POL 3085: Quantitative Methods for Political Science

University of Minnesota Fall 2026

Lecture: Monday and Wednesday, 9:45 – 11:00 AM (Blegen 150) **Lab (Section 002):** Wednesday, 12:00 – 12:50 PM (Blegen 220) **Lab (Section 003):** Wednesday, 1:00 – 1:50 PM (Blegen 220)

Instructor Information

Professor: Prof. Dan Myers (he/him) **Office:** 1309 Social Science Building **Office Hours:** Wednesday, 2:00 – 3:30 PM (except September 16, September 30, October 21, November 18, December 2, and December 9); Friday, 11:00 AM – 12:00 PM **Office Hours Zoom:** Available by request **Office Hours Sign-up:** calendly.com/cdmyers

Teaching Assistant: Nick Campos (he/him) **TA Office Hours:** Monday, 11:15 AM – 1:15 PM **TA Office Location:** Social Sciences 1273 **TA Office Hours Zoom:** Available by request

Course Email Address: pol3085fall2026@umn.edu

"Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding." — William Paul Thurston, mathematician

"It was my understanding that there would be no math." — Chevy Chase as President Gerald Ford, *Saturday Night Live*

Course Description

This course introduces students to quantitative research methods in political science. Students will learn how political scientists develop theories, formulate testable hypotheses, collect and analyze data, and draw inferences about the political world. The course covers both experimental and observational research designs, with hands-on experience using the R statistical programming language.

Learning Objectives

By the end of this course, students will be able to:

1. Develop research questions and theoretical frameworks for studying political phenomena
2. Design and conduct survey experiments

3. Understand the logic of causal inference and the role of confounding variables
4. Calculate and interpret descriptive statistics
5. Create effective data visualizations
6. Understand sampling distributions and measures of uncertainty
7. Conduct hypothesis tests using t-tests and chi-squared tests
8. Perform and interpret bivariate and multiple linear regression
9. Use R and RStudio for data analysis
10. Communicate research findings clearly in writing and presentations

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Readings

Course readings will primarily be drawn from two sources:

- **Jenkins-Smith, Hank C., and Joseph Ripberger. 2017.** *Quantitative Research Methods for Political Science, Public Policy and Public Administration (With Applications in R) - 3rd Edition.* University of Oklahoma Libraries. Available free online at: https://open.umn.edu/opentextbooks/textbooks/quantitative-research-methods-for-political-science-public-policy-and-public-administration-with-applications-in-r-3rd-edition
- **Sumner, Jane L. 2024.** *R for Political Science Research: An Introduction for Absolute Beginners.* Springer Nature. Provided free on the course website.

Some classes have other readings assigned. Generally, these readings are available electronically through the University library. If not, they will be posted to Canvas. Readings posted to Canvas are marked with a (C). If you have trouble locating a reading, please contact the course email address.

Lectures, Labs, and Readings

Lectures, labs, and readings serve different purposes in this course.

This course's material can be challenging, particularly for students who are not used to thinking in statistical terms. As such, the readings and lectures will reinforce each other. The readings will provide a first look at the day's topic—they should be completed before the class for which they are assigned. Lectures will reinforce the important concepts from the readings as well as cover some aspects not covered in the readings. If, after reading carefully and reviewing your lecture notes, you find that you do not understand a topic from class, you should ask clarifying questions in class or lab and/or come to office hours.

Labs are for hands-on practice with R, the statistical programming language that we will use to apply the concepts and methods introduced in readings and

lectures. The course is designed so that you will encounter new material in lecture before you are asked to apply it in lab. This means that missing a Monday lecture will leave you less prepared for Wednesday's lab. Lab assignments will ask you to practice what you learned in lab, and you may be able to complete some of them during the lab period itself. We assume no pre-existing knowledge of R—this may make some of the early lab sessions relatively easy for students who have experience with R.

Throughout class, we will occasionally break into small-group discussion to think together about an important argument or problem; at the end of these breaks, we will often ask groups to report out the results of their discussion. I will also occasionally cold call random members of the class to answer questions after we, as a class, have given them some thought. You should be prepared to participate in class in this manner.

Instructional Time

This is a four-credit class, which corresponds to an expected twelve hours of work per week. Students are expected to attend four hours of class per week (two 1.25-hour lectures and one 1-hour lab section). In addition to time spent in class, you should budget eight hours per week on average for preparing for class and working on your research project. Some weeks will be more demanding, some less, but if you cannot commit an average of twelve hours per week to this class you should not take it.

Canvas

All course materials will be on the class's Canvas page. This includes the course schedule, all assigned readings, all assignments, and everything else. Even though some class components will not directly be through Canvas (e.g., some materials will be administered through Google Forms, Sheets, or Docs), the links to those will be in the appropriate class's page on Canvas.

