

Fariborz Maseeh Department of Mathematics and Statistics

## **STAT 244: Introduction to Probability and Statistics II**

Updated Winter 2020

**Course Description:** A basic course in statistical analysis including estimation, tests of significance, experimental design and analysis of variance, linear regression and correlation, nonparametric statistics, selected topics, applications, and use of statistical computer packages. A broad nontechnical survey designed primarily for non-math students who need to utilize the subject in their own fields. Not approved for major credit. This is the second course in a sequence of two: Stat 243 and Stat 244 which must be taken in sequence.

**Credits:** 4

**Prerequisites:** STAT 243

### **Course Objectives:**

1. Display and interpret qualitative and quantitative data using SPSS or similar software.
2. Conduct inferential techniques for a wide variety of statistical scenarios.

**Student Learning Outcomes:** Upon completion of this course students will have the ability to:

- Apply inferential statistics to real world problems.
- Communicate information effectively and efficiently.
- Use graphing calculators and/or SPSS as a computational and graphical tool.
- Select theoretical concepts from various disciplines and apply them to real world problems.

### **Topics:**

1. Hypothesis Testing for One Population
2. Hypothesis Testing for Two Populations
3. Chi-Square Tests
4. Hypothesis Testing for Three or More Populations
5. Correlation and Regression
6. Nonparametric Statistics

### **Suggested Textbooks:**

Alan Agresti, Christine A. Franklin, Bernhard Klingenberg, *Statistics: The Art and Science of Learning from Data*, Pearson, 4<sup>th</sup> edition.

**Suggested Calculator:** TI-83, TI-84 or TI-89

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### **Current STAT 244 Textbook Mapping:**

Alan Agresti, Christine A. Franklin, Bernhard Klingenberg, Statistics: The Art and Science of Learning from Data, Pearson, 4<sup>th</sup> edition.

The course uses the online homework system MyStatLab from Pearson.

Suggested Calculator: TI-83, TI-84 or TI-89

#### **Chapter 9: Statistical Inference: Significance Tests About Hypotheses (For Review)**

- 9.1 Steps for Performing a Significance Test
- 9.2 Significance Tests About Proportions
- 9.3 Significance Tests About Means
- 9.4 Decisions and Types of Errors in Significance Tests
- 9.5 Limitations of Significance Tests
- 9.6 The Likelihood of a Type II Error and the Power of a Test

#### **Chapter 10: Comparing Two Groups**

- 10.1 Categorical Response: Comparing Two Proportions
- 10.2 Quantitative Response: Comparing Two Means
- 10.3 Other Ways of Comparing Means, Including a Permutation Test (Optional)
- 10.4 Analyzing Dependent Samples
- 10.5 Adjusting for the Effects of Other Variables

#### **Chapter 11: Analyzing the Association between Categorical Variables**

- 11.1 Independence and Dependence (Association)
- 11.2 Testing Categorical Variables for Independence

#### **Chapter 12: Analyzing the Association between Quantitative Variables: Regression Analysis**

- 12.1 Modeling How Two Variables Are Related
- 12.2 Inference about Model Parameters and the Association
- 12.3 Describing the Strength of the Association
- 12.4 How the Data Vary Around the Regression Line
- 12.5 Exponential Regression: A Model for Nonlinearity

#### **Chapter 14: Comparing Groups: Analysis of Variance Methods**

- 14.1 One-Way ANOVA: Comparing Several Means
- 14.2 Estimating Differences in Groups for a Single Factor

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14.3 Two-Way ANOVA (Optional)

**Chapter 15: Nonparametric Statistics**

15.1 Compare Two Groups by Ranking

15.2 Nonparametric Methods for Several Groups and for Matched Pairs