

# Econ 4650 - Principles of Econometrics

## Contact details

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**Zoom virtual office hour:** Thursday 11.00 AM - 12.00 PM throughout the semester. Please use this [link](#) for virtual office hours. The passcode for the meeting is spring2022.

**Canvas Discussion Forum:** I strongly encourage you to use the [Class Forum](#) for general questions about the course chapters, assignments, and to prepare for exams – it is a great way to collaborate and connect with your peers!

## Course Information

**Course:** Economics 4650 Online

**Prerequisites:** College Algebra & Introduction to Probability & Statistics

**Credit Hour/s:** 3

**Semester:** Spring, 2022

## Canvas Time Zone Information

To ensure you are viewing due dates and times correctly, as well as events in the calendar, set your student Canvas time zone to your current location by following this [guide \(Links to an external site.\)](#).

If you do not change your time zone, all due dates and times listed in Canvas default to Mountain Time (MT).

Content written by instructors, such as office hours written in the syllabus, are in Mountain Time, unless stated otherwise.

## Textbook

The textbook is A.H. Studenmund, *Using Econometrics: A Practical Guide* (7/e). You should have access to the digital book through the [Bookshelf](#) tab in Canvas.

Older edition of the text are also acceptable, but please be aware that the order of the chapters and some content (e.g., the assignment questions) may be different in older edition. A copy of the textbook is available at the Marriott Library Reserve Desk.

## Modules

The online course is based on a series of modules which track chapters from text book. The majority of work in this course is applied and these modules are designed to help you succeed in assignments, exams, and your group discussions.

The first chapter is a review of statistics (chapter 17 in full text). You should be comfortable with this material from Economics 3640, or your basic probability and statistics course. We then progress through ordinary least squares, and the important assumptions of the "classical" regression model (chapters 1, 2 and 4).

We then move through hypothesis testing and model specification, including the choice of explanatory variables and the choice of functional form (chapters 5, 6 and 7). The midterm exam, which will be a limited time at-home online exam, will be based on all this material. Diagnostics are covered in the next three modules: multicollinearity, serial correlation, and heteroskedasticity (text chapters 8, 9, and 10). We then study special topics including Dummy Dependent Variables and Time Series Analysis in the next two modules (chapters 13 and 12). The final exam, also a limited-time at-home online exam, will be comprehensive and will test the contents of the entire course.

Modules will open up over the course and include overviews, links to videos, sample data, R code, and assignments.

## Discussions, Assignments, Project & Exams

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 (due on Mondays) are designed to help you review the key concepts of this course. I will open other discussions for assignments and exams, which are not mandatory. You can also open discussions on any topic, allowing you to ask and answer questions, find data, and provide helpful comments to other members of the course. You can earn up to 2% extra credit by actively and meaningfully participating in those discussions.

We have five assignments in this course. Assignments (schedule is listed under "Assignments" tab) are available on Canvas for download, and must be uploaded before the due date noted (usually due on Mondays). These assignments are designed to enhance your understanding of key material and ensure you are able to apply your understanding appropriately. Whenever possible, please only submit one PDF file for each assignment and make sure to write your name on each file you submit.

The midterm and final exams will be timed and administered at home. Both the midterm and final exams are open notes open book tests.

## Software

The course uses R extensively. It is widely used in business, academia, and government. R is also free and operates the same across computing platforms. Because this course is very applied in nature, we will learn econometrics by *doing* econometrics and thus by learning to use R. It is available at <http://cran.us.r-project.org>, where you can download it for Linux, OS X, and Windows. Within each of the class modules, the commands needed to complete the assignment are included in the text guides for reference and use. You will also discover thousands of useful ways to use R on the internet.

## Disclaimers

Please Note: *It is your responsibility to maintain your computer and related equipment in order to participate in this online course. Equipment failures will not be an acceptable excuse for late or absent assignments.* Classroom equivalency: Discussion threads, e-mails, and chat rooms in an Online course are all considered to be equivalent to classrooms, and student behavior within those environments shall conform to the Student Code.