The class is split into weeks. Each week will have its own page that contains all relevant material for the class and lab sessions during that week.

Required Computer

In this class and its lab section you will need a laptop computer that is capable of running RStudio. If you do not have a computer capable of this, please come talk to me as soon as possible.

Assignments

This course will have lab assignments, exams, and a sequence of group project assignments.

Lab Assignments

Lab assignments will follow most labs and are intended to help you practice what you learned in lab. You may be able to complete some of them during the lab period itself. Lab assignments are graded satisfactory/unsatisfactory.

Exams

This course features three exams during the semester plus a cumulative final exam. All exams will be completed in person, on paper, without the aid of electronic devices. You will be allowed to bring one 3" x 5" notecard with notes to each exam. In these exams you will be asked to do four kinds of things:

1. Explain important methodological and statistical concepts in plain English
2. Apply these concepts to challenges in developing and evaluating social research
3. Demonstrate how to use formulas from the class to calculate important quantities
4. Interpret R code and describe the results that it will produce

Exam 1 (October 5): Covers concepts and theories, operationalization and hypotheses, measurement and data, survey design, causal inference, and experimental design.

Exam 2 (November 9): Covers descriptive statistics, data visualization, sampling distributions, uncertainty, confidence intervals, and hypothesis testing.

Exam 3 (December 14): Covers observational research design and linear regression (bivariate and multiple).

Final Exam (Saturday, December 19, 10:30 AM – 12:30 PM): Cumulative, covering all course material.

The Research Project

You will complete two group projects over the course of the semester: one centered on an experimental study and one centered on an observational study. For each project, you will be assigned to a group of three to four students; you will be placed in new groups for the second project. More details on the group projects will be provided as the first project approaches.

Experimental Project: Due Friday, November 13, 5:00 PM

Observational Project: Due Wednesday, December 16, 5:00 PM

After each project is submitted, you will write a brief reflection on how your group worked together and your contribution to the group. You will also rate the participation of yourself and your groupmates. Your individual grade on the project will take these reflections and ratings into account.

Grades

Grades will be calculated in the following manner:

Component	Percentage
Lab Assignments	10%
Exam 1	10%
Exam 2	10%
Exam 3	10%
Final Exam	20%
Experimental Design Project	15%
Observational Study Project	15%
Class Participation	10%

Grades will be assigned using the standard University grading scale:

Letter	Percent	Letter	Percent
A	93-100	C	73-76.99
A-	90-92.99	C-	70-72.99
B+	87-89.99	D+	67-69.99
B	83-86.99	D	63-66.99
B-	80-82.99	F	0-62.99
C+	77-79.99		

Note that I do not round grades — an 89.99 is a B+, even though it is .01 from an A-.

Class Participation

Your participation grade will be based on completing and turning in occasional in-class exercises. These exercises cannot be made up outside of class, except for absences covered under the University's Excused Absences and Makeup Work policy.

Course Policies

Use of Personal Electronic Devices in the Classroom

The University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. In this class I ask that you keep all personal electronic devices, including laptops, phones, tablets, away and on silent except when I ask you to take out your laptop computer to complete an in-class activity. If you must take a phone call or send a text message during class, please step out of the classroom to do so.

For complete information on the University policy, please reference: policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

Scholastic Honesty and Plagiarism

The goal of this class, as with all classes, is to learn. Ultimately your grade on any assignment is less important than the knowledge, skills, and habits of thought that you develop by completing the assignment. This is important for your life and career after college, but also for your success in this class; later assignments build on earlier assignments, and if you do not actually learn the material early in the class you will be unable to understand material later in class.

In pursuit of the goal of learning, you are expected to turn in your own original work for all assignments in this class. This means that you may draw on readings, discussions with others, and, within the confines of the course's Generative AI Policy, AI tools when figuring out how to complete an assignment. However, you may not simply copy the output of others, be they classmates or authors of readings. You must always be able to explain what your work means and how you arrived at it; if I suspect academic dishonesty, I may ask you to meet with me and explain your work verbally in your own words.

Any work where you draw on the ideas of others should include citations and a works cited page. Citations are important to give credit to others for ideas or text that is not your own, but also because they allow your reader to track where your research fits into a broader scholarly conversation and where they can turn for more information about a topic, idea, or method. If you are unsure of how to use citations for an assignment, please contact me or raise the question in class.

You may not engage in unauthorized collaboration on assignments. Each assignment will specify whether collaboration is permitted and, if so, what kind. You should be particularly cautious about websites that advertise themselves as "tutoring websites." It is not permissible to upload any instructor materials to these sites without permission or to copy material for your homework assignments from these sites.

