

ECON 4650–090: PRINCIPLES OF ECONOMETRICS

SPRING 2023

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Office Hours: By Appointment

Time: Online

Web: utah.instructure.com/courses/826965

Place: Online

Overview

In this course, you will be exposed to data analysis from the lens of an economist. The class builds on Economics 3640 and we will review basic probability and statistics as we move through the course material. You will learn about statistical estimation, inference, causal analysis methods and forecasting. The emphasis of the course will be on applications, but you will be exposed to foundation of econometric theory that will help you explore more advanced topics.

This class has the potential for being one of the most rewarding classes you can take as an undergraduate. This will be an applied class and should prepare you for working with data in a job environment or in a graduate school. You will learn to use the statistical software R to perform econometric analysis.

The contents of this course are based on a series of modules which track chapters from text book. Modules will open up over the course and include overviews, links to lecture videos, sample data, R code, and assignments.

Required Materials

A.H. Studenmund, *Using Econometrics: A Practical Guide (7/e)*, 7th edition, Pearson, 2021.

You should have access to the digital version of this book through the *Bookshelf* tab in Canvas. The older edition of this book is also acceptable, but be aware that the order of the chapters and some content may be a bit different.

The textbook can be found at:

- Inclusive Access Program (*Bookshelf* in Canvas)
- Campus Store/ University Library
- www.used.addall.com

Software Requirements

Our classes will always have *theoretical* and *applied* components. The latter will be done using R, an open-source and completely *free* statistical/programming language. Since this course is very applied in nature, we will learn Econometrics by doing Econometrics and thus by learning to use R. Within each of the class modules, the commands needed to complete the assignment are included in lectures and documents. I recommend to use R through RStudio Studio IDE (Integrated Development Environment). However, students are welcome to use the platform they prefer (i.e., Command prompt).

In addition, having a spreadsheet editor (e.g., Excel) is strongly recommended. University of Utah students should have free access to Microsoft Office programs through [Office 365](#).

No previous knowledge in R is required. The course will guide students through every step in the applied lectures.

- Download R: <https://cloud.r-project.org/>
- Download R Studio: <https://rstudio.com/products/rstudio/>

Prerequisites

At least C- in ECON3640 (or equivalent)

Course Outcomes

At the completion of this course, you will learn:

1. How to use the statistical software package R to perform basic statistical analyses;
2. Multivariate Regression Analysis;
3. The statistical foundation of Ordinary Least Squares (OLS);
4. How to detect the violations of Classical Linear Regression Model (CLRM);
5. How to deal with violations of the CLRM;
6. How to summarize and analyze various kinds of data.

Discussion, Assignments, and Exams

- **Weekly Discussions** (15%): We have fifteen discussions that constitute 15% of the total credit, one for each module. You are required to write the meaning of each of the important terms in that module. These discussions are designed to help you review the key concepts of this course, and keep up with contents on a regular basis.
- **Assignments** (25%): We have five assignments (5% each) in this course. Assignments are available on Canvas for download, and must be uploaded before the due date noted. These assignments are designed to enhance your understanding of key material and ensure you are able to apply your understanding appropriately. You are required to submit one **PDF** file for each assignment.

- **Real Economics** (10%): In addition to practical assignments, students are required to read an Economics research paper and answer a few questions based on their reading.
- **Midterm exam** (20%): The Midterm exam will ask theoretical and applied questions on Econometrics. R is not required during the exam. However, students are expected to interpret the results from R. The exam will be take-home and timed.
- **Final exam** (30%): The Final exam is comprehensive, covering all studied topics. Similar to the Midterm exam, the Final exam will be take-home and timed.

Important note 1: Exams will strongly reflect what you will study in class and practice in the assignments.

Important note 2: For *any* assignment, if an answer contains a direct “Copy+Paste” from the lecture notes, or if it is copied from someone else’s work, **no credit will be given**. Read more in the *Academic Dishonesty* section, on page 5.

Late Policy:

You are expected to turn things in/on time. It is your responsibility to maintain your computer and related equipment in order to participate in this course. Equipment failures will not be an acceptable excuse for late or absent assignments. Similarly, **it is your responsibility to start assignments early enough** so that even if you are in traffic, your flight gets delayed, you are called into work, you do work for another class, etc., you still have time to deal with the situation and then finish the assignment.

The late assignments will be accepted up to 24 hrs after the due date with a **20% late penalty**. Any late submissions later than 24 hrs will receive no credit.

Letter Grade Distribution

<i>Performance</i>	<i>Letter Grade</i>
Superior performance	A (93-100%), A- (90-92.9%)
Good performance	B+ (87-89.9%), B (83-86.9%), B- (80-82.9%)
Standard performance	C+ (77-79.9%), C (73-76.9%), C- (70-72.9%)
Substandard performance	D+ (67-69.9%), D (63-66.9%), D- (60-62.9%)
Unsatisfactory performance	E (0-59.9%)

Class Policies

- The exams will reflect what has been studied in class and viewed in questions from Assignments;
- You can expect me to reply to emails/messages within 24 hours on weekdays and 48 hours on weekends/holidays. If I do not reply within this time, please do not hesitate to reach out again. In a very rare case, I may miss your email by accident;

- Please notify me in the event of an emergency that prevents you from doing an exam or completing the course;
- No make-up exams will be given for reasons other than a documented medical emergency or conflict with another exam.

