ECON 441 Course Syllabus

Course Title  Economics 441– Introduction to Econometrics

Meetings  AB 205 every Tuesday and Thursday, 11:00 to 12:15

Instructor  Dr. Jingjing Yang,
AB 319A
Office phone: 775-784-1112

Office Hours  Tuesdays and Thursdays 2:30-3:30 and by appointment

Prerequisites  ECON 102, ECON 103, and ECON 262R


Software:  EXCEL and STATA. These are available on computers in the COB lab and STATA is on the Citrix server. The econometric software used in this course is STATA. Recommended learning resources: Tutorial for learning how to use STATA: http://www.stata.com/links/resources-for-learning-stata/

Grading  Homework 20%
Term Project 20%
Exam 1 (October 15) 25%
Exam 2 (Finals Week) 25%
Participation & Quizzes 10%

Grading Scale  Percent of all points  Grade
92.5-100  A
90.5-92.49  A-
88.5-90.49  B+
82.5-88.49  B
80.5-82.49  B-
78.5-80.49  C+
72.5-78.49  C
70.5-72.49  C-
68.5-70.49  D+
62.5-68.49  D
58.5-62.49  D-
0-58.49  F
Course Description

As a social science, Economics attempts to analyze and predict individual behaviors and their societal impacts. Economists have developed the theories of micro and macro economics to analyze various issues and students are expected to have taken those foundational courses prior to this course. This course is an empirically based course in which students will develop hypotheses grounded in theory and then test those hypotheses using data and statistical methods. Econometrics can be considered as a way to test theories, so econometrics is core to the economics as a social science.

The main part of the course provides an introduction to basic econometric concepts and data analysis techniques, such as descriptive statistics, correlation and regression, probability, chance variability, and sampling. This part will be covered relatively quickly. And the second part of the course covers hypothesis testing, the basic regression theory and techniques used in empirical work which include simple and multiple regression models, dummy variables, heteroskedasticity, and methods of instrumental variables.

Most econometric applications have societal implications, because the goal is to understand in an empirical way some economic process or system, whether it is microeconomic or macroeconomic. A big portion of the course will not be societal in nature because it is about learning the techniques. However, the implications of the results for individual or social decision making will be discussed. For example, students may do a simple linear regression where they estimate the price and income elasticities for the demand for beer in Wisconsin. These elasticities have implications for firms (pricing the product, advertising) and governments (taxing the product). Some other examples include:

- Local and regional utility companies forecasting the demand for power, water, and natural gas, which impacts the price and availability of these basic items.
- Local and state governments using econometric models to forecast their revenues, which effects government budgets
- Large companies econometric modeling to understand how factors impact their business, both factors the business can control and factors the business cannot control, and the knowledge can be used to help business plan (e.g. advertising) and respond (e.g. to changes in energy prices or exchange rates).
- At the national level, econometrics are used by many federal agencies and by the federal reserve, and the outputs of those models impact multi-billion dollar budget decisions and federal government policy decisions which impact the life of every American.

To further encourage students to apply econometrics to issues of societal concern, the course will require students to undertake a term project analyzing a dataset and developing conclusions based upon their results.

Finally, the limitations of the methods of econometrics will be discussed. Some such as Nobel Prize winning economist Ronald Coase have criticized aspects of the specification and usefulness of econometrics. Coase once remarked, ““if you torture the data long enough it will confess.” Similarly, Deirdre McCloskey has argued that the selection of which variables to include or exclude must be guided by theory. Another Nobel winning economist, Robert Lucas, has developed a critique that argues econometric models may have limited usefulness for policy analysis if individuals actors change their expectations.
about the future and change their behavior. These issues will be explored in discussing both model development and uses of econometrics for public policy analysis.

**Course Objectives**

- To familiarize you with methods of data analysis including descriptive statistics, regression analysis, and advanced issues in econometrics
- To improve your ability to communicate your understanding of data analysis.
- To expand your knowledge of various statistical techniques to analyze data and better understand the selection of different statistical techniques for different research problems.
- To understand how economic theories may be used to create testable hypotheses using empirical data and econometrics.
- To examine the role of econometrics in analyzing issues of social concern
- To examine the limitations of econometrics and their applications on society.
- To prepare you for other courses and for a job as an economist where data analysis is required.