This policy is in compliance with, and supplements, the University and Department scholastic dishonesty policies. As stipulated by University policy,

instructors are obligated to report all incidents of scholastic dishonesty to the Office for Community Standards. The Board of Regents Policy: Student Conduct Code defines scholastic dishonesty and provides a full description of prohibited conduct. For additional resources on avoiding scholastic dishonesty, see the Office for Community Standards website.

For specific guidance on using AI tools appropriately in this course, see the Generative AI Policy section below.

Generative AI Policy

Why This Matters for Your Learning In this course, you will develop skills in programming, statistical thinking, and research design. Even in a world where AI tools are ubiquitous, you need to understand the logic of data analysis and programming to use these tools effectively. Just as you can't effectively use a calculator if you don't understand basic mathematics, you can't use AI effectively for data analysis if you don't understand what good code looks like, what statistical tests are appropriate, or how to interpret results. More fundamentally, learning to think like a programmer and a data scientist—even if you never program again—develops habits of logical thinking and problem-solving that are valuable throughout your life and career.

This course is designed to help you develop these skills through practice. The paper-based exams (completed without electronic devices) will test whether you've actually learned these skills, not whether you can use AI tools. Students who rely on AI to complete their lab assignments without actually learning the material will struggle on the exams.

The "Always-On Teaching Assistant" Approach Think of AI tools as an always-available teaching assistant who can help you learn, but who shouldn't do your work for you. A good teaching assistant helps you understand concepts when you're confused, talks through problems when you're stuck, and helps you understand errors when your code isn't working. A good teaching assistant does not just tell you what to type, write your code for you, or complete your assignments.

Recommended Tool: Google Gemini with Guided Learning Mode The University provides access to Google Gemini through your UMN login at gemini.google.com (make sure to sign into your UMN Google account before using Gemini). Gemini includes a "guided learning" mode specifically designed to help you learn rather than simply giving you answers. When using AI for this course, I strongly recommend that you use Gemini's guided learning mode. This mode will ask you questions, prompt you to think through problems, and help you understand concepts rather than just providing solutions.

You may use other AI tools, but be aware of data privacy concerns (see below) and remember that using tools that simply provide answers rather than helping

you learn are likely to lead you to do poorly in this class, and also more likely to lead you to violate this policy inadvertently.

You may use AI as a learning tool when:

- **Understanding concepts:** Ask AI to explain statistical concepts, research design principles, or programming logic that you don't understand, but only after reviewing course materials and struggling to understand on your own. If you tentatively think that you "get it," you may use AI to check your understanding.
- **Debugging assistance:** When you encounter errors in your code, you should first try to debug these on your own. This will be a struggle—moderate levels of struggle are good, as they indicate that you are learning. Try to understand what the error message means, review your code carefully, check the course materials, and experiment with potential solutions. Only after you've genuinely tried to solve the problem yourself should you use AI to help understand the error. Doing so effectively will involve asking AI to explain the problem and guide you to a solution, not just asking AI for a solution.
- **Exploring ideas:** Use AI as a conversation partner to refine your research questions, discuss approaches to analysis, or think through methodological choices.
- **Clarifying confusion:** Ask AI to provide additional examples or explanations of material from lectures or readings.

You may not use AI to:

- **Generate code or analysis for submission:** Having AI write your code, generate your statistical analyses, or produce your interpretations for lab assignments or projects is prohibited.
- **Complete assignments:** Turning in AI output as your own work—even if you modify it slightly—without truly understanding it violates this policy.
- **Bypass the learning process:** If you find yourself using AI to get through an assignment quickly rather than to understand the material deeply, you're using it inappropriately.
- **Skip the struggle:** Drafting code, debugging, and problem-solving are core learning experiences in this course. Immediately turning to AI when you encounter an error prevents you from developing crucial problem-solving skills.

The Standard for Assignments: Can You Explain It? You must be able to verbally explain any work you submit. If I ask you to walk me through your code in office hours, explain why you chose a particular statistical test, or interpret your results, you should be able to do so clearly and in your own words.

If you cannot explain work you've submitted, that suggests you've used AI (or other resources, such as a roommate or online "tutoring service") inappropriately.

I reserve the right to ask students to explain their work verbally. The ability to explain your work is fundamental to actually understanding it.

Best Practices When Using AI When you use AI tools to help you learn (in the allowed ways described above):

1. **Keep notes of your learning process:** If you use AI to help debug code or understand a concept, make notes about what you learned. This helps reinforce your learning and provides documentation if questions arise.
2. **Understand before implementing:** Never include AI-generated code or analysis in your work unless you fully understand what it does and why. If you can't explain it, don't submit it.
3. **Struggle first:** Before turning to AI for help, make a genuine effort to solve problems yourself. The struggle is where learning happens.

