MATH C103: STATISTICS FOR ELEMENTARY TEACHERS

Item	Value
Curriculum Committee Approval Date	04/09/2010
Top Code	170100 - Mathematics, General
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	• CL Option 1 Math Competency (CA3)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B4 Math/Quant.Reasoning (B4)

Course Description

This course is designed for prospective teachers. It is an activity-based exploration of statistics aligned with the California State Mathematics Standards for K-12. Topics include data representation and analysis, randomization, and sampling, measures of central tendency, and dispersion, hypothesizing, and statistical inference. PREREQUISITE: A course taught at the level of intermediate algebra or appropriate math placement. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Collect, analyze, and summarize sample data; write inferences; make predictions; and explain the learning process used by elementary school students to master these topics.

Course Objectives

- 1. Correctly select an appropriate sampling method to collect sample data when given a specific survey topic.
- 2. Correctly find the central tendency and standard deviation and summarize the data distributions.
- 3. Estimate parameters, find probabilities, write inferences, and make predictions using statistical technology.
- 4. Use appropriate technology such as calculators or computer software to enhance mathematical thinking, visualization, and understanding, to solve mathematical problems, and judge the reasonableness of the results.
- 5. Demonstrate quantitative reasoning skills by developing convincing arguments and by communicating mathematically both verbally and in writing.

Lecture Content

Introduction to Statistics Types of Data Critical Thinking Design of Experiments Summarizing and Graphing Data Frequency Distributions Histograms Statistical Graphics Statistics for Describing, Exploring, and Comparing Data Measures of Center Measures of Variation Measures of Relative Standing Exploratory Data Analysis (EDA) Probability Fundamentals Addition Rule Multiplication Rule: Basics Multiplication Rule: Complements and Conditional Probability Counting Bayes Theorem (on CD-ROM) Probability Distributions Random Variables Binomial Probability Distributions Mean, Variance, and Standard Deviation for the Binomial Distribution Normal Probability Distributions The Standard Normal Distribution Applications of Normal Distributions Sampling Distributions and Estimators The Central Limit Theorem Normal as Approximation to Binomial Estimates and Sample Sizes Estimating a Population Proportion Estimating a Population Mean: . Known Estimating a Population Mean: . Not Known Estimating a Population Variance Hypothesis Testing Basics of Hypothesis Testing Testing a Claim about a Proportion Testing a Claim about a Mean: . Known Testing a Claim about a Mean: . Not Known Testing a Claim about Variation Inferences from Two Samples Inferences about Two Proportions Inferences about Two Means: Independent Samples Inferences from Matched Pairs Correlations and Regression Correlation Regress ion Variation and Prediction Intervals Rank Correlation Chi-Square and Analysis of Variance Multinomial Experiments: Goodness-0f-Fit Contingency Tables: Independence and Homogeneity Analysis of Variance Observation of Elementary School Classroom Deliver Instructional Unit to Elementary School Classroom Class Project and Presentation (Optional)

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)

Reading Assignments

Read assigned sections from the textbook.

Writing Assignments

Solve word problems.

Out-of-class Assignments

Do homework exercises and take online quizzes.

Demonstration of Critical Thinking

Sovle word problems.

Required Writing, Problem Solving, Skills Demonstration

Included as homework assignments, part of classroom lectures and discussions, part of quizzes, Midterm Examination, Final Examination, and ProjectsStudents will be able to explain solutions and justify reasoning verbally or in writing and may be included in classroom discussions, quizzes, Midterm Examination, Final Examination, and Projects

Eligible Disciplines

Mathematics: Masters degree in mathematics or applied mathematics OR bachelors degree in either of the above AND masters degree in statistics, physics, or mathematics education OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Illowsky, Barbara; Dean, Susan. Introductory Statistics (OER), Web Version ed. Houston: OpenStax, Rice University, Houston, 2021

Other Resources

1. Coastline Library