

SOPA 309: Applied Econometrics for Policy Evaluation

Dogus Aktan

Fall 2025

BKH 229

TR // 9:25AM - 10:40AM

Contact Information

Instructor: Dr. Dogus Aktan

Teaching Assistant:

Office: Herzstein Hall 107

Email: da105@rice.edu

Office Hours: Monday 10:30-12:00 // Thursday: 2:30-4:00

Course Overview and Learning Outcomes

This course covers applications of statistics to policy analysis and evaluation. The purpose of this course is to give you a full mastery of regression analysis and a solid foundation in using R. This course is fundamental for students developing the skills that will allow them to be successful in their capstone projects and, hopefully, their careers. By the end of this course, students should have the ability to:

- Identify the fundamental statistical model and apply it to public policy research
- Apply the principles of multivariate regression and hypothesis testing
- Demonstrate the implementation and interpretation of interaction models
- Demonstrate the implementation and interpretation of models with binary dependent variables
- Identify common approaches in time-series analysis
- Justify model specification decisions in building a research design
- Practice a variety of data skills in preparation for more advanced projects

Following the course, students should be prepared to learn other experimental and non-experimental methods addressing causality in other courses without needing an extensive review of multiple regression, and be prepared to run their own basic analyses in R. Through hands-on learning, you will become familiar with R, a statistics computer program used for analyzing data. The goal is for you to be able to use R to analyze your own data by the end of this course. However, it takes time and practice to become fluent with this software. You do not need to memorize all the steps and commands for every analysis, but you should understand what the commands are doing so you can come back to your code and use it as a resource in future projects.

Course Materials

Required Materials

1. Bailey, Michael. (2020). Real Stats: Using Econometrics for Political Science and Public Policy. Oxford University Press. I will be using the second edition but the first edition should also be acceptable. Feel free to use a print or online version.
2. **Recommended:** The Effect: An Introduction to Research Design and Causality by Nick Huntington-Klein is available for free at [here](#).
3. R Access: The software we will be using in this course is R. R is free to download and students will need to download R on their personal computers. Download and install R first and then RStudio. Further instruction on how to download R will be available on Canvas and directly emailed to students the week before classes start. You should have RStudio up and running before the second session. If students run into issues, they should contact me via email and I will answer any questions and can assist via Zoom if needed.
4. Canvas Course Site: Canvas is Rice's course management site. I will use Canvas to post announcements, required readings, assignments, lecture slides, and other course materials, as well as grades. Updates will be sent via Announcements; you are responsible for checking Canvas yourself – I recommend at least once per day.

Course Structure

Course meetings will be a combination of lectures, discussions, practical exercises, and R programming. Completing the assigned reading or module prior to each class meeting is crucial. This will allow you to ask questions during class, participate in discussions, and complete in-class activities.

Policy on Student Questions and Emails

I am always happy to answer student questions during office hours or over e-mail. I will generally reply to e-mails within 24 hours but make sure you send your questions in a timely manner. If I don't respond to your email within 2 days, please feel free to remind me in person or send a reminder email.

Keep in mind that most questions you may have (about assignments, policies, etc. . .) can be answered by simply taking a close look at the syllabus. Every student should read the entire syllabus carefully at the beginning of the class and before sending me a question. When you have finished reading the syllabus for the first time, send me an e-mail, telling me what your favorite animal is.

Assignments and Grades

Assignments

The grading for this course is different from other courses in that you are graded by the 'bundle' of work that you complete for the associated grade. Bundles will be composed of reading quizzes, class prep modules, class engagement, problem sets, exam modules, and final exam modules.

Reading Quizzes

I expect that students will read assigned readings before class sessions. To encourage this, there will be reading quizzes at the beginning of class over the material covered in the assigned reading.

Class Prep Modules

There will be some classes in which students will not read from the textbook to prepare for class but will instead complete a module composed of a little reading and a practice before class. This will give students the opportunity to engage and practice with the material and come to class with questions.

Class Engagement

Learning statistics can be challenging. Students are expected to be actively engaged in the course. Students are expected to read the materials, ask questions in class and in office

hours, and engage in class discussions. Students will complete course engagement reflections at the beginning, middle, and end of the semester. These assignments will ask students to reflect on their level of engagement with the course and then set goals and identify actionable steps to enhance their engagement.

Problem Sets

Students will complete five problem sets over the course of the semester. These exercises are an opportunity for students to practice what we have learned. Students may work collaboratively on problems sets. However, each student should be typing their own code for problem sets. **To avoid any Honor Code violations, students should not email their code for problem sets to other students.**

For each problem set, I will post the problem set instructions and the problem set key. Students should complete the assignment and then check their work with the provided key. Students should submit both their assignment and the R script. Part of the submission will involve some reflective questions over the assignment. Problem sets will be evaluated based on completion of the assignment and the reflective survey. The goal of this approach is to allow students the opportunity to practice and learn from the problem set and allow both myself and the students to identify challenging or confusing concepts.

