



# USC University of Southern California

## Economics 318, 26312R and 26313R Introduction to Econometrics

**Units:** 4  
**Term—Day—Time:** Summer 2022, Tue, Wed, Thu 10:00-11:50 am.  
**Location:** VHE-217  
**Instructor:** Manochehr Rashidian  
**Office:** Online  
**Office Hours:** 12:00-1:00 pm, Tue, Wed.  
If my office hours are not convenient for you, I am also available by appointment.  
**Contact Info:** [rashidia@usc.edu](mailto:rashidia@usc.edu)

**Teaching Assistant:** TBD  
**Discussion Session:** 1:00-1:50 Thu, VHE-217  
**Office Hours:**  
**Contact Info:**

### Course Description and Overview

Econometrics is about quantifying economic relationships using mathematical methods and statistical inference. It involves using economic data to reveal economic relationships. Econometrics techniques have been increasingly used in macroeconomics and applied microeconomics. Macroeconomics data are used to test macroeconomic theories, evaluate the impacts of public policies, estimate macroeconomics relationships, and forecast economic variables such as inflation rate, GDP growth rate, and interest rate. The application of econometrics to microeconomic is concerned with estimating microeconomic relationships such as demand functions, cost, and profit functions, testing for underlying microeconomics theories, and evaluating and forecasting the impacts of business decisions.

We will start with a brief overview of the data presentation and the univariate and bivariate random variables. Next, we will learn how to estimate and interpret the population parameters. The properties of the estimators and inference about the population's parameters will be covered next. The second part of the course deals with simple and multiple linear regression models. The regression analysis is the main focus of this course. We will cover various topics under regression analysis such as assumptions of linear regression, model building, estimation and Interpretation of the unknown parameter, goodness of fit measures, testing for restrictions on parameters, and forecasting. The last part of the course deals with relaxing the classical linear regression assumptions and how to estimate the linear model in the absence of these assumptions. Dealing with nonlinearities and qualitative dependent and independent variables is also discussed in the last part.

### Learning Objectives

This course is designed to provide the students with sufficient knowledge of statistics and econometrics necessary to understand, evaluate, and interpret econometric research that uses basic regression methods. After completing this course, students should be able to perform data collection tasks, modeling econometrics relationships, estimating and testing the model, and interpreting and using the estimation results.

### Course Notes

- 1- To prevent disruptions in lectures, students should come to class on time.

- 2- Additional points for class participation can be earned by getting involved in the class discussion.
- 3- Students are advised to take notes during class because exam questions are mostly on the subjects discussed in the class. You should also know that your notes are not substitutes for the text.
- 4- Attendance at the lecture is mandatory. Missing class will reduce your class participation points. (there is some flexibility for students in different time zones)
- 5- Solutions to homework assignments and exams will be posted on the Blackboard after they are completed.
- 6- You should regularly check your grades on the Blackboard and if you see any discrepancies, inform the instructor or your TA immediately.
- 7- Students should be aware that this course is designed in such a way that knowledge of the prerequisites (Econ 317 and some knowledge of macro and microeconomics theories and elementary calculus) is essential to passing the course.

### **Technological Proficiency and Hardware/Software Required**

Classes are in person, but if circumstances change and classes are moved to online, we will use Zoom for lectures and office hours and Blackboard for exams and homework assignments. If you need help with Zoom or Blackboard, use the following technology support links:

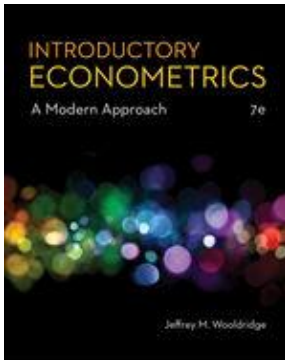
[Zoom information for students](#)

[Blackboard Help for students](#)

[Software available to USC Campus](#)

### **Required Readings and Supplementary Materials**

The required text is **Wooldridge, Jeffrey "Introductory Econometrics, a Modern Approach,"** South-Western Cengage Learning. 7<sup>th</sup> Edition,



Textbook's website contains the data you need for your assignments. The website is:

