descriptive statistics on a variable or a key relationship before analyzing a multivariate regression model (or two). Students should consult with the professor no later than August 9 to have a topic and/or outline approved. Students who do not have a topic and/or outline approved by August 9, and/or have received a 70 or less on the regression worksheets, or opt to complete a modified version of the write-up will be given a regression analysis to interpret in a paper but will not be able to earn a grade higher than a 78 (B+) on the paper.

Assignment Format

Please submit work as .pdf, .docx, .xlsx or compatible output to Quercus. The university’s plagiarism software (via Quercus) nor your instructors can read Apple Pages documents. You may not submit any work using Apple Pages. If you do use pages, please export to a .pdf or something compatible with .docx. A reminder: all University of Toronto students can access the university’s license to use Office 365 for no charge.

Late Assignments

The deadline for all assignments is at 11:59 pm on Quercus. No late penalties will be applied within 72 hours of deadlines. After 72 hours (so, Tuesday at 12:01 am after the customary deadlines on Friday at midnight), assignments will be penalized 3% per day for the next seven days of lateness. After ten calendar days of lateness, the teaching assistants and the instructor will refuse to accept the work for grading.

All matters of grading, exemptions, and discipline procedures will be handled in accordance with the U of T Academic Handbook. We will generously grant extensions for work, family, child care, or other non-health reasons prior to the deadline or quiz, so please make sure you, or someone you delegate, contacts the instructor or the TA whenever there may be an issue. Students whose health renders them unable to complete an assignment should also contact the professor before deadlines or test administrations under non-exceptional circumstances. All students, including those with special deadlines for accommodation reasons, should remember that delaying work will often lead to the need to play “catch up,” which can often be challenging and frustrating for students.

See <http://www.artsci.utoronto.ca/main/faculty/resources/faculty/acaresources> for the complete handbook.

Appeals

Any student who believes that any work has been unfairly graded may ask the instructor to re-evaluate his or her work. Grading appeals should be submitted via email with a cover letter explaining the basis of the appeal to the instructor.

Plagiarism and Academic Integrity

Every year, students are caught for plagiarism. This is defined by the University of Toronto’s Code of Behavior on Academic Matters as “the wrongful appropriation and purloining, and publication as one’s own, of the ideas, or the expression of the ideas...of another.” Do not become a cheater. Penalties are severe.

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student’s individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto’s Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else’s ideas or words without appropriate acknowledgement;
2. Submitting your own work in more than one course without the permission of the instructor;
3. Making up sources or facts;
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids;
2. Looking at someone else’s answers during an exam or test;

3. Misrepresenting your identity; and
4. When you knew or ought to have known you were doing it.

In academic work:

1. Falsifying institutional documents or grades;
2. Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes; and
3. When you knew or ought to have known you were doing so.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If students have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, they are expected to seek out additional information on academic integrity from their instructors or from other institutional resources.

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 work 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 website (<https://uoft.me/pdt-faq>).

Please familiarize yourself with the University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>). It is the rule book for academic behaviour at the U of T, and you are expected to know the rules. A list of potential offences can be found here:

<https://view.officeapps.live.com/op/view.aspx?src=http://www.artsci.utoronto.ca/osai/instructors-and-staff/tips-templates/AI-statement-and-checklist.docx>

The above link also includes a checklist that you should consult before you submit written work in any class to avoid any plagiarism issues. Plagiarism is a serious academic offense with a severe penalty. It is essential that you understand what plagiarism is and that you do not commit it. Please see <http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize> for more information and tips on how to avoid plagiarism.

All work submitted must be original and reflect the student's own efforts. The major assignment in this class should be drawn from original research. Students are reminded that all material must be cited and all quotations that use the verbatim language of other authors must be bracketed by quotation marks. Passages that include only a few changes in wording may still be considered plagiarism if the ideas, structure of the argument or language employed are still judged to be the work of another author.

This is a class that you will have opportunities to collaborate with other students. It is important that all students acknowledge, and identify, any and all collaborators when they submit such work, even if the work is not formally submitted on behalf of more than one student.

The regression test is open book; however, students may not communicate with each other during the test. If there are multiple sittings of the test, students should avoid all communications with other students from whenever students start taking the test until an hour or two after the test window closes to ensure that no one is given an unfair advantage.

Required Readings

The primary textbook for this class when we learn regression is:

Lewis-Beck, C. and Lewis-Beck, M., 2016. *Applied regression: An introduction, Second Edition* (Vol. 22). Sage. <https://methods-sagepub-com.myaccess.library.utoronto.ca/book/applied-regression-an-introduction-second-edition>

All other readings will be drawn from textbooks that are available for free on-line through the University of Toronto library, and/or the Toronto Public Library, or are free, open-source readings. The readings through the library will only require your UTORid and password to access.

