Salem Community College Course Syllabus

Course Title: Statistics

Course Code: MAT 201

Lecture Hours: 3
Lab Hours: 0
Credits: 3

Course Description: This course teaches basic statistical methods with an emphasis on business applications. The principles of both descriptive and inferential statistics are taught, with topics including the normal distribution, hypothesis testing, correlation and regression, analysis of variance, and probability theory. This is a state approved General Education course for Mathematics.

Prerequisite: Either MAT 134 or MAT 137, or written permission of Assistant Dean of Academic Affairs

Co-requisite: None

Place in College Curriculum:
This course is required in the Business Administration options of the Associate in Science Degree and several others programs. The course can be taken as a 3 credit Mathematics elective.

Date of Last Revisions:
November 2018

Course Content Outline:

I. Introduction
- A. Overview of Statistics
- B. Nature of Data
- C. Use of Excel in Statistics

II. Data Analysis
- A. Summarizing Data
- B. Measures of Central Tendency
- C. Measures of Variation
- D. Measures of Dispersion

III. Probability Fundamentals

IV. Probability Distributions
- A. Random Variables
- B. Binomial Probability Distribution
- C. Poisson Distribution

V. Normal Probability Distributions
- A. Standard Normal Distribution
- B. Central Limit Theorem

VI. Sampling Methods and Sampling Distribution
- A. Estimating Population Mean
  1. Large Samples
  2. Small Samples
- B. Central Limit Theorem
- C. Estimating Population Proportion
- D. Estimating Population Variance
- E. Finite Population Correction Factor

VII. Hypothesis Testing
- A. Fundamentals
- B. Testing a Claim about a Mean
  1. Large Samples
  2. Small Samples
- C. Testing a Claim about a Proportion
- D. Testing a Claim about a Standard Deviation or Variance

VIII. Analysis of Variance
- A. One-Way
- B. Two-Way

IX. Correlation and Regression
- A. Correlation
- B. Regression
  1. Linear
  2. Multiple

Course Performance Objective #1:
The student will define and comprehend the nature of statistical data.
Learning Outcomes:

1. The student will recognize key terms used in the field.
2. The student will identify different types of data, measurement levels, and sampling methodology.
3. The student will recognize common uses and misuses of statistical data.

Course Performance Objective #2:
The student will convey statistics in a descriptive sense.
Learning Outcomes:

1. The student will construct various visual data displays.
2. The student will calculate and interpret measures of central tendency and dispersion.

Course Performance Objective #3:
The student will discuss the basics of probability theory and its relationship to inference.
Learning Outcomes:

1. The student will define and identify the basics of probability theory
2. The student will analyze the relationship of basic probability theory to inference.

Course Performance Objective #4:
The student will recognize and define discrete and continuous random variables and probability distributions.
Learning Outcomes:

1. The student will calculate probabilities for binomial experiments.
2. The student will calculate the mean, variance and standard deviation for a binomial distribution.
3. The student will define and interpret calculations using the Poisson distribution.

Course Performance Objective #5:
The student will apply the concepts of a normal probability distribution.
Learning Outcomes:

1. The student will compute standard values to determine probabilities.
2. The student will compute scores that correspond to given probabilities.
3. The student will apply the Central Limit Theorem to statistical problems.
4. The student will apply the normal distribution to estimate probabilities in a binomial experiment.

Course Performance Objective #6:
The student will apply the basics of statistical inference.
Learning Outcomes:

1. The student will estimate population parameters from sample statistics.
2. The student will define and compute confidence intervals and margins of error for both large and small samples.
3. The student will select the appropriate distribution for various samples.
4. The student will estimate a population proportion from sample statistics.
5. The student will recognize the uses for and compute probabilities from the chi-square distribution.

Course Performance Objective #7:
The student will recognize the relevance of hypothesis testing in statistical processes.
Learning Outcomes:

1. The student will construct basic hypothesis tests.
2. The student will recognize the two types of errors which can occur during hypothesis testing. 3. The student will conduct hypothesis testing for large samples, small samples, proportions, and standard deviations (or variances).
4. The student will conduct hypothesis testing for means of paired or dependent samples.
5. The student will conduct hypothesis testing for two population variances or standard deviations.

Course Performance Objective #8:
The student will recognize uses for one and two-way analysis of variance (ANOVA).
Learning Outcomes:

1. The student will compute and analyze one-way analysis of variance.
2. The student will compute and analyze two-way analysis of variance.

Course Performance Objective #9:
The student will recognize relationships between two variables (correlation).
Learning Outcomes:

1. The student will compute the strength of the relationships.
2. The student will recognize common errors involving correlation.
3. The student will construct hypothesis tests for linear correlation.

Course Performance Objective #10:
The student will recognize linear relationships.
Learning Outcomes:

1. The student will compute and analyze linear regression equations.
2. The student will graph scatter diagrams.

Course Performance Objective #11:
The student will recognize multiple regression equations.
Learning Outcome:

1. The student will construct and analyze multiple regression equations.

General Education Requirements:
The general education goals covered in MAT 201 are critical thinking & problem solving, quantitative skills, science & technology, and Information Literacy. See student handbook for additional details.

Outcomes Assessment:
A college-wide outcomes assessment program has been put into place to enhance the quality and effectiveness of the curriculum and programs at Salem Community College. As part of this assessment program, the learning outcomes for this course will be assessed. Assessment methods may include tests, quizzes, papers, reports, projects and other instruments. Copies of all outcomes assessments are available in an electronic assessment bank maintained by the Institutional Research and Planning Office.

Course Activities:
The classroom activities will include informal lectures introducing new material, practice sets to reinforce concepts, and review of assigned homework problems.

Course Activities:
Students will learn from lectures during which new material will be delivered, small group discussions, individual explorations, practice work, and discussion of assigned homework problems. Students will have the opportunity to investigate the Statistics concepts using some computer software. The assignment(s)/activity students engage in to demonstrate their acquisition of the NJCCC GE Learning goal will be a mathematics lab activity.

Course Requirements and Means of Evaluation:
Please refer to the instructor's syllabus addendum (to be distributed in class) for specific information regarding the course requirements and means of evaluation.

Attendance:
Regular and prompt attendance in all classes is expected of students. Students absent from class for any reason are responsible for making up any missed work. Faculty members establish an attendance policy for each course and it is the student's responsibility to honor and comply with that policy.

Academic Honesty Policy:
Students found to have committed an act of academic dishonesty may be subject to failure of this course, academic probation, and / or suspension from the college. See the Student Handbook for additional details.

ADA Statement:
If you have a 504 Accommodation Plan, please discuss it with your instructor. If you have any disability but have not documented it with the Disability Support coordinator at Salem Community college, you must do so to be eligible for accommodations. To contact the Disability Support Coordinator, call 856-351-2773 or email disabilitysupport@salemcc.edu to set up an appointment. To find out more information about disability support services at Salem Community College, visit www.salemcc.edu/students/student-success-programs/disability-support.

Required Text:
For textbook information, please see the Salem Community College Bookstore Website.

Optional Text(s): None

Materials/Supplies:
TI-83 or 84 series graphing calculator
Computer flash drive (thumb drive) may be required.

Additional Costs:
As necessitated by the required materials.