|  |  |
| --- | --- |
|  | SYLLABUS |
|  |
|  |
|  |
| POLS 8501 | Advanced Quantitative Methods 1 |
| Fall 2022 | I want to estimate a regression, but… |
| Baldwin 102 | Monday, 3:55-6:40pm |
|  |
| **Course Description and Prerequisites** |
|  |
| Maximum likelihood estimation and advanced regression applications. Topics include models with qualitative or limited dependent variables (binary, ordered, and unordered logit and probit; event count models), regression with time series cross-sectional data, models with missing data and measurement models.**Prerequisites:** POLS 7050. |
|  |
| **Learning Outcomes or Course Objectives** |
|  |
| Students will be able to:Estimate, interpret, and communicate generalized linear models and related maximum likelihood modelsDiagnose and treat problems common to maximum likelihood modelsConsume the latest research in political methodology |
|  |
| **Instructor Information** |
|  |
| Dr. Garrett N. Vande Kamp | Baldwin 409 |
| garrettvandekamp@uga.edu | Office Hours: T 2:00-4:00 |
|  |  |
|  |  |
|  |
| **Textbook and/or Resource Material** |
|  |
| Textbooks*:* The following textbooks are good introductions to maximum likelihood estimation and generalized linear models. The textbooks in bold are required. One of the textbooks underlined are for each student depending on the software you plan to use to complete the course assignments. All other textbooks are recommended for specific circumstances, detailed below.Box-Steffensmeier, Janet M., and Bradford S. Jones. 2004. *Event History Modeling: A Guide for Social Scientists*. Cambridge: Cambridge University Press. (the seminal book for any duration model)Cameron, A. Colin and Pravin K. Trivedi. 2013. *Regression Analysis of Count Data, Second Edition.* Cambridge: Cambridge University Press. (the seminal book for any count model)**Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables.* Thousand Oaks, CA: SAGE Publishing.**Long, J. Scott and Jeremy Freese. 2014. *Regression Models for Categorical Dependent Variables Using Stata, Third Edition*. College Station, TX: Stata Press. (For the applied scholar using Stata)Ward, Michael D., and John S. Ahlquist. 2018. *Maximum Likelihood for Social Science.* Analytical Methods for Social Research. Cambridge: Cambridge University Press. (For the methodologist using R)Software: All in-class examples will be given in R, RStudio, and the tidyverse. Office hours will offer support for Stata. No other software will be supported in this class.In addition, journal articles will be required reading during the semester. They can be accessed through the university’s resources available freely to students. |
|  |
| **Class Format and Attendance Policy** |
| The class will be taught in an in-person format, with exceptions occasionally made if the professor is travelling. Attendance is mandatory and will be taken in class for the instructor’s records. Repeated absences will be reported to the graduate student coordinator overseeing the student.Make-up opportunities will only be provided for students with unforeseen, unavoidable absences. Foreseen and avoidable absences can schedule earlier testing, if necessary. Unforeseen and unavoidable absences will require documentation for verification. COVID-19 does not merit any special exceptions to this policy. |
|  |
| **Grading Policies and Grading Scale** |
|  |
| Homework 40%Final Exam 30%Research Paper 30% | A = 90-100 B = 80-89C = 70-79D = 60-69F < 60 |
|  |
| **Homework**: Students will assigned homework to learn to implement the techniques discussed in class. Homework will be graded for participation. Students can discuss homework assignments with anyone but must have a unique, completed assignment to submit to the instructor. As the homework assignment is covered in class, students must grade their homework and then submit this graded version to the professor, along with a memo discussing which topics from the homework they understand and which they do not understand.**Research Paper**: Students will write a research paper on a topic of their choice that is related to their research agenda and employs the quantitative methods learned in this class. Ideally, students should produce a paper that can either be used in their dissertation or be submitted to a peer-reviewed journal. This paper may be one written for another class, given that the student has permission from other instructor(s) the student is currently taking classes with. This paper cannot be coauthored with another student in the class. **Final Exam**: Students will have an online, open-book final exam. |
