

HERKIMER COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Mathematics/Science/Allied Health and Physical Education
COURSE TITLE: Mathematical Statistics I
COURSE NUMBER: MA 127
CREDIT: 3 Credits (3,1)
DATE: Revised Fall 2006
GRADE TYPE: Letter Grade
PREPARED/REVIEWED BY: A. Getman

COURSE DESCRIPTION

This course is designed to explore topics from descriptive and inferential statistics: graphing, measure of central tendency and variation, probability, Central Limit Theorem, estimation, the binomial distribution, the normal distribution and hypothesis testing. The laboratory provides hands-on technology experience using a statistical software package. Skill in elementary algebra is required.

COURSE OBJECTIVES

Upon completion of the work of this course, using a computer as a tool where appropriate, a student will be able to:

1. Demonstrate the meaning of terms used in statistics by recognizing examples of each term from specific data or statements.
2. Group given data into different categories.
3. Recognize the different types of graphical forms, the different types of graphical distributions and draw the various types from given data.
4. Define the different measures of central tendency.
5. Calculate a numerical value for any of the measures of central tendency.
6. Apply the definition of probability to some basic situations.
7. Describe the binomial distribution and apply it.
8. Describe the normal distribution by the properties of its parameters.
9. Define the standard normal curve.
10. State what the total area under the curve represents.
11. Compute Z values from specific data.
12. Determine particular relationships between specified boundary positions of intervals along the abscissa and determine the probabilities for specific given intervals using tables.
13. Find probability values based upon the normal distribution and the binomial distribution.
14. Compute values of sample means and sample standard deviations of means and sketch graphs of their distributions.
15. Test a hypothesis for one sample mean by defining H_0 or H_1 for the test, defining the rejection region, and determining when rejection is warranted.
16. Determine confidence intervals for specific data.
17. Use confidence intervals to test hypotheses about means.
18. State the differences between Z and t distributions.
19. Determine the estimation of the mean.
20. Provide calculations for sampling distributions and the Central Limit Theorem.
21. Effectively use the English language in comparing and contrasting computer printouts of frequency graphs and probability distributions.

22. Effectively use the English language in writing and describing population statistics, and in drawing conclusions in hypotheses testing.
23. Effectively use the English language to describe and explain results in computer experiments such as modeling, confidence intervals, sampling, and correlation and regression.
24. Appreciate the value and importance of statistics in our society.
25. Think critically as to the possible improper application of statistics in a given situation.

OUTCOMES

By the end of this course, students will demonstrate 60% mastery on average on all tests and computer projects administered.

MAJOR DIVISIONS OF SUBJECT MATTER

- I. Introduction to Statistics
 - A. What is Statistics?
 - B. Populations and Samples Defined
 - C. Introduction of Minitab
- II. Organizing Data
 - A. Sampling
 - B. Graphs
- III. Measures of Central Tendency
 - A. Mode, Median, Mean
 - B. Measures of Variation
- IV. Elementary Probability Theory
 - A. Definition of Probability
 - B. Some Probability Rules
 - C. Counting Techniques
 - D. Probability Distributions
- V. Binomial Distribution
 - A. Binomial Experiments
 - B. Binomial Distribution
 - C. Additional Properties
- VI. Normal Distribution
 - A. Graphs of Normal Probability Distributions
 - B. Standard Units and the Standard Normal Distribution
 - C. Areas Under the Standard Curve
 - D. Areas Under Any Normal Curve
- VII. Introduction to Sampling Distributions
 - A. Sampling Distributions
 - B. The Central Limit Theorem
 - C. Normal Approximation to the Binomial Distribution

- VIII. Estimation
 - A. Estimating μ With Large Samples
 - B. Estimating μ With Small Samples
 - C. Estimating p in a Proportion
 - D. Choosing the Sample Size
- IX. Hypothesis Testing
 - A. Introduction to Hypothesis Testing
 - B. Tests Involving the Mean
 - C. Tests Involving the Difference of Two Means
- X. Regression and Correlation
 - A. Introduction to Paired Data and Scatter Diagrams
 - B. Linear Regression

LABORATORY EXERCISES REQUIRED

- I. Introduction to My Math Lab
- II. Introduction to Minitab
- III. Measures of Center and Variation
- IV. Creating Graphs, Charts and Plots
- V. Data Analysis: Comparing Groups
- VI. Probabilities Through Simulations
- VII. Exploring Probability Distributions
- VIII. Binomial Distributions
- IX. Normal Distributions
- X. Central Limit Theorem
- XI. Confidence Intervals and Sample Size
- XII. Hypothesis Testing About μ and p
- XIII. Hypothesis Testing with Simulations
- XIV. Regression and Correlation

COURSE REQUIREMENTS

Please see individual instructor's syllabus.

EVALUATION/GRADING

Please see individual instructor's syllabus.

TEXTBOOK

Please see individual instructor's syllabus.

CLASSROOM POLICIES

Cell phones, food, drink, and inappropriate language are not allowed in class. Regular attendance and punctuality are expected.

Please see individual instructor's syllabus for a more detailed explanation of classroom policies.