

General Syllabus

MATH 2130 – Business Statistics I
3 (Semester) Credit Hours
Semester: Summer 2009 and following

Lakeland Community College
Kirtland, OH 44094

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Text: Statistical Techniques in Business and Economics with Student CD
Douglas A. Lind, COASTAL CAROLINA UNIV
William G Marchal, University of Toledo---Toledo
Samuel A. Wathen, Coastal Carolina University
McGraw-Hill Publishing
Summer 2009: 13th Edition 9780073272962
Fall 2009 and following: 14th Edition 9780077309428

(Covers chapter 1 – 10)

Prerequisite: ITIS 1012 or MATH 1040 or MATH 1050 or MATH 1650 or higher

COURSE DESCRIPTION:

This course introduces students to the collection, analysis, and graphic presentation of data and the application of statistical methods to the solution of practical business problems. The course covers descriptive statistics, mathematics of probability, and statistical inference. This course is a requirement in the accounting program and several information technology and computer science programs.

This course forms part of a two-course sequence to meet the Ohio Transfer Assurance Guide (TAG) requirements for business statistics. Students must take both this course and MATH 2135 Business Statistics II for transfer purposes. Students who are considering transferring this course sequence should take MATH 1650 College Algebra in addition to or as a replacement for the mathematics courses required for their degree programs.

GENERAL COURSE GOALS:

The course will

1. Introduce, explore, and provide experience in correctly using and manipulating secondary data sources such as those found in government and private companies.
2. Introduce, explore, and provide experience in using technology to develop conceptual understanding of and to analyze and manage data.

3. Introduce students to the general characteristics of data.
4. Provide hands-on experience in grouping data to facilitate analysis.
5. Provide hands-on experience in interpreting graphs and explore various ways to present data including frequency distributions and graphic presentations.
6. Provide hands-on experience in performing an analysis of data by measuring central tendency and dispersion.
7. Introduce and explore the principles of uncertainty.
8. Provide hands-on experience in dealing with uncertainty using concepts of probability.
9. Introduce, explore, and provide hands-on experience in probability problems using
 - a. addition rules.
 - b. multiplication rules.
 - c. multiplication, permutation, and combination formulas.
 - d. contingency tables.
 - e. tree diagrams.
10. Introduce and explore probability distributions.
11. Introduce, explore, and provide hands-on experience in statistical inference using
 - a. sampling.
 - b. hypothesis testing.

COURSE OBJECTIVES:

Upon completion of the course, the student should be able to

1. Find, explore, and correctly use and manipulate secondary data sources such as those found in government and private companies.
2. Use technology for developing conceptual understanding and analyzing and managing data.
3. Acquire raw data and make frequency distributions (ungrouped and grouped).
4. Present data graphically and correctly interpret graphic presentations.
5. Compute and interpret the following measures of central tendency:
 - a. mean
 - b. median
 - c. mode
6. Compute and interpret the following measures of dispersion:
 - a. variance
 - b. average deviation
 - c. standard deviation
 - d. coefficient of variation
7. Solve probability problems including joint and conditional probabilities, using addition, multiplication, permutations, and combination formulas as well as contingency tables and tree diagrams.
8. Use the Binomial and Normal Probability Distributions to answer probability questions.
9. Choose an appropriate method for selecting a sample by examining and evaluating the various methods discussed.
10. State and test a hypothesis.
11. State a null hypothesis and an alternate hypothesis.

COURSE OUTLINE:

- I. Descriptive Statistics
 - A. Frequency distributions

- 1. grouping data
- 2. graphical presentation
- B. Measures of central tendency
 - 1. mean
 - 2. median
 - 3. mode
- C. Measures of dispersion
 - 1. range
 - 2. variance
 - 3. average deviation
 - 4. standard deviation
 - 5. coefficient of variation
 - 6. quartiles and percentiles

TAG Outcomes Met in This Section

- 2.01 Construct and interpret frequency and relative frequency distributions
- 2.02 Use graphical methods to portray and summarize data
- 2.03 Compute and interpret measures of central tendency: mean, median, mode.
- 2.04 Compute and interpret measures of variation: range, variance, standard deviation
- 2.05 Compute and interpret percentiles and quartiles
- 2.06 Understand the Empirical Rule and its application
- 2.07 Use a computer to produce appropriate graphics and compute summary statistics

II. Probability

- A. Use of probability rules and formulas and other tools
 - 1. random variables
 - 2. addition rules
 - 3. multiplication rules
 - 4. multiplication, permutation, and combination formulas
 - 5. contingency table and tree diagram
- B. Binomial probability distribution
- C. Normal probability distribution (curve)

TAG Outcomes Met in This Section

- 3.01 Understand the concept of probabilities and the properties that must be satisfied by a probability
- 3.02 Perform computations using the rules of probability; addition and multiplication rules
- 3.03 Be able to interpret a two-way cross-tabulation table
- 3.04 Understand the concept of statistical independence and use it to compute probabilities

- 4.01 Understand the concept of a discrete random variable
- 4.02 Use discrete probability distribution to compute probabilities
- 4.03 Understand, compute, and interpret the expected value, variance, and standard deviation of a discrete probability distribution
- 4.04 Understand the binomial distribution and some of its business applications
- 4.05 Understand the concept of a continuous random variable
- 4.06 Understand the concept of a continuous probability curve
- 4.07 Understand the normal probability distribution and some of its business applications

- III. Introduction to Statistical Inference
 - A. Sampling
 - B. Central Limit Theorem
 - C. Estimates and confidence intervals
 - D. Hypothesis testing (one-sample)

TAG Outcomes Met in This Section

- 1.01 Understand selecting a simple random sample
- 1.03 Understand basic principles of survey sampling and be able to critique a survey

- 5.01 Understand the concept of a sampling distribution
- 5.02 Be familiar with sample mean, sample proportion and their distributions
- 5.03 Compute and interpret the mean and standard error of the sample mean and sample proportion and use them to compute probabilities
- 5.04 Apply the Central Limit Theorem to obtain approximate sampling distributions

- 6.01 Be able to compute point estimates of a population mean and population proportion
- 6.02 Understand the concept of a confidence interval and its components
- 6.03 Be able to compute and interpret a z-based confidence interval for a population mean
- 6.04 Be able to compute and interpret a t-based confidence interval for a population mean (including discussion of the t-distribution and when to use such an interval)
- 6.05 Be able to compute and interpret a large sample confidence interval for a population proportion
- 6.06 Be able to determine the sample size needed to give a specific margin of error and confidence level

- 7.01 Understand the concept and steps of performing a hypothesis test
- 7.02 Be able to formulate an appropriate null and alternate hypothesis
- 7.03 Understand and describe Type I and Type II errors
- 7.04 Use a critical value to test a hypothesis about a population mean
- 7.05 Use a p-value to test a hypothesis about a population mean