

# POLS 8501: Advanced Quantitative Methods I

Course information	Instructor information
Fall 2024	dwhill@uga.edu
Wednesday, 4:10 p.m.–6:55 p.m.	Office hours: By appointment
Baldwin 104	Office: 319 IA Building

## Course Description

This course presents students with an overview of regression analysis as it is commonly used in political science. The emphasis of the course is on models where the traditional assumptions of ordinary least-squares regression are violated because the dependent variable is non-continuous. The course focuses on maximum likelihood estimation of various models for discrete response variables, including binary, ordered, and nominal variables, event counts, and duration times. Despite the course title, the models covered are among the most widely used in political science today. It is very difficult to produce or consume quantitative research in political science without some familiarity with these models. While course readings provide clear presentations of the models, much of the material in this course is technical and will require several readings (and hands-on experience) to fully comprehend. Because reading books and articles and attending lectures is not sufficient to learn how to perform statistical analysis competently, students will be required to complete lab exercises during several weeks. Special attention will be given to estimation and post-estimation analysis using the statistical software program R. Students will apply various models to different sets of data in a series of computer lab assignments, and to data relevant to their own area of specialization in a final paper to be submitted at the end of the semester.

## Required Texts

Ward, Michael D. and John Ahlquist. 2018. *Maximum Likelihood for Social Science*. New York: Cambridge University Press.

Long, Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications. (I will provide an electronic copy)

## Grades

Your grades will be based on lab assignments, a final paper, and class attendance/participation. Your final grade will be determined as follows:

Lab assignments (5): 40%

Final paper: 60%

Grade Distribution:

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90-100: A	80-89: B	70-79: C
60-69: D	59 and below: F	

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## Lab Exercises/Homework Assignments

Students will complete 5 lab assignments throughout the semester. The assignments will require students to use the statistical software program R, which is open-source and completely free. We will spend a lot of time in class going through example code, and I will meet with the class via zoom once per week (time TBA) to answer any questions you have about assignments. Assignments are due Tuesday by 5 p.m. the week after they are assigned.

## Final Paper

For your final paper, you are expected to write a high-quality paper that could be presented at a professional conference. The paper can be on any topic in political science but must include a *complete* analysis using one of the techniques covered in this course. This means your research question must be amenable to off-the-shelf data (that you could download right now), assuming you have not collected relevant data yourself before the course begins. For this project you are strongly encouraged to extend/finish seminar papers or other projects you have already begun. You may also use a paper you are writing for another seminar in which you are currently enrolled, though you must get approval from the instructor of that course.

There are a few dates you need to remember with respect to the final paper. You must submit to me via email a 1-2 page paper proposal by Friday, September 13th. The proposal should outline your research question, argument, and the analysis you plan to conduct. I will then set up individual meetings with each of you to discuss your paper proposals. By Friday, October 18th you must submit a rough draft of the *research design* portion of your paper, meaning everything except the analysis. Your research design draft should include a description of the data you plan to analyze. I will again set up individual meetings to discuss progress on your final paper and any problems you might be encountering with your analysis. These meetings will be scheduled between November 4th and 15th. All analysis must be conducted in R, and students must submit replication files (a script and a data file) along with their papers. Final papers are due December 5th by 5 p.m.

## Course Website and Email

Can be accessed through [www.elc.uga.edu](http://www.elc.uga.edu). You will need to check this site regularly for any syllabus updates or for posted readings. Announcements may also be sent out via email. It is your responsibility to check ELC for syllabus updates.

## Syllabus Change Policy

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

## Students with Disabilities

Students with disabilities who require reasonable accommodations in order to participate in course activities or meet course requirements should contact the instructor or designate during regular office hours or by appointment.

## University Honor Code/Academic Honesty Policy

As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at [www.uga.edu/honesty](http://www.uga.edu/honesty). Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

## Withdrawal Policy

Students who withdraw from the class before the withdrawal deadline are assigned a grade based on their performance (pass/fail) in the class up the point of withdrawal. This means that students who are failing will be assigned a "WF" grade even if they withdraw before the deadline. Students who withdraw from the class after the withdrawal deadline are automatically assigned a "WF" grade upon withdrawal.

## Course Schedule

### **Aug 14: Course overview, introduction to R**

No reading.

### **Aug 21: More intro to R**

No reading.

### **Aug 28: Linear model review**

Long, p. 1–25.

Lab 1 due Tuesday, Sep 3.

### **Sep 4: Maximum likelihood estimation**

Ward and Ahlquist, ch. 1–2.

Long, p. 25-33, ch. 4.

**Sep 11: Models for binary response variables**

Ward and Ahlquist, ch. 3.

Long, ch. 3.

Paper proposals due Friday, Sep 13.

**Sep 18: Model evaluation and interpretation in R**

Ward and Ahlquist, ch. 6–7.

Lab 2 due Tuesday, Sep 24.

**Sep 25: Models for ordered response variables I**

Ward and Ahlquist, ch. 8.

Long, ch. 5.

**Oct 2: Models for ordered response variables II**

Ward and Ahlquist, ch. 8.

Long, ch. 5.

**Oct 9: Models for nominal/unordered response variables**

Ward and Ahlquist, ch. 9.

Long, ch. 6.

Lab 3 due Tuesday, Oct 15.

**Oct 16: Models for event counts I**

Ward and Ahlquist, ch. 10.

Long, ch. 8.

Research design draft due Friday, Oct 18.

**Oct 23: Models for event counts II**

Ward and Ahlquist, ch. 10.

Long, ch. 8.

Lab 4 due Tuesday, Oct 29.

**Oct 30: Models for durations I**

Ward and Ahlquist, ch. 11.

**Nov 6: Models for durations II**

Ward and Ahlquist, ch. 11.

Lab 5 due Tuesday, Nov 12.

**Nov 13: Final paper meetings**

No class meeting, I will meet with each of you individually.

**Nov 20: Model fit, validation, and prediction**

Ward and Ahlquist, ch. 5.

Ward, Greenhill, and Bakke. 2010. "The Perils of Policy by p-value." *Journal of Peace Research* 47(4): 363–375

**Nov 27: Analyzing grouped/panel data**

Green, Kim, and Yoon. 2001. "Dirty Pool." *International Organization* 55(2): 441–468

Clark and Linzer. 2015. "Should I Use Fixed or Random Effects?" *Political Science Research and Methods* 3(2): 399-408

Final paper due Thursday, Dec. 5, 5 p.m.