Exam Modules

Instead of having one grade for an exam, exams will be divided into different modules. Each module will cover one major topic and will have its own independent rating (Satisfactory/Unsatisfactory). Some modules will be only short answer questions, some will be primarily R questions, and some will be a mix of both short answer and R.

These modules will be grouped into two exams and one final exam. There will be 5 modules in each exam and 4 modules in the final exam. Exam 1 is composed of Statistical Model, OLS Regression, Advanced Regression I, Categorical Variables, and Advanced Regression II. Exam 2 is composed of Interactions, Linear Probability Model, Logit and Probit Models, Fixed Effects, and Model Specification.

Exam modules will be open for a week. Once a student opens a specific module, they will have 8 hours to complete the module.

When taking exams, students may consult readings, notes, prior assignments, course code, and official R help files. Students may not collaborate or request assistance from online sources, such as Stack Overflow. If students become stuck on a problem or encounter a technical or programming error they can not solve, students should email the instructor for assistance.

In order to pass the course with a C, students must receive a satisfactory rating on all Fundamental Modules. The number of advanced modules that students satisfactorily

complete influences the degree to which students receive a passing grade (C-A) in the course.

Students will have the opportunity to revise and resubmit exam modules. Students will have only one opportunity to revise and re-submit each advanced exam module. Resubmissions must occur within two weeks of the initial rating being posted.

Fundamental Modules

- Statistical Model
- OLS Regression
- Advanced Regression I
- Categorical Variables
- Model Specification

Advanced Modules

- Advanced Regression II
- Interactions
- Linear Probability Model
- Logit and Probit Models
- Fixed Effects

Grades

The grading for this course is different from other courses in that you are graded by the ‘bundle’ of work that you complete for the associated grade. If you do not complete that bundle, you will move to the next lower bundle where you have completed those responsibilities. The bundle that you complete is up to you; however, as the grades increase, so does the difficulty of the content and your time directed towards achieving that bundle.

All assignments will be graded as Satisfactory/Unsatisfactory. You must have satisfactory scores on all assignments in the bundle in order to have completed the bundle and receive the associated grade. Students will have the opportunity to revise and resubmit some assignments in order to achieve a satisfactory rating.

Grade Bundles

The grading for this course is different from traditional courses. You are graded by the *bundle* of work you complete for the associated letter grade. If you do not complete that bundle, you will move to the next lower bundle where you have completed all requirements. All assignments are graded as **Satisfactory** / **Unsatisfactory**. You must have satisfactory scores on all components of a bundle to receive the associated grade.

Bundle 1 (D Range)

- Score $\geq 60\%$ on reading quizzes
- Satisfactory rating on 4 homework assignments
- Satisfactory rating on 5 class prep modules
- Satisfactory ratings on 4 Fundamentals exam modules

Bundle 2 (C Range)

- Satisfactory on all homework assignments
- Satisfactory on all course engagement self-assessments
- Satisfactory on 5 Fundamentals exam modules
- Satisfactory on 2 Advanced exam modules

For C-

- Score $\geq 60\%$ on reading quizzes
- Satisfactory on 6 class prep modules

For C

- Score $\geq 70\%$ on reading quizzes
- Satisfactory on 6 class prep modules
- Satisfactory on 1 final exam module

For C+

- Score $\geq 80\%$ on reading quizzes
- Satisfactory on 7 class prep modules
- Satisfactory on 1 final exam module

Bundle 3 (B Range)

- Satisfactory on all homework assignments
- Satisfactory on all course engagement self-assessments
- Satisfactory on 5 Fundamentals exam modules
- Satisfactory on 3 Advanced exam modules

For B-

- Score $\geq 60\%$ on reading quizzes
- Satisfactory on 8 class prep modules
- Satisfactory on 1 final exam module

For B

- Score $\geq 70\%$ on reading quizzes
- Satisfactory on 8 class prep modules
- Satisfactory on 2 final exam modules

For B+

- Score $\geq 80\%$ on reading quizzes
- Satisfactory on 9 class prep modules
- Satisfactory on 2 final exam modules

Bundle 4 (A Range)

- Satisfactory on all homework assignments
- Satisfactory on all course engagement self-assessments
- Satisfactory on 5 Fundamentals exam modules

For A

- Score $\geq 80\%$ on reading quizzes
- Satisfactory on 9 class prep modules
- Satisfactory on 4 Advanced exam modules
- Satisfactory on 3 final exam modules

For A+

- Score $\geq 95\%$ on reading quizzes
- Satisfactory on 10 class prep modules
- Satisfactory on 5 Advanced exam modules
- Satisfactory on 4 final exam modules

Late Work

Late Work If there are circumstances that come up in your life that will make it difficult for you to turn in an assignment on time, please email me **BEFORE** the assignment is due and we will discuss a potential extension. In your email, please include a proposed extension based on your situation and the progress you have made on the assignment. Requests for extensions **AFTER** the assignment is due will not be granted.

