Shanghai Jiao Tong University

EC313 Introduction to Statistics

Instructor Information:	Gexin Yu Home Institution: College of William and Mary Email: gyu@wm.edu Office Hours: Determined by Instructor

Term:	June 29, 2020 - July 24, 2020	**Credits:**	4 units

Class Hours：	Monday through Friday, 120 minutes per teaching day
Discussion Sessions:	2 hours each week, conducted by teaching assistant(s)
Total Contact Hours:	66 contact hours (1 contact hour = 45 mins, 3000 mins in total)
Required Texts (with ISBN):	Business Statistics—A First Course, David Levine, Kathryn Szabat, and David Stephan, 7th edition (global edition), ISBN 10: 1-29-209593-8. ISBN 13: 978-1-292-09593-6 (Print) ISBN 13: 978-1-292-09602-5 (PDF)
Prerequisite:	N/A

Course Overview

This course is an introduction to the basic concepts and procedures behind probability and statistics. Some of the topics covered are descriptive statistics, experimental design, regression, probability, discrete random variables including the binomial distribution, the normal distribution, confidence intervals, hypothesis tests for a single parameter, inference on two samples and the chi-square distribution to test goodness-of-fit and independence.

Course Goals

After the course, students should learn some basics concepts and methods in statistics to analyze simple problems in business.

Grading Policy

Quizzes and Homework	30%
Midterm Examination	30%
Final Examination	40%

Grading Scale

Number grade	Letter grade	GPA
90-100	A	4.0
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3.0
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2.0
62-64	C-	1.7
60-61	D	1.0
≤ 59	F (Failure)	0

Class Schedule

Date	Lecture	Readings
Day 1	Introduction, Defining and collecting data	Chapter 1
Day 2	Organizing and visualizing variables	Chapter 2
Day 3	Numerical description measures	Chapter 3
Day 4	Basic probability 1	Chapter 4
Day 5	Basic probability 2	Chapter 4
Day 6	Discrete probability distribution	Chapter 5
Day 7	Normal distribution	Chapter 6
Day 8	Sample distribution	Chapter 7
Day 9	Midterm review	
Day 10	**Midterm Examination**	Chapter 1-7
Day 11	Confidence internal estimation	Chapter 8
Day 12	Fundamentals of hypothesis testing: one sample tests	Chapter 9
Day 13	Two-sample tests	Chapter 10
Day 14	One-way ANOVA	Chapter 10
Day 15	Chi-square tests	Chapter11
Day 16	Simple linear regression 1	Chapter 12
Day 17	Simple linear regression 2	Chapter 12
Day 18	Multiple regression	Chapter 13
Day 19	Final Review	
Day 20	**The Final Examination**	Chapter 1-13

More detail topics

1. Defining and collecting data: how to define and collect data, identify the ways to collect a sample (completely randomized design, randomized block design), and understand the types of survey errors;
2. Organizing and visualizing data: Methods to organize and visualize variables, principles of proper visualizations;
3. Numerical descriptive measures: Describe the properties of central tendency, variation, and shape in numerical variables, covariance and the coefficient of correlation;
4. Basic probability: Basic probability concepts, conditional probability, Bayes' rules, counting rules;
5. Discrete probability distributions: Properties of probability distribution, expected value and variance, binomial distribution and Poisson distribution;
6. Normal Distribution: Continuous probability distribution, normal distribution, evaluating normality;
7. Sampling distributions: Sampling distributions, probability related to the sample mean and the sample proportion, Central Limit Theorem;
8. Confidence Interval Estimation: Confidence interval estimate for the mean and for the proportion;
9. Fundamentals of Hypothesis Testing: One-sample tests: Fundamentals of hypothesis-testing methodology, t-test. One-tail test, Z test;
10. Two-sample Tests and One-way ANOVA: Comparing the means of two independent or two related populations, compare the proportions and variances of two independent populations, One-Way ANOVA, F-test for the ratio of two variances;
11. Chi-square tests: Chi-square test, the Goodness-of-Fit Test, the Chi-square test of independence and homogeneity;
12. Simple Linear Regression: Least-square method, measures of variation, assumption of regression, residual analysis, inferences, estimation of mean values and prediction of individual values;

13. Multiple Regression: Develop a multiple regression model, interpret the regression coefficients, coefficient of multiple determination, overall F test, ANOVA, residual analysis and inference, Dummy variable and interaction terms.