

Course Objectives/Course Outline
Spokane Community College

Course Title: Introduction to Stats

Prefix and Course Number: MATH& 146

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Distinguish between quantitative and categorical data.
- Display categorical data using frequency tables and two-way tables.
- Construct appropriate graphical displays of quantitative and categorical data by hand and using technology.
- Compute appropriate summary statistics for quantitative variables
- Perform computations using the Normal model
- Construct and interpret scatterplots of bivariate quantitative data
- When appropriate, compute the correlation of two quantitative variables
- When appropriate, construct and interpret a linear regression model on two quantitative variables
- Interpret a residual plot
- Use random numbers to perform a simulation
- Appropriately use terms related to sample surveys, experiments and observational studies
- Compute the expected value and standard deviation of a random variable
- Perform computations with probability models, including the binomial model
- When appropriate, construct and interpret a confidence interval and perform a hypothesis test in situations involving: a. one proportion; b. two proportions; c. one mean; d. two means
- When appropriate, use chi-square methods to perform: a. goodness-of-fit tests; b. tests of homogeneity; c. tests of independence

Course Outline:

- I. Introduction to Statistics
 - A. Data
 - B. Design of Experiments
- II. Summarizing and Graphing Data
 - A. Frequency Distributions
 - B. Histograms
 - C. Statistical Graphs
 - D. Graphs in the Media
- III. Describing Data
 - A. Measures of Center
 - B. Measures of Variation
 - C. Measures of Relative Standing
- IV. Probability
 - A. Fundamentals

- B. Addition Rule
- C. Multiplication Rule
- D. Bayes' Theorem
- E. Counting
- V. Discrete Probability Distribution
 - A. Random Variables
 - B. Binomial Probability Distribution
 - C. Mean, Standard Deviation and Variance for Binomial Distribution
 - D. Poisson Distribution (optional)
- VI. Normal Probability Distribution
 - A. Standard Normal Distribution
 - B. Applications of Normal Distribution
 - C. Sampling Distribution and Estimators
 - D. Central Limit Theorem
 - E. Assessing Normality
- VII. Estimates, Confidence Intervals, and Sample Sizes
 - A. Estimating a Population Proportion
 - B. Estimating a Population Mean; Sigma Known
 - C. Estimating a Population Mean; Sigma Not Know (Students +- distribution)
 - D. Estimating a Population Variance (optional)
- VIII. Hypothesis Testing
 - A. Fundamentals of Hypothesis Testing
 - B. Testing a Claim about a Proportion
 - C. Testing a Claim about a Mean: Sigma Known
 - D. Testing a Claim about a Mean: Sigma Not Known (Students +- distribution)
 - E. Testing a Claim about Variation (Chi-Square Distribution)
 - F. Inference from Two Samples (optional)
- IX. Comparing Three or More Means
 - A. One-Way ANOVA
 - B. Post-Hoc Tests on One-Way ANOVA (optional)
 - C. Randomized Complete Block Design
 - D. Two-Way ANOVA (optional)