Late assignments will be marked as unsatisfactory. Students will have 5 no-questions-asked 24 hour extensions. To use one of these extensions, students will need to comment on assignment submission “NQA Extension”. Priority will be given to extensions for homework assignments.

Absence Policies

I expect you to attend all scheduled classes. An absence will be considered unexcused unless you give me documentation of the absence. You should also check out the Rice University absence policies [here](#).

AI Policies

Students are not allowed to use advanced automated tools (artificial intelligence or machine learning tools, such as ChatGPT) on assignments in this course. Each student is expected to complete each assignment without substantive assistance from others, including automated tools. If you are found to have used AI for an assignment, this will be treated as a violation of the Rice Honor Code. In my experience, automated tools are not great at writing political science papers. They can make up sources that don't exist and produce relatively low quality analysis. Using AI will not only result in a poor assignment, but it also undermines the whole reason why you are taking this course – to build writing and analytical skills that will help you understand and critically evaluate current events!

Rice Honor Code

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at <http://honor.rice.edu/honor-system-handbook/>. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

Disability Resource Center

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with the Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Mental Health Statement

If you are having trouble completing your coursework, please reach out to the Wellbeing and Counseling Center. Rice University provides cost-free mental health services through the Wellbeing and Counseling Center to help you manage personal challenges that threaten your personal or academic well-being. If you believe you are experiencing unusual amounts of stress, sadness, or anxiety, the Student Wellbeing Office or the Rice Counseling Center may be able to assist you. The Wellbeing and Counseling Center is located in the Gibbs Wellness Center and can be reached at 713-348-3311 (available 24/7).

Title IX Responsible Employee Notification

Rice University cares about your wellbeing and safety. Rice encourages any student who has experienced an incident of harassment, pregnancy discrimination or gender discrimination or relationship, sexual, or other forms interpersonal violence to seek support through The SAFE Office. Students should be aware when seeking support on campus that most employees, including myself, as the instructor/TA, are required by Title IX to disclose all incidents of non-consensual interpersonal behaviors to Title IX professionals on campus who can act to support that student and meet their needs. For more information, please visit safe.rice.edu or email titleixsupport@rice.edu.

Syllabus Change Policy

This syllabus is only a guide for the course and is subject to change with advanced notice.

Course Schedule

- Week 1:**
- Tuesday, August 26: Course Introduction
 - Thursday, August 28: Working with Data in R
- Week 2:**
- Tuesday, September 2: Introduction to Causality
 - Thursday, September 4: Introduction to OLS Framework
- Week 3:**
- Tuesday, September 9: Hypothesis Testing
 - Thursday, September 11: Omitted Variable Bias and Multivariate OLS
- Week 4:**
- Tuesday, September 16: Collider and Post-treatment Bias
 - Thursday, September 18: Practice with Multivariate OLS
- Week 5:**
- Tuesday, September 23: Dummy Variables
 - Thursday, September 25: Interactions
- Week 6:**
- Tuesday, September 30: Practice with Dummy Variables and Interaction Effects
 - Thursday, October 2: Exam 1 Modules Work Time
- Week 7:**
- Tuesday, October 7: OLS with Binary DVs
 - Thursday, October 9: Logit and Probit
- Week 8:**
- Tuesday, October 14: NO CLASS
 - Thursday, October 16: Calculating Substantive Effects
- Week 9:**
- Tuesday, October 21: Visualizing Substantive Effects
 - Thursday, October 23: Model Specification
- Week 10:**
- Tuesday, October 28: Data with Dependencies
 - Thursday, October 30: Fixed Effects
- Week 11:**
- Tuesday, November 4: Random Effects
 - Thursday, November 6: Introduce Extended Example: Model Specification
- Week 12:**
- Tuesday, November 11: Exam 2 Modules Work Time
 - Thursday, November 13: Webscraping
- Week 13:**
- Tuesday, November 18: Regular Expressions
 - Thursday, November 20: Analyzing Text Data
- Week 14:**
- Tuesday, November 25: Data Visualization

- Thursday, November 27: NO CLASS

Week 15:

- Tuesday, December 2: Final Exam Block
- Thursday, December 4: Final Exam Modules Due