Data Privacy and Copyright

- **Never input sensitive or private information** into AI tools. This includes personally identifiable information, protected research data, or private information about yourself or others.
- **Course materials and other copyrighted materials:** You may use my course materials created by me (e.g. lecture slides) with AI tools to help your learning. However, you may not upload other copyrighted materials (such as textbook excerpts, journal articles, or other readings) or other students' work (your classmates' code, project work, or discussion posts) to AI tools without explicit permission from the copyright holder or the student.
- **Be aware of AI limitations:** AI tools can generate false, misleading, or biased outputs and may reproduce copyrighted materials. You are responsible for verifying the accuracy of any AI-generated information.

Connection to University Policies Using AI to complete assignments rather than to learn—or submitting AI-generated work you cannot explain—constitutes scholastic dishonesty under University policy. Violations will be handled according to University procedures and reported to the Office for Community Standards.

When in Doubt, Ask This policy aims to support your learning while maintaining academic integrity. If you're unsure whether a particular use of AI is appropriate, assume it is not allowed and consult me before proceeding. I'm happy to discuss specific situations and help you think through how to use AI tools appropriately for learning.

The AI landscape is evolving rapidly, and this policy may be updated during the semester. Any changes will be announced in class and via the course email address.

Communication and Office Hours

If you have questions about the course I much prefer face-to-face discussions (over Zoom or in person) to email. Face-to-face conversation is a much more effective way to communicate, and I appreciate knowing students as more than their email addresses. Please come talk to me before or after class, or during office hours.

You do not need an appointment or permission to stop into office hours – my door (and Zoom room) is open. If you know in advance that you will be attending my office hours, you can schedule an appointment at calendly.com/cdmyers. Regular office hours may not be convenient for you, so I'm also happy to meet with you by appointment. Just ask before or after class or, if necessary, over email, and we can arrange a time to meet.

If you do need to email us, please use the course email address pol3085fall2026@umn.edu for all course-related communication. This allows Nick and me to both respond to your emails, which should allow for quicker responses. We will respond to all emails within 24 hours, except on weekends. Though we will respond as quickly as possible, we cannot guarantee that we will respond to any email faster than 24 hours after it is sent. Please keep this in mind as deadlines approach.

I will make most announcements about class logistics at the start of the class period. Occasionally, I will communicate these announcements or details of these announcements over email. You must check your campus email every weekday. You are responsible for any information that I communicate at the start of the class period as well as information that I pass along via email. I do not use Canvas messages or announcements for communication and am unlikely to see messages sent over Canvas.

Attendance Policy

While I do not formally take attendance, completing the in-class exercises that the participation grade is based on requires being in class. More broadly, doing well in this class requires regular attendance—students who do not regularly attend class do less well on exams and projects. If you will not be able to attend class regularly, you should drop this course immediately. For details on excused absences, see the Extensions and Late Work section below.

Extensions and Late Work

Students may only make up work if their absence is excused under the University's policy on Excused Absences and Makeup Work. This policy applies to all course

assessments including lab assignments, exams, and project components.

Notification Requirements: Students must notify me of circumstances causing them to miss a scheduled class meeting or assignment deadline and must provide information to explain the absence. Students must provide required notification prior to the missed class meeting or deadline when the circumstance allows for advanced notice. When circumstances are sufficiently urgent that advanced notification is not possible, students must notify me as soon as reasonably possible. Please send all communication regarding excused absences to the course email address.

Verification: I may request verification documentation that is appropriate for the circumstances. For health-related absences, students should submit the University self-report form as documentation.

For complete details on excused circumstances, makeup work arrangements, and appeals processes, please see the Administrative Policy on Excused Absences and Makeup Work.

Lab Assignments: All lab assignments are due on the dates listed on Canvas. Note that lab assignments that are turned in before the due date will receive comments and can then be resubmitted with corrections – only the final version turned in will be graded. If you miss the deadline for a lab assignment, you turn it in late and receive half-credit. If the request is for circumstances covered by the University's Excused Absences policy you will receive full credit, provided that you complete the assignment by a mutually agreed upon deadline.

Barring multiple group members encountering challenges covered by the University's Excused Absences policy, deadlines for group projects will not be extended.

The dates of the exams will only be changed for cases covered by the University's Excused Absences and Makeup Work policy.

Students are encouraged to plan ahead of time to assure their assignments are done on time, because each assignment builds on the previous assignment, and late assignments can easily pile up.

Anxiety, Panic, and Withdrawing/Disappearing

Every semester a handful of students get behind on their work for some reason, panic, conclude they will fail and/or cannot get a good grade, and either withdraw or disappear entirely without withdrawing. Even the worst of mistakes within a semester usually doesn't mean there's no way to pass the class. If at any point in the semester you end up feeling like this, please email me or come talk to me in office hours and we can assess how you are doing and try to come up with a plan to make the rest of your semester successful and manageable. You do not have to tell me why you fell behind and you don't need to defend yourself. I am here to help you, not to judge you. I want all of you to succeed, but I can't help you if you withdraw and/or disappear without talking to me.

