

**Dornsife College of  
Letters, Arts and  
Sciences,  
Department of  
Economics**

ECONOMICS 318, 26101R- Introduction to Econometrics

Units: 4

Spring 2016, Mon, Wed 4:00-5:50 pm

Location: WPH-B28

Instructor: Manochehr Rashidian

Office: KAP-116B

Office Hours: Tue, Thu, 12:00 - 1:30 p.m.. If my office hours are not convenient for you, I am also available by appointment.

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Office Hours: TBA

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## Course Description and Overview

Econometrics is about using statistical and mathematical methods in economics. It involves using economic data to reveal economic relationships. Econometrics techniques have been increasingly used in macroeconomics and applied microeconomics. Macroeconomics data are used for testing macroeconomic theories, evaluating the impacts of public policies, estimating macroeconomics relationships and forecasting economic variables such as inflation rate, GDP growth rate and interest rate. 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 impacts of business decisions.

We will start with a brief overview of data presentation and fitting of the data. Univariate and bivariate random variables, estimation of unknown parameters, properties of the estimators and inference about parameters of the population will be covered next. The second part of the course deals with simple and multiple linear regression models. This is the main focus of the course. We will cover variety of the topics under regression models such as, assumptions of linear regression, estimation and interpretation of the parameter estimates, goodness of fit measures, testing for restrictions on parameters, consequences of violating the linear regression assumptions, and forecasting. The last part of the course deals with relaxing the classical assumptions and how to estimate the linear model in absence of these assumptions. How to deal with nonlinearities and qualitative dependent and independent variables are also discussed in the last part of the course.

## Learning Objectives

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

## Course Notes

- 1- To prevent disruptions in lecture, 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 to the lecture is mandatory. Missing class will reduce your class participation points.
- 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.

## Required Readings and Supplementary Materials

The required text is: **Wooldridge, Jeffrey “Introductory Econometrics, a Modern Approach”**, South-Western Cengage Learning. Latest Edition,  
Textbook website contains the data and text’s figures and tables. Textbook’s website is:

[http://www.cengagebrain.com/cgi-wadsworth/course\\_products\\_wp.pl?fid=M20b&product\\_isbn\\_issn=9781111531041&token=](http://www.cengagebrain.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781111531041&token=)

The class lectures are organized in the same sequence as in text book. 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**

You may use any statistical software for your homework assignments such as SAS, STATA, MINITAB, EVIEWS, SHAZAM, EXCEL, GRET, etc. Some of these software programs are available on the network at USC and instructions for using them will be available to students. I will use GRET program for class demonstrations. GRET program along with its manual can be downloaded free of charge from <http://gretl.sourceforge.net/>

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

The list of homework assignments from the end of chapter problems and questions is in the weekly reading table (next page). In addition to these problems, I will assign more questions and problems from the lecture in class. Homework assignments should be turned in 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 late homework once solutions are posted online.

There will be 2 quizzes (short exams), a midterm and a final exam. Exams and quizzes consist of problems and short answer questions. Although the quizzes are non-cumulative, most chapters build on previous ones. Hence, to do well on the exams, students should carefully review the previous chapters. The final exam is cumulative and will cover most the materials in the course.

### **Grading Breakdown**

The course will be graded on regular scale of 100% unless class average falls short of my expectations. In that case, I will use a curve based on the average grade of students who actually complete the course. Depending on students' performance, 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%
Quizzes	20% (10% each)
Midterm exam	27%
Final exam	33%
Total	100%

### **Assignment Submission Policy**

The due dates for homework assignment are in the following table. Any changes in the due dates will be announced in class and/or posted on Blackboard.

Students have the option of turning their homework to me or the TA prior to the due date. Do not email your homework without prior arrangements.

### Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework Assignments	Due Dates
<b>Week 1</b> 1-11, 1-13	<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	Appendix A: all 1 - 10 Appendix B: # 4, 10	Due 1-25 Due 1-25
<b>Week 2</b> 1-20	Normal and related distributions  <b>Appendix C,</b> Random sampling, Estimators and estimates Finite and asymptotic properties of an estimator	Appendix C: #3, 6	Due 2-1
<b>Week 3</b> 1-25, 1-27	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	Chapter 1, # 1, C2, C3  Chapter 2, # 4, 6, C4, C6	Due 2-1  Due 2-8
<b>Week 4</b> 2-1, 2-3	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	Chapter 3, # 4, 6, C6, C8	Due 2-17
<b>Week 5</b> 2-8, 2-10	Confidence intervals and Testing Hypotheses about a single population parameter in MLR  <b>Chapter 4,</b> Testing for linear restrictions on parameters, t and F tests <b>Quiz 1, Feb. 10<sup>th</sup></b>	Chapter 4, # 6, 9, C3, C9	Due 2-24

<b>Week 6</b> 2-17	$R^2$ and its interpretation, testing for General linear restrictions, P-value and its interpretation		
<b>Week 7</b> 2-22, 2-24	<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	Chapter 5, # 4, C1, C3  Chapter 6, # 3, C5, C12	Due 3-7  Due 3-9
<b>Week 8</b> 2-29, 3-2	Other nonlinear functions Adjusted $R^2$ , Prediction and residual analysis  <b>Midterm Exam, Feb. 29<sup>th</sup></b>		
<b>Week 9</b> 3-7, 3-9	<b>Chapter 7,</b> Qualitative variables and use of dummy variables in regression analysis Interactions between dummy variables	Chapter 7, # 2, 9, C6, C8, C10	Due 3-28
<b>Week 10</b> 3-21, 3-23	Chow's test of model differences Binary dependent variables and linear probability model  <b>Chapter 8,</b> Heteroskedasticity and its consequences Heteroskedasticity robust inference Testing for Heteroskedasticity	Chapter 8, # 4, 6, C4, C8	Due 4-11
<b>Week 11</b> 3-28, 3-30	Breusch-Pagan, White's and other tests of Heteroskedasticity Weighted Least Squares and its properties		
<b>Week 12</b> 4-4, 4-6	Feasible Generalized Least Squares and its properties  <b>Chapter 10,</b> The nature of time series, Time series assumptions Finite sample properties of OLS <b>Quiz 2, Apr. 4<sup>th</sup></b>	Chapter 10, # 5, C2, C12	Due 4-20
<b>Week 13</b> 4-11, 4-13	Trend and seasonality Spurious regression and how to correct for it  <b>Chapter 12,</b> Serial correlation and hetroskedasticity in time series Properties of OLS with serially correlated errors	Chapter 12, # 3, 6, C6, C10	Due 4-27

<b>Week 14</b> 4-18, 4-20	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		
<b>Week 15</b> 4-25, 4-27	Robust inference with serial correlation Autoregressive conditional Heteroskedasticity (ARCH) model Heteroskedasticity and serial correlation in linear regression  If time allows, we will cover parts of chapter 16		
<b>FINAL Exam</b>	<b>Wednesday May 4<sup>th</sup>, 4:30 - 6:30 pm</b>		

### Policy on Missed Exams

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

### 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](http://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.