Documentation of a disability is required in order to receive services or accommodations. Any student eligible for and requesting reasonable academic accommodations due to a disability must provide a letter of accommodation to their professor from the Disability Resource Center within the first two weeks of the beginning of classes. Please contact the Center on the main campus to follow through with the documentation process. They are located in the Student Services Center, or you may call for an appointment and further information regarding the Americans with Disabilities Act (ADA).

Note that this syllabus is subject to change though students will be notified if and when a change occurs.

**The Assignment Schedule is located directly below this syllabus, or in the Assignments Section of this website.**

## Course Description

In this course, you will be exposed to data analysis from the lens of an economist. 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 foundational 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 class builds on Economics 3640 and we will review basic probability and statistics as we move through the course material.

## Course Objectives

By the end of this course, you will learn:

1. How to use the statistical software package R
2. Multivariable regression analysis
3. The statistical foundations of ordinary least squares
4. How to detect violations of classical model assumptions (CLRM)
5. How to deal with violations of the CLRM
6. How to summarize and analyze various kinds of data

## Canvas Information

Canvas is the where course content, grades, and communication will reside for this course.

- Textbook & Reading Materials -
- Access Canvas through [utah.instructure.com](http://utah.instructure.com) or through [CIS](#)
- For Canvas, Passwords, or any other computer-related technical support contact the [Campus Help Desk](#).
  - 801 581-4000
  - <http://it.utah.edu/help>
  - [helpdesk@utah.edu](mailto:helpdesk@utah.edu)
- For Canvas related issues or bugs, contact the Teaching & Learning Technologies help desk
  - 801-581-6112 ext 3
  - [classhelp@utah.edu](mailto:classhelp@utah.edu)

## Evaluation

- Weekly discussions (15% grade)
- Five assignments (25% grade)
- One real economics assignment (10% grade)
- Midterm examination (20% grade)
- Final examination (30% grade)
- Extra credit (up to 2%)
- Grades will be given based on the traditional standard: with 100-93%=A, 92-90%=A-, 87-89%=B+, 83-86%=B, 80-82%=B-, and so on to 59-0%=E,

# University Policies

## COVID-19 Campus Guidelines

### Important: Updated Spring 2022 Instructional Guidelines

University leadership has urged all faculty, students, and staff to **model the vaccination, testing, and masking behaviors** we want to see in our campus community. These include: • Vaccination • Masking indoors • If unvaccinated, getting weekly asymptomatic coronavirus testing • Quarantining after exposure

### Vaccination

- **Get a COVID-19 vaccination and the booster shot recommended for pairing with your vaccine** if you have not already done so. Vaccination is proving highly effective in preventing severe COVID-19 symptoms, hospitalization, and death from coronavirus. Vaccination is the single best way to stop this COVID resurgence in its tracks.
- University of Utah students are required (as of August 27, 2021) to complete a cycle of COVID-19 vaccination and booster shot with an approved vaccine, or complete an exemption form. The university provides three convenient vaccination options:
  - Attend one of the regularly scheduled [vaccine events](#) at the Student Union on campus.
  - Schedule an appointment with [Student Health](#).
  - Visit [My Chart](#), [Vaccine Information](#), or [CDC Vaccine.gov](#) to schedule your vaccination.

### Masking

- While masks are not required outside of Health Sciences facilities, UTA buses, and campus shuttles, **CDC guidelines now call for everyone to wear face masks indoors.**
  - Check the [CDC website](#) periodically for masking updates
    - With high transmission rates in Salt Lake County, the CDC recommends: “Everyone should wear a mask in public indoor settings.”
  - Treat masks like seasonal clothing (i.e.during community surges in COVID transmission, masks are strongly encouraged indoors and in close groups outside).
  - In cases of classroom exposure, masks should be worn for the quarantine period (see details below).