Grade Disputes

Clarifying questions about grades should be directed to me. You must wait 24 hours after receiving a grade before seeking clarification about the grade. If, after seeking clarification, you feel that a grading decision is incorrect, you may appeal in writing (minimum one paragraph). Your appeal should specify what the grading decision was, why you feel it was incorrect, why your answer was correct, and what you feel an appropriate grade is. If asked to re-grade a question, I reserve the right to raise or lower the original grade. All grade appeals must be made within two weeks of an assignment being returned.

University Policies

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical, mental health, or safety of members of the University community.

As a student at the University, you are expected to adhere to the Board of Regents Policy: Student Conduct Code. Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach and/or a student's ability to learn." The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities.

Scholastic Dishonesty

As students in a university community, you are expected to do your own academic work, and to cite sources of knowledge that you draw on in completing your assignment and other academic work. Failing to do so is scholastic dishonesty, which includes: plagiarism; cheating on assignments or examinations, including the unauthorized use of online learning support and testing platforms; engaging in unauthorized collaboration on academic work, including the posting of student-generated coursework on online learning support and testing platforms not approved for the specific course in question; taking, acquiring, or using test materials without faculty permission, including the posting of faculty-provided course materials on online learning support and testing platforms; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University

academic record; or fabricating or falsifying data, research procedures, or data analysis.

When it is determined that a student has cheated, the student may be given an "F" or an "N" for the course, and may face additional sanctions from the University. See section F of the Administrative Policy on Instructor and Unit Responsibilities.

Additional resources pertaining to academic integrity can be found through the Office for Community Standards and the Center for Educational Innovation.

Beware of websites that advertise themselves as being "tutoring websites." It is not permissible to upload any instructor materials to these sites without their permission or copy material for your own homework assignments from these various sites. When you have additional questions and concerns, please speak with or email your instructor to clarify practices expected for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class, for example, when and whether collaboration on assignments is permitted, when citing sources is required and what citation method to use, or when and which electronic aids are permitted or prohibited during an exam.

As stipulated by University policy, instructors are obligated to report all incidents of scholastic dishonesty to the Office of Community Standards.

If you have additional questions, please ask me or the TA. In particular, if you are at all in doubt about whether a particular action constitutes scholastic dishonesty, please contact me. I would much rather have a conversation before any potential scholastic dishonesty than after, and I will not penalize in any way questions raised about the scholastic dishonesty policy so long as they are raised **before** the potential scholastic dishonesty occurs.

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information and more importantly of personally recording, integrating, and connecting information as part of your educational experience. However, broadly disseminating class notes beyond the current classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see item 6 of the Administrative Policy on Student and Learning Responsibilities.

Grading and Transcripts

The University utilizes plus and minus grading on a 4.000 cumulative grade point scale. The two grading systems used are the ABCDF and S-N. Political science majors and minors must take POL courses on the

ABCDF system. An S grade is the equivalent of a C- or better. Inquiries regarding grade changes should be directed to the course instructor. Extra work in an attempt to raise a grade can only be submitted with the instructor's approval. For additional information, please refer to: policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html.

Incompletes

The instructor will specify the conditions, if any, under which an "Incomplete" will be assigned instead of a grade. No student has an automatic right to an incomplete.

Department of Political Science Policy: The instructor may set dates and conditions for makeup work using a "Completion of Incomplete Work" contract form. All work must be completed no later than one calendar year after the official last day of the class.

Sexual Harassment, Sexual Assault, Stalking and Relationship Violence

The University prohibits sexual misconduct, and encourages anyone experiencing sexual misconduct to access resources for personal support and reporting. If you want to speak confidentially with someone about an experience of sexual misconduct, please contact a confidential resource on your campus. If you want to report sexual misconduct, or have questions about the University's policies and procedures related to sexual misconduct, please contact your campus Title IX office or relevant policy contacts. For additional information on reporting misconduct, please see the EOT page on Reporting Concerns.

Instructors are required to share information they learn about possible sexual misconduct with the campus Title IX office that addresses these concerns. This allows a Title IX staff member to reach out to those who have experienced sexual misconduct to provide information about personal support resources and options for investigation. You may talk to instructors about concerns related to sexual misconduct, and they will provide support and keep the information you share private to the extent possible given their University role. For additional information, please see the Administrative Policy on Sexual Harassment, Sexual Assault, Stalking and Relationship Violence.

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: https://eoaa.umn.edu/policies.

Disability Accommodations

The University of Minnesota is committed to creating learning environments that are inclusive and accessible to all students. If you are experiencing disability-related barriers to learning in your courses, the Disability Resource Center (DRC) is the office that collaborates with students to explore reasonable accommodations, tools, and resources.