[https://www.cengage.com/cgi-wadsworth/course\\_products\\_wp.pl?fid=M20b&product\\_isbn\\_issn=9781337558860&token=89EEF5AC408826CD381C3B27F19B3BD859B7EA69CEEC2862139E3103F28A65F8B5723398CC46DB404DBD2F5133810D34C7CE7229B0384EDDF43D55641137D5F4B0C5319725D38EF2](https://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781337558860&token=89EEF5AC408826CD381C3B27F19B3BD859B7EA69CEEC2862139E3103F28A65F8B5723398CC46DB404DBD2F5133810D34C7CE7229B0384EDDF43D55641137D5F4B0C5319725D38EF2)

The class lectures are organized in the same sequence as in the textbook. But if you don't like the presentation style of the text, you can find the same topics in any of the following books.

Ramanathan, Ramu, *Introductory Econometrics with Applications*. 5<sup>th</sup> Edition.

Stock, and Watson, *Introduction to Econometrics*, 3<sup>rd</sup> Edition, Addison Wesley

Studenmund, A. H. *Using Econometrics: A Practical Guide*, Addison Wesley Longman.

Goldberger, A. (Latest Edition). *Introductory Econometrics*, Harvard.

Hill, C., W. Griffiths, and G. Judge. Undergraduate Econometrics, Wiley  
Gujarati, D. (Latest Edition), Basic Econometrics, McGraw-Hill.  
Johnson, A., M. Johnson, and R. Buse, Econometrics: Basic and Applied.

### **Computer Software Information**

Learning how to use statistical software is part of the requirements for this course. If you are already familiar with well-known software such as SAS, STATA, MINITAB, EVIEWS, SPSS, R, and EXCEL, you may use it for your assignments and classwork. All of these software programs and instructions about using them are available on the network at USC. I will use STATA program for class demonstrations. If you like to have your copy of STATA software, the student version (STATA/IC) is available on STATA website: <http://www.stata.com/order/new/edu/gradplans/student-pricing/#>

### **Description and Assessment of Assignments and exams**

The homework assignments from the end of chapters' problems and questions are on the syllabus. Due dates for the homework assignments will be announced in class and posted on Blackboard. In addition to the textbook problems, I will assign more problems from the class lectures called class problem sets (which I will post on the Blackboard). Homework assignments must be submitted on time and preferably typewritten. For empirical assignments, a computer printout of the estimation results must be attached to the homework. There will be no credit for any late homework submitted after we post the solutions on Blackboard.

There will be two midterm exams and a final exam. Exams of problems and short answer questions. Although the 2<sup>nd</sup> exam is non-cumulative, most chapters build on previous ones. Hence, to do well on the exams, you should carefully review the previous chapters. The final exam is cumulative and will cover most of the materials in the course.

Students are also required to participate in a group project (term paper). The project involves data collection, model building, model estimation, and presenting the results. I will provide you with more information regarding the group project and its requirements in class.

### **Grading Breakdown**

The course will be graded on a regular scale of 100% unless the class average falls short of my expectations. In that case, I will use a curve based on the average grade of students who complete the course. Depending on the students' performance, the class average is usually around a low B.

### **Weights for homework and exams are**

<u>Activity</u>	<u>Percentage of Grade</u>
Homework and class participation	20%
Exam 1	20%
Exam 2	20%
Group Project	10%
Final exam	30%
Total	100%

### **Assignment Submission Policy**

The due dates for the homework assignment will be posted on the Blackboard. Students must turn in their homework as instructed by their TA. If you need any special accommodations for submitting your assignment or taking the exam, let me know in advance.