|  |
|  |
| **Mental Health and Wellness Resources** |
|  |
| * *If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit*[*https://sco.uga.edu*](https://sco.uga.edu/)*. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.*
* *UGA has several resources for a student seeking mental health services (*[*https://www.uhs.uga.edu/bewelluga/bewelluga*](https://www.uhs.uga.edu/bewelluga/bewelluga)*) or crisis support (*[*https://www.uhs.uga.edu/info/emergencies*](https://www.uhs.uga.edu/info/emergencies)*).*
* *If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (*[*https://www.uhs.uga.edu/bewelluga/bewelluga*](https://www.uhs.uga.edu/bewelluga/bewelluga)*) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.*
* *Additional resources can be accessed through the UGA App.*
 |
|  |
| **Academic Integrity** |
|  |
| UGA Student Honor Code: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." In this course, academic dishonesty could include plagiarism and unauthorized assistance. A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at [www.uga.edu/ovpi](http://www.uga.edu/ovpi) . |
|  |
| **Syllabus as a Contract** |
| This syllabus is a contract between the professor and the individual student. Every student in this class receives an identical syllabus; therefore, every student in this class will be taught and evaluated in the same manner. This syllabus is unique to this class; therefore, the students in this class may not be taught and evaluated as students in other sections of this class, past or present, even if taught by the same professor. |
|  |
| **A Word of Thanks** |
| I appreciate the help of my peers who contributed to the creation of this syllabus: Clayton Webb, Joseph Ornstein, Mollie Cohen.That being said, this syllabus and the course materials referenced in it is the intellectual property of the instructor and subject to copyright law. Do not reproduce any course materials without explicit written permission. |

|  |
| --- |
| **Course Calendar: I want to estimate a regression model, but…**The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. |
| **Generalizing the Linear Model****Week 1: I do not entirely understand what a regression model and why I want to estimate one.**Review last semester’s notesKellstedt and Whitten, Chapters 1-4Keele, Luke. 2015. “The Statistics of Causal Inference: A View from Political Methodology.” Political Analysis 23(3): 313-335.Long, Chapters 1 and 2Wasserstein, Ronald L. & Nicole A. Lazar. 2016. “The ASA's Statement on p-Values: Context, Process, and Purpose.” *The American Statistician* 70(2): 129-133.Hoekstra, Rink, Richard D. Morey, Jeffrey N. Rouder and Eric-Jan Wagenmakers. 2014. "Robust misinterpretation of confidence intervals." *Psychonomic bulletin & review* 21(5): 1157-1164.**Week 2: I do not know what estimator to use.**Long, Chapters 2.6 and 4Long and Freese, Chapters 3 and 4Ward and Ahlquist, Chapters 1, 2**Week 3: I have data that is heteroskedastic/autocorrelated.**Braumoeller, Bear. 2006. “Explaining Variance; Or, Stuck in a Moment We Can’t Get Out Of.” *Political Analysis* 14(3): 268-290.Kriner, Douglas, and Liam Schwartz. 2009. "Partisan dynamics and the volatility of presidential approval." *British Journal of Political Science* 39(3): 609-631.**Week 4: I have data that is censored/truncated.**Long, Chapter 7Sigelman, Lee, and Langche Zeng. 1999. "Analyzing censored and sample-selected data with Tobit and Heckit models." *Political Analysis* 8(2): 167-182.**Limited Dependent Variables****Week 5: I have a dependent variable that is a count.**Long, Chapter 8Long and Freese, Chapter 9Ward and Ahlquist, Chapter 10King, Gary. "Statistical models for political science event counts: Bias in conventional procedures and evidence for the exponential Poisson regression model." *American Journal of Political Science* (1988): 838-863.**Week 6: I have a dependent variable that is binary.**Long, Chapter 3Long and Freese, Chapters 5 and 6Ward and Ahlquist, Chapter 3Hanmer, Michael J., and Kerem Ozan Kalkan. 2013. "Behind the curve: Clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models*." American Journal of Political Science* 57(1): 263-277.Nagler, Jonathan. 