

**Department of Economics
Spring 2014
Rutgers University**

**ECON 50: 220: 322
ECONOMETRICS (Hybrid)
Instructor: Noha Emara**

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Class room and time: BSB-134, Mon./Wed., 11:15am- 12:10pm, and online class on Fridays.

COURSE DESCRIPTION

This course introduces students to multiple regression methods for analyzing data in economics and related disciplines. Extensions include regression with discrete random variables, instrumental variables regression, analysis of random experiments and quasi-experiments, and regression with time series data. The objective of the course is for the student to learn how to conduct – and how to critique – empirical studies in economics and related fields. Accordingly, the emphasis of the course is on empirical applications. The mathematics of econometrics will be introduced only as needed and will not be a central focus.

PREREQUISITES

Microeconomic Principles (50:220:102) *AND* Macroeconomic Principles (50:220:103) *AND* *Introduction to Statistics I* (50:960:283).

TEXTBOOK AND SOFTWARE

The text for this course is: James H. Stock and Mark W.Watson, *Introduction to Econometrics 3rd Edition*, Addison-Wesley 2010. This is an excellent textbook and should be available in the University Bookstore on Cooper street. The software that will be used in this course is STATA. The software that will be used in this course is STATA. The software is available at most of public labs on campus. Some labs are open in the evening and at the weekend. No prior knowledge of this software package is assumed. This package will be introduced in lectures and in the assignments as the course proceeds. Also a helpful handout on how to use STATA is posted on the course website.

The text has an excellent additional resource website. The address is http://www.Pearsonhighered.com/stock_watson/ . At this website you will find answers to selected exercises that appear at the end of each Chapter of the book. You will also find a tutorial on how to use STATA at this site.

WEB ACCESS

The course web page is available through Sakai. Announcements, Assignments, additional papers to accompany each chapter, and a secure grade book will all be on Sakai website. You are responsible for checking announcements, grades, and discussion board frequently. If you miss a class, please check Sakai for any announcements, handouts and other information.

ONLINE ASSIGNMENTS

There will be a total of five assignments. The five assignments will count a total of 20% toward your final grade. The assignments consist of a series of multiple choice questions. Some of these questions will require the use of the STATA. Data files required for each assignment will be available through either Sakai website or the textbook's website. The assignments will be posted on almost every other Wednesday and answers will be submitted online. You will have ONE WEEK to finish and submit the assignment. The post dates for the assignments are **January 29, February 12, February 26, April 2, and April 16**. The due dates for the assignments are **February 5, February 19, March 5, April 9, and April 23**.

FRIDAYS ONLINE CLASS'S ASSESSMENTS

There will be no in-class instructions on Fridays. However, on every Friday (fourteen Fridays excluding the spring recess) throughout the semester, you are required to take an online assessment posted under Sakai. The assessments are either multiple choice questions and/or video instructions related to teaching the STATA software. These Friday's assessments are posted on every Friday at 12:00am and will be due on the same day at 11:59pm. This means you will have ONE DAY to finish and submit the assessment. The total fourteen assessments will count a total of 20% of your final grade in the course.

EXAMS

Two Midterms and one non-cumulative Final exam. All exams are multiple choice question and are taken in class.

The first Midterm is scheduled for **Wednesday February 19**.

The second Midterm is scheduled for **Friday March 12**.

The final exam **TBA**

THERE WILL BE NO MAKE-UP EXAMS WITHOUT A DOCUMENTED MEDICAL EXCUSE.

GRADING

Online Assignments	20%
Hybrid Friday Class Quizzes	20%
Midterm Exam I	20%
Midterm Exam II	20%
Final Exam	20%

GRADES CUTOFF

A	90 - 100
B +	85 - 89.99
B	80 - 84.99
C +	75 - 79.99
C	70 - 74.99
D	60 - 69.99
F	0 - 59.99

IMPORTANT DATES

- Wednesday January 22: First day of the class.
- Wednesday February 19: Midterm exam I (in class).
- Friday March 12: Midterm exam II (in class).

- Spring Recess: March 15 – 23.
- Friday May 2: Last day of the class (Hybrid).
- Final Exam TBA

FINAL REMARKS

- I will NOT accept late assignments and I will NOT accept any assignments by email or fax.
- You can use a calculator for the exams.
- You may work with your classmates on the assignment and/or Friday's assessments but each student has to submit the answers online and independently.
- Midterm and Final exams are closed book.
- You must turn off your cell phone during the class and exams.
- Attendance is important in this course.
- Academic dishonesty, including cheating, is never acceptable.

TENTATIVE TOPICS

These topics are subject to change. Students are responsible for all topics covered in the lecture notes. Often my treatment of topics will be different from that of the textbook. The textbook should be viewed as complements to the lectures, not as substitutes.

Topic 1: Introduction, Econometric Methodology, and Data

- Introduction to the course
- Description of types of data that we will use
- Randomized controlled experiments and casual effects

Readings: Chapter 1.

Topic 2: Review of Probability

- Discrete vs. continuous random variables
- Probability distribution function (density) and cumulative distribution function
- Expected value and variance of a random variable
- Joint, marginal and conditional distribution
- Covariance, correlation and independence of random variables
- Special distributions: Normal, Chi-square, F and student t
- Random sampling
- Law of large numbers and the Central limit theorem

Readings: Chapter 2

Topic 3: Review of Statistics

- Estimating values in the true population
- Hypothesis testing and confidence intervals for the estimates

Readings: Chapter 3.

Topic 4: Ordinary Least Squares

- One regressor, estimation and assumptions: Sections 4.1 – 4.3 and 4.4
- Multiple regressors, estimation and assumptions: Sections 6.2 – 6.5
- Hypothesis testing and confidence intervals for one regression coefficient: Sections 4.5, 5.1 – 5.3 and 5.5 – 5.6

- Testing hypotheses on more than one coefficient: Sections 7.1 – 7.6

Topic 5: Violation of OLS Assumptions

- Heteroskedasticity
- Omitted Variable Bias
- Other forms of misspecification
- Multicollinearity

Readings: Sections 5.4, 6.1, 6.7, 9.2 – 9.3

Topic 6: Nonlinearities

- Interactions between regressors
- Other nonlinear specifications

Readings: Sections 8.2 – 8.3

Topic 7: Binary Dependent Variable

- Linear Probability Model
- Probit
- Logit
- Introduction to maximum likelihood estimation

Readings: Chapter 11.

Topic 8: Instrumental Variables

- TSLS in the General IV Model
- Instrument Relevance and Exogeneity

Readings: Sections 12.1 – 12.3

Topic 9: Introduction to Panel

- Before and After Regression
- Cross-section Fixed Effects
- Time Fixed Effects

Readings: Sections 10.1 – 10.4

Topic 10: Introduction to Time Series Econometrics

- 1st Order and Pth Order Autoregressions
- Autoregressive Distributed Model
- Lag Length Selection Using Information Criteria
- Non-Stationarity: Testing for a Unit Root and Testing for Breaks

Readings: Chapter 14