Fall 2017

Econ 3640-001

Probability and Statistical Inference

This course fulfills QB general education requirement.

Instructor: Sophie Wu

Class meets: T/TH from 9:10 am – 10: 30 am

Classroom: BEH S 102

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Office hours: T/TH 11:00 am-12:30 pm or by appointment through email.

Course Overview

This course is designated to fulfill the QB general education requirement at the university. It aims to help students obtain a deep understanding of statistical theories and applications in the business world. This course will be divided into three sections. In the first section, we will primarily study the fundamental concept of descriptive statistics. Students are expected to have a clear understanding of how to find the central locations and determine the amount of variation of any set of data. In the second section, we will primarily focus on the probability theory, and how it links to the sampling distribution. In the third section, we will primarily study the statistical inference in the normal distribution, t-distribution, Chi-squared distribution and F distributions, etc. Students are expected to be familiar with the procedures of testing the validity of the hypotheses. By the end of this semester, students are expected to demonstrate qualitative literacy and problem solving abilities.

Qualitative literacy includes the following aspects:

(1) Interpretation: ECON 3640 teaches how to interpret different types of graphs (for example, pie chart, bar graph, histograms), numerical summaries of data (for example, proportion, mean, median, variance, standard deviation), statistical test results (for example, hypothesis tests about means, proportions).

(2) Representation: ECON 3640 teaches how to construct appropriate graphical and numerical summaries of data, how to present estimates and test results.

(3) Estimation: ECON 3640 teaches the theoretical foundations of statistical estimation and how to use a sample to construct the estimates.

(4) Application: ECON 3640 teaches how to distinguish between different types of variables, so that they can use appropriate summaries and estimates for analysis. ECON 3640 also teaches the strengths and limitations of the estimations, so that they can apply them judiciously.

(5) Communication: ECON 3640 teaches how to present statistical results in simple language so that it can be communicated to a general audience.

The problem solving skills includes the following aspects:

(1) Defining Problems: The assignments and project in ECON 3640 teaches how to systematically define a problem for statistical analysis. The students are required to state the objective of an analysis in very precise terms (example, gender based comparison of academic performance of ECON majors). They are also required to identify the following before embarking on the analytical process: the unit of analysis (for example it can be individual, firm, country), the attributes of the units that need to be analyzed, and the nature of attributes (quantitative or categorical).

(2) Identifying Strategies: ECON 3640 teaches students to identify appropriate graphical and numerical analytical strategies based on the problem description and the nature of the variables.

(3) Generating Solutions: ECON 3640 teaches students to appreciate that there exist several ways of addressing a question. For example, for a

hypothesis testing one can construct different alternative hypotheses and the result can depend upon the way the hypothesis is stated.

(4) Selecting Solutions: ECON 3640 teaches students to select the solution approach that best suits their problem description.

(5) Evaluating Outcomes: ECON 3640 emphasizes the need to interpret the statistical results in the broader context that requires synthesis of reasoning from varied perspectives.

Textbook:

The lectures will be based on the contexts of these two textbooks:

(1) Statistics for Management and Economics (January 2014), 10ᵗʰ edition, by Gerald Keller

(2) Schaum's Outline of Statistics and Econometrics, 2ⁿᵈ Edition, by Salvatore & Reagle

The tentative schedule is listed based on Keller's book, in which chapters 1 through 4 cover the first section in descriptive statistics, chapters 5 through 8 cover the second section in the probability theory, and chapters 9 through 13 cover the third section in hypothesis testing.

Evaluations:

Generally speaking, how you perform in the tests will primarily determine your semester grade. You need to write quizzes, midterms and final. There are multiple quizzes that will come from time to time to give you a good sense of what you can expect to come in your tests. The dates to have a quiz will be announced a week earlier so you will definitely have plenty of time to prepare in advance. The dates for writing a midterm or final are indicated in the tentative schedule below, but they may be pushed forward or back according to the flow of lectures. The final is comprehensive and a study guide will be provided ahead of time. The lectures and assignments will cover all the questions that you can expect to see in the tests.

Quizzes: 15%

Midterms: 40%

Final: 30%

Assignments: 15%

Tentative Grade Scales:

A: 93 or above

A-: 87 or above

B+: 83 or above

B: 78 or above

B-: 70 or above

C+: 65 or above

C: 60 or above

C-: 50 or above

E: less than 50 (including 49.99)

Tentative Schedules:

This schedule is tentative and may be changed any time. Please follow the announcement on canvas tightly for the updated version.

