

University of Wisconsin-Madison
Sociology 361, Statistics for Sociologists II, Spring, 2020
3 Credits

Meeting Time and Location: 9:30-10:45 TR, 2435 Social Science
Instructional Mode: All Face-to-Face
Credit hours standard: Traditional Carnegie Definition

Lab 301 Meeting Time and Location: W 1:20-3:15, 3218 Social Science

Instructor: John Allen Logan, Professor of Sociology
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COURSE DESCRIPTION

Applied regression modeling for social scientists. Bivariate and multiple linear regression, dummy variables, interactions, nonlinear relationships, indirect effects and omitted variable bias, outliers, heteroskedasticity, and multicollinearity; associated diagnostics and corrections. A brief treatment of logistic regression. Use of Stata and/or SAS for dataset creation and analysis. Lectures and lab.

REQUISITES

Sophomore standing and one of these courses: SOC/C&E SOC 360, SOC/C&E SOC 359, STAT 301, ECON 310, PSYCH 210, PSYCH 280, GEOG 360, POLI SCI 551, STAT/MATH 310, GEN BUS 303, OTM 300, or STAT 371.

LEARNING OUTCOMES

Students completing the course will be ready to conduct their own research using linear and logistic regression analysis and secondary data sources, at a level befitting beginning research assistants on faculty research projects. They will be able to find, download and format social science data suitable for analysis. They will understand how to make, interpret and critique advanced specifications involving dummy variables, interactions, and nonlinear transformations. They will be able to use diagnostics for various threats to model fit and interpretation. They will be able to write an article-length description of an independent research project that uses linear or logistic regression. By the end of the course they will have a solid foundation for studying the many methods that are extensions of linear regression (including logistic regression).

GRADING

Homework	30%
Exams	30% (15% each)
Term Paper	35% (see milestone assignments, below)
Class Participation	5%

Classroom and lab participation will be assessed by your TA and professor. Lab attendance will be taken weekly. Your class participation grade will depend on attendance and signs of commitment to the course.

All assignments will be given either letter or numerical grades. Letter grades will be transformed to numerical scores before final, weighted totals are calculated. Here are the letter/number correspondences: A = [100, 94], AB = (94, 88], B = (88, 82], BC = (82, 76], C = (76, 70], D = (70, 60], F = (60, 0]. Letter grades may be given as simple letters, or with + or - modifiers. For example, the letter grade "A" equals the numerical value 97, while "A+" equals 99 and "A-" is 95, and so on, with each simple letter grade translated to the midpoint of its numerical range and the "+" and "-" values adding or subtracting 2 points. (The grade F is equal to 30 points, while "F+" and "F-" are not used.) The final grades reported to the Registrar will be simple letter grades without "+" or "-" modifiers. The instructor may curve the final grades by lowering cut points between them to reflect his judgement of student performances. (Cut points will never be raised.)

REQUIRED TEXTBOOKS (with abbreviation used in Reading Assignments):

RASS: Rachel A. Gordon, *Regression Analysis for the Social Sciences*, 2nd ed., Routledge, 2015. ISBN 978-1-138-81251-2 (pbk).

PAMPEL: Fred C. Pampel, *Logistic Regression*. Sage, 2000. ISBN (print): 9780761920106. Available online via library.wisc.edu, at <https://dx-doi-org.ezproxy.library.wisc.edu/10.4135/9781412984805>.

SUPPLEMENTARY READINGS (with abbreviations used in Reading Assignments):

Juul: Svend Juul. 2004. *Take Good Care of Your Data*. www.epidata.dk/downloads/takecare.pdf.

The following are now posted on the class Canvas page:

AS: R.A. Gordon. 2012. *Applied Statistics for the Social and Behavioral Sciences*. Routledge, excerpts as follows. (Please note: *Carefully ignore* any parts of these excerpts that deal with SAS instead of Stata; usually, SAS is discussed first, and Stata second.) Each reading is a separate file on the Canvas page.

