

ECON 3640: Probability and Statistical Inference

Fall 2024

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Office hours	By appointment
Section	ECON 3640-001
Class time	Monday and Wednesday, 1:25–2:45 PM
Classroom	GC 2675
Prerequisites	College Algebra (MATH 1090), ECON 2010, and ECON 2020

Overview

In this course, you will be exposed to statistical analysis through the lens of an economist. You will learn graphical and numerical methods of summarizing data, the concept of probability, and hypothesis testing. These skills are useful in a wide range of contexts, from reading and interpreting news articles critically and becoming an educated consumer to evaluating policies and preparing for advanced courses in quantitative analysis. This course belongs to the Quantitative Reasoning (QR-B) category and is a prerequisite for ECON 4650.

Course Outcomes

At the completion of this course, you will be able to:

1. Comfortably use R to perform basic statistical analyses;
2. Critically assess the most common tools in statistics;
3. Understand the difference between causation and correlation in empirical data and policy debates;
4. Interpret and critique empirical results in economics journals and newspaper articles.

Required Materials

Layth C. Alwan, Bruce A. Craig, and George P. McCabe. *The Practice of Statistics for Business and Economics*, 5th edition. Macmillan Learning, 2020.

You should have access to the digital version of the book through the Bookshelf tab in Canvas (Inclusive Access program). It is also available from the Campus Store and the University Library. An older edition is acceptable, but the order of chapters and some content may differ.

Software

Our classes have theoretical and applied components. Applied work uses [R](#), an open-source and free statistical programming language. In applied lectures I use the [RStudio](#) IDE, also freely available, but you are welcome to use the platform you prefer. A spreadsheet editor (e.g., Excel) is strongly recommended; University of Utah students have free access to Microsoft Office through Office 365. No previous knowledge of R is required; the course guides you through every step in the applied lectures.

Assignments, Exams, and Grading

- **Assignments (30%).** Whenever enough content has been covered in class, a new problem set will be posted on Canvas. There are six assignments (5% each). To receive full credit, assignments must be turned in on time (see the late policy below).
- **Midterm exam (30%).** Theoretical and applied questions on descriptive statistics and some probability concepts.
- **Final exam (40%).** Comprehensive, covering all topics. The final exam will be take-home, and we will discuss an appropriate window that gives every student time to complete it.

Exams strongly reflect what you practice in class and in the problem sets. For any assignment, answers copied directly from the lecture notes or from someone else's work receive no credit.

Late policy. You are expected to turn work in on time. It is your responsibility to maintain your computer and related equipment; equipment failures are not an acceptable excuse for late or missing assignments. Please start assignments early enough that unexpected events still leave you time to finish. Late assignments are accepted up to 24 hours after the due date with a 20% penalty; submissions more than 24 hours late receive no credit.

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

Important Dates

Classes begin	August 19
Last day to add/drop classes	August 30
Labor Day holiday	September 2
Midterm exam (tentative)	October 3–4
Fall Break	October 6–13
Last day to withdraw from classes	October 18
Thanksgiving Break	November 28 – December 1
Classes end	December 5
Final exam (tentative)	December 9–10

Class Policies

- Students are strongly encouraged to attend class, although attendance is not part of the grade.
- Exams reflect what has been studied in class and practiced in the assignments.
- Please be respectful of others. If you need to make a call or talk to someone, you are welcome to step out of class for a moment.
- You can expect replies to emails and messages within 24 hours on weekdays and 48 hours on weekends and holidays. If I do not reply within this time, please reach out again.
- Food and drinks are allowed in class as long as they do not disturb others.
- Please notify me in the event of an emergency that prevents you from taking an exam or completing the course. No make-up exams will be given for reasons other than a documented medical emergency or a conflict with another exam.

Tentative Course Schedule

Week	Content	Note
1	Introduction	Syllabus and R
2	Ch. 1: Examining distributions	Assignment 1
3	Ch. 2: Examining relationships	Labor Day (Sep 2)
4	Ch. 2–3: Producing data	Assignment 2
5	Ch. 3 (cont.)	
6	Ch. 4: Probability	Assignment 3
7	Ch. 4 (cont.)	Midterm (Oct 3–4)
8	<i>Fall Break</i>	
9	Ch. 5: Random variables and probability distributions	
10	Ch. 5–6: Sampling distributions	Assignment 4
11	Ch. 7: Introduction to inference	

Week	Content	Note
12	Ch. 8: Inference for means	Assignment 5
13	Ch. 10: Inference for proportions	
14	Ch. 11: Inference for categorical data	
15	Ch. 17: Nonparametric tests	Thanksgiving; Assignment 6
16	Review	
Dec 9–10	<i>Final exam</i>	Good luck!

University Policies and Resources

Updated mandatory syllabus policies regarding the Americans with Disabilities Act, Safety at the U, Addressing Sexual Misconduct, and Academic Misconduct can be viewed at <https://cte.utah.edu/instructor-education/syllabus/institutional-policies.php>.

Academic misconduct. It is expected that students adhere to University of Utah policies regarding academic honesty, including but not limited to refraining from cheating, plagiarizing, misrepresenting one's work, and/or inappropriately collaborating. This includes the use of generative artificial intelligence (AI) tools without citation, documentation, or authorization. Any student who engages in academic dishonesty may be subject to academic sanctions as per the University of Utah's Student Code: <https://regulations.utah.edu/academics/6-410.php>.

Drop and withdrawal. 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. See the University's Academic Calendar for deadlines.

Campus resources.

- **Accommodations:** Center for Disability & Access, 162 Union Building, 801-581-5020, <https://disability.utah.edu>
- **Safety:** To report suspicious activity or request a courtesy escort, call campus police at 801-585-COPS (801-585-2677); <https://safeu.utah.edu>
- **Title IX:** Office of Equal Opportunity and Affirmative Action, 383 South University Street, 801-581-8365
- **Wellness:** Center for Student Wellness, 426 SSB, 801-581-7776, <https://wellness.utah.edu>
- **Basic needs:** Basic Needs Collective, <https://basicneeds.utah.edu>
- **Tutoring:** Learning Center, <https://learningcenter.utah.edu>; Writing Center, <https://writingcenter.utah.edu>
- **Other student support:** <https://studentsuccess.utah.edu/resources/student-support/>

Syllabus changes. This syllabus is meant to serve as an outline and guide for our course. I may modify it with reasonable notice to you, and I may also modify the course schedule to accommodate the needs of our class. Any changes will be posted to Canvas under Announcements.