Spring 2017

Econ 3640-002

Probability and Statistical Inference

This course fulfills QB general education requirement.

Instructor: Sophie Wu

Class meets: T/TH from 12:25 pm to 1:45 pm

Classroom: ST 216

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Office hours: T/TH 3:00 pm – 4:20 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), 10 edition, by Gerald Keller

(2) Schaum's Outline of Statistics and Econometrics, 2 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:

   You will have to take 10 quizzes during the entire semester. Usually, the quizzes will be run on Tuesdays in the first twenty minutes of the class meetings. Each quiz will count 2% of your final evaluation. The specific dates of taking a quiz will be announced a week before. You will also need to write three midterms and one final. I will drop the lowest mark of your midterm grades and take two midterms. Almost every week you will be given a weekly assignment to complete, each assignment

Quizzes: 20%

Midterms: 40%

Final: 30%

Assignments: 10%

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

Tentative Schedules:

This schedule is tentative and may be changed according to the flow of the lecture. Please follow the announcement on canvas for the most updated exam or assignment submission dates. (*: You need to submit your assignments on these dates.)

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)

01/10: ch 1 introduction

01/12: ch 4 numerical descriptive techniques

01/17: ch 4

01/19: ch 4

01/24: ch 2,3 graphical descriptive techniques

01/26: ch 2,3

01/31: ch 2-4

02/02: ch 2-4

02/07: Midterm 1 (ch 2-4)

02/09: ch 6

02/14: ch 6

02/16: ch 6-7

02/21: ch 7

02/23: ch 7

02/25: ch 7

03/02: ch 7

03/07: ch 8 continuous probability distributions

03/09: Midterm 2 (ch 5-7)

03/14: No class, Spring break

03/16: No class, Spring break

03/21: ch 9 sampling distribution

03/23: ch 9

03/28: ch 10 estimation

03/30: ch 10

04/04: ch 10

04/06: ch 11 hypothesis testing

04/11: ch 11

04/03: Midterm 3 (ch 8-ch 11 on normal distribution)

04/18: ch 11

04/20: ch 12 inference

04/25: ch 13 inference

05/02: 10:30 am- 12:30 pm

      (Final)

Class Policies:

1. Students must take the exams on the scheduled dates.

2. Cheating and plagiarism will result a failure mark in this class.

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

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.