The course structure is divided into three sections as follows:

1. Descriptive Statistics (Ch 1-4)
2. Probability Theory (Ch 5-8)
3. Estimation and Statistical Inference (Ch 9-13)

08/22 T: ch 1 introduction

08/24 TH: ch 4 numerical descriptive techniques

08/29 T: ch 4

08/31 TH: ch 4

09/05 T: ch 2,3 graphical descriptive techniques

09/07 TH: ch 2,3

09/12 T: ch 2-4

09/14 TH: Test Review

09/19 T: Midterm 1 (ch 2-4)

09/21 TH: ch 5

09/26 T: ch 6

09/28 TH: ch 6

10/03 T: ch 7

10/05 TH: ch 7

10/10 T: ch 7

10/12 TH: Test Review

10/17 T: Fall Break

10/19 TH: Fall Break   (10/20: last day to withdraw)

10/24 T: Midterm 2 (ch 5-7)

10/26 TH: ch 8 continuous probability distribution

10/31 T: ch 8

11/02 TH: ch 9 sampling distribution

11/07 T: ch 10 estimation

11/09 TH: ch 10 estimation

11/14 T: ch 11 hypothesis testing for normal distribution

11/16 TH: Test Review

11/21 T: Midterm 3 (ch 8-ch 11 for normal distribution)

11/23 TH: No class, Thanksgiving Day

11/28 T: ch 11 inference

11/30 TH: ch 12 inference

12/05 T: ch 13 inference

12/07 TH: Final Exam Review

12/14-12/15: comprehensive take-home final exam (ch 1-13)

Class Policies:

1. Students must take the exams on the scheduled dates. No make up tests will be offered.

2. Cheating and plagiarism will result a failure mark in this class without negotiation.

3. Late homework submission will not be tolerated and will result a mark of zero.

4. The test dates will be confirmed a week before. The dates listed in the syllabus are just tentative.

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.

CSBS EMERGENCY ACTION PLAN
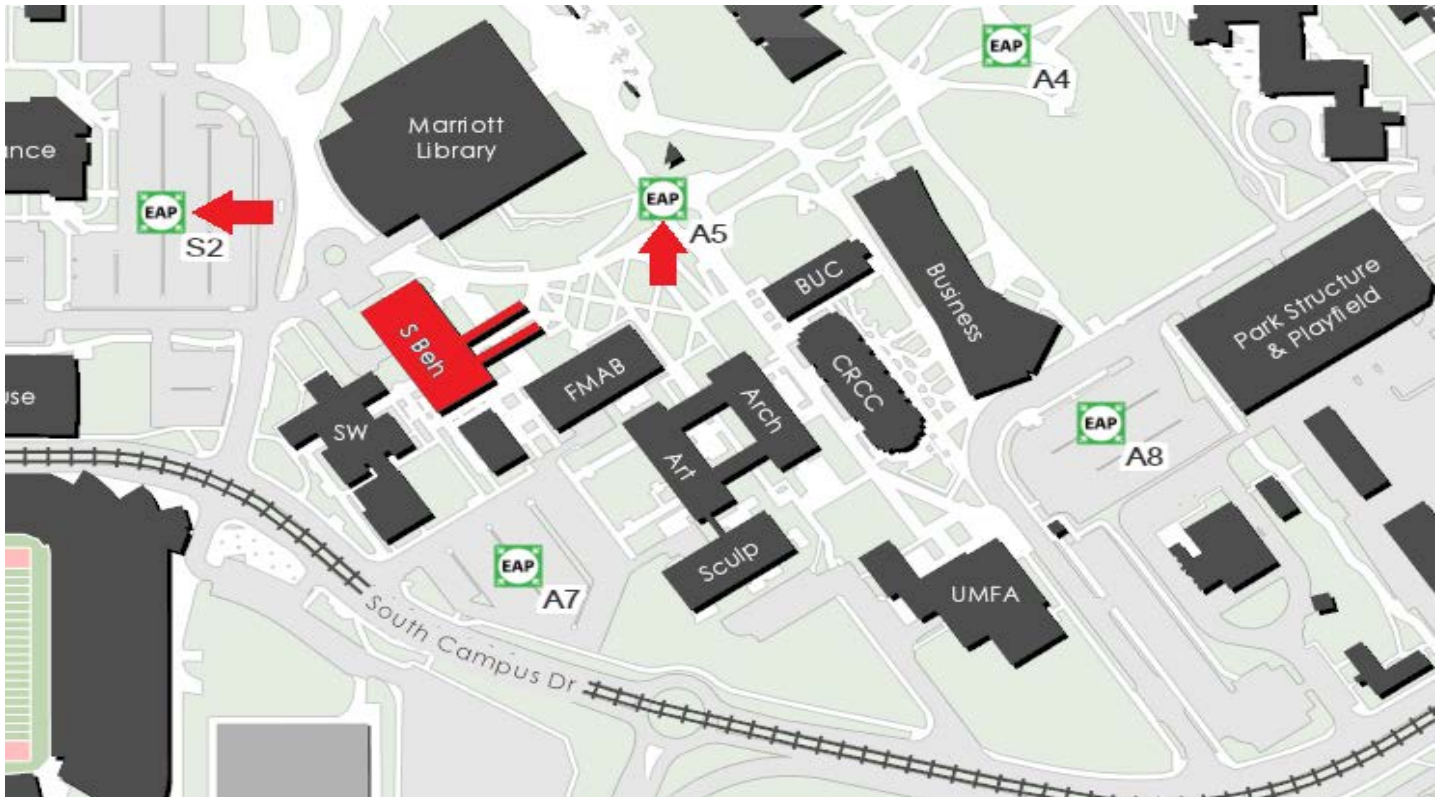
BUILDING EVACUATION

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 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.

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