1994. "Scobit: An alternative estimator to logit and probit." *American Journal of Political Science* (1994): 38(1): 230-255.Ginker, Tim, and Offer Lieberman. 2017. "Robustness of binary choice models to conditional heteroscedasticity." *Economics Letters* 150: 130-134.**Week 7: I have a dependent variable that is ordinal.**Long, Chapter 5Long and Freese, Chapter 7Ward and Ahlquist, Chapter 8.**Week 8: I have a dependent variable that is nominal.** Long, Chapter 6Long and Freese, Chapter 8Ward and Ahlquist, Chapter 9.Alvarez, R. Michael, and Jonathan Nagler. 1995. "Economics, issues and the Perot candidacy: voter choice in the 1992 presidential election." *American Journal of Political Science* 39(3): 714-744.**Week 9: I have a dependent variable that is a duration**.Ward and Ahlquist, Chapter 11.Box-Steffensmeier, Janet M., and Bradford S. Jones. 1997. "Time is of the essence: Event history models in political science." *American Journal of Political Science* 41(4): 1414-1461.Carter, David B. and Curtis S. Signorino. 2010. “Back to the future: Modeling time dependence in binary data.” *Political Analysis* 18(3):271-292.**Week 10: I have a dependent variable that is a proportion.**Ward and Ahlquist, Chapter 7.Tomz, Michael, Joshua A. Tucker, and Jason Wittenberg. "An easy and accurate regression model for multiparty electoral data." *Political Analysis* 10.1 (2002): 66-83.Papke, Leslie E., and Jeffrey M. Wooldridge. 1996. "Econometric methods for fractional response variables with an application to 401 (k) plan participation rates." *Journal of applied econometrics* 11(6): 619-632.**Problems and Solutions for Maximum Likelihood Models****Week 11: I don’t know how to communicate the results in a paper.**Vande Kamp, Garrett N. 2021. "The Conditioning Role of Judicial Independence in the Exercise of Judicial Review." *Journal of Law and Courts* 9(2): 261-282.Zigerell, L. J. 2013. "Rookie mistakes: Preemptive comments on graduate student empirical research manuscripts." *PS: Political Science & Politics* 46(1): 142-146.King, Gary. 2020. “So You're A Grad Student Now? Maybe You Should Do This.” In *The SAGE Handbook of Research Methods in Political Science and International Relations.* Edited by Luigi Curini and Robert Franzese. Sage Press.Clark, Williams R. 2020. “Asking Interesting Questions.” In *The SAGE Handbook of Research Methods in Political Science and International Relations.* Edited by Luigi Curini and Robert Franzese. Sage Press.*Fundamentals of Data Visualization,* Claus Wilke. <https://clauswilke.com/dataviz/>**Week 12: I have grouped data.**Wooldridge, Chapter 14 (From Cohen’s OLS class)Clark, Tom S., and Linzer, Drew A., 2015. “Should I use fixed or random effects?” *Political Science Research and Methods* 3(2):399-408.Bell, Andrew, and Jones, Kelvyn. 2015. “Explaining fixed effects: Random effects modeling of time-series cross sectional and panel data.” *Political Science Research and Methods* 3(1):133-153.Arceneaux, Kevin, and David W. Nickerson. 2009. “Modeling certainty with clustered data: A comparison of methods.” *Political Analysis* 17(2):177-190.Esarey, Justin, and Andrew Menger. 2019. "Practical and effective approaches to dealing with clustered data." *Political Science Research and Methods* 7(3): 541-559.**Week 13: I have a small dataset.**Ward and Ahlquist, Chapter 4.5Cole, Stephen R., Haitao Chu, and Sander Greenland. 2014. "Maximum likelihood, profile likelihood, and penalized likelihood: a primer." *American journal of epidemiology* 179(2): 252-260.Zorn, Christopher. 2005. “A solution to separation in binary response models.” *Political Analysis* 13: 157–170.McCaskey, Kelly and Carlisle Rainey. 2021 “Estimating Logit Models with Small Samples.” *Political Science Research and Methods* 9(3): 549-564.Beiser-McGrath, Janina, and Liam F. Beiser-McGrath. 2020. "Problems with products? Control strategies for models with interaction and quadratic effects." *Political Science Research and Methods* 8(4): 707-730.Blackwell, Matthew, and Michael P. Olson. 2021. "Reducing model misspecification and bias in the estimation of interactions." *Political Analysis*: 1-20.**Week 14: I have multiple data-generating processes at work.**Long, Chapter 8.5Ward and Ahlquist, Chapter 10.5**Week 15: Final Exam** |