- If you are registered with the DRC and have a current accommodation letter please share your letter with your instructor as soon as possible to start a discussion about how your accommodations will be implemented in this course. The sooner your instructor knows about your disability access-needs, the more equipped they can be to facilitate accommodations. You may reach out to the instructor or your access consultant/disability specialist if you have any questions or concerns about your accommodations.
- If you are not registered with the DRC and are experiencing or think you may be experiencing disability related to a mental health, attention, learning, chronic health, sensory, or physical condition, and would like to discuss accommodations and/or resources, please contact the DRC (Twin Cities campus: 612-626-1333).
- If you have a short-term medical condition, such as a broken arm, your instructor may be able to assist in minimizing classroom barriers. In situations where additional assistance is needed, you should contact the DRC as noted above.

For additional information, please see the DRC website: https://disability.umn.edu/.

Mental Health and Stress Management

As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: https://mentalhealth.umn.edu.

As an instructor/University community member, we care about the wellbeing of students. If health, safety, or mental health concerns are conveyed, we may consult with campus support offices to provide support and resources to a student.

Academic Freedom and Responsibility

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

Students are responsible for class attendance and all course requirements, including deadlines and examinations. The instructor will specify if class attendance is required or counted in the grade for the class.

Health and Safety

The University of Minnesota is committed to maintaining a healthy and safe environment for students. Information about policies, procedures, and emergency plans can be found at University Health and Safety or the Department of Emergency Management.

Course Schedule

September

Wednesday, September 9: Introduction to the Course Learning Objectives:

- Understand the goals and structure of the course
- Know what you will need to do to succeed in the class
- Get R and RStudio up and running on your computer

Reading:

- This syllabus
- Sumner, Chapters 1 and 3
- Anthropic. 2026. "How AI Assistance Impacts the Formation of Coding Skills." https://www.anthropic.com/research/AI-assistance-coding-skills
- Graham, Paul. 2024. "Writes and Write-Nots." *paulgraham.com*. https://www.paulgraham.com/writes.html

Optional Reading:

- Kotran, Alex. 2025. "Writing is thinking. What about co-writing with AI?" *Substack*. https://alexkotran.substack.com/p/writing-is-thinking-so-should-kids (A more in-depth argument about writing and thinking)
- Bassner, Patrick, Ben Lenk-Ostendorf, Ramona Beinstingel, Tobias Wasner, and Stephan Krusche. 2026. "Less Stress, Better Scores, Same Learning: The Dissociation of Performance and Learning in AI-Supported Programming Education." *Computers and Education: Artificial Intelligence* 10. https://www.sciencedirect.com/science/article/pii/S2666920X25001778 (More on why AI can raise your assignment scores without teaching you anything)

Lab: Setting Up R and RStudio

Assignment: Lab Assignment 0 - Setting Up R (due Monday, September 14, 5:00 PM)

Monday, September 14: Concepts and Theories Learning Objectives:

- Understand what political scientists mean when they talk about theories and hypotheses
- Understand what inference is, and the difference between descriptive and causal inference
- Understand what a concept is and the central role concepts play in theories, hypotheses, and inference

Reading:

- Sumner, Chapter 2
- Jenkins-Smith and Ripberger, Chapter 1.1 and 1.2

Assignment: Write and bring to class three paragraphs, each describing a question that interests you and that you might try to answer in a research project.

Wednesday, September 16: Operationalization and Hypotheses Learning Objectives:

- Understand how to turn a theoretical concept into a measurable variable by operationalizing it
- Learn how to formulate testable hypotheses

Reading:

- Sumner, Chapters 4 and 5
- Review Jenkins-Smith and Ripberger, Chapter 1.2.2 and 1.2.3

Lab: Calculating, Objects, and Debugging

Assignment: Lab Assignment 1 - Calculating, Objects, and Debugging (due Monday, September 21, 5:00 PM)

Monday, September 21: Measurement and Data Learning Objectives:

- Know the basics of different levels of measurement
- Understand the role of validity and reliability in measurement
- Learn what data looks like in a dataset

Reading:

- Review Jenkins-Smith and Ripberger, Chapter 1.2.1
- Gubitz, "Data" (Chapter 4 from *Empirical Methods in Political Science: An Introduction*), Sections 4.2, 4.3, and 4.5: https://nulib-oer.github.io/empirical-methods-polisci/data.html
- Pew Research Center. "Writing Survey Questions." https://www.pewresearch.org/writing-survey-questions/

Wednesday, September 23: Survey Design in Qualtrics Learning Objectives:

- Learn the basics of programming surveys using Qualtrics

Reading:

- Sumner, Chapter 6 and 7.1-7.3

Preparation:

- Set up Qualtrics Account through U: https://it.umn.edu/services-technologies/qualtrics
- Work through some of the Qualtrics training materials: https://it.umn.edu/services-technologies/self-help-guides/qualtrics-create-customize-manage

