

**Syllabus**  
**Econ 103A: Introduction to Econometrics & Research Methods**  
San Jose State University  
Online-Asynchronous  
Spring 2022

Instructor: Dr. Marjan Orang  
Email: marjan.orang@sjsu.edu

Office Hours: Tuesday 10am at <https://sjsu.zoom.us/j/84773652257>

**Welcome to Econ 103A, Introduction to Econometrics & Research Methods!**

**Course Description**

Research methods and core econometric techniques for analysis of causal effects, from difference-in-means tests of experimental data through multiple regression analysis of observational data. Topics include selecting an appropriate research question, reviewing the relevant literature, and obtaining data. Core econometric techniques used to analyze data in an original term paper.

**Grading and Classroom Policy**

This is a 4-unit course. The grading scale is: 60-62, D-, 62-68, D, 68-70, D+, 70-72, C-, 72-78, C, 78-80, C+, 80-82, B-, 82-88, B, 88-90, B+, 90-92, A-, 92-98, A, 98-100, A+. I generally don't allow makeup assignments unless there is sufficient notice and a well justified and documented reason.

**Online Lectures and Daily Office Hour**

Lectures will be posted on Canvas under weekly modules.

**Suggested Textbooks:**

- 1.) Bailey, M.W. 2016. Real Econometrics: The Right Tools to Answer Important Questions. Oxford University Press; 1st edition.  
Resources: <https://global.oup.com/us/companion.websites/9780190296827/>
- 2.) Holian, M. J. Forthcoming. Data and the American Dream: Contemporary Social Controversies and the American Community Survey. Palgrave Macmillan.  
Excerpts from this in-progress manuscript will be provided to students in class.
- 3.) Angrist, J. D. and Pischke, J. 2014. Mastering Metrics, Princeton University Press, Princeton, N.J. Resources: [www.mastermetrics.com](http://www.mastermetrics.com)

### **Other Recommended Textbook**

1.) Stock, J.H. and Watson, M.W. 2011. Introduction to Econometrics. Pearson, 3<sup>rd</sup> edition. This is the book we use in the graduate econometrics sequence, although it is perfectly accessible to undergraduates. Any recent edition is suitable. See also the publisher's Student Resources page for replication files for the book in Stata format:  
[http://wps.aw.com/aw\\_stock\\_ie\\_3/178/45691/11696965.cw](http://wps.aw.com/aw_stock_ie_3/178/45691/11696965.cw)

### **Required Computer Software**

All students must have installed on their home machines free R and R Studio software. Students whose computers have limited memory are advised to create a free R Studio Cloud account.

### **Course and Program Learning Objectives (CLOs and PLOs)**

This course reinforces PLO3: research methods and PLO5: communication, and introduces PLO4: areas: quantitative methods.

Specific CLOs for this course include:

CLO 1.) Explain basic methods in econometric and identify correct procedures

- a) Explain the difference between a variable and a statistic in the context of a regression equation.
- b) Define the terms "causal effect" and "ideal experiment". Explain the difference between descriptive statistics, inferential statistics, and causal inference.
- c) Give two examples of difference-in-means tests, using experimental and observational data, and explain when we can and cannot interpret a difference-in-means as an estimate of a causal effect.
- d) Describe how to use a simple (bivariate) regression model to carry out a difference in means test.
- e) Give an example of a regression coefficient estimate that suffers from omitted variable bias, and explain how the regression control technique could reduce bias in the example.
- f) Describe all the numbers in a Stargazer regression table in R; identify the main independent variable of interest, interpret the econometric models, test their statistical significance and evaluate them in terms of any potential bias.
- g) Discuss best practices in estimating standard errors.
- h) Discuss an example of a natural experiment, where: 1.) a difference-in-means is a plausible causal effect, and 2.) where a difference-in-difference(D-in-D) in means is a plausible causal effect.
- i) Finally, explain how an interaction model automates estimation of a D-in-D estimate.

CLO 2: Use technology to analyze data

- a) Create summary statistics for variables in a data set using the R software program.
- b) Estimate a regression model(coefficients and standard errors)and create a scatterplot with a regression line in R.
- c) Download data from the Internet and read it into a statistical software package

- d) Run an R script associated with a published research study by modifying the directory path, installing required packages, loading data, and obtaining results.
- e) Create a new script by modifying an existing script, and use your original results in a term paper

CLO 3: Prepare a scholarly research paper describing an original regression analysis:

- a) Formulate an interesting and important research question.
- b) Locate and describe data from Internet or other sources.
- c) Search and analyze scholarly literature related to research question.
- d) Write a review of econometric literature that is integrated and not merely an annotated bibliography; list and describe relevant studies and their research questions, the data and methods they used, and the results they found. Highlight any studies that provide compelling estimates of well-defined causal effects, or explain why a study does not.
- e) Develop, estimate and interpret a statistical model that can be used with the data to answer a question which is original and contributes to the literature.

**Grading:**

Your course grade will be determined as follow:

Assignment	Points	Due Dates
Check-in Assignments	25	

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' web page at <http://www.sjsu.edu/gup/syllabusinfo>