MATH 15 Course Outline as of Summer 2017

CATALOG INFORMATION

Dept and Nbr: MATH 15   Title: ELEMENTARY STATISTICS
Full Title: Elementary Statistics
Last Reviewed: 1/9/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00   Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable
Grading: Grade or P/NP
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Exploration of concepts in statistics, descriptive statistics, probability theory (including but not limited to the uniform, binomial, Poisson, normal, chi-square and t distributions), Central Limit Theorem, estimation of population parameters from a sample, hypothesis testing (including parametric and nonparametric methods), correlation and linear regression, introduction to analysis of variance, computer simulations.

Prerequisites/Corequisites:
Completion of MATH 154 or higher; or Qualifying Placement from Math Assessment.
See Student Success & Assessment Services (assessment.santarosa.edu) for more information about the assessment process.

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Exploration of concepts in statistics, descriptive statistics, probability theory, Central Limit Theorem, estimation of population parameters from a sample, hypothesis testing,

correlation and linear regression, introduction to analysis of variance, computer simulations. (Grade or P/NP)

Prerequisites/Corequisites: Completion of MATH 154 or higher; or Qualifying Placement from Math Assessment.

See Student Success & Assessment Services (assessment.santarosa.edu) for more information about the assessment process.

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 1989	
	MC	Math Competency	Fall 1981	
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 1990	
IGETC:	**Transfer Area**		Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 1993	

CSU Transfer:	Transferable	Effective:	Fall 1989	Inactive:
UC Transfer:	Transferable	Effective:	Fall 1989	Inactive:

CID:

CID Descriptor:	MATH 110	Introduction to Statistics
SRJC Equivalent Course(s):		MATH15 OR PSYCH9

Certificate/Major Applicable:

Major Applicable Course

COURSE CONTENT

Outcomes and Objectives:

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

1. Create and use graphic displays of data and frequency distributions.
2. Identify the standard methods of obtaining data and identify advantages and disadvantages of each method.
3. Distinguish among different scales of measurement and their implications.
4. Define mean, median, mode, percentiles, variability and standard deviation, and compute each for sets of data.
5. Use laws of probability and Bayes' formula.
6. Define and apply combinations, permutations, sample space, and probability distributions, including calculation of the mean and variance of a discrete distribution and calculation of probabilities using normal and t distributions.
7. Distinguish the difference between sample and population distributions and apply the Central Limit Theorem to calculate sampling distributions of

means, proportions and standard error.
8. Compute and interpret confidence intervals and required sample size.
9. Identify the basic concept of hypothesis testing including Type I and II errors.
10. Select the appropriate technique for testing a hypothesis and interpret the result.
11. Perform hypothesis testing for mean, proportion and variance.
12. Determine and interpret levels of statistical significance including p-values.
13. Implement goodness of fit test, the test for independence.
14. Use linear regression and Analysis of Variance, ANOVA, for estimation and inference, and interpret the associated statistics.
15. Use statistics software package for evaluation of data and inference.
16. Process data sets from disciplines including business, social sciences, psychology, life science, health science and education.

Topics and Scope:

I.   Statistical Description
    A. Graphic display of data
    B. Levels of measurement
    C. Frequency distributions
    D. Mean
    E. Median
    F. Mode
    G. Percentiles
    H. Variability
    I. Standard deviation
    J. Chebyshev's Theorem
II. Counting and Probability Distributions
    A. Laws of probability and counting
    B. Combinations
    C. Permutations
    D. Random variables and expected value
    E. Probability distributions (including, but not limited to, the following)
        1. Uniform
        2. Binomial
        3. Poisson
        4. Normal
        5. Chi-squared
        6. Student t
III. Statistical Inference
    A. Sampling methods
    B. Sampling distributions
        1. Means
        2. Proportions
        3. Differences of means
    C. Standard error
    D. Central Limit Theorem
    E. Confidence intervals
    F. Hypothesis testing (parametric and extended nonparametric)
        1. Means, including t-tests for one and two populations
        2. Proportion
        3. Differences of means

      4. Variances
      5. Chi Square tests: Goodness of Fit and Independence
   G. Required sample size
   H. Correlation and linear regression
   I. Introduction to analysis of variance
IV. Use of computer and electronic calculator
   A. Evaluation of data
   B. Methods of simulations
V. Use data sets from disciplines including business, social science, psychology, life science, health science and education.

Assignment:

1. Daily reading outside of class (0-50 pages per week)
2. Problem set assignments from required text(s) or supplementary materials chosen by the instructor (8-16)
3. Exams (2-4) and a final exam; quizzes (0-20)
4. Projects, e.g. computer activities, surveys or data collection and analysis (0-2)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem sets	Problem solving 10 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Objective exams, quizzes, final	Exams 70 - 80%

Other: Includes any assessment tools that do not logically fit into the above categories.

Projects	Other Category 0 - 10%

Representative Textbooks and Materials:
Elementary Statistics: Picturing the World (6th ed.). Larson, Ron and Farber, Betsy. Pearson: 2015.
Elementary Statistics, A Step by Step Approach (9th ed.). Bluman, Allan. McGraw-Hill: 2015.
Modern Elementary Statistics (12th ed.). Freund, John. Pearson: 2007 (current edition)
Elementary Statistics (12th ed.). Triola, Mario F. Pearson: 2014.