ECON 101: STATISTICS FOR ECONOMICS

Summer 2019

Office Hours and Office:

Instructor:	Professor TH Lee	URL: http://faculty.ucr.edu/~taelee
Office hours:	MW 11 a.m. – 12 p.m.	Office: SPR 3103
LEC:	MW 2:10 – 5:00 p.m.	Classroom: HMNSS 1503

Teaching Assistants, Office Hours, and Offices:

Mr. Tao Wang

Office hours: MW 10 – 11 a.m. Office: SPR 3120

The DIS and LAB sessions begin from week 1 (from June 24). DIS is on Mondays, and LAB on Wednesdays.

Required Textbook: Keller, G., *Statistics for Management and Economics*, South-Western Cengage Learning. Make sure you will be reading the book as we progress. The 11th edition (2017, ISBN: 9781337298766) is the most current edition. The 11th edition is on order at the university Campus Store. The 10th edition (2014, ISBN: 9781285425450) is also ok because the changes in the 11th edition are minor.

Course Description: The course is an introduction to probability and statistics for econometrics. The goal is to study the "mean", both unconditional mean and conditional mean. The keyword of the course is "conditional". By learning conditional probability, conditional distribution, conditional median, conditional mean, you'll be prepared for Econ 107 among many other things.

Catalog Course Description: 5 Units, Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour; individual laboratory, 2 hours. Prerequisite(s): MATH 009A or MATH 09HA or MATH 022 or equivalent. An introduction to the basic statistical methods for economics. Topics include economic data analysis, index numbers, univariate and bivariate probability distributions, correlation and regression, sampling distributions, properties of estimators, and hypothesis testing.

Course Outline:

Chapters 1-5 and 8 cover basic materials.
Chapters 6, 7, 9 cover fundamental materials. (https://www.youtube.com/watch?v=UUVubfIY2ns)
Chapters 10, 11, 12, 13, 16, 17 are extensions of Chapter 9.
Note that the length of each chapter in the textbook is not uniformly distributed.

- Introduction [Chapters 1, 2, 3, 4, 5]
  histogram (unconditional histogram and conditional histogram)
  mean (unconditional mean and conditional mean)
- Probability and Distribution [Chapters 6, 7, 8]
  probability (unconditional probability and conditional probability)
  distribution (unconditional distribution and conditional distribution)
  mean (unconditional mean and conditional mean)
- Statistics [Chapters 9, 10, 11, 12, 13, 16, 17]
  sample mean (unconditional sample mean and conditional sample mean)
  its sampling distribution

Course Contents and Homework Assignments:

Chapters 1-5 will be discussed briefly only to motivate the course. Chapters 6, 7, 8, 9, 10, 11, 12, 13, 16 are main chapters of this course. Some sections of these chapters will be skipped. For sections to be included (as indicated below), the following Exercises from the textbook are selected as homework assignments, which you must try on your own. No solutions will be provided. This is intentional. Many of them will be discussed in LEC/DIS/LAB. [The numbers in the square brackets are for 10th edition.]

Chapters 1, 2, 3, 4, 5. Introduction

- Chapter 1: Exercises 1.3, 1.4, 1.6, 1.7
- Chapter 2: Exercises 2.33
- Chapter 3: Exercises 3.5, 3.17, 3.58 [3.50], 3.62 [3.54]
- Chapter 4: Exercises 4.2, 4.28 [4.20], 4.35 [4.27], 4.83 [4.63], 4.84 [4.64], 4.85 [4.65], 4.86 [4.66], 4.87 [4.67]
- Chapter 5: Exercises 5.13, 5.14, 5.17

Chapter 6. Probability

- Section 6.1 (sample space, events, and probability): Exercises 6.5, 6.7
- Section 6.2 (joint, marginal, conditional probabilities): Exercises 6.21 [6.17], 6.22 [6.18], 6.23 [6.19], 6.24 [6.20], 6.25 [6.21], 6.26 [6.22], 6.27 [6.23], 6.28 [6.24], 6.29 [6.25], 6.30 [6.26], 6.31 [6.27], 6.32 [6.28], 6.47 [6.43]
- Section 6.3 (probability tree): Exercises 6.59 [6.47], 6.64 [6.52], 6.65 [6.53], 6.71 [6.59], 6.73 [6.61], 6.76 [6.64], 6.79 [6.67], 6.82 [6.70]
- Section 6.4 (Bayes' theorem): Exercises 6.92 [6.76], 6.93 [6.77], 6.96 [6.80], 6.97 [6.81]

Chapter 7. Discrete Random Variables and Probability Distributions

- Section 7.1 (random variables and probability distributions): Exercises 7.18, 7.19, 7.20, 7.21, 7.26, 7.32, 7.33
- Section 7.2 (joint, marginal, conditional distributions): Exercises 7.45 [7.43], 7.46 [7.44], 7.47 [7.45], 7.48 [7.46], 7.53 [7.51], 7.56 [7.54], 7.57 [7.55], 7.58 [7.56]
- Section 7.3 (applications in finance: portfolio diversification and asset allocation): 7.71 [7.61]
- Section 7.4 (binomial distribution) Exercises 7.100 [7.84], 7.101 [7.85], 7.102 [7.86], 7.103 [7.87], 7.104 [7.88], 7.105 [7.89], 7.106 [7.90], 7.107 [7.91], 7.108 [7.92], 7.110 [7.94], 7.116 [7.100], 7.119 [7.101], 7.120 [7.102]

