



Math 1350 Introduction to Statistics 4 CREDITS

SYLLABUS

CATALOG DESCRIPTION

This course discusses the fundamentals of descriptive and inferential statistics. Students will gain introductions to topics such as descriptive statistics, probability and basic probability models used in statistics, sampling and statistical inference, and techniques for the visual presentation of numerical data. These concepts will be illustrated by examples from a variety of fields.

Co-requisite: High School Algebra II course grade of C or better or High School Algebra II course grade of B or better and ENGL 111 OR ENGL 118 or enroll in Math 096.

Semester Offered: Fall, Spring, Summer

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Student Learning Outcomes

1. EXPLAIN THE GENERAL CONCEPTS OF STATISTICS.

- A. EXPLAIN AND EVALUATE STATISTICS USED IN THE REAL WORLD (FROM A NEWS ARTICLE, RESEARCH PROJECT, ETC.).
 - B. USE STATISTICAL VOCABULARY APPROPRIATELY.
 - C. DISTINGUISH BETWEEN DESCRIPTIVE AND INFERENCE STATISTICS.
 - D. DISTINGUISH BETWEEN QUALITATIVE AND QUANTITATIVE DATA.
 - E. DISTINGUISH BETWEEN POPULATIONS AND SAMPLES, AND PARAMETERS AND STATISTICS.
 - F. GIVE EXAMPLES OF INDEPENDENT AND DEPENDENT VARIABLES.
2. PRESENTATION AND DESCRIPTION OF DATA.
 - A. PRESENT DATA GRAPHICALLY USING HISTOGRAMS, FREQUENCY CURVES AND OTHER STATISTICAL GRAPHS.
 - B. INTERPRET GRAPHS OF DATA, INCLUDING HISTOGRAMS AND SHAPES OF DISTRIBUTIONS.
3. SUMMARIZE DATA USING MEASURES OF CENTRAL TENDENCY AND VARIATION.
 - A. CALCULATE AND INTERPRET THE MEAN, MEDIAN, AND MODE TO DESCRIBE DATA.
 - B. CALCULATE AND INTERPRET RANGE, VARIANCE, AND STANDARD DEVIATION TO DESCRIBE DATA.
4. PRESENT THE CONCEPTS OF PROBABILITY.
 - A. INTERPRET BASIC PROBABILITIES.
 - B. CALCULATE PROBABILITIES USING COMPOUND PROBABILITY RULES AND THE BINOMIAL DISTRIBUTION.
 - C. CALCULATE PROBABILITIES USING THE STANDARD NORMAL DISTRIBUTION AND RELATE THEM TO AREAS UNDER THE CURVE.
 - D. DETERMINE IF THE BINOMIAL DISTRIBUTION CAN BE APPROXIMATED WITH THE NORMAL DISTRIBUTION.
 - E. DESCRIBE THE RELATIONSHIP BETWEEN THE SAMPLING DISTRIBUTION AND THE POPULATION DISTRIBUTION.
 - F. USE THE CENTRAL LIMIT THEOREM TO APPROXIMATE THE PROBABILITY DISTRIBUTION AND CALCULATE PROBABILITIES.
5. Compute point and interval estimates.
 - a. Determine the confidence interval for a parameter.
 - b. Interpret the confidence level and margin of error.
 - c. Determine whether a statistical technique is appropriate under stated conditions.
 6. Perform hypothesis tests.
 - a. Determine whether a statistical test is appropriate under stated conditions.
 - b. Identify null and alternative hypothesis.
 - c. Perform and interpret statistical tests (e.g. z-test, t-test, one-tailed and two-tailed, one-sample, two-sample) and determine whether data is statistically significant.
 - d. State the conclusion of a hypothesis test.
 - e. Interpret a p-value as compared to a significance level.

- f. Explain why a test can lead us to reject a null hypothesis, not accept one.
- g. Distinguish between Type I and Type II errors.

7. Analyze data using regression and correlation.
 - a. Explain the difference between correlation and causation.
 - b. Construct and interpret scatter plots.
 - c. Calculate and interpret the linear correlation coefficient.
 - d. Determine and use the equation of a least-squares regression line between two variables to make predictions.
 - e. Interpret the meaning of the coefficient of determination.
8. Optional topics.
 - a. Inter-quartile range, box-plots, stem-and-leaf plots.
 - b. Combinations and permutations.
 - c. The Poisson distribution.
 - d. Statistical power.
 - e. Chi-square.
 - f. Analysis of variance.

SME Dean:

Approval Date: