

MATH 550

Applied Probability & Statistics

Summer Semester, 2004

Instructor: Bill Blubaugh, Ph. D

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Office hrs: M, W @ 9 AM & T @ 10:30 AM
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Textbook: Elementary Statistics: A Step by Step Approach, A Brief Edition (Second Edition), written by Allan Bluman, and published by McGraw Hill, 2002.

Course Objectives:

- To develop proficiency in the use of statistics to structure understanding of and investigate questions in the world around us.
- To develop proficiency in treating statistical content at the appropriate level.
- Demonstrate competence in the use of numerical, graphical, and algebraic representations.
- Demonstrate proficiency in the use of statistics to formulate and solve problems.
- Demonstrate the ability to interpret data, analyze graphical information, and communicate solutions in written and oral form.
- Demonstrate proficiency in the use of computer and calculator technology in supporting the use of statistics.
- To learn and connect topics of probability and statistics in a context for use in secondary mathematics.

Course Content:

- The Nature of probability and statistics
 - a. Descriptive and Inferential Statistics
 - b. Variables and Types of Data
 - c. Data Collection and Sampling Techniques
- Frequency Distributions and Graphs
 - a. Organizing Data
 - b. Histograms, Frequency Polygons, and Ogives
 - c. Other Types of Graphs
- Data Description
 - a. Measures of Central Tendency
 - b. Measures of Variation
 - c. Measures of Positions
 - d. Exploratory Data Analysis
- Probability
 - a. Sample Spaces and Probability
 - b. The Addition Rules for Probability
 - c. The Multiplication Rules and Conditional probability
- Probability Distributions
 - a. Probability Distributions
 - b. Mean, Variance, and Expectation
 - c. The Binomial Distribution
- The Normal Distribution (ND)
 - a. Properties of the ND
 - b. The Standard ND
 - c. Applications of the ND
 - d. The Central Limit Theorem

- e. The Normal Approximation to the Binomial Distribution
- Confidence Intervals (CI) and Sample Size (SS)
 - a. CI and SS with a Known Mean
 - b. CI and SS with an Unknown Mean
 - c. CI and SS for Proportions
 - d. CI for Variances and Standard Deviations (SD)
- Hypothesis Testing
 - a. Steps in Hypothesis Testing
 - b. Large Sample Mean Test
 - c. Small Sample Mean Test
 - d. Proportion Test
 - e. Variance or SD Test
 - f. CI and Hypothesis Testing
- Testing the Difference among Means, Variance, and Proportions
 - a. Testing the Difference between Two Means: Large samples
 - b. Testing the Difference between Two Variances
 - c. Testing the Difference between Two Means: Small Independent Samples
 - d. Testing the Difference between Two Means: Small Dependent Samples
 - e. Testing the Difference between Proportions
- Correlations and Regressions
 - a. Scatter Plots
 - b. Correlations
 - c. Regressions
 - d. Coefficient of Determination and Standard Error of Estimate
- Chi-Squared and Analysis of Variance (ANOVA)
 - a. Test for Goodness of Fit
 - b. Tests Using Contingency Tables
 - c. Analysis of Variance (ANOVA)

Attendance: Attendance to class is expected and required. Material and methods may be covered in class which are not in your textbook. If you absolutely cannot be in class for a test or lab, you must contact me in advance if you wish to make it up; there will be no exceptions.

Disabilities: Students with disabilities who believe they may need accommodations in this class are encouraged to contact the Disability Access Center (970) 351-2289 as soon as possible to better ensure that accommodations are implemented in a timely fashion.

Homework: Assignments will be made for each class period, but not collected. You will be tested "directly" over some of the assigned problems on the tests. You should feel free and are encouraged to work with other class members, and become interested in each other's achievements. Your success in mathematics is not only important to you, but also to the hundreds of students you influence in your future classrooms.

