

# ECON 3640-090: PROBABILITY & STATISTICAL INFERENCE

Fall 2019

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<b>Instructor:</b> Márcio Santetti	<b>When and where:</b> Online
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## Course Page:

1. [Canvas course page](#)

**Office Hours:** By appointment via email.

**Main References:** In addition to our class notes and online materials, these are the most useful references to the covered topics:

- Gerald Keller, *Statistics for Management and Economics*, 10th edition, South-Western/Cengage, 2014.
- David S. Moore, George McCabe, and Bruce Craig, *Introduction to the Practice of Statistics*, 6th edition, W. H. Freeman and Company, 2009.
- **[Optional]** Dominick Salvatore and Derrick Reagle, *Schaum's outlines of Theory and Problems of Statistics and Econometrics*, 2nd edition, McGraw-Hill, 2002.
- **[Optional]** Robert Hogg and Elliot Tanis, *Probability and Statistical Inference*, Pearson Educational International, 2009.

The course will follow the structure of Keller's book. Moreover, weekly **class notes** will be posted on Canvas as a general reference to the covered topics. It is **highly recommended** that students consult either one of the two first references, which are available at the Marriott Library.

**Course Overview:** This course is primarily designed to help undergraduate students in understanding the basic foundations of statistics. At first, we will study the fundamental concepts of descriptive statistics. Secondly, the focus is on probability theory and its connections with discrete and continuous distributions (e.g., Binomial, Poisson, Uniform, Normal, Chi-squared and F). Thirdly, our aim is to analyze statistical inference with respect to different parameters, such as population means and variances, by means of estimation techniques.

**Prerequisites:** College algebra, ECON 2010, and ECON 2020.

**Course Outline:** The course will be divided in three main sections: (i) descriptive statistics; (ii) probability theory and distributions; and (iii) statistical inference.

## Course Outcomes:

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

1. Understand the main tools to statistically describe a sample/population, by means of quantitative measures and visual reports;
2. Comprehend the main components of probability theory, and how the latter is linked to real data sets and their respective probability distributions;
3. Perform estimation techniques that will allow you to describe an entire population by means of sample statistics, such as constructing confidence intervals and implementing hypothesis testing;

4. Build the elementary foundations to move on to more complex statistical applications, such as those seen in Econometrics (ECON 4560), and other applied areas of knowledge.

**Grading Policy:** Quizzes (20%) + Problem sets (45%) + Final exam (35%).

### Important Dates:

Classes begin ..... **August 19**  
 Last day to add classes ..... **August 30**  
 Last day to withdraw from classes ..... **October 18**  
 Fall Break ..... **October 6–13**  
 Thanksgiving Break .... **November 28 – December 1**  
 Final Exam ..... **December 6, 6:30-8:30pm**

**Letter Grade Distribution:** The grading system follows these standards:

- Excellent, superior performance: A (90-100%), A- (85-89.9%)
- Good performance: B+ (80-84.9%), B (75-79.9%), B- (70-74.9%)
- Standard performance: C+ (65-69.9%), C (60-64.4%), C- (55-59.9%)
- Substandard performance: D+ (50-54.9%), D (45-49.9%), D- (40-44.9%)
- Unsatisfactory performance: E (0-39.9%)

### Course content & activities:

- **Quizzes:** weekly online quizzes will be posted as a general assessment of the subject. Quizzes will not have a time limit, and students may only complete it once, with the deadline day being every Sunday, at 11:59 PM. Quizzes are worth 20% of final grades.
- **Assignments:** along with quizzes, problem sets will be posted whenever enough course content is available. Due dates will be determined as they are posted. Problem sets are worth 45% of final grades, and in order to receive full credit, all calculations must be provided in your submission files. Correct answers without any work will not get credit. All problem set submissions are online and more details will be given as they are posted.
- **Final Exam:** the final exam is a comprehensive take-home exam, asking students to work on problems referring to all three blocks of the course. Students will have 2 (two) hours to complete and submit the exam via Canvas, and the same rules of problems sets apply. The final exam is worth 35% of final grades.
- **Required material:** For exams, students can, and should, use a scientific calculator to perform quantitative assessments. I provide all necessary and useful formulas attached to each exam, so the time-consuming effort to memorize formulas is taken out of the equation. Moreover, a few probability tables will be required from each student, and they will be posted on Canvas throughout Part 3.
- **Course dynamics:** all questions should be addressed by **email** to the instructor. Canvas inbox messages will not be answered. Moreover, with respect to the weekly content, a full description of readings, videos, and due dates will be provided as each module is open on Canvas.

