Econ 4650-090 (Principles of Econometrics)

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Course Description

Econometrics is based on the development of statistical techniques for estimating economic relationship, testing economic theories, and evaluating and implementing government policy and business decisions focusing on the problems inherent in collecting and analyzing nonexperimental economic data. The general application of econometrics includes the forecasting of important macroeconomic variables - interest rates, inflation rates, and gross domestic product (GDP) -, the cause-and-effect of many socio-economic phenomena such as the effect of education attainment on wage rate and the effect of income on the environment, and so on. This course will study the statistical foundations and methodology of measuring causal effects of socio-economic phenomena in which we will cover the statistical tools needed to understand empirical economic analysis and to plan and carry out such an analysis using the statistical software **R**. Topics include statistical inference, simple linear regression, multiple regression, nonlinear regression, instrumental variables, panel data analysis, etc. Due to the characteristics of econometrics, Econ 3620 (*Mathematics for Economists*) and Econ 3640 (*Probability and Statistical Inference for Economists*) or equivalent are prerequisite for this course.

Course Objectives

Students who successfully complete this course should have a basic theoretical and conceptual understanding of econometric model such as multivariate regression analysis, to some extent, be able to understand and interpret empirical economic analysis, and execute such an analysis using the statistical software **R**.

Prerequisite

This course has two prerequisites – Econ 3620 (*Mathematics for Economists*) and Econ 3640 (*Probability and Statistical Inference for Economists*). If you didn't take these classes or equivalent before, you are not eligible for taking this course. If you believe you took similar equivalent courses before, please let me know as soon as possible, indicating which courses you have taken.

Course Materials

The classes will be operated by PPTs and/or short videos (linked or created) of required and optional textbooks, **R** programming, and practice questions (theoretical and technical). All relevant information will be found on CANVAS (https://learn-uu.uen.org).

Required Textbook

- (**SW**) *Introduction to Econometrics* by James H. Stock and Mark W. Watson, 3rd edition update (2014), ISBN-13: 978-0133486872 (recommend you rent the book from www.amazon.com or campus bookstore).

Optional Textbooks/ R Supplements

(**Wooldridge**) *Introductory Econometrics – A Modern Approach* by Jeffrey M. Wooldridge, any editions.
(**Westhoff**) *An Introduction to Econometrics: A Self-Contained Approach* by Frank Westhoff (2013), (access to ebook via the Marriott lib.)
(**Studenmund**) *Using Econometrics: A Practical Guide* by A. H. Studenmund, 4th editions or later.
(**Metrics**) *Mastering 'Metrics: The Path from Cause to Effect* (2015) by J. D. Angrist and J-S. Pischke.
(**Dummies**) *R for Dummies* by de Vries, Andrie, Meys, Joris and Meys, Joris (2012), 2nd edition (access to ebook via the Marriott lib.)
(**Intro_R**) *An Introduction to R: Version 3.2.1* (2015) by W. N. Venables, D. M. Smith and the R Core Team
(**RBook**) *The R Book* by Michael J. Crawley (2013), 2nd edition (access to ebook via the Marriott lib.)

(**Art**) *The Art of R Programming* by Norman Matloff (2011) (access to ebook via the Marriott lib.)

Software

Assignments and project will require use of the statistical software **R**. Detailed instructions about **R** will be posted on Canvas.

Grading and Assessment

The course grade will be based on assignments, exams, and a project (assignments: 50%; exams: 30%; and project: 20%). The official course grade will be based on the sum of the grade you have made on each part. Tentative grading scale: A range $\geq$ 90; B range $\geq$ 75; C range $\geq$ 60; D range $\geq$ 50 (it is tentative and thus might be adjusted based on class performance). The information and instructions about assignments, exams and project will be explained separately.

Class Policies

- No late submission of exams and assignments is allowed.
- You cannot miss an exam and take a makeup exam unless I give you permission to do so. Without my permission, you will earn a zero point on your missing exam.
- Incomplete will be given only for compelling reasons such as illness or family emergency.
- Academic misconduct such as cheating on exams (or other forms of academic dishonesty) may lead to failure of class (or expulsion from the class).
- The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

Tentative Schedule

Week	Topic	Reading Assignment	Note
1	Economic Questions and Data	SW Ch.1; Metrics (Intro)	
2	Review of Probability and Statistics	SW Chs. 2 & 3	Assignments 1 & 2
3		Wooldridge Appendices	
4	Linear Regression (Simple)	SW Chs. 4 & 5	Assignment 3
5	Hypotheses Tests and Confidence Intervals		
6	**Midterm**		
7	Linear Regression (Multiple)	SW Chs. 6 & 7	Assignments 4 & 5
8	Hypotheses Tests and Confidence Intervals		
9			
10	No Topic (Spring Break)		
11	Nonlinear Regression	SW Ch. 8	Assignment 6
12	Special Topics	SW Chs. 9 & 12 SW Ch. 10	Assignments 7 & 8
13			
14			
15	**Final**		Project