



East China Normal University

STAT 11 - Introduction to Statistics

Instructor: Wanzhong Lu

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Home University: Shanghai University of Finance Economics

Semester: June 27 to July 15, 2022

Course Hour: Monday through Friday, 160 mins per teaching day;

Total Contact Hours: 64 contact hours

Credits: 4

Designated Textbook with ISBN:

McClave & Sincich, Statistics (Twelfth Edition), Pearson, ISBN 13: 978-0-321-75593-3

Course Prerequisite:

At least one semester of calculus is required; two or three semesters are strongly recommended.

**Notes: The course might be moved to online delivery due to COVID-19 pandemic. Students will be notified once such decision is made.*

Course Overview

The field of modern statistics, with an increased emphasis on statistical inference, is based primarily on the theory of probability. An introduction to the basic concepts of probability theory using set notation is, therefore, presented in this course. The material introducing random variables and their mathematical expectations, is also included in this course. The discussing of discrete and continuous probability distributions and the various properties describing these distributions, a brief treatment of joint, marginal, and conditional distributions is included too. This then naturally leads to the treatment of sampling theory, estimation theory, and hypothesis testing theory.

The following concepts will be covered in this course: descriptive statistics, elementary probability theory, laws of probability, random variables, discrete and continuous probability models, mathematical expectation, statistical inference, point estimation, interval estimation, tests of hypotheses, ANOVA, analysis of contingency tables and the use of statistical computing packages.

This course will cover Chapters 1-10 in McClave & Sincich. -12th ed. It will concentrate on Probability Theory and Statistical Methods and will encompass the following topics:

- (i) Graphical and descriptive statistical methods; stem-and-leaf displays, histograms, boxplots, quantile plots, measures of location, variation and position.
- (ii) Probability theory; set theory, axiomatic foundations, conditional probability and independence, Bayes' Rule; random variables, expected values; common families of distribution; discrete and continuous distributions; covariance and correlation; properties of a random sample and central limit theorem.
- (iii) Methods of statistical inference; estimation, test of hypothesis, analysis of variance, categorical data analysis.
- (iv) The use of examples as a teaching device. Almost all new ideas are introduced and illustrated by data-based applications and examples.

Learning Outcomes

Upon completion of this course, students should be able to:

1. Understand the main features of traditional and modern statistics.
2. Learn how to analyze statistical data properly.
3. Understand the role of formal statistical theory and informal data analytic methods.
4. Gain an understanding of statistical methods relevant to upper division interdisciplinary courses.
5. Develop the skills necessary to diagnose and analyze real-world problems.
6. Apply their knowledge of techniques presented in this course.
7. Utilize their critical thinking skills to solve challenging real-life problems with careful, logical thoughts and the appropriate statistical analysis tools.
8. Explore data with statistical computer software and graphing calculator.

Grading Scale and Notes

The following definitions will be used as a guide for the assignment of grades:

Number Grade	Letter Grade	Definitions
94-100	A	Extraordinary distinction, indicating a full mastery of course content and excellent work.
90-93	A-	
87-89	B+	Strong performance demonstrating a high level of attainment, indicating a good comprehension of the course material and the student's full engagement with the course requirements and activities.
84-86	B	
80-83	B-	
77-79	C+	Acceptable performance, demonstrating an adequate and satisfactory comprehension of the course material and the student has met the basic requirements for completing assignments and participating in class activities.
70-76	C	
60-69	D	A marginal performance in the required exercises demonstrating a minimal passing level of attainment.
0-59	F	An unacceptable performance. The F grade indicates that the student's performance has revealed almost no understanding of the course content.

Assessment Policy

Assessment	Final Grade
Quiz	30%
Mid-Term Examination	30%
Final Examination	30%
Attendance	10%