Chapter 8. Continuous Random Variables and Probability Distributions

- Section 8.1 (probability density functions): Exercises 8.1 - 8.8, 8.11- 8.14
- Section 8.2 (normal distribution): Exercises 8.19 - 8.45 [8.15 - 8.41], 8.51 [8.45], 8.52 [8.46], 8.53 [8.47], 8.54 [8.48], 8.55 [8.49], 8.56 [8.50], 8.57 [8.51], 8.58 [8.52], 8.61 [8.53], 8.62 [8.54]

Chapter 9. Sampling Distribution of A Statistic

- Section 9.1 (sample mean): Exercises 9.15 [9.7], 9.16 [9.8], 9.17 [9.9], 9.23 [9.15], 9.31 [9.21], 9.35 [9.25]
- Section 9.2 (sample proportion): Exercises 9.42-9.47 [9.30-9.35], 9.52-9.56 [9.40-9.44]

Chapter 10. Estimation

- Section 10.1 (properties of a point estimator): Exercises 10.1 - 10.8
- Section 10.2 (interval estimator): Exercises 10.13-10.16 [10.9-10.12], 10.25-10.33 [10.21-10.29], 10.34-10.41 [10.30-10.37]

Chapter 11. Hypothesis Testing

- Section 11.1 (introduction and concepts): Exercise 11.1-11.6
- Section 11.2 (testing on μ when σ is known): Exercises 11.7-11.12, 11.21-11.23 [11.13-11.15], 11.36 [11.28], 11.37 [11.29], 11.43 [11.35], 11.44 [11.36]

Chapter 12. Estimation and Hypothesis Testing when σ is unknown

- Section 12.1 (inference on μ when σ is unknown): Exercises 12.3-12.7, 12.23-12.25, 12.31
- Section 12.3 (inference about a population proportion): Exercises 12.82-12.85, 12.93-12.95
- Section 12.4 (applications in marketing: market segmentation): Example 12.6

Chapter 13. Inference about Comparing Two Populations

- Section 13.1 (inference about the difference between two means): Exercises 13.1 [13.5], 13.12, 13.18
- Section 13.2 (inference about the difference between two means: an example)

Chapter 16. Simple Linear Regression

- Section 16.1 (a linear model for the conditional mean)
- Section 16.2 (estimation of the conditional mean): Exercises 16.1-16.13
- Section 16.3 (classical assumptions for linear models): Exercise 16.19
- Section 16.4 (inference)
- Section 16.5 (prediction)
- Section 16.6 (model diagnostics)

Chapter 17. Multiple Linear Regression

- Section 17.1 (a linear model for the conditional mean)
- Section 17.2 (estimation of the conditional mean)
- Section 17.3 (multicollinearity, big data, high dimensional regression, machine learning)

DIS and LAB Sessions: You must attend the registered section only. Attendance to discussion and laboratory sessions is mandatory. TA will provide supplementary lectures to review the class lectures, discuss the homework assignments, and provide help with computer problems. Some problems in homework assignments will require the use of computer. EXCEL will be used. LAB sessions will be held at SPR 2225. Additional computer facilities are in Watkins 2101 and Watkins 2111. To check whether a lab is available, click here.

Grading:

• Homework Assignments	0%	
• Attendance and Quizzes	20%	many times, to be given without prior notice
• Midterm 1	20%	07/08/2019, Monday (4-5 p.m.)
• Midterm 2	20%	07/17/2019, Wednesday (4-5p.m.)
• Final Exam	40%	07/26/2019, Friday, 3:30 p.m. – 5:30 p.m.

There are many **Homework Assignments** as listed above. Homework Assignments will provide many hand-on examples to help you understanding the lecture material. Homework Assignments will be discussed in DIS and LAB, but will not be graded and therefore there is no need to turn in. It is important that you do Homework Assignments on the synchronized pace with LEC, because it will be difficult for you to do all at once just before each exam. Homework Assignments will be useful for exams.

Attendanace in all LEC/DIS/LAB is required. If you miss a class, you may be lost quickly and the cost of recovering can be high. You will have to attend only the *registered* DIS/LAB sections to get attendance credits. Attendance will be checked frequently.

There will be many pop-up **Quizzes** during LEC/DIS/LAB without prior notice. All quiz questions will be based on LEC materials. There will be no make-up quiz for *any* reasons because quizzes are to be used to check attendance.

All three **Exams** are mandatory. No make-up exams will be given (take it or lose it). The final exam is comprehensive. No exam will be given earlier or later than the scheduled time or date for any reasons. Classes and exams are university's official functions and should not have any schedule conflict with any personal schedule including medical appointment. The exam schedules can be subject to change with a short notice, and students are responsible for any announcement and information provided during LEC/DIS/LAB.

We will do our best for maintaining the highest level of fairness. Bring a photo ID to the exams. You will be signing in and/or signing out with the photo ID for each exam. Cheating, fabrication, plagiarism, or any form of academic dishonesty are violations of university values and policies, and will be reported immediately to the university.

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