MATH 15 Course Outline as of Fall 2024

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:
Students will explore 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, and computer simulations.

Prerequisites/Corequisites:
Completion of MATH 161 OR MATH 156 OR MATH 154 OR MATH 155 or AB705 placement into Math Tier 1 or higher.
Students placing into tier 1 are required to take Math 215 concurrently with this course.
Students placing into tier 2 are recommended to take Math 215 concurrently with this course.

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will explore 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, and computer simulations. (Grade or P/NP)
Prerequisites/Corequisites: Completion of MATH 161 OR MATH 156 OR MATH 154 OR MATH 155 or AB705 placement into Math Tier 1 or higher. Students placing into tier 1 are required to take Math 215 concurrently with this course. Students placing into tier 2 are recommended to take Math 215 concurrently with this course.
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 PSYC9

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Use numerical and graphical methods to summarize, display, and interpret data sets.
2. Estimate population parameters from sample statistics.
3. Perform one and two sample hypothesis tests for population means and proportions.

Objectives:
At the conclusion of this course, the student should 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.
6. Apply concepts of 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 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, and the test for independence.
14. Use linear regression and Analysis of Variance (ANOVA) for estimation and inference, and interpret the associated statistics.
15. Use statistical software for evaluation of data and inference.
16. Process data sets from disciplines including business, social sciences, psychology, life sciences, health sciences, and education.

Topics and Scope:

I. Statistical Description
   A. Graphic display of univariate and bivariate data
   B. Levels of measurement
   C. Frequency distributions
      1. Shapes of distributions
      2. Empirical rule
   D. Measures of central tendency
   E. Measures of variation
   F. Measures of relative position
   G. Correlation
II. Probability Theory
   A. Sample space and laws of probability
   B. Random variables and expected value
   C. Probability distributions including, but not limited to:
      1. Binomial
      2. Normal
      3. Student
      4. Chi squared
III. Statistical Inference
   A. Sampling methods and experimental design
   B. Sampling distributions of means and proportions
   C. Standard error
   D. Central Limit Theorem
   E. Estimation and confidence intervals
   F. Hypothesis testing
      1. Tests of proportions and means, including t-tests for one and two populations
      2. Chi square tests: goodness of fit and independence
      3. P-values, significance, type I error, and type II error
   G. Required sample size
   H. Correlation and linear regression
   I. Introduction to ANOVA
IV. Use of Statistical Software

A. Analysis and evaluation of data
B. Methods of simulations
V. Use Data Sets from Disciplines, such as:
A. Business
B. Social sciences
C. Behavioral sciences
D. Life sciences
E. Health sciences
F. Education

Assignment:

1. 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; quiz(zes) (0-20)
4. Project(s), e.g. computer activities, surveys or data collection and analyses (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 assignments or supplementary materials	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.

Exams, final exam, quiz(zes),	Exams 70 - 80%

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

Project(s)	Other Category 0 - 10%

Representative Textbooks and Materials:

Elementary Statistics: Picturing the World. 8th ed. Larson, Ron and Farber, Betsy. Pearson. 2023.
Elementary Statistics. 14th ed. Triola, Mario. Pearson. 2022.
Elementary Statistics, A Step by Step Approach. 11th ed. Bluman, Allan. McGraw-Hill. 2022.
Modern Elementary Statistics. 12th ed. Freund, John and Perles, Benjamin. Pearson. 2007 (classic).
Statistics: Unlocking the Power of Data. 3rd ed. Lock, Robin et al. Wiley, 2020.
Statistics: Informed Decisions Using Data. 6th ed. Sullivan, Mike. Pearson. 2021.

Open Educational Resources (OER):
Introductory Statistics. Illowsky, Barbara and Dean, Susan.
https://openstax.org/books/introductory-statistics/pages/1-introduction OpenStax is licensed under Creative Commons Attribution License v4.0