C-ID Descriptor
Statistics for Public Health

Descriptor Details

- **Descriptor Title**: Statistics for Public Health
- **C-ID Number**: 114
- **Units**: 3
- **Date of Last Revision**: 9/18/2023 07:08:57 PM GMT+0000

General Description

This course emphasizes the calculation, interpretation, and application of descriptive and inferential statistics in the public health science and related fields. Topics include statistical principles and use of probability techniques, hypothesis testing, and predictive techniques to facilitate evidence-based practices. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-square and t-tests. Application of statistical concepts will incorporate data from public health sources including research and governmental datasets. The application of technology for statistical analysis including the interpretation of the relevance of the statistical findings will be covered.

Prerequisites

Intermediate Algebra or any CSU accepted* statistics pathway curriculum prerequisite

*At present there are two mechanisms to become accepted:

the proposed statistics course has been accepted to meet CSU General Education Breadth Area B4

the pathway has been accepted by the CSU Chancellor's Office process per its October 20, 2015 memo (Statistics Pathways in CSU Quantitative Reasoning)

Corequisites

None

Advisories

English, one level below transfer (i.e., eligibility for English composition (C-ID ENGL 100) and reading a course with an exiting skill of ability to read a college level text.

Content

1. Introduction to statistics use health public health and biostatistics
2. Descriptive verses inferential statistics
    a. Descriptive statistics:
        i. measurement
        ii. measures of central tendency
        iii. variation.
    b. Association or causality
    c. Criteria for causality
3. Summarizing data graphically and numerically.
4. Sample spaces and probability.
5. Random variables and expected value.
6. Types of studies
7. Sampling and sampling distributions.
8. Discrete distributions – Binomial.
9. Continuous distributions – Normal.
10. The Central Limit Theorem.
11. Estimation and confidence intervals.
12. Hypothesis Testing and inference,
    a. t-tests for one and two populations, and
    b. Chi-square test

13. Correlation, regression lines, and analysis of variance (ANOVA);
14. Applications using data from at least four of the following disciplines: social science, psychology, life science, physical science, health science, information technology, and education.
15. The use of technology for statistical analysis.

Lab Activities

No information provided

Objectives

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

1. Interpret data displayed in tables and graphically.
2. Describe the usefulness of descriptive and inferential statistics, demonstrating an understanding of the association versus causality.
3. Apply concepts of sample space and probability.
4. Calculate measures of central tendency and variation for a given data set.
5. Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
6. Calculate the mean and variance of a discrete distribution.
7. Describe different types of research study designs and the pros and cons of each.
8. Calculate probabilities using normal and t-distributions.
9. Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem.
10. Construct and interpret confidence intervals.
11. Determine and interpret levels of statistical significance including p-values.
12. Interpret the output of a technology-based statistical analysis.
13. Identify the basic concept of hypothesis testing including Type I and II errors.
14. Formulate hypothesis tests involving samples from one and two populations.

15. Select the appropriate technique for testing a hypothesis and interpret the result.
16. Use regression lines and ANOVA for estimation and inference, and interpret the associated statistics; and
17. Use appropriate statistical techniques to analyze and interpret applications based on data from at least four of the following disciplines: social science, psychology, life science, physical science, health science, information technology, and education.

Evaluation Methods

May include:

Exams

Quizzes

Written Assignments

Projects

Textbooks

Sullivan, L. M. *Biostatistics for Population Health: A Primer*.

Gerstman, B. B. Basic Biostatistics: Statistics for Public Health Practice

OER:

Illowski, B. & Dean, S. Introductory Statistics. Openstax. Available at https://openstax.org/details/books/introductory-statistics