

Reviewed by: D. Mitchell  
Reviewed by: N. Cahoon  
Reviewed by: S. Getty  
Date reviewed: Spring 2023  
C & GE Approved: May 11, 2023  
Board Approved: June 14, 2023  
Semester effective:

Statistics (STAT) 1510 Elementary Statistics (5 Units) CSU: UC  
[formerly Statistics 10]

Prerequisite: Successful completion in Mathematics 1060 or the knowledge and skills equivalent to the successful completion of an intermediate algebra course

Prerequisite knowledge/skills: Before entering the course the student should be able to:

1. identify numbers as belonging to specified sets, and graph discrete and continuous sets of real numbers,
2. perform the basic arithmetic operations with positive and negative real numbers,
3. know and apply the rules of exponents and the order of operations in algebraic expressions,
4. use the properties of addition and multiplication for real numbers,
5. solve linear equations and inequalities in one variable,
6. solve and graph the solutions of compound inequalities or absolute value inequalities in one variable,
7. perform addition, subtraction, multiplication and division of polynomials,
8. factor simple polynomials, with special emphasis on quadratic trinomials, and solve related polynomial equations,
9. add, subtract, multiply and divide rational algebraic expressions, and reduce to lowest terms,
10. solve equations involving rational algebraic expressions, and analyze and solve word problems leading to such equations,
11. simplify radical expressions involving numbers and/or variables,
12. use fractional exponents,
13. perform addition, subtraction, multiplication and division of expression involving radicals and complex numbers and simplify the results, including rationalization of denominators,
14. solve equations that involve radicals,
15. solve quadratic equations in one variable, and quadratic equations by factoring, completing the square, and the quadratic formula,
16. analyze and solve application problems requiring the use of quadratic equations,
17. solve and graph quadratic inequalities in one variable,
18. graph points in the rectangular coordinate system, and straight lines from ordered pairs obtained from a linear equation,
19. determine the slope of the line between any given pair of points,
20. know the slope formulas for the equation of a straight line, and be able to determine the equation of a particular straight line from specified input information,
21. solve and graph linear inequalities in two variables,
22. solve linear systems of equations in two or three variables algebraically, and solve two dimension systems graphically,
23. analyze and solve application problems requiring the use of linear systems of equations in two or three variables,
24. evaluate determinants and use them to solve linear systems of equations,

25. determine whether or not a specified relation is a function,
26. for a function, compute the value of the function given the value of the independent variable, and be able to construct the inverse of simple functions in numeric or algebraic terms,
27. identify the quadratic equation representing a specific conic section, and be able to draw the graph of a conic section by analyzing its equation, or to write the equation of a specified conic section,
28. solve nonlinear systems of equation involving the intersection of two conic sections or a conic section and a straight line,
29. compute and graph specified exponential and logarithmic functions,
30. know the properties of logarithms (product, quotient, power and change of base rules) and be able to use them in practical numerical computations using a table of common logarithms or a calculator, and
31. solve simple exponential and logarithmic equations.

Hours and Units Calculations:

80 hours lecture. (160 Outside-of-class Hours); (240 Total Student Learning Hours) 5 units

Catalog Description: The use of probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-square and t-tests; and application of technology for statistical analysis including the interpretation of the relevance of the statistical findings. Applications using data from a broad range of disciplines. C-ID: MATH 110.

Type of Class/Course: Degree Credit

Text: Illowsky, Barbara. Dean, Susan – *Introductory Statistics*. OpenStax.  
<https://openstax.org/details/books/introductory-statistics?Book%20details>

Additional Instructional Materials: TI-83/84 calculator or iPad (with TC-Stats app)

Course Objectives:

Upon successful completion of the course, students will be able to:

1. Interpret data displayed in tables and graphically
2. Apply concepts of sample space and probability
3. Calculate measures of central tendency and variation for a given data set
4. Identify the standard methods of obtaining data and identify advantages and disadvantages of each
5. Calculate the mean and variance of a discrete distribution
6. Calculate probabilities using normal and t-distributions
7. Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem
8. Construct and interpret confidence intervals
9. Determine and interpret levels of statistical significance including p-values
10. Interpret the output of a technology-based statistical analysis
11. Identify the basic concept of hypothesis testing including Type I and II errors
12. Formulate hypothesis tests involving samples from one and two populations
13. Select the appropriate technique for testing a hypothesis and interpret the result
14. Use regression lines and ANOVA for estimation and inference, and interpret the associated statistics

15. Use appropriate statistical techniques to analyze and interpret applications based on data from at least four of the following disciplines: business, economics, social science, psychology, political science, administration of justice, life science, physical science, health science, information technology, and education

Course Scope and Content:

- Unit I Experimental Design
  - A. Basic terminology
  - B. Levels of Measurement
  - C. Observational & Experimental Studies
  - D. Random Sampling
  - E. Applications using data/scenarios from multiple disciplines
  
- Unit II Descriptive Statistics
  - A. Descriptive statistics: measurement, measures of central tendency, and variation
  - B. Summarizing data graphically and numerically
  - C. Applications using data/scenarios from multiple disciplines
  
- Unit III Probability
  - A. Sample spaces and probability
  - B. Empirical and theoretical probabilities
  - C. Rules of probability
  - D. Applications using data/scenarios from multiple disciplines
  
- Unit IV Discrete & Continuous Distributions
  - A. Random variables and expected value
  - B. Sampling and sampling distributions
  - C. Discrete distributions – Binomial
  - D. Mean and variance of discrete distributions
  - E. Continuous distributions – Normal
  - F. The Central Limit Theorem
  - G. Applications using data/scenarios from multiple disciplines
  
- Unit V Analyzing Data Using Intervals and Hypothesis Tests
  - A. Estimation and confidence intervals
  - B. Hypothesis Testing and inference, including t-tests for one and two populations, and Chi-square test
  - C. Analysis of Variance (ANOVA)
  - D. Non-parametric techniques (e.g. Kruskal-Wallis, Wilcoxon Rank-Sum)
  - E. Applications using data/scenarios from multiple disciplines
  
- Unit VI Analyzing Bivariate Data
  - A. Correlation and regression lines
  - B. Applications using data/scenarios from multiple disciplines

Learning Activities Required Outside of Class:

The students in this class will spend a minimum of 10 hours per week outside of the regular class time doing the following:

1. Completing the assigned reading from the textbook
2. Completing homework and other assignments
3. Watching instructional videos
4. Studying
5. Completing supplementary reviews

Methods of Instruction:

1. Lecture demonstrations and sample problems done by instructor
2. Individual work with calculators/iPads
3. Recorded videos that introduce concepts and explain how to solve problems utilizing technology
4. Student presentations of completed problems
5. Hands on activities

Methods of Evaluation:

1. Homework and other problem solving assignments
2. Quizzes
3. Exams
4. Discussions
5. Math lab attendance

Supplemental Data:

TOP Code:	170100: Mathematics, General
SAM Priority Code:	E: Non-Occupational
Distance Education:	Online; Offline
Funding Agency:	Y: Not Applicable(funds not used)
Program Status:	1: Program Applicable
Noncredit Category:	Y: Not Applicable, Credit Course
Special Class Status:	N: Course is not a special class
Basic Skills Status:	N: Course is not a basic skills course
Prior to College Level:	Y: Not applicable

Cooperative Work Experience:	N: Is not part of a cooperative work experience education program
Eligible for Credit by Exam:	E: Credit By Exam
Eligible for Pass/No Pass:	NO
Taft College General Education:	CSB4: CSU Area B4 IG2A: IGETC Area 2A LCAT: Local GE Communication
Discipline	Mathematics