Shanghai Jiao Tong University

EC313 Introduction to Statistics

Instructor:	Gexin Yu	**Email:**	gyu@wm.edu
Instructor's Home Institution:	College of William and Mary	**Office:**	TBD
Office Hours:	TBD		
Term:	July 15-August 9, 2019	**Credits:**	4 units
Classroom:	TBD	**Teaching Assistant(s):**	TBD
Class Hours:	Monday through Friday, 120 mins 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.

Learning Outcomes

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

Grading Policy

Homework and quizzes	30%
Midterm exam	30%
Final exam	40%

Grading Scale is as follows:

Number grade	Letter grade	GPA
90-100	A	4
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2
62-64	C-	1.7
60-61	D	1
$\leq$59	F (Failure)	0

Class Schedule (Subject to Change)

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