**Course Learning Outcomes**

After taking this class, students will be able to:

- Demonstrate in a class project application of appropriate econometric methods to test an economic theory including deriving and test a specific hypothesis relevant to a general economic or policy question.
- Develop econometrically testable hypotheses based upon economic theory
- Identify and use the correct statistical technique to test hypotheses for different types of variables.
- Conduct and present, either in writing or in a class presentation, results from a multivariate statistical analysis using appropriate econometric techniques.
- Use different computer applications to analyze data and perform econometric analyses.
- Identify problems in data analysis and interpretation arising from methodological or data problems.

**Core Curriculum:**

This course is part of the Silver Core Curriculum for the University. It meets the Core Objective 9: Science, Technology & Society, and Core Objective 14: Application. This course will also develop discipline-specific competency in both CO2 (Quantitative Reasoning) and CO3 (Critical Analysis & Use of Information).

**Core Objective 9: Science, Technology & Society:** This course uses data, statistics, and computer applications to develop and test scientific theories from economics. Students will be able to distinguish between sound and unsound interpretations of scientific information, including identifying appropriate data analysis techniques and problems; employ cogent reasoning methods in their own examinations of problems and issues; and understand the applications of technology. The course builds upon the applications of data analysis and computer applications introduced in ECON 261, ECON262R Principles of Statistics I and II. The course also relies upon computer methods developed in IS101, a pre-requisite for ECON261 and ECON262.
The course will help students use technology to examine and test economic hypotheses and apply results to issues of social concern. Student term projects and lectures will be used to examine the implications of econometric methods on societal issues and the limitations of econometrics and technology for analyzing issues.

**Course Policies**

The exam dates scheduled above are tentative and subject to change. However, every attempt will be made to hold the exams on the days indicated. You are responsible for taking all exams and turning in all assignments. Make-up exams will not be given unless I am notified prior to the exam, in which case an exam may be rescheduled. Late homework and projects will NOT be accepted.

Students are bound by the Academic Honor System. This system is based on the premise that each student has the responsibility a) to uphold the highest standards of academic integrity in the individual's own work, b) to refuse to tolerate violations of academic integrity in the University community, and c) to foster a high sense of integrity and social responsibility on the part of the University community. While problems of academic dishonesty rarely come up, feel free to bring them to my attention, and I will work with you to address them appropriately.

**Audio and Video Recording:**
Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may be given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

**Classroom Etiquette:**
I will make every effort to begin and end class on time. If you arrive late or leave early, please do so quietly. Also make sure your cell phones are turned off during classes and exams.

**Attendance and make-up exams:**
Attendance will be taken. You need to contact me if you miss three classes. Please do not mislead me about missing class due to illness since that will be considered academic dishonesty and may result in penalties. Skipping class will lower your participation grade, although failing grades will not be given based on truancy alone. Grading scale will be announced in class.

There are no scheduled make-up exams. In case of a known conflict with one of the exams, students who miss an exam for any reason must communicate with me by email no later than one week prior to the scheduled exam. If you anticipate a conflict with the final exam schedule, you should drop this course and retake it in another semester. In case of emergency, eventually you should provide a medical or legal documentation explaining your situation.

Below please see the important dates and course outline. The midterm exam dates are tentative. I reserve the rights to make changes to the course calendar and outline.
Students with Disabilities
I encourage any student needing to request accommodations for a specific disability to please meet with me at your earliest convenience to ensure timely and appropriate accommodations.

Course Assignments:

Homework and Problem Sets (20%):
Problem sets must have your name, student ID in the upper right corner. There are totally nine (tentative) problem sets. If I assign more than nine problem sets, the lowest scores will be dropped. No email problem sets will be accepted. Usually they are due one week after they are assigned, but sometimes due at the beginning of the next lecture after they are assigned. Problem sets must be word-processed; however, you may do graphs and equations by hand if you like. Answers to problem sets will be collected at the beginning of lecture. Any problem sets coming in after that lecture will be accepted before I hand out solutions in class but will be penalized by 50% of the allocated score.

