

ECON 4261: COURSE SYLLABUS

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1 Introduction

Econometrics is a body of theory and methods for analyzing economic data. Econometrics draws primarily from statistics, probability and economic theory to address empirical questions about the economy.

This course will start with some classic examples of econometric models; some are derived from economic theory, others are not. These will serve as an introduction to econometric modeling. Three key concepts: unbiasedness, consistency and efficiency of an estimator will then be studied. We will discuss the Classical Linear Model and the estimation method of Ordinary Least Squares (OLS) and Method of Moments. We will then be precise about assumptions under which OLS is unbiased, consistent, and efficient. Inference, still in the Classical Linear Model, will have us study hypothesis tests and confidence intervals. Before moving onto refinement of the above theory, we will cover identification problems to gain a better understanding of what can and cannot be said from the data. Violations of the assumptions alluded to above and associated remedies will then be studied: Generalized Least Squares (GLS) for serial correlated and heteroskedastic errors and IV for endogeneity. Endogeneity and the use of instrumental variables will provide natural grounds for a discussion of causality. We will also cover the method of Maximum Likelihood. Applications of the above techniques to economic data with Stata will be a constant theme. If time allows, we will also cover basic concepts in time series analysis and panel data models for which data is organized along both the cross-sectional dimension and the time series dimension.

1.1 Learning goals

After taking this course, a student will be able to read critically and conduct empirical analysis of economic data. In particular, the student will be able to:

- estimate parameters of an economic model and conduct inference;
- read and interpret empirical analysis critically, and in particular, appreciate the difference between correlation and causation;
- appreciate what can and cannot be said from economic data (identification).

2 Course Details

2.1 Times and Location

Lecture is held Monday, Tuesday, Wednesday, and Thursday from 11:15 am to 1:10 pm in Blegen Hall 330.

2.2 Recitation

Recitations will be held on Thursdays, from 1:25 to 2:15 pm in Blegen Hall 415.

2.3 Homework

There will be six assignments which will involve analytical derivations as well as using a statistical software to conduct estimation and inference and report your results. You will be granted access to Stata by CLA OIT; make sure that by the end of the second week of class you know how to access Stata.

All homework assignments will be available online at the class webpage. No hard copies will be provided. We do not require that your assignments be typed (although learning to use something like L^AT_EX wouldn't be a bad skill to learn), but all assignments must be neatly done.

Homework assignments are due each Monday (except the day of the midterm). Homework will be collected at the beginning of lecture on the due date. No late assignments will be accepted. Only documented special circumstances (e.g. severe illness with doctor's note) are possible exceptions to this. If you cannot attend class on the due date, you must turn it in before the class.

2.4 Exam

There will be a midterm on Monday July 10 during the lecture time. The material for the midterm exam will include everything we will have covered by then.

The final exam will be on Thursday August 3 during the lecture time. The material for the final exam is cumulative with an emphasis on the material covered after the midterm.

All exams are closed book and closed notes.

2.5 Project

You are expected to collect data and write a short research paper. In the paper you will need to motivate an interesting empirical question, discuss the data you have to answer the question, discuss the econometric methods used, discuss the validity of the methods, and discuss the interpretation of the results. The project will be handed in on the last day of class. More information about the project will be given later in the course when it will make more sense.

2.6 Grading

- 6 Homeworks - 25 percent
- Midterm - 25 percent
- Project - 15 percent
- Final - 35 percent

Below is the grading scale for the course. We reserve the right to lower these cut-offs points (i.e., increase the letter grades for percentages), but we will not raise the cut-offs (i.e., make it harder to get good grades).

Percentage	Grade	Percentage	Grade
93 - 100	A	73 - 77	C
90 - 92	A-	70 - 72	C-
88 - 89	B+	68 - 69	D+
83 - 87	B	60 - 67	D
80 - 82	B-	0 - 59	F
78 - 79	C+		

Table 1: Grading Scale

2.7 Course Material

Material will be posted on the Moodle course website (<https://moodle2.umn.edu/>). Please check it regularly. The material for the course will be based on lecture notes (students are expected to take notes during classes). References in Greene will be given for each topic we will cover.

- Greene, William H., *Econometric Analysis: 7th Edition*, 2012, Prentice Hall.

All the material covered can be found in Greene (and much more), but the textbook is a bit advanced. For a simpler treatment see

- Wooldridge, Jeffrey M., *Introductory Econometrics: A Modern Approach*, Cengage Learning.

There is, however, no good substitute for attending lecture.

2.8 Disability Services

Students with disabilities must be registered with Disability Services. Contact <http://ds.umn.edu>. The Department of Economics, in conjunction with Disability Services, will make appropriate accommodations for students with disabilities. Specifically, exams will be administered by Disability Services to meet student needs. Please contact the instructor as soon as possible if you need accommodation.

2.9 Prerequisites

The prerequisites for this course are:

- ECON 3101 Intermediate Micro
- MATH 1271/2 Calculus
- MATH 2243 Linear Algebra
- MATH 2263 Multivariate Calculus
- STAT 4/5101/2 Theory of Statistics
- MATH 4242 Applied Linear Algebra is strongly recommended
- Familiarity with computers.

2.10 Academic Dishonesty

For the purpose of this class, students are allowed (and in fact encouraged) to work together on homework provided the following rules are followed: any collaboration must be acknowledged explicitly, each student must individually type up or write up each homework assignment and any use of material other than class notes must be cited. Identical assignments will receive a zero score. Anyone committing scholastic dishonesty on an exam will receive an F for the assignment or exam and the incident will be referred to the Office for Student Conduct and Academic Integrity. Among other things, this includes looking at the exam of another student, communicating with another student via any means during the exam, and continuing to work on the exam when the exam is complete. There is zero tolerance for cheating on exams.

3 Tentative Schedule of Course Content

- Introduction
 - What is Econometrics
 - Estimation Methods
 - Properties of Estimators

- Ordinary Least Squares
 - Derivation of OLS
 - Properties of OLS
 - Inference
 - Validity of OLS
- Violations of Assumptions
 - Binary Choice Models
 - Generalized Least Squares
 - Instrumental Variables Regressions
- Other Topics (Time Permitting)
 - Panel Data
 - Bayesian Estimation
 - Distribution Fitting

Remember, econometrics is easy, econometrics is fun, and econometrics is
your friend!