Two books deserve highlighting here:

An open-source textbook, focusing on political science and employing R can be found here:

Jenkins-Smith et al, "*Quantitative Research Methods for Political Science, Public Policy and Public Administration (With Applications in R)*," Ch. 16 <https://shareok.org/handle/11244/52244>

This book has been assigned to POL222 students in the past, and is still recommended for students intending to continue to graduate work in political science or related fields:

Kellstedt, P.M. and Whitten, G.D., 2021. *The fundamentals of political science research*. Cambridge Univ. Press. https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106095563406196 Copies are available at several U of T libraries, but it is not available for free online.

Many statistics textbooks are available and can readily be substituted for the assigned reading. It will often be obvious which chapters in any text will substitute for the required or recommended readings. I expect that whether using one or more of the books above, or another book, that students will primarily draw upon that text for the duration of the class.

On Quercus, you will find a lengthy review of textbook options available online, including short descriptions of many of them to help students identify which texts may be best for their learning goals and styles. For example, some texts are heavy on math and formulas, some are very good at explaining the concepts in "plain English" with amusing examples, while others focus on the mechanics of completing an analysis using Excel or a statistics package like R or STATA. In the expanded weekly schedule (on Quercus), you will find recommended reading or online resources for each topic or subject, for conceptual explanations, for Excel, for R, or for STATA. Some of these books can be downloaded as PDFs or EPUBs in their entirety. Others require downloading chapter-by-chapter and/or reading on-line. The instructor is happy to provide free advice to students who prefer to purchase hard copies of texts, tailored to each student's needs and budget.

Required Software

We will start this class by using Excel. Then we will use R using an interface called R-Studio. R is free. The instructor will also support STATA and SPSS/PSPP for interested students

Other

Contact

The instructor will be available via Quercus email, U of T email, Microsoft Teams and Whatsapp at 6477213456. Please include POL232 in the subject line of all emails, and as a preface to all Whatsapp messages. Be forewarned, the instructor tries to unplug during the Jewish Sabbath from Friday evening

through Saturday evening (if not all weekend). During the week, the instructor will try to respond to emails within 48 hours. Students are encouraged to use the Quercus discussion forums for class questions. Please do not hesitate to request a time for a face-to-face or phone chat, especially after 9 pm on weeknights. This is especially true for questions involving a statistics program or task that is not quite working out since many computer issues are best resolved that way rather than back-and-forth emails or messages.

Accessibility Needs

The University of Toronto is committed to accessibility and I wholeheartedly share that commitment by ensuring that every student should have a fair chance to excel in this course. I strive to create and maintain an inclusive environment and promise to provide reasonable and appropriate accommodations to persons who require them. 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 <https://studentlife.utoronto.ca/department/accessibility-services/>. 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.

Accommodations for Specific Medical Circumstances and Personal Reasons

If you become ill and it affects your ability to do your academic work, consult me right away. Normally, I will ask you for documentation in support of your specific medical circumstances. This documentation can be an Absence Declaration (via ACORN) or the University's Verification of Student Illness or Injury (VOI) form. The VOI indicates the impact and severity of the illness, while protecting your privacy about the details of the nature of the illness. If you cannot submit a VOI due to limits on terms of use, you can submit a different form (like a letter from a doctor), as long as it is an original document, and it contains the same information as the VOI (including dates, academic impact, practitioner's signature, phone and registration number). For more information on the VOI, please see <http://www.illnessverification.utoronto.ca>. For information on Absence Declaration Tool for A&S students, please see <https://www.artsci.utoronto.ca/absence>. If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible.

As a student, you may experience challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation, financial concerns, family worries and so forth. These factors may affect your academic performance and/or reduce your ability to participate fully in daily activities. Everyone feels stressed now and then – it is a normal part of university life. Some days are better than others, and there is no wrong time to reach out. There are resources for every situation and every level of stress.

There are many helpful resources available through your College Registrar or through Student Life (<http://studentlife.utoronto.ca> and <http://www.studentlife.utoronto.ca/feeling-distressed>). An important part of the University experience is learning how and when to ask for help. Please take the time to inform yourself of available resources.

There may be times when you are unable to complete course work on time due to non-medical reasons. If you have concerns, speak to me or to an advisor in your College Registrar's office; they can help you to decide if you want to request an extension or other forms of academic consideration. They may be able to email your instructors directly to provide a College Registrar's letter of support and connect you with other helpful resources on campus. While we will strive to accommodate, students should remember that in six-week intensive classes, especially one like POL232 with near-weekly assignments, disruptions to one's involvement in class for even two weeks has more significant consequences than a similar disruption in a 12-week course with few assignments spread out over the course of the term

Family Care & Involvement

In today's times I know that many often face unexpected child- and elder- care challenges. If you have children of any age, or responsibility to care for children and older adults, you should know that when circumstances require their presence, they are welcome to be present during class and office hours. I will be happy to respond to any questions they might have, just please remember that everyone's work in this class must reflect their own efforts or those of fellow classmate-participants (as part of group efforts).

Religious Accommodations

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. For my part, I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays or preparations for such days. Further to University Policy, if you anticipate being absent from class or missing a major course activity (such as a test or in-class assignment) due to a religious observance, please let me know so that we can work together to make alternate arrangements to enable you to enjoy all celebrations and commemorations.