You are encouraged to discuss with others in class on the problem sets and an ideal study group size is two to three. But you must write you own answer separately. Plagiarized or copied homework will not be accepted. If the problem set includes computer exercises (later in this semester), you must attach the STATA command and output as well. When you hand in the problem sets, you may attach the questions along with your solutions, so that you will have a complete set of problem sets to review before the exams.

Exams (50%):
There will be two in-class midterm exams tentatively scheduled for mid-October and during Finals week in December. The first midterm covers material in the first seven weeks of lecture, and the second one covers material that comes after the first midterm. The final will be cumulative, but with more coverage of the material since the first midterm. No laptops, beepers, cell phones, or other electronic devices are allowed during exams. Please bring your own calculator.

Regrading: Graded exams will be returned during my lecture. If you miss the lecture and don't pick up the graded exams, you need to make an appointment with me to pick them up as soon as possible. Regrade requests are due no later than one week after the exams are returned to you. There is no extension of the deadline if you miss the class and fail to pick them up on time. I will regrade the entire work, not just the question you have problem with, which may result in lower or higher grade.

Participation and quizzes (10%)
Quizzes (announced and unannounced), attendance, and participation add up to 10%. Quizzes will cover material from the current section and are meant to insure that students are keeping up with reading and lecture material.

Term Project (20%)(see attached description for more details)

A term project for the course is required. The term project must be on a topic identified by the student and agreed upon by the instructor. The project should be focused on a topic in either microeconomics or macroeconomics. These are broad areas including issues in labor, healthcare, international, transportation, production, housing,
unemployment, inflation, monetary and fiscal policies, and other topics. Students will be required to develop a testable model regarding their topic based upon appropriate economic theory. Students will then use secondary data sources to analyze and test their model using appropriate methods in econometrics and statistics. Each project must in some manner address the impact of science & technology on society.

**Brief Course Outline**

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Students will submit a paper written in an appropriate research format to present their results. The paper must include an introduction, discussion of data, model, results, and policy implications. Extended tables and results should be placed in an appendix. The paper will be due by the beginning of finals week. Papers will average 10-15 pages.

Groups: Students will work in groups of 4 or 5 people. All students must contribute to the project and peer evaluations will be used to ensure participation. In the event a person does not contribute, their grade will be correspondingly lowered.

Options:
1) Case Study Data: Using data about a case study provided by the instructor, students will develop a model to analyze the topic. Possible topics include: cigarette sales and taxation rates to determine price elasticity and incidence of taxes; restaurant sales data to analyze labor productivity, marketing effectiveness, and other aspects of a business; cell phone data to analyze market segments, customer turnover, and usage.
2) Other Topics: Students who wish to pursue a different topic than the case studies may discuss topics with the instructor. Graduate students will be required to develop their own topics and should see the instructor.

Project Mileposts: (for each milestone, groups must submit a 1-2 page summary except for the draft paper).
1) Sept 30th Topic Overview: Students must submit a brief description of their case study or proposed topic including how they will use the data to test relevant hypotheses and how the topic can be used to develop policy recommendations.
2) Oct 30th: Model Specification: Using knowledge from the first portion of the course on general model specification, students must present a proposed model for analysis. The model must specify proposed variables, model form, and clearly identify data sources. Students should have preliminary data collected and in a format for analysis.
3) November 15th: Data Problems: Using concepts from class about issues such as multicollinearity, heteroskedasticity, and autocorrelation, students should identify any possible problems with their data and how they will deal with them in their analysis.
4) November 30th: Preliminary Draft: Students should submit a preliminary draft of their project for review and critique.
5) December 10th: Final project Due:

Project Grading: In addition to grading the mileposts and paper, students will also be graded based upon their peer reviews which may be used to adjust their individual grade. A question related to the project will also be contained on the final exam to ensure that all individuals understand their project.