**Course Schedule: A Weekly Breakdown (this is a tentative schedule, any changes will be announced in class)**

	<b>Topics/Daily Activities</b>	<b>Readings and Homework Assignments</b>
<b>Week 1</b> <b>Starts Wednesday,</b> <b>May 18<sup>th</sup></b>	<b>Appendix A, Read it yourself</b>  <b>Appendix B,</b> Random variables and their probability distribution, Joint, marginal and conditional distributions Expected value, variance, and standard deviation of random variables and their properties, Normal and related distributions	Appendix A: 2, 6, 8, 10  Appendix B: # 4, 8, 10 Class problem set 1, (1.5)
<b>Week 2</b>	<b>Appendix C,</b> Random sampling, Estimators, and estimates Finite and asymptotic properties of an estimator, Confidence interval, and hypothesis testing  <b>Chapter 1,</b> Introduction to econometrics and structure of economic data <b>Chapter 2,</b> Simple linear regression, deriving the OLS estimates Interpretation of the parameter estimates	Appendix C: #2, 6  Chapter 1, # 1, 4, C2, C4 Class problem set 2 (1.2)  Chapter 2, # 4, 6, C4, C6 Class problem set 3 (1.5)
<b>Week 3</b>	SLR assumptions and properties of OLS estimates, testing a single parameter  <b>Chapter 3,</b> Mechanics and Interpretation of Multiple Linear Regression (MLR) Assumptions and properties of MLR, Efficiency of OLS Confidence intervals and Testing Hypotheses about a single population parameter, Confidence intervals and Testing Hypotheses about a single population parameter in MLR	Chapter 3, # 4, 6, C6, C8 (1.00)
<b>Week 4</b> <b>Exam1, Tuesday</b>	<b>Chapter 4,</b> Testing for linear restrictions on parameters, t and F tests, $R^2$ and its Interpretation, testing for General linear restrictions, P-value and its Interpretation	Chapter 4, # 6, 10, C2, C6, C8 Class problem set 4 (1 a-g) (2.5)
<b>Week 5</b>	<b>Chapter 5,</b> Asymptotic properties of OLS, Large sample test, the Lagrange Multiplier test  <b>Chapter 6,</b> Econometrics modeling Using logarithmic functional forms Other nonlinear functions Adjusted $R^2$ , Prediction, and residual analysis	Chapter 5, # 4, C2, C6 Class problem set 4 (1-h, 2) (1.5)  Chapter 6, # 4, 6, C6, C12 Class problem set 5 (2.0)

<b>Week 6</b>	<p><b>Chapter 7,</b> Qualitative variables and use of dummy variables in regression analysis Interactions between dummy variables, Chow's test of model differences Binary dependent variables and linear probability model</p> <p><b>Chapter 8,</b> Heteroskedasticity and its consequences Heteroskedasticity robust inference Testing for Heteroskedasticity, Breusch-Pagan, White's and other tests of Heteroskedasticity, Weighted Least Squares and its properties</p>	<p>Chapter 7, # 2, 10, C6, C8, C10 Class problem set 6 (2.5)</p> <p>Chapter 8, # 4, 6, C4, C8 Class problem set 7 (2.5)</p>
<b>Week 7</b> <b>Exam 2, Tuesday</b>	<p>Feasible Generalized Least Squares and its properties</p> <p><b>Chapter 10,</b> The nature of time series, Time series assumptions Finite sample properties of OLS, Trend and seasonality, Spurious regression, and how to correct for it</p>	<p>Chapter 10, # 2, C2, C12 Class problem set 8 (1.5)</p>
<b>Week 8</b>	<p><b>Chapter 12,</b> Serial correlation and heteroscedasticity in time series Properties of OLS with serially correlated errors, Testing for serial correlation of 1<sup>st</sup> order, t, and Durbin-Watson tests Correcting for 1<sup>st</sup> order serial correlation FGLS and iterative FGLS methods Testing and correcting for higher-order serial correlation. Robust inference with serial correlation Autoregressive conditional Heteroskedasticity (ARCH) model Heteroskedasticity and serial correlation in linear regression</p>	<p>Chapter 12, # 2, 6, C6, C10 Class problem set 9 (2.3)</p>
<b>Week 9</b>	<b>FINAL EXAM</b> <b>Tuesday, July 12<sup>th</sup></b>	

### Policy on Missed Exams

Students must take the exams as scheduled. There will be no make-up exams unless the student has a valid medical excuse and can provide documentation for such a reason, or if a student cannot take the exam because of extenuating circumstances, and prior arrangements are made with the instructor. Students will receive zero credit for unexcused missed exams. The student will receive an F for the course if the final exam is missed for unexcused absence regardless of the student's performance during the semester. If a student has a valid reason for missing the final exam and can document it, they will receive an incomplete grade.

### Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate->

[sanctions/](#). Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety of whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage [sarc@usc.edu](mailto:sarc@usc.edu) describes reporting options and other resources.

### **Support Systems**

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology.