



El Camino College

COURSE OUTLINE OF RECORD - Official

I. GENERAL COURSE INFORMATION

Subject and Number: Mathematics 150
Descriptive Title: Elementary Statistics with Probability

Course Disciplines: Mathematics

Division: Mathematical Sciences

Catalog Description: The focus of this course is the basic practice of statistics, including descriptive statistics, inferential statistics, and the role probability plays in statistical analysis. Students calculate and interpret various descriptive statistics using graphing calculators with statistical testing capabilities and statistical software, as well as by hand. Major topics include methods of data collection and simulation; measures of central tendency, variability, and relative position; graphical summaries of data; linear regression and correlation; distributions, including normal and binomial distributions; probability theory; and inferential statistical methods. Students choose, justify, use, and interpret the results of inferential techniques, such as confidence intervals, hypothesis tests, goodness of fit, analysis of variance, and nonparametric tests.

Conditions of Enrollment:

Prerequisite

Mathematics 73 or

Mathematics 80

with a minimum grade of C in prerequisite
or

qualification by testing (El Camino College Mathematics Placement Test) and assessment

Course Length: Full Term Other (Specify number of weeks):
Hours Lecture: 4.00 hours per week TBA
Hours Laboratory: 0 hours per week TBA
Course Units: 4.00

Grading Method: Letter
Credit Status Associate Degree Credit

Transfer CSU: Effective Date: Prior to July 1992
Transfer UC: Effective Date: Prior to July 1992

General Education:

EI Camino College: **4B – Language and Rationality – Communication and Analytical Thinking**

Term:

Other:

6 – Mathematics Competency

Term:

Other:

CSU GE: **B4 - Mathematics/Quantitative Thinking**

Term:

Other:

IGETC: **2A - Mathematical Concepts and Quantitative Reasoning**

Term:

Other:

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. Given a specific set of data, students will be able to calculate the measures of central tendency, measures of variation, measures of position, create graphical displays of the data and determine which graph best displays the data.
2. Students will be able to compute measures of central tendency and variation.
3. Students will be able to relate the sample mean and standard deviation to the frequency histogram for a data set.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the EI Camino College SLO webpage at <http://www.elcamino.edu/academics/slo/>.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Identify, compare and contrast various types of data and sampling techniques.
No Assessment Selected
2. Create appropriate displays of data, including histograms, frequency distributions, stem and leaf plots, box plots, bar graphs and pie charts. Use the displays to interpret and answer questions in the context of the data.
No Assessment Selected
3. Calculate appropriate measures of central tendency, variation and relative position. Use the measures to interpret and answer questions in the context of data.
No Assessment Selected
4. Calculate the probability of a given event using elementary probability techniques.
No Assessment Selected
5. Calculate and interpret confidence interval estimates of various parameters. Justify the choice of confidence interval by demonstrating that the necessary criteria are met.
No Assessment Selected
6. Perform parametric and non-parametric hypothesis tests using the classical (critical region) and probability (P-value) methods and interpret the results in context. Justify the choice of test by demonstrating that the necessary criteria are met.
No Assessment Selected

7. Describe the role probability and the central limit theorem play in confidence intervals and hypothesis testing.

No Assessment Selected

8. Create appropriate scatterplots for a given set of bivariate data. Calculate the regression line and correlation coefficient, interpret the results and use the regression line to calculate predicted values.

No Assessment Selected

9. Perform tasks corresponding to objectives 1 through 8 using statistical software.

No Assessment Selected

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	2	I	Overview of Statistics - Descriptive and Inferential
Lecture	2	II	Collection of Data and Sampling Techniques
Lecture	8	III	Data Description A. Frequency Distributions and Graphs B. Measures of Center, Spread and Relative Position
Lecture	8	IV	Probability A. Subjective (Informal) Probability B. Empirical (Experiential) Probability C. Classical (Theoretical) Probability D. Addition and Multiplication Rule
Lecture	8	V	Probability Distributions A. General Probability Distributions B. Binomial Distributions
Lecture	8	VI	Normal Distributions A. The Standard Normal Distribution B. Applications of Normal Distributions C. Binomial Distributions Approximated by Normal Distributions
Lecture	6	VII	Central Limit Theorem
Lecture	6	VIII	Confidence Intervals for Parameters A. Estimating Population Proportion B. Estimating Population Mean C. Difference of Parameters
Lecture	8	IX	Hypothesis Testing for Parameters A. Testing a Claim About a Proportion B. Testing a Claim About a Mean C. Testing a Claim About the Difference of Parameters

Lecture	8	X	Correlation and Regression A. Scatter Plots B. Correlation Coefficient C. Regression Line D. Predicted Values
Lecture	8	XI	Other Statistical Tests A. Chi-Squared 1. Tests of Independence 2. Tests Goodness of Fit B. Analysis of Variance C. At least one Nonparametric Test
Total Lecture Hours		72	
Total Laboratory Hours		0	
Total Hours		72	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

A random sample of 49 shoppers showed that they spent an average of \$23.45 per visit at a grocery store. The standard deviation of the sample was \$2.80. Decide what type of confidence interval is appropriate to estimate the true mean and justify your choice. Then find a 90% confidence interval estimate of the true mean.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. A researcher claims that students in a private school have an IQ that is 8 points higher than that of students in public schools. Random samples of 60 students from each type of school are selected and given an IQ exam. The results are shown below. Justify why performing a test comparing the two population means is appropriate. Set up the null and alternate hypotheses. At a significance level of 0.05, test the claim and interpret the results in the context of the problem.

Private Schools

$x = 110$

$s = 15$

$n = 60$

Public Schools

$x = 104$

$s = 18$

$n = 120$

2. In a sampling of 200 surgeons, 15% felt that the government should control health care. In a sample of 200 dentists, 21% felt this way. At a significance level of 0.10, decide if there is a difference in the proportions. Explain and justify what test you used and explain how probability played a role in your conclusion.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Other exams

Quizzes

Written homework

Laboratory reports

Homework Problems

V. INSTRUCTIONAL METHODS

Discussion

Lecture

Other (please specify)

Computer assignments using statistical software

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Study

Answer questions

Required reading

Problem solving activities

Estimated Independent Study Hours per Week: 8

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Michael Sullivan III. Statistics - Informed Decisions Using Data. 2nd ed. Pearson

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

Graphing calculator with statistical analysis capabilities

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
Course Prerequisite Mathematics-73 or	Sequential
Course Prerequisite Mathematics-80 or	Sequential
Non-Course Prerequisite	

B. Requisite Skills

Requisite Skills
1. Solve algebraic equations. (Mathematics 73 and Mathematics 80)
2. Graph linear functions. (Mathematics 73 and Mathematics 80)
3. Perform numerical calculations involving powers and roots. (Mathematics 73 and Mathematics 80)

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification

D. Recommended Skills

Recommended Skills

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by H. Jones, R. Maier, H. Pickett on 02/01/1956.

BOARD APPROVAL DATE:

LAST BOARD APPROVAL DATE:

Last Reviewed and/or Revised by Robert Horvath on 09/21/2009