Stat 1 : Introduction to Statistics

California State University, Sacramento · Department of Mathematics & Statistics

Catalog Description

Descriptive statistics, basic concepts of probability and sampling with the aim of introducing fundamental notions and techniques of statistical inference. Students will be given periodic writing assignments which encourage them to express various concepts of the course. **Graded**: Graded Student. **Units**: 3.0.

Prerequisites

Math 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of the ELM requirement and a passing score on the Intermediate Algebra diagnostic test.

Learning Objectives

- Organize, Summarize, and Interpret data in tabular, graphical, and pictorial formats.

- Organize and interpret bivariate data and learn simple linear regression and correlation.

- Understand the basic rules of probability. Use of the binomial distribution as a model for discrete variables.

- Understand the Normal distribution as a model for continuous variables.

- Learn Statistical Inference techniques of parameter estimation such as Point Estimation, and Confidence Interval Estimation.

- Learn techniques of testing various statistical hypotheses concerning population parameters.

Text

Elementary Statistics 6/e, by Neil A. Weiss

Coverage

The course will closely follow the text and cover chapters 1 - 12. The use of statistical software software will be discussed.

Assignments

A variety of reading and problem solving assignments will be part of the course.

Examinations

There will be regular midterm examinations and a comprehensive final examination for this course.

Writing Component

STAT 1 is an area B4 GE course and has a writing component. To satisfy the writing requirement graded assignments involving writing and understanding of complex technical prose, interpretation of theoretical ideas, and the use of mathematical ideas will be part of the course.

Area B-4 Mathematical Concepts and Quantitative Reasoning Student Learning Outcomes

Students will be able to:

1. Solve problems by thinking logically, making conjectures, and constructing valid mathematical arguments.

2. Make valid inferences from numerical, graphical and symbolic information.

3. Apply mathematical reasoning to both abstract and applied problems, and to both scientific and non-scientific problems.

Outline

I. Descriptive Statistics (3 1/2 weeks)

    A. What is statistics?

    B. Basic terminology and concepts

    C. Graphical presentations of statistical data

    D. Frequency distributions, histograms, and ogives

    E. Measures of central tendency

    F. Measures of variability

    G. Measures of position

    H. Bivariate data and scatter diagrams

    I. Linear correlation

    J. Linear regression

II. Probability (2 weeks)

    A. Experiments, sample space, events

    B. Different approaches to probability

    C. Probability axioms

    D. Rules of probability:

        1. generalized addition rule

        2. complement rule

    E. Conditional probability, independence, and the multiplication rule

    F. Bayes' rule [1]

III. Discrete Random Variables (2 weeks)

    A. Random variables and their probability distributions

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[1]Optional

B. Connection between relative frequency distributions and probability distributions of discrete random variables

C. Mean and variance

D. The binomial probability distribution

E. Using the binomial distribution tables; mean and variance of the binomial distribution [1]

IV. The Normal Probability Distribution (3 weeks)

A. Continuous random variables

B. The normal distribution

C. The standard normal distribution

D. Normal approximation of the binomial distribution

E. Digression: How to MINITAB! [1]

F. Sampling distributions

G. The Central Limit Theorem and its applications