### Tentative Course Schedule:

- **Part 1: Descriptive Statistics**

**Week 1:** Course introduction, key concepts, types of data and information, graphical techniques.

**Week 2:** Numerical descriptive techniques I.

**Week 3:** Numerical descriptive techniques II.

**Week 4:** Measures of linear relationship.

**Week 5:** Least-squares method, data collection and sampling.

- **Part 2: Probability Theory**

**Week 6:** Basic concepts, joint, marginal, and conditional probabilities.

**Week 7:** Probability rules, Bayes' theorem.

**Week 8:** Fall Break.

**Week 9:** Random variables and discrete probability distributions.

**Week 10:** Continuous probability distributions.

**Week 11:** Continuous probability distributions II.

**Week 12:** Sampling distributions.

- **Part 3: Statistical Inference**

**Week 13:** Introduction to estimation: confidence intervals.

**Week 14:** Hypothesis testing I.

**Week 15:** Hypothesis testing II.

**Week 16:** Course wrap-up and final discussions.

**Class Policies:**

You can expect me to:

- Grade and provide feedback on assignments/exams until the end of the following week;
- Reply to emails within 24 hours during the week and within 48 hours on weekends, holidays and break weeks;
- Be readily available to answer students on their doubts and general concerns, via email or at a specific time that works for both of us.

I expect you to:

- Frequently check our Canvas page.
- Observe the deadline dates to complete quizzes, assignments, and exams. No make-ups/late assignments submissions will be allowed.
- Immediately notify me in the event of an emergency that prevents you from doing an exam or completing the course.
- Ask questions if any expectations or assignments are unclear.
- Be courteous of your instructor and fellow classmates when using technology. Despite this being an online course, a respectful environment is a necessary condition.

*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](http://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's 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 ones 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.

**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 the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

**Withdrawal Policy and "I" Grade Policy:**

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.

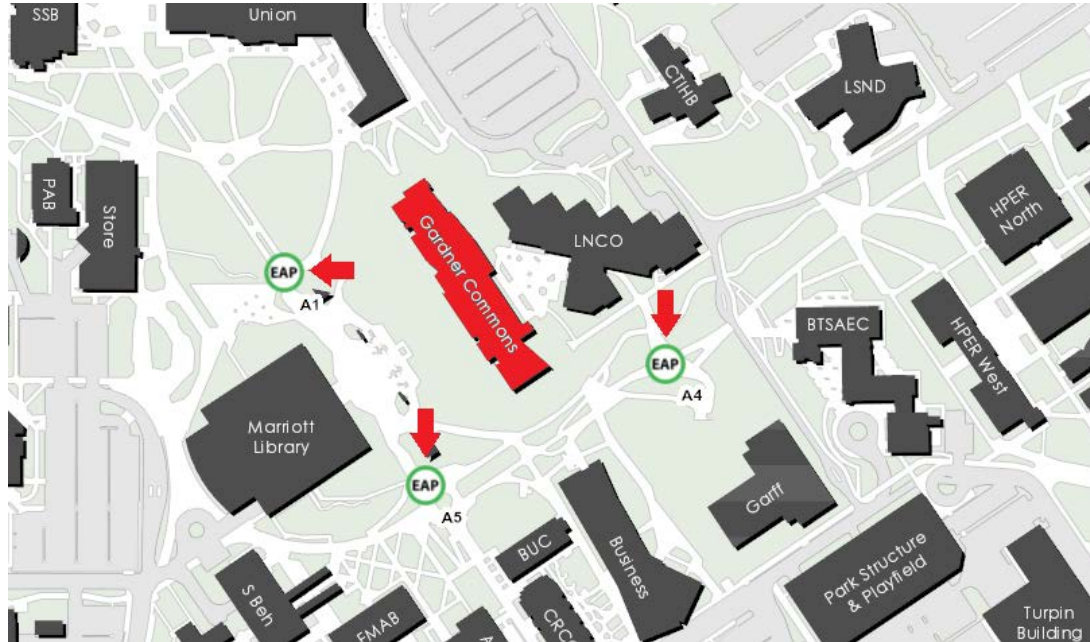
An Incomplete grade can be given for work not completed due to circumstances beyond your control. You must be passing the course and have completed at least 80% of the required coursework. Arrangements must be made between you and the instructor concerning the completion of the work. You may not retake 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](http://www.oeo.utah.edu).

# CSBS EMERGENCY ACTION PLAN



### BUILDING EVACUATION

EAP (Emergency Assembly Point) – When you receive a notification to evacuate the building either by campus text alert system or by building fire alarm, please follow your instructor in an orderly fashion to the EAP marked on the map below. Once everyone is at the EAP, you will receive further instructions from Emergency Management personnel. You can also look up the EAP for any building you may be in on campus at <http://emergencymanagement.utah.edu/eap>.



### CAMPUS RESOURCES

**U Heads Up App:** There’s an app for that. Download the app on your smartphone at [alert.utah.edu/headsup](http://alert.utah.edu/headsup) to access the following resources:

- **Emergency Response Guide:** Provides instructions on how to handle any type of emergency, such as earthquake, utility failure, fire, active shooter, etc. Flip charts with this information are also available around campus.
- **See Something, Say Something:** Report unsafe or hazardous conditions on campus. If you see a life threatening or emergency situation, please call 911!

**Safety Escorts:** For students who are on campus at night or past business hours and would like an escort to your car, please call **801-585-2677**. You can call 24/7 and a security officer will be sent to walk with you or give you a ride to your desired on-campus location.