Reading and Topic Schedule

On Quercus, you will find alternative and additional readings for each week, especially those focused on explaining how to complete analyses in R or other statistical software. There is also a list of readings, books and resources that may prove more useful or helpful than these readings, depending on what statistical program you are using and how you tend to learn. Since there is so much overlap between statistical texts, treat these readings as recommended texts for that topic, with an emphasis on texts that emphasize one's understanding of the topic, rather than instructions on how to implement an analysis of that topic. Some students may find that sticking with one, or one of two texts, will be superior than reading a few chapters of one book and one chapter of another book.

Course materials like worksheets and activities are provided for the exclusive use of enrolled students. These materials should not be reposted, shared, put in the public domain, or otherwise distributed without the explicit permission of the instructor. These materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Students violating these policies will be subject to disciplinary actions under the Code of Student Conduct.

Week 1 Introduction

July 2 Descriptive Statistics

Quirk, T. 2020. *Excel 2019 for Educational and Psychological Statistics: A Guide to Solving Practical Problems*. Springer, Ch. 1 <https://link-springer-com.myaccess.library.utoronto.ca/book/10.1007/978-3-030-39264-2>

July 4 Descriptive Statistics II: Dispersion & Basics of R

Jarman, K.H., 2013. *The art of data analysis: How to answer almost any question using basic statistics*. John Wiley & Sons, Ch. 3

Kellstedt, P.M. and Whitten, G.D., 2021. *The fundamentals of political science research*. Cambridge University Press, Ch. 6

Activities: Welcome to R! Boxplots; Recoding and creating new variables

Week 2 Bivariate

July 9 T-tests & Hypothesis Testing

Good, Phillip I., and James W. Hardin. *Common errors in statistics (and how to avoid them)*. John Wiley & Sons, 2012, Ch. 2

P-hacking: <https://www.wired.com/story/were-all-p-hacking-now/>

Activities: Differences in Means; Hypotheses

July 11 Crosstabulations & Correlations

Kellstedt, P.M. and Whitten, G.D., 2021. *The fundamentals of political science research*. Cambridge University Press, Ch. 8 (from 8.4.3)

Marchant-Shapiro, Theresa. *Statistics for Political Analysis* (Sage, 2015), Ch. 10 <https://methods-sagepub-com.myaccess.library.utoronto.ca/book/statistics-for-political-analysis-understanding-the-numbers/i1111.xml>

Activities: Control, Correlation

Assignments: Worksheet Descriptive Statistics; Worksheet Hypotheses

Week 3 To Regression!

July 16 Indexing & Control

Marchant-Shapiro, Theresa. *Statistics for Political Analysis* (Sage, 2015), Ch. 11 <https://methods-sagepub-com.myaccess.library.utoronto.ca/book/statistics-for-political-analysis-understanding-the-numbers/i1277.xml>

Palazzolo, Daniel. "Evaluating a Control Variable"
<http://writing2.richmond.edu/writing/wweb/polisci/controlv.html>

Activities: Indexing; Control

July 18 Bivariate Regression

Lewis-Beck, C. and Lewis-Beck, M., 2016. *Applied regression: An introduction, Second Edition* (Vol. 22). Sage. Ch. 1 & 2 <https://methods-sagepub-com.myaccess.library.utoronto.ca/book/applied-regression-an-introduction-second-edition>

Activities: Bivariate Regression

Week 4 Linear Regression

July 23 Multivariate Regression I

Lewis-Beck, C. and Lewis-Beck, M., 2016. *Applied regression: An introduction, Second Edition* (Vol. 22). Sage. Ch. 3 & 4 <https://methods-sagepub-com.myaccess.library.utoronto.ca/book/applied-regression-an-introduction-second-edition>

July 25 Multivariate Regression II: Dummies and Interactions

Linneman, T.J. 2011. *Social Statistics: The Basics and Beyond*. Routledge. [Catching Up or Falling Behind: Interaction Effects | 21 | Social Stati \(utoronto.ca\)](#)

Activities: Dummies; Interactions, Multivariate regression

Assignments: Worksheet: Intro Linear Regression; Multivariate Regression

Week 5 Linear Regression II

July 30 Regression Test (Online, Timed)

August 6 Assessing OLS & Building Models

Good, Phillip I., and James W. Hardin. *Common errors in statistics (and how to avoid them)*. John Wiley & Sons, 2012, Ch. 15

Jenkins-Smith et al, "Quantitative Research Methods for Political Science, Public Policy and Public Administration (With Applications in R)," Ch. 10, 11 & 15 <https://shareok.org/handle/11244/52244>

Week 6 Logit Regression

Jenkins-Smith et al, "Quantitative Research Methods for Political Science, Public Policy and Public Administration (With Applications in R)," Ch. 16 <https://shareok.org/handle/11244/52244> **and/or** Thrane, C. 2020. *Applied Regression Analysis*. Routledge, Ch. 7 https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alm_a991106909607906196

An Introduction to "Margins" <https://cran.r-project.org/web/packages/margins/vignettes/Introduction.html>

Activities: OLS Diagnostics

Worksheet: Logit

Final Paper due