Quantitative Techniques in Sociology
SOC 506/CSSS 507 - Spring 2017

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Lecture: MW 1:30-3:20pm
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This is the third course of a sequence in quantitative methods for PhD students in the social sciences. In this course, we will study statistical and computational methods that are essential to perform modern data analysis and to interpret correctly various types of data that arise in social science research.

This course is intended to familiarize students with concepts that are widely used in the literature that leverages quantitative methods, as well as help them become effective producers of quantitative research. There will be a mix of lectures and hands-on lab activities. Lectures will focus on statistical theory and principles as well as discussion of applications relevant for sociology and related areas. Labs will focus on data analysis, data management and the implementation of statistical and computational techniques.

This course serves as the endpoint of the Stats sequence in the Sociology Department as well as a gateway to more specialized courses offered by the Center for Statistics and the Social Sciences (CSSS), Center for Studies in Demography and Ecology (CSDE) or courses related to data science sponsored by the eScience institute.

Prerequisites and Diversity of Student Backgrounds: Students in this class have different backgrounds and come from different departments. To accommodate the range of backgrounds, I emphasize key methodological concepts and encourage the participation of students who do not have extensive background in methods, but are eager to learn.

The course assumes that students are comfortable with the material taught in SOC 504 and SOC 505, and have basic familiarity with calculus and linear algebra. For this course we will use the statistical software and programming language R. I do not expect prior knowledge of R: the labs will introduce R gradually.

This class meets for an average of 3 hours per week. We will use the extra ½ hour per session for special topics and some catch-up time.

Reference Material: There is not a single textbook for this course. I will draw from a number of sources, including journal articles that will be posted on the canvas course website. Some useful reference books include:

-Everitt, B.S. and Hothorn, T. *A Handbook of Statistical Analyses using R*. CRC Press.

-James, G., Witten, D., Hastie, T. and Tibshirani, R. *An Introduction to Statistical Learning, with Applications in R*. Springer

-Fox, J. *Applied Regression Analysis, Linear Models, and Related Methods*. SAGE Publications

Course Requirements and Grading

Participation & Contribution	10%
Homework Assignments	50%
In-class quiz	40%
Total	100%

Class Participation and Contribution: Class participation will count towards your final grade. Please help create a constructive learning environment. Different people have different ways in which they participate best, all of which are valid: thoughtful preparation, sharing a well-formulated idea after a long pause, stimulating discussion through questions, helping a classmate understand a concept or perform hands-on activities with R, discussing ideas and challenges during office hours, sharing news articles with the class via canvas, etc. I strongly encourage you to interact with me, with the teaching assistant and with the other students. Please listen to your peers, wait for your turn to speak, and refrain from using discriminatory language. If you are very talkative, make sure that your quieter peers get a chance to speak. If you are shy, remember that if you have a question, most likely there is at least one other person with the same question who would be happy to listen to the answer.

Homework assignments: There will be homework assignments almost every week. Some of the assignments will be problem sets where you will be asked to answer questions. These are typically “paper and pencil” type of problems. Some assignments will be related to lab activities and will involve data analysis and data manipulation using R. You may work in small groups (2-3 people) on the assignments, but each person of the group must submit a copy of the assignment and report the names of all the group participants.

In-class quiz: The quiz is an opportunity for you to consolidate the skills that you have learned during the course. It will cover the material presented in class and will consist of questions similar in style to the “paper and pencil” problem sets asked for the homework assignments.

Class Conduct

The class atmosphere will be quite relaxed. Here are just a few guidelines:

- Arriving a bit late is tolerated as long as you make an effort to minimize the disturbance for other students.

- Eating and drinking in class is allowed, but please make sure that you are not disturbing others.

- Please turn off your cellphone or put it on silent mode.

- If you cannot make it to class for whatever reason, make sure that you know what happened during the lecture or lab that you missed.

- If you are having trouble with the course material or personal problems that are hindering your performance in the class, please come and talk to me so that we can solve the problem before it is too late. It is better to bring up any concerns as early as they arise.

- Please always show respect to your fellow classmates and help create a positive and constructive environment

Students with Disabilities

Please inform me as soon as possible of special needs that you may have.
The sooner you notify me, the better I will be able to make appropriate arrangements.

Academic Integrity

A fundamental tenet of all educational institutions is academic honesty. Students must do all their work within the boundaries of acceptable academic norms. See the UW statement about student academic responsibility prepared by Committee on Academic Conduct in the College of Arts and Sciences (https://depts.washington.edu/grading/pdf/AcademicResponsibility.pdf). Students found guilty of plagiarism or academic dishonesty will be subject to appropriate disciplinary actions.

Approximate Course Outline

Week 1 (03/27, 03/29) **Introduction to the course; Review of key concepts; Getting started with R for data analysis**

Week 2 (04/03, 04/05) **Frequentist approaches to statistical inference**

Week 3 (04/10, 04/12) **Bayesian approaches to statistical inference**

Week 4 (04/17, 04/19) **Generalized linear models**

Week 5 (04/24) **Generalized linear models**
No meeting on 4/26

Week 6 (05/01, 05/03) **Research Design: Regression Discontinuity, difference-in-differences, instrumental variables**

Week 7 (05/08) **Research Design and causal inference (continued)**
(05/10) **Review**

Week 8 (05/15) **In-class Quiz**
No meeting on 5/17

Week 9 (05/22, 05/24) **Special topics (related to students' interests)**

Week 10 (05/31) **Special topics (continued)**