AS 4.5. Complex Sampling Designs, pp. 83-86

AS 5.6. Weighted Statistics, pp. 123-133

AS 6.2-4. Sample, Population and Sampling Distributions, pp. 150-178

AS 8.5. Complex Sampling Designs, pp. 281-285

AS 14.4. Complex Sampling Designs, pp. 509-511

Allison: P.D. Allison. 2002. *Missing Data*. Sage. Chapters 1 Introduction; 2 Assumptions; 3 Conventional Methods; 5 Multiple Imputation: Basics. Available online via library.wisc.edu, at <https://dx-doi-org.ezproxy.library.wisc.edu/10.4135/9781412985079>.

DeVellis: R.F. DeVellis. 2003. *Scale Development Theory and Applications*. Sage. pp. 6-39.

Neter: Neter, J., W. Wasserman, and M.H. Kutner. 1989. "Some Basic Results in Probability and Statistics," pp. 1-9 in *Applied Linear Regression Models*, 2nd. ed., Irwin.

Wooldridge: J.M. Wooldridge. 2013. *Introductory Econometrics*. "The Natural Logarithm," pp. 712-713; and "The Exponential Function," p. 716.

Von Hippel: P.T. Von Hippel, S.V. Scarpino, and I. Holas. 2016. *Sociological Methodology* 46(1): 212-251. "Robust estimation of inequality from binned incomes."

EXAMS, PAPERS, AND OTHER MAJOR GRADED WORK

Summary Period: Wednesday, May 6, 2020, 2:45PM - 4:45PM.

Exams: Two in-class, non-cumulative exams will be given. The first will be on March 8, and the second on the last day of class, May 2.

Term Paper: A term paper applying the regression methods of the class to a published or unpublished social science data set is required. The paper should be concise, taking no more pages than you need to complete the work. In any event, it should generally be no more than 15 double-spaced pages, plus tables, figures, and a (short) bibliography. Details of the assignment will be distributed in a separate document on the second day of class.

Term paper milestone assignment due dates, and percentage contributions to total course grade:

Due date	Paper assignments	Share of grade
Feb 13	topic/data	5%
Feb 27	measures and descriptive statistics	5%
Mar 26	basic regressions	5%
Apr 28	regression diagnostics	5%
May 6 (sum. per.)	full paper	15%
TOTAL PAPER		35%

Homework assignments: At the end of each chapter in the text book you will find Review Questions, Review Exercises, Chapter Exercises and a Course Exercise. A selection of the questions of the first three types will be assigned for each chapter, and posted on the Canvas site for our course. (Additional questions will be assigned for Topic 6, Logistic Regression.) The answers to questions are due at the beginning of the lecture exactly one week following the completion of the chapter. If the chapter is finished on a Tuesday, the homework is due the next Tuesday, for example. At the end of the term this rule may need to be modified. Assignments will be graded on a 4-point scale, corresponding roughly to full credit (3), a good-faith effort (2), a bad-faith effort (1), and no effort (0).

Method of Submission of Written Work: Your final paper is to be submitted in a provided dropbox on the class website, in **PDF format only**. No other formats are permitted, including Microsoft Word. (This is to streamline the grading process and to preserve equationa formatting details across PC and Mac computers; I only use Mac and Linux computers.)

All homework and lab assignments are to be handed in to the TA by the indicated deadlines. Late assignments will not be accepted except by pre-arrangement with the TA (*not* the professor), and only for sufficient cause. Your TA will establish rules for the acceptable format of homework (e.g., paper vs. electronic, pen vs pencil, pdf vs. Word), and for exact submission procedures.

Any assignments made in lab will be due at the beginning of lab on the announced due date.

COMPUTING REQUIREMENTS AND RESOURCES

The course requires you to use Stata (in batch command mode) for many assignments. *The textbook contains enough information about operating Stata for the work you need to do.* Social Science Computing Cooperative (SSCC) staff and your TA will make sure you have enough skills to get the job done. Stata consulting is also available to you: Stop by 4226 Sewell Social Sciences Building and look for the yellow “SSCC Consultant” or red “Stat Consultant” sign, or send a message to helpdesk@ssc.wisc.edu. Make sure to say you are enrolled in Sociology 361.

Computing outside the lab: SSCC computers with Stata are available for course assignment use via the web. You will be offered advice concerning how best to get access from your home or from other campus computer labs or wifi connections. We require all students to begin their computing work in the SSCC computer lab, however. This simplifies giving everyone a basic familiarity with the systems and programs.

Work independently: All computer-related assignments are to be based on program code independently written and run by each individual student. In addition, each assignment’s written analysis must be the independent work of the individual student. Evidence of borrowing or copying between or among students will be (heavily) penalized. However, students are welcome to consult with each other in general terms about strategies for completing the various assignments. You **must turn in your own computer output** with each assignment that requires the use of a computer.

Computers/Phones in Lecture and Lab: When lab is held in the computer lab (as will be announced by your TA), you obviously will be on a computer. Otherwise, don’t use any laptops or phones while in lab or lecture. Don’t distract others, including the instructors.

RULES, RIGHTS & RESPONSIBILITIES

See the Guide to Rules, Rights, and Responsibilities, here: <http://guide.wisc.edu/undergraduate/#rulesrightsandresponsibilitiestext> .

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct may be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA." <http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

DIVERSITY & INCLUSION

Institutional statement on diversity: "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world." <https://diversity.wisc.edu/>

SCHEDULE AND READING ASSIGNMENTS

After the first session, do the readings *before* the corresponding lecture. Abbreviations: See readings list above.

Week # and Dates		Topic Number (T = Tuesday, R = Thursday)	Assigned Readings
1	1/21-23	1. Course introduction. Overview of text's literature excerpts. Term paper: Description, and review of data sources.	RASS Ch. 1, 2
		2. Selected topics in statistical packages, data documentation, and Stata batch jobs	RASS Ch. 3-4, and Juul , pp. 1-6, 12-15, 20-31.
2	1/28-30	3. Term paper topics: Scale construction, and income/wealth coding	DeVellis , pp. 6-39; Von Hippel (just skim this). Help files for Stata alpha and topcat.
		4. Basic Bivariate Regression	RASS Ch. 5. AS 6.2-4 (360 basics, as needed)
3	2/4-6	Basic Bivariate Regression, continued	AS 8.5 (complex sampling designs)
4	2/11-13	5. Basic Multivariate Regression	RASS Ch. 6.
5	2/18-20	Basic Multivariate Regression, continued	AS 14.4 (complex sampling designs, cont.)
6	2/25-27	6. Logistic Regression	Pampel Ch. 1 (Logic), Ch. 2 (Interpretation), and the four "Back Matter" appendices on logarithms, as needed.
7	3/3-5	T: Catch-up / review	
		R: First exam covering topics 4, 5, and 6	
8	3/10-12	7. Term paper topics: T: Sampling Weights; R: Missing Data	AS 4.5 (complex sampling); AS 5.6 (weighted statistics); Allison , pp. 1-12 (missing data)
--	3/14-22	SPRING BREAK	
9	3/24*-26	8. Dummy Variables (* T: JAL at meeting.)	RASS Ch. 7.
10	3/31-4/2	9. Interactions	RASS Ch. 8.
11	4/7-9	10. Nonlinear relationships	RASS Ch. 9.
12	4/14-16	11. Indirect Effects, Omitted Variable Bias	RASS Ch. 10.
13	4/21-23	12. Outliers, Heteroskedasticity and Multicollinearity	RASS Ch. 11.
14	4/28-30	T: Catch-up / review	
		R: Second exam covering topics 8-12	