Course description
This seminar is a survey of maximum likelihood (ML) methods and their applications to empirical political questions. The course focuses on understanding the conditions when the assumptions of ordinary least squares (OLS) regression are violated, the principles of maximum likelihood estimation, and what models are appropriate given observed data. This seminar centers on the use and interpretation of ML and on linking theory to statistical models.

The models covered in this course are widely used in political science today. To engage with other researchers' quantitative empirical work it is necessary to be able to understand and evaluate it. This course covers a number of different models—some of which will be more of use to you than to others. This course enables students to explore models suited to the nature of their data in detail and use these models to replicate and extend current research.

Class meetings
This class meets Thursdays from 6pm to 8:45pm. Reading the assigned readings prior to class is essential as is attendance, attentiveness, and finishing assignments on time.

Student learning objectives
After successfully completing this course, students will be able to understand the principles of maximum likelihood estimation including its assumptions and various models appropriate to different types of observed data. Further, students will be able to use ML in their own work and interpret and evaluate the works of others.

Course requirements
Participation is essential to a successful seminar as is an engagement with the material. Your course grade will be determined by three components:

- 20% Discussion and participation
- 20% Homework
- 30% Class notes (2 sets, each worth 15%)
- 30% Replication paper (15-25 pages)

Discussion and participation
To do well in this class (like any graduate-level class) it is necessary to actively participate in class discussion. It should go without saying that attendance is a necessary condition for participation. Attendance is mandatory.
Homework
Over the course of the semester, I will hand out several homework assignments that complement the course material. While I focus in class on the intuition and math behind a specific model, actually getting your hands dirty and trying your hand at the math and running models is the best way to make the knowledge your own and tie what we have learned in class to your own research.

Assignments must be turned in at the beginning of class the week after they are given out. I have no specific requirements for the format of your answers, but completeness and legibility are essential. I do recommend that you learn how to use a statistical software package. These are useful skills necessary to do your own research and submit your writing for publication. The sooner you learn how to use statistical software the easier it will be to create presentable research reports.

I will use Stata in my presentations and in creating the handouts. R is another (free) alternative. Since I am much more conversant in Stata I will be using it to teach this course. It is available in the political science computer lab, and I have signed up this class for a Course GradPlan, which allows us a discounted price for a personal copy of Stata.

Class notes
You will also be required to pair up with another student to write two sets of class notes over the course of the semester. Your notes should address the model’s theory, the math behind it, and then apply this model to an empirical application of interest to you. They should also include your interpretation of the empirical results. In the first two weeks of class, you will be asked to choose the weeks you would like to write on and the partner you will work on a particular set of notes with.

Replication paper
Your final assignment is a replication paper. By week 9 you will chose an article (or book chapter) in political science that has been published in the last few years to replicate. The finished replication paper is due on the last day of class. The goal is to familiarize you with the numerous (often-unstated) assumptions researchers make and allow you to critique them and run additional models loosening these restrictions. Indeed, a number of graduate students have turned replication papers into published journal articles.

Academic Integrity
Academic integrity is fundamental to the process of learning and evaluating academic performance. Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, tampering with academic records and examinations, falsifying identity, and being an accessory to acts of academic dishonesty. Refer to the UNO Judicial Code for further information.

The Code is available online at: http://studentaffairs.uno.edu/pdfs/AcademicDishonestyPolicy.pdf.

You will submit a digital copy of your replication paper to Turnitin software, which traces whether sentences originate in other works. If there is evidence of plagiarism, it will be punished to the fullest extent possible. Neither ignorance of what constitutes plagiarism nor a lack of intent to plagiarize are not acceptable defenses.

Moodle
Moodle is a useful tool that will be used extensively for this course for announcements and posting grades. During the course I will make readings, homework, and data available in the Documents section. I also have a number of links to useful resources for research and writing on my website: http://richardwfrank.com.
Accommodations for Students with Disabilities
Students who qualify for services will receive the academic modifications for which they are legally entitled. It is the responsibility of the student to register with the Office of Disability Services (UC260) each semester and follow their procedures for obtaining assistance.

Assigned Readings
There are five assigned books available from the UNO Bookstore or from online booksellers. Online stores are usually significantly cheaper, but you need to plan ahead so as to receive them in time to read them and discuss them in class. These books are important for this class, but they will also serve as useful reference books for your future research.

In addition to these books, I have assigned a number of scholarly journal articles. All articles are available through Moodle, the library’s website, or through Google Scholar. If you have any questions about accessing e-journals, please let me know.

Required


Recommended but optional
The following books are also reference works that you will find useful, but that are not required for this course.


READING SCHEDULE

This reading list is subject to change. Updates to this syllabus will be posted on Moodle. All readings listed below are required readings and must be completed before the start of class.

Week 1  Aug. 23  Introduction/Review

Week 2  August 30  No Class—APSA

Week 3  Sept. 6  OLS, Time Series Review/Intro to Likelihood Inference
- King 1998: Ch. 1-2
- Long 1997: Ch. 1-2

Week 4  Sept. 13  Introduction to Likelihood Inference
- King 1998: Ch. 3-4
- Eliason 1993: Ch. 1-2 (optional)

Week 5  Sept 20  Binary Dependent Variables I: Intro
- Long 1997: Ch. 3
- Greene 2012: 511-552 (optional)

Week 6  Sept 27  Binary DVs II: Interpretation, Heterskedastic models
- Long 1997: Ch. 4
- King 1998: Ch. 5.1-5.3; Ch. 6

Week 7  Oct. 4  Ordered Dependent Variables
- Long 1997: Ch. 5
- King 1998: Ch. 5.4
Week 8  Oct. 11  no class—Mid-semester break

Week 9  Oct. 18  Unordered/Choice
- Long 1997: Ch. 6
- Greene 2012: 760-784 (optional)

Week 10  Oct. 25  Event Count I: Poisson
- King 1998: Ch. 5.7-5.10; Ch. 9
- Long 1997: Ch. 8
- Greene 2012: 802-821 (optional)

Week 11  Nov. 1  Event Count II: Negative binomial, Zero-altered
- Cameron and Trivedi 1998: Ch. 4-6
- Long 1997: Ch. 8.3-8.7
- Greene 2012: 821-829 (Optional)

Week 12  Nov. 8  Hazard Models I: Discrete/continuous time, Semi-parametric
- Box–Steffensmeier and Jones 2004: Ch. 1-5
- Greene 2012: 861-872 (optional)

Week 13  Nov. 15  Hazard Models II: Parametric, special topics
- Box–Steffensmeier and Jones 2004: Ch. 6-11

**Week 14  Nov. 22 no class—Thanksgiving**

**Week 15  Nov. 29  Censored/Truncated Variables**
• Long 1997: Ch. 7
• King 1998: Ch. 9
• Greene 2012: 833-861 (optional)

**Week 16  Dec. 6  Multiple Equations**
• Greene 2012: 314-336 (optional)