

**MISSOURI WESTERN STATE UNIVERSITY**  
**COLLEGE OF LIBERAL ARTS AND SCIENCES**

**DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS**

***COURSE NUMBER:*** MAT 132

***COURSE NAME:*** Elementary Statistics

***COURSE DESCRIPTION:***

A basic course for students in natural sciences, behavioral sciences, and social sciences; tabulation of data, graphic representation, measures of central tendency and dispersion, probability, types of distributions, estimations, sampling, hypothesis testing, elementary aspects of correlation. (3 credit hours, offered Fall, Spring, and Summer semesters).

***PREREQUISITE:***

Grade of C or better in MAT 112, MAT 116, or equivalent.

***TEXT:***

***TECHNOLOGY:***

Use of graphing calculators will be required throughout the course and each student must have access to a suitable graphing calculator. The graphing calculator must have at least the capacity of the TI-83/84 (the recommended calculator). Graphing calculators other than Texas Instruments calculators may be used but classroom instruction on calculators will be given for TI equipment only.

***COURSE OBJECTIVES:***

The main objective of this course is to familiarize the student with the basic concepts and applications of descriptive and inferential statistics and probability. In order to meet this objective, students will learn how to:

1. Use a calculator to organize data in the form of tables, charts, and graphs.  
(*MoStep Mathematics Competencies 1.10, 1.11, 4.1*)
2. Compute measures (with or without a calculator) of central tendency and measures of dispersion for grouped and ungrouped data.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.11, 4.3, 5.5*)

3. Utilize the Additional Law, the Law of the Complement, and the General Multiplication Law to determine the probability of a given event.  
(*MoStep Mathematics Competencies 1.1, 1.2, 4.2, 5.5, 7.1*)
4. Determine the probabilities of discrete (i.e., binomial) and continuous (i.e., normal) random variables.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.10, 1.11, 5.5, 7.1, 7.2*)
5. Determine the expected value, variance and standard deviation of a binomial distribution.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.10, 1.11, 4.3, 5.5, 7.2*)
6. Determine the mean, variance, and standard deviation of sampling distributions.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.10, 1.11, 4.3, 7.2*)
7. Determine confidence intervals for population parameters.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.11, 4.3, 4.4, 5.5*)
8. Perform tests of hypotheses involving population parameters.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.11, 4.3, 4.4*)
9. Perform a test of goodness of fit.  
(*MoStep Mathematics Competencies 1.1, 1.2*)
10. Perform a test of independence.  
(*MoStep Mathematics Competencies 1.1, 1.2*)
11. Compute and interpret the correlation coefficient.  
(*MoStep Mathematics Competencies 1.2, 1.11*)
12. Determine the least squares regression line.  
(*MoStep Mathematics Competencies 1.1, 1.2, 1.11, 4.3, 5.5*)

***STUDENT COMPETENCIES:***

1. Construct frequency and grouped frequency distributions.
2. Construct a pie chart, histogram, stem-and-leaf diagram, and boxplot.
3. Determine the median, quartiles, and interquartile range.
4. Compute the mean, variance, and standard deviation for a set of data.
5. Determine which measure of central tendency is most appropriate.
6. Determine the probability of a given event.

7. Determine conditional probability.
8. Determine whether events are independent.
9. Determine the probability function, the expected value, the variance, and the standard deviation of a discrete random variable.
10. Determine the expected value, variance, and standard deviation of a binomial distribution.
11. Determine the probability of a continuous random variable (i.e., normal).
12. Determine the mean, variance, and standard deviation of the sample mean and of the distribution of the sample mean.
13. Determine the mean, variance, and standard deviation of the sample mean and of the distribution of the sample proportion.
14. Determine point estimates.
15. Determine a confidence interval for a single population parameter.
16. Determine a confidence interval for the difference of two population parameters.
17. Determine the sample size for estimating the population mean and the population proportion.
18. State the null and alternative hypotheses.
19. State the Type I and Type II errors in a hypothesis test.
20. Perform a test of hypotheses on a single population parameter.
21. Perform a test of hypotheses on the difference of two population parameters.
22. Perform a test of goodness of fit.
23. Perform a test of independence.
24. Compute and interpret the correlation coefficient.
25. Determine the least squares regression line.
26. Use the regression line to compute predicted values.
27. Determine residual values associated with the regression line.

***COURSE OUTLINE:***

- I. Data Collection
- II. Organizing and Summarizing Data
- III. Numerically Summarizing Data
- IV. Describing the Relation between Two Variables
- V. Probability
- VI. Discrete Probability Distributions
- VII. The Normal Probability Distribution
- VIII. Sampling Distributions
- IX. Estimating the Value of a Parameter
- X. Hypothesis Tests Regarding a Parameter
- XI. Inferences on Two Samples
- XII. Inferences on Categorical Data