### Testing

- **If you are not yet vaccinated, get weekly asymptomatic coronavirus tests.** This is a helpful way to protect yourself and those around you because asymptomatic individuals can unknowingly spread the coronavirus to others.
  - Asymptomatic testing centers are open and convenient:
    - [Online scheduling](#)
    - Saliva test (no nasal swabs)

- Free to all students returning to campus (required for students in University housing)
- Results often within 24 hours
- Visit [Testing and Vaccine Information](#) Campus Alert
- Remember: **Students must self-report if they test positive for COVID-19** via the [Campus Covid Response](#) webpage.

### **Student Mental Health Resources**

- Rates of burnout, anxiety, depression, isolation, and loneliness have noticeably increased during the pandemic. If you need help, reach out for campus mental health resources, including counseling, training, and other support.
- Consider participating in a [Mental Health First Aid](#) or other [wellness-themed training](#) provided by our Center for Student Wellness and sharing these opportunities with your peers, teaching assistants, and department colleagues.

**Students are required to self-report if they test positive for COVID-19.** To report, please contact:

**COVID-19 Central @ The U**  
 801-213-2874  
[coronavirus.utah.edu](http://coronavirus.utah.edu)

### **Drop/Withdrawal Policies**

Students may drop a course within the first two weeks of a given semester without any penalties.

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 “W” is not used in calculating the student’s GPA.

For deadlines to withdraw from full-term, first, and second session classes, see the U's [Academic Calendar](#).

### **Plagiarism and Cheating**

It is assumed that all work submitted to your instructor is your own work. When you have used the ideas of others, you must properly indicate that you have done so.

Plagiarism and cheating are serious offenses and may be punished by failure on an individual assignment, and/or failure in the course. Academic misconduct, according to the University of Utah Student Code,

*“...Includes, but is not limited to, cheating, misrepresenting one’s work, inappropriately collaborating, plagiarism, and fabrication or falsification of information...It also includes*

*facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct.”*

For details on plagiarism and other important course conduct issues, see the U's [Code of Student Rights and Responsibilities](#).

## **Course Materials Copyright**

**The Content is made available only for your personal, noncommercial educational, and scholarly use.** You may not use the Content for any other purpose, or distribute, post or make the Content available to others unless you obtain any required permission from the copyright holder. Some Content may be provided via streaming or other means that restrict copying; you may not circumvent those restrictions. You may not alter or remove any copyright or other proprietary notices included in the Content.

Please see the [Code of Student Rights and Responsibilities](#), Section III.A.5 regarding the [use and distribution of class Content](#) and materials. Section III.A.5. prohibits the following:  
Sale or distribution of information representing the work product of a faculty member to a commercial entity for financial gain without the express written permission of the faculty member responsible for the course. (“Work product” means original works of authorship that have been fixed in a tangible medium and any works based upon and derived from the original work of authorship.)

## **Safety at the U**

The University of Utah values the safety of all campus community members. You will receive important emergency alerts and safety messages regarding campus safety via text message.

For more safety information and to view available training resources, including helpful videos, visit [safeu.utah.edu](http://safeu.utah.edu) ([Links to an external site.](#)).

To report suspicious activity or to request a courtesy escort, contact:

### **Campus Police & Department of Public Safety**

801-585-COPS (801-585-2677)

[dps.utah.edu](http://dps.utah.edu)

1735 E. S. Campus Dr.

Salt Lake City, UT 84112

## **Wellness at the U**

Your personal health and wellness are essential to your success as a student. Personal concerns like stress, anxiety, relationship difficulties, depression, or cross-cultural differences can interfere with a student’s ability to succeed and thrive in this course and at the University of Utah.

Please feel welcome to reach out to your instructor or TA to handle issues regarding your coursework.

For helpful resources to manage your personal wellness and counseling options, contact:

**Center for Student Wellness**

801-581-7776

[wellness.utah.edu](http://wellness.utah.edu)

2100 Eccles Student Life Center  
1836 Student Life Way  
Salt Lake City, UT 84112

**Women's Resource Center**

801-581-8030

[womenscenter.utah.edu](http://womenscenter.utah.edu)

411 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

**Addressing Sexual Misconduct**

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status, or genetic information.