Lab: Functions and Packages

Assignment: Lab Assignment 2 - Functions and Packages (due Monday, September 28, 5:00 PM)

Monday, September 28: Causal Inference Learning Objectives:

- Understand what a causal inference is
- Understand why establishing causation is difficult
- Learn about the potential outcomes framework

Reading:

- Jenkins-Smith and Ripberger, Chapter 2.1-2.4
- (C) Gerber and Green, *Field Experiments*, Chapter 1 (Read from the start of the chapter to Section 1.3, skim Sections 1.4 to end)

Wednesday, September 30: Experimental Design Learning Objectives:

- Understand why experiments are particularly well suited to drawing causal inferences
- Know the basics of how to conduct a survey experiment

Reading:

- Gubitz, "Experiments" (Chapter 7 from *Empirical Methods in Political Science: An Introduction*): https://nulib-oer.github.io/empirical-methods-polisci/experiments.html

Lab: Optional catch-up and synthesis

October

Monday, October 5: EXAM 1 Covers: Concepts and theories, operationalization and hypotheses, measurement and data, survey design, causal inference, and experimental design

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Wednesday, October 7: Project Work Day — Experimental Design Learning Objectives:

- Program your own survey experiment that manipulates your independent variable of interest and then measures the effect of this experimental manipulation on your dependent variable of interest

Reading:

- Sumner, Chapter 7 (rest of chapter) and Chapter 8

Preparation: Bring the plan for your survey experiment to class

Lab: Working with Data and Recoding Variables

Assignment: Lab Assignment 3 - Working with Data and Recoding Variables (due Monday, October 12, 5:00 PM)

Monday, October 12: One-Variable Descriptive Statistics Learning Objectives:

- Learn commonly used descriptive statistics for summarizing individual variables
- Understand when to use descriptive statistics meant for continuous variables and when to use descriptive statistics meant for ordinal or nominal variables

Reading:

- Jenkins-Smith and Ripberger, Chapter 3
- Sumner, Chapter 10 (Start of Chapter to 10.6)

Wednesday, October 14: Two-Variable Descriptive Statistics Learning Objectives:

- Learn commonly used descriptive statistics for summarizing the relationship between two variables

Reading:

- Sumner, Chapter 10 (10.6-end of chapter)
- Jenkins-Smith and Ripberger, Chapter 6

Lab: Summary Statistics

Assignment: Lab Assignment 4 - Summary Statistics (due Monday, October 19, 5:00 PM)

Monday, October 19: Data Visualization Learning Objectives:

- Understand common ways to summarize variables, and the relationships between variables, graphically

Reading:

- Sumner, Chapter 12

Wednesday, October 21: Drawing Inferences about Populations from Samples Learning Objectives:

- Understand what it means for a sample to be random and why this is important for statistical inference

- Understand how probability provides the foundation for drawing inferences about populations

Reading:

- Jenkins-Smith and Ripberger, Chapter 4 and Chapter 5.1

Lab: Data Visualization

Assignment: Lab Assignment 5 - Data Visualization (due Monday, October 26, 5:00 PM)

Monday, October 26: Uncertainty of Our Inferences Learning Objectives:

- Understand the properties of the normal distribution and why it is central to statistical inference
- Learn what a sampling distribution is and how the Central Limit Theorem tells us that sample means are normally distributed
- Understand why this property allows us to quantify how uncertain we are about inferences drawn from samples

Reading:

- Jenkins-Smith and Ripberger, Chapter 5.2

Wednesday, October 28: Confidence Intervals Learning Objectives:

- Understand what a standard error is and how it relates to the sampling distribution
- Learn how to construct and interpret a confidence interval
- Understand the basic logic of using measures of uncertainty to test claims about populations

Reading:

- Jenkins-Smith and Ripberger, Chapter 5.3

Lab: Catch up and synthesis

November

Monday, November 2: Hypothesis Testing Learning Objectives:

- Understand what a null hypothesis and an alternative hypothesis are
- Know the difference between one-sided and two-sided hypothesis tests
- Know how to test the difference between groups using a t-test for continuous variables or a chi-squared test for categorical variables

Reading:

- Jenkins-Smith and Ripberger, Chapter 5.4 and Review 6.1
- Sumner, Chapter 13

Wednesday, November 4: Mid-Semester Catch-up / Make-up Day No new lecture content today — this session is held open for catch-up and make-up work.