Tentative Course Schedule

Week	Content
Week 1	Introduction, M1: Stats Review
Week 2	M2: What is an Econometric Model
Week 3	M3: R Tutorial
Week 4	M4: Regression
Week 5	M5: Classical Model
Week 6	M6: Hypothesis testing (part1)
Week 7	M7: Hypothesis testing (part2)
Week 8	Midterm Week (Feb 27 - Mar 3)
Week 9	Spring Break
Week 10	M9: Specification Issues (part1)
Week 11	M10: Specification Issues (part2)
Week 12	M11: Multicollinearity
Week 13	M12: Serial Correlation, M13: Heteroscedasticity
Week 14	M14: Dummy dependent variable
Week 15	M15: Time Series, Review
Week 16	Review, Final Exam (Apr 27 - May 3)

Important Dates

- **Classes begin:** Jan 09
- **Martin Luther King Jr. Day holiday:** Jan 16
- **Last day to add/drop classes:** Jan 20
- **Presidents Day holiday:** Feb 20
- **Midterm Exam:** Feb 27 - Mar 03
- **Last day to withdraw from classes:** Mar 03
- **Spring Break:** Mar 05-12
- **Classes end:** Apr 25
- **Final Exam:** Apr 27 - May 03

Important Note

This syllabus is meant to serve as an outline and guide for our course. Please note that I may modify it with reasonable notice to you. I may also modify the Course Schedule to accommodate the needs of our class. Any changes will be announced in class and posted on Canvas under *Announcements*.

Institutional Policies and Procedures

Faculty and Student Responsibilities

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and failing grade. Students have the right to appeal such action to the Student Behavior Committee. “Faculty . . . must strive in the classroom to maintain a climate conducive to thinking and learning.” PPM 8-12.3, B.

“Students have a right to support and assistance from the University in maintaining a climate conducive to thinking and learning.” PPM 8-10, II. A.

Wellness Statement

Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness: www.wellness.utah.edu, 801-581-7776.

Student Names & Personal Pronouns

Class rosters are provided to the instructor with the student's legal name as well as “Preferred first name” (if previously entered by you in the student profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined in the University Student Code. Acts of academic dishonesty include but are not limited to:

- Cheating: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
 - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done individually;
 - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
 - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
 - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
 - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;

- Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- Falsification: altering or fabricating any information or citation in an academic exercise or activity.
- Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

Sexual Harassment

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. It is the policy of the University of Utah to maintain an academic and work environment free of sexual harassment for students, faculty, staff and participants. A claim under this policy may be brought by any faculty, staff member, student or participant based on the conduct of any University employee or student that is related to or in the course of University business. A claim may also be brought by an administrator acting on behalf of the University. The Office of Equal Opportunity and Affirmative Action (OEO/AA) will handle all alleged sexual harassment matters pursuant to the Procedures set forth in Policy 5-210.

Any student, staff, faculty member, or participant in university services or activities who believes that there is or has been sexual harassment should contact any of the following:

- the cognizant academic chair of the department or the dean of the college within which the conduct occurred;
 - the immediate supervisor or director of the operational unit within which the conduct occurred;
 - the Human Resources Division (Address: 420 Wakara Way, Suite 105, Salt Lake City, Utah 84108; Phone: 801-581-2169; TDD: 801-585-9070);
 - directors or deans of Student Affairs and Services (Associate Dean - SW 108; Phone: 801-581-8828);
 - or the Office of Equal Opportunity and Affirmative Action (201 South Presidents Circle, John Park Building, Room 135, Salt Lake City, Utah 84112; Phone/TDD: 801-581-8365).

Once informed, the supervisor, chair or dean shall consult with OEO/AA. Similarly, OEO/AA shall advise as appropriate the cognizant dean, staff director or administrator of any complaints of sexual harassment OEO/AA receives concerning a member of the faculty, staff or student body.

Withdrawal Policy and "I" Grade

Failure to withdraw from school results in a E or EU grade being recorded in all classes. Students may officially withdraw (*W*) from a class or all classes after the drop deadline through the midpoint of a course. A *W* grade is recorded on the transcript and appropriate tuition/fees are assessed. The grade of *W* is not used in calculating the students GPA.

An Incomplete grade can be given for work not completed due to circumstances beyond your control. You must be passing the course and have completed at least 80% of the required course-work. Arrangements must be made between you and the instructor concerning the completion of

the work. You may not retake a course without paying tuition. If you attend class during a subsequent term, in an effort to complete the coursework, you must register for the course. Once the work has been completed, the instructor submits the grade to the Registrars Office. The *I* grade will change to an *E* if a new grade is not reported within one year. A written agreement between you and the instructor may specify the grade to be given if the work is not completed within one year. Copies of the agreement are kept by the instructor and the academic department.

Americans with Disabilities Act (ADA) Statement

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 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

Additionally, the University endeavors to provide reasonable accommodations and to ensure equal access to qualified persons with disabilities. Inquiries concerning perceived discrimination or requests for disability accommodations may be referred to the University's Title IX/ADA/Section 504 Coordinator: Director, Office of Equal Opportunity and Affirmative Action, 201 South Presidents Circle, Rm. 135, Salt Lake City, UT, 84112. 801-581-8365 (voice/tdd), 801-585-5746 (fax). www.oeo.utah.edu.