If you or someone you know has been harassed or assaulted, you are encouraged to report it to university officials:

**Title IX Coordinator & Office of Equal Opportunity and Affirmative Action**

801-581-8365

[oeo.utah.edu](http://oeo.utah.edu)

135 Park Building  
201 Presidents' Cir.  
Salt Lake City, UT 84112

**Office of the Dean of Students**

801-581-7066

[deanofstudents.utah.edu](http://deanofstudents.utah.edu)

270 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

To file a police report, contact:



## **Campus Police & Department of Public Safety**

801-585-COPS (801-585-2677)

[dps.utah.edu](http://dps.utah.edu)

1735 E. S. Campus Dr.

Salt Lake City, UT 84112

If you do not feel comfortable reporting to authorities, the U's Victim-Survivor Advocates provide **free, confidential, and trauma-informed** support services to **students, faculty, and staff** who have experienced interpersonal violence.

To **privately** explore options and resources available to you with an advocate, contact:

## **Center for Student Wellness**

801-581-7776

[wellness.utah.edu](http://wellness.utah.edu)

328 Student Services Building

201 S. 1460 E.

Salt Lake City, UT 84112

## **Americans With Disabilities Act (ADA)**

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities.

All written information in this course can be made available in an alternative format with prior notification to the Center for Disability & Access (CDA). CDA will work with you and the instructor to make arrangements for accommodations. Prior notice is appreciated. To read the full accommodations policy for the University of Utah, please see Section Q of the [Instruction & Evaluation regulations](#).

If you will need accommodations in this class, or for more information about what support they provide, contact:

## **Center for Disability & Access**

801-581-5020

[disability.utah.edu](http://disability.utah.edu)

162 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

## **Diverse Student Support**

Your success at the University of Utah is important to all of us here! If you feel like you need extra support in academics, overcoming personal difficulties, or finding community, the U is here for you.

## **Student Support Services (TRIO)**

TRIO federal programs are targeted to serve and assist low-income individuals, first-generation college students, and individuals with disabilities.

Student Support Services (SSS) is a TRIO program for current or incoming undergraduate university students who are seeking their first bachelor's degree and need academic assistance and other services to be successful at the University of Utah.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

## **Student Support Services (TRIO)**

801-581-7188

[trio.utah.edu](http://trio.utah.edu)

Room 2075

1901 E. S. Campus Dr.

Salt Lake City, UT 84112

## **American Indian Students**

The AIRC works to increase American Indian student visibility and success on campus by advocating for and providing student-centered programs and tools to enhance academic success, cultural events to promote personal well-being, and a supportive “home-away-from-home” space for students to grow and develop leadership skills.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

## **American Indian Resource Center**

801-581-7019

[diversity.utah.edu/centers/airc](http://diversity.utah.edu/centers/airc)

Fort Douglas Building 622

1925 De Trobriand St.

Salt Lake City, UT 84113

## **Black Students**

Using a pan-African lens, the Black Cultural Center seeks to counteract persistent campus-wide and global anti-blackness. The Black Cultural Center works to holistically enrich, educate, and advocate for students, faculty, and staff through Black-centered programming, culturally affirming educational initiatives, and retention strategies.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

### **Black Cultural Center**

801-213-1441

[diversity.utah.edu/centers/bcc](http://diversity.utah.edu/centers/bcc)

Fort Douglas Building 603

95 Fort Douglas Blvd.

Salt Lake City, UT 84113

### **Students with Children**

Our mission is to support and coordinate information, program development, and services that enhance family resources as well as the availability, affordability, and quality of child care for University students, faculty, and staff.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

### **Center for Childcare & Family Resources**

801-585-5897

[childcare.utah.edu](http://childcare.utah.edu)

408 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

### **Students With Disabilities**

The Center for Disability Services is dedicated to serving students with disabilities by providing the opportunity for success and equal access at the University of Utah. They also strive to create an inclusive, safe, and respectful environment.