Labs: There will be four labs assigned and collected. The software program Excel will be used. Each lab write-up will be due a few days after the lab is conducted in class. Each lab assignment will be worth 25 points. You are encouraged to work in groups of two (three maximum or individually if preferred) for the lab work. Each lab will be a group project and each lab partner

will receive the same grade for the assignment. Also, you can change partners for each lab project if you like.

Tests: There will be three tests of approximately 60 minutes each, over the course material. If you absolutely cannot be in class for a test or lab, you must contact me in advance if you wish to make it up; there will be no exceptions. Each test will consist of problems which require knowledge of the techniques covered in class and on homework problems assigned.

Evaluation: There will be three tests and four laboratory write-ups. Each test will be worth 100 points and each lab write-up is worth 25 points. You will be permitted a 3 by 5 (or 4 by 6) note card for each test and you can always use your calculator. A course letter grade, based on 90%, 80%, 70% and 60% of a possible 400 points, will be assigned.

Tentative Class Content Schedule

<u>Date</u>	<u>Sections</u>	<u>Date</u>	<u>Section</u>
June 28	Introduction, Chapters 1, 2, 3.1, 3.2	July 15	8.4, 8.5, Lab #3
June 29	3.3 & 3.4	July 19	9.1 - 9.3 (Lab #3 Due)
June 30	5.1, 5.2, Lab #1	July 20	9.4 - 9.6
July 1	5.3 & 5.4	July 21	Test #2
July 5	University Closed	July 22	10.1 & 10.2
July 6	6.1 & 6.2 (Lab #1 Due)	July 26	10.3 & 10.4
July 7	6.3, 6.4, Lab #2	July 27	10.5 & 10.6
July 8	Test #1	July 28	11.1 - 11.3
July 12	7.1 - 7.4 (Lab #2 Due)	July 29	11.4, 11.5, Lab #4
July 13	7.5 & 7.6	Aug 2	12.1 - 12.3
July 14	8.1 - 8.3	Aug 3	Test #3 (Lab #4 Due)

Problem Assignments from Textbook by Chapter & Section

Chapter 1 5, 6, 9, 14, 17

Chapter 2 3, 9, 13, 18, 19, 28, 31, 39, 47, 53, 60, 61, 67, 69, 71, 80, 89

Chapter 3

Section 2 7, 14, 27, 32, 40

Section 3 49, 56, 63, 75, 82, 87, 88

Section 4 102, 107, 117

Read Through Chapter 4 – No assigned problems

Chapter 5

Section 2 2, 8, 11, 13, 17, 23, 27, 30, 37

Section 3 40, 43, 46, 49, 55, 61

Section 4 69, 78, 91, 100, 103, 107, 118

Chapter 6

Section 2 2, 7, 10, 13, 17, 23, 31, 36

Section 3 41, 50, 55, 58

Section 4 63, 65, 67, 81, 88

Chapter 7

Section 3 9, 13, 22, 29, 39, 41, 45

Section 4 55, 67, 73, 79, 86, 89

Section 5 95, 99, 103, 111, 117, 121

Section 6 124, 129, 133, 136

Chapter 10

Section 2 1, 3, 11, 17, 20, 21

Section 3 23, 27, 35, 40, 41

Section 4 45, 46, 49, 53

Section 5 55, 61, 63, 65

Section 6 67, 73, 79, 80, 83

Chapter 8

Section 2 9, 13, 21, 25

Section 3 26, 33, 36, 41, 45, 46

Section 4 47, 51, 55, 61, 64, 65

Section 5 67, 69, 71, 77, 79

Chapter 11

Section 2 1, 17, 23, 29

Section 3 31, 45, 51, 56, 61, 63

Section 4 67, 75, 81, 87

Chapter 9

Section 2 2, 3, 10, 12, 13

Section 3 17, 26, 31, 39

Section 4 45, 47, 54, 59

Section 5 63, 71, 75, 77, 78

Section 6 79, 83, 87

Chapter 12

Section 2 1, 7, 11, 17, 18

Section 3 29, 34, 43, 51