Lab: Chi-squared and t-tests

Assignment: Lab Assignment 6 - Chi-squared and t-tests (due Monday, November 9, 5:00 PM)

Monday, November 9: EXAM 2 Covers: Descriptive statistics, data visualization, sampling distributions, uncertainty, confidence intervals, and hypothesis testing

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Wednesday, November 11: Project Work Day — Experimental Data Analysis Learning Objectives:

- Analyze your experimental data
- Prepare your experimental results section

Lab: Wrangling Data

This lab covers accessing, loading, and understanding datasets from major survey sources. Students will learn to:

- Access and download data from the American National Election Studies (ANES), General Social Survey (GSS), and other publicly available datasets
- Read and interpret codebooks and data documentation
- Load external datasets into R
- Understand variable coding and missing data conventions
- Create documentation for your own data analysis

Assignment: Lab Assignment 7 - Wrangling Data (due Monday, November 16, 5:00 PM)

Assignment: Experimental Project (due Friday, November 13, 5:00 PM)

Monday, November 16: Bivariate Linear Regression Part 1 Learning Objectives:

- Understand the logic of linear regression and how it allows us to summarize the relationship between two variables
- Be able to interpret a regression coefficient
- Understand what confounders are, why they are a problem for observational designs but not experimental designs, and how we manage them in observational research

Reading:

- Huntington-Klein, "Identification" (Chapter 5 from *The Effect: An Introduction to Research Design and Causality*), Sections 5.1 and 5.3-5.5: https://theeffectbook.net/ch-Identification.html
- Jenkins-Smith and Ripberger, Chapter 7

Wednesday, November 18: Bivariate Linear Regression Part 2 Learning Objectives:

- Understand how we measure uncertainty in linear regression models and how to interpret these measures of uncertainty

Reading:

- Jenkins-Smith and Ripberger, Chapter 9
- Sumner, Chapter 14.1-14.3

Lab: Bivariate Linear Regression

Assignment: Lab Assignment 8 - Bivariate Linear Regression (due Monday, November 23, 5:00 PM)

Monday, November 23: Multiple Linear Regression Part 1 Learning Objectives:

- Expand the logic of bivariate linear regression to the multiple regression case
- Be able to interpret a regression table

Reading:

- Jenkins-Smith and Ripberger, Chapter 12

Wednesday, November 25: NO CLASS No class — the Wednesday before Thanksgiving break.

Thursday-Friday, November 26-27: THANKSGIVING BREAK No class.

Monday, November 30: Multiple Linear Regression Part 2 Learning Objectives:

- Learn the assumptions underlying the multiple linear regression model and how these assumptions allow us to interpret the results of our model in a causal manner
- Discuss how to carefully build models that test our hypotheses while accounting for confounders

Reading:

- Jenkins-Smith and Ripberger, Chapter 13 and review 12.1.1
- Sumner, Chapter 14.4

December

Wednesday, December 2: Project Work Day — Observational Study Learning Objectives:

- Design your observational study project
- Develop a plan to answer your research question using data from the GSS

Lab: Multiple Linear Regression

Assignment: Lab Assignment 9 - Multiple Linear Regression (due Monday, December 7, 5:00 PM)

Monday, December 7: Interaction Terms Learning Objectives:

- Understand what an interaction term is and when to include one in a regression model
- Learn how to interpret coefficients in a model that includes an interaction term

Reading:

- Jenkins-Smith and Ripberger, Chapter 14

Wednesday, December 9: Model Diagnostics Learning Objectives:

- Learn important regression diagnostics and what they tell us about our models
- Understand the consequences of failing to meet the assumptions of the linear regression model

Reading:

- Jenkins-Smith and Ripberger, Chapter 10
- Sumner, remainder of Chapter 14

Lab: Presenting and Interpreting Linear Regression Results

Assignment: Lab Assignment 10 - Presenting and Interpreting Linear Regression Results (due Monday, December 14, 5:00 PM)

Monday, December 14: EXAM 3 Covers: Observational research design and linear regression (bivariate and multiple)

Wednesday, December 16: Final Exam Review / Make-up Session Review session for the cumulative final exam.

Last day of instruction.

Assignment: Observational Project (due today, 5:00 PM)

Final Exam: Saturday, December 19, 10:30 AM – 12:30 PM Location: [TBD]

Cumulative exam covering all course material.

Course Structure Summary

Component	Count
Topic Lectures	20
Exams (during semester)	3
Final Exam	1

Component	Count
Project Work Days	3
Mid-Semester Catch-up/Make-up Day	1
Structured Labs	11
Optional Catch-up Labs	2

Important Dates Summary

Date	Event
September 7	Labor Day (no class)
September 9	First day of class
October 5	Exam 1
November 4	Mid-semester catch-up/make-up day
November 9	Exam 2
November 13	Experimental Project Due
November 25	No class (Wednesday before Thanksgiving)
November 26-27	Thanksgiving Break
December 2	Observational Study Project Work Day
December 14	Exam 3
December 16	Last day of instruction; Final Exam Review; Observational Project Due
December 19	Final Exam, 10:30 AM – 12:30 PM

This syllabus is subject to change. Any changes will be announced in class and posted to Canvas.