For more information about what support they provide and links to other resources, view their website or contact:

### **Center for Disability Services**

801-581-5020

[disability.utah.edu](http://disability.utah.edu)

162 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

### **Students of Ethnic Descent**

The Center for Ethnic Student Affairs offers several programs dedicated to the success of students with varied cultural and ethnic backgrounds. Its mission is to create an inclusive, safe campus community that values the experiences of all students.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

### **Center for Ethnic Student Affairs**

801-581-8151

[diversity.utah.edu/centers/cesa/](http://diversity.utah.edu/centers/cesa/)

235 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

### **English as a Second/Additional Language (ESL) Students**

If you are an English language learner, there are several resources on campus available to help you develop your English writing and language skills. Feel free to contact:

#### **Writing Center**

801-587-9122

[writingcenter.utah.edu](http://writingcenter.utah.edu)

[\(Links to an external site.\)](#)

2701 Marriott Library

295 S 1500 E

Salt Lake City, UT 84112

#### **English for Academic Success (EAS) Program**

801-581-8047

[linguistics.utah.edu](http://linguistics.utah.edu)

2300 LNCO

255 S. Central Campus Dr.

Salt Lake City, UT 84112

#### **English Language Institute**

801-581-4600

[continue.utah.edu/eli](http://continue.utah.edu/eli) [\(Links to an external site.\)](#)

540 Arapeen Dr.

Salt Lake City, UT 84108

### **Undocumented Students**

Immigration is a complex phenomenon with broad impact—those who are directly affected by it and those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles that prevent you from engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center.

**Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence.** The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families.

For more information about what support they provide and links to other resources, view their website or contact:

**Dream Center**

801-213-3697

[dream.utah.edu](http://dream.utah.edu)

[\(Links to an external site.\)](#)

1120 Annex (Wing B)

1901 E. S. Campus Dr.

Salt Lake City, UT 84112

**LGBTQ+ Students**

The LGBTQ+ Resource Center acts in accountability with the campus community by identifying the needs of people with a queer range of [a]gender and [a]sexual experiences and responding with university-wide services.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**LGBTQ+ Resource Center**

801-587-7973

[lgbt.utah.edu](http://lgbt.utah.edu) [\(Links to an external site.\)](#)

409 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

**Veterans & Military Students**

The mission of the Veterans Support Center is to improve and enhance the individual and academic success of veterans, service members, and their family members who attend the university; to help them receive the benefits they earned, and to serve as a liaison between the student veteran community and the university.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**Veterans Support Center**

801-587-7722

[veteranscenter.utah.edu](http://veteranscenter.utah.edu) [\(Links to an external site.\)](#)

418 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

## **Women**

The Women's Resource Center (WRC) at the University of Utah serves as the central resource for educational and support services for women. Honoring the complexities of women's identities, the WRC facilitates choices and changes through programs, counseling, and training grounded in a commitment to advance social justice and equality.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

### **Women's Resource Center**

801-581-8030

[womenscenter.utah.edu](http://womenscenter.utah.edu)

411 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

## **Inclusivity at the U**

The Office for Inclusive Excellence is here to engage, support, and advance an environment fostering the values of respect, diversity, equity, inclusivity, and academic excellence for students in our increasingly global campus community. They also handle reports of bias in the classroom as outlined below:

*Bias or hate incidents consist of speech, conduct, or some other form of expression or action that is motivated wholly or in part by prejudice or bias whose impact discriminates, demeans, embarrasses, assigns stereotypes, harasses, or excludes individuals because of their race, color, ethnicity, national origin, language, sex, size, gender identity or expression, sexual orientation, disability, age, or religion.*

For more information about what support they provide and links to other resources, or to report a bias incident, view their website or contact:

### **Office for Inclusive Excellence**

801-581-4600

[inclusive-excellence.utah.edu](http://inclusive-excellence.utah.edu) (Links to an external site.)

170 Annex (Wing D)  
1901 E. S. Campus Dr.  
Salt Lake City, UT 84112

## **Other Student Groups at the U**

To learn more about some of the other resource groups available at the U, check out:

[getinvolved.utah.edu/](http://getinvolved.utah.edu/)

[studentsuccess.utah.edu/resources/student-support](http://studentsuccess.utah.edu/resources/student-support)