Course Schedule

Date	Lecture	Reading/Assignments/ Examination
Day 1	Chapter 1: Statistics, Data, and Statistical Thinking. The Science of Statistics, Types of Statistical Application, Fundamental, Elements of Statistics, Types of Data, Collecting Data, The Role of Statistics in Critical Thinking and Ethics.	P1-24 1.16, 1.26, Quiz
Day 2	Chapter 2: Methods for Describing Sets of Data. Part 1: Describing Qualitative Data, Graphical Methods for Describing Quantitative Data, Numerical Measures of Central Tendency, Numerical Measures of Variability, Interpreting the Standard Deviation.	P22-72 2.28, 2.58 Quiz
Day 3	Chapter 2: Methods for Describing Sets of Data. Part 2: Numerical Measures of Relative Standing, Methods for Detecting Outliers: Box Plots and z-Scores. Chapter 3: Probability. Part 1: Events, Sample Space, and Probability, Unions and Intersections, Complementary Events.	P73-127 2.123, 3.10 Quiz
Day 4	Chapter 3: Probability. Part 2: The Additive Rule and Mutually Exclusive Events, Conditional Probability, the Multiplicative Rule and Independent Events, Random Sampling.	P128-183 3.71, 3.72 Quiz
Day 5	Chapter 4: Discrete Random Variables. Two types of Random Variables, Probability Distributions for Discrete Random Variables, Expected Values of Discrete Random Variables, the Binomial Random Variables, the Poisson Random Variables.	P184-223 4.20, 4.40 Quiz
Day 6	Chapter 5: Continuous Random Variables. Part 1: Continuous Probability Distributions, the Union Distribution.	P224-230 5.3, 5.5 Quiz
Day 7	Chapter 5: Continuous Random Variables. Part 2: The Normal Distribution, Descriptive Methods for Assessing Normality. Chapter 6: Sampling Distributions. Part 1: The Concept of a Sampling Distribution.	P231-278 5.28, 5.34 Quiz
Day 8	Chapter 6: Sampling Distributions. Part 2: Properties of Sampling Distributions: Unbiasedness and Minimum Variance, The Sampling Distribution of \bar{x} and	P279-297 6.30, 6.31 Mid-Term Examination



	the Central Limit Theorem.	
Day 9	Chapter 7: Inferences Based on a Single Sample: Estimation with Confidence Intervals. Part 1: Identifying and Estimating the Target Parameter, Confidence Interval for a Population Mean: Normal (z) Statistic.	P298-309 7.8, 7.10 Quiz
Day 10	Chapter 7: Inferences Based on a Single Sample: Estimation with Confidence Intervals. Part 2: Confidence Interval for a Population Mean: Student's t -Statistic, Large Sample Confidence Interval for a Population Proportion, Determining the Sample Size.	P310-348 7.33, 7.34 Quiz
Day 11	Chapter 8: Inferences Based on a Single Sample: Tests of Hypothesis. Part 1: The Elements of a Test of Hypothesis, Formulating Hypotheses and Setting up the Rejection Region, Test of Hypothesis about a Population Mean: Normal (z) Statistic.	P349-366 8.26, 8.27 Quiz
Day 12	Chapter 8: Inferences Based on a Single Sample: Tests of Hypothesis. Part 2: Observed Significance Levels: p -Values, Test of Hypothesis about a Population Mean: Student's t -Statistic. Large sample Test of Hypothesis about a Population Proportion.	P367-408 8.43, 8.44 Quiz
Day 13	Chapter 9: Inferences Based on a Two Samples: Confidence Intervals and Tests of Hypotheses. Part 1: Identifying the Target Parameter, Comparing Two Population Means: Independent Sampling.	P409-427 9.6, 9.7 Quiz
Day 14	Chapter 9: Inferences Based on a Two Samples: Confidence Intervals and Tests of Hypotheses. Part 2: Comparing Two Population Means: Paired Difference Experiments, Comparing Two Population Proportions: Independent Sampling, Determining the Sample Size.	P428-449 9.33, 9.34 Quiz
Day 15	Chapter 10: Analysis of Variance: Comparing More Than Two Means. Elements of a Designed Study, the Completely Randomized Design: Single Factor, Multiple Comparison of Means, the Randomized Block design, Factorial Experiments: Two Factors. Final Exam.	P474-548 10.22, 10.23, 10.24 Final Examination

Reading List:

1. David M. Levine, Timothy C. Krehbiel, Mark L. Berenson, Business Statistics (Fifth Edition), Pearson Education.cpt.1-cpt.5.
2. Martin Sternstein, Barron's AP Statistics 2008 with CD-ROM (4th Edition), Barron's Educational Series, Inc. cpt.1-cpt.4.
3. Douglas A. Lind, Robert D. Mason, William G. Marchal, Basic Statistics for Business and Economics (Third Edition), the McGraw-Hill Company. cpt.1-cpt.5.
4. David R. Anderson, Dennis J. Sweeney, Thomas, A. Williams, Statistics for Business and Economics (Eighth Edition), Thomson Learning. cpt.1-cpt.4.