PSYC 0142 - INTRODUCTION TO PSYCHOLOGICAL STATISTICS

Catalog Description

Formerly known as PSYC 42
Prerequisite: Completion of MATH D with grade of "C" or better
Hours: 54 lecture
Description: Statistical procedures used for experimental analysis in the social and behavioral sciences. Descriptive and correlational statistics, parametric and nonparametric inference tests, and current controversies in hypothesis testing. (C-ID MATH 110) (C-ID SOCI 125) (CSU, UC-with unit limitation)

Course Student Learning Outcomes

- CSLO #1: Justify the appropriate statistical analysis and analyze a data set.
- CSLO #2: Assess the results of statistical analyses conducted in class and on exams.
- CSLO #3: Construct a statement of the results of statistical analyses in accordance with APA publication guidelines.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

108

Total Student Learning Hours

162

Course Objectives

1. Distinguish among different scales of measurement and their implications.
2. Interpret data displayed in tables and graphically.
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. Calculate probabilities using normal and t-distributions.
8. Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem.
9. Construct and interpret confidence intervals.
10. Determine and interpret levels of statistical significance including p-values.
11. Interpret the output of a technology-based statistical analysis.
12. Identify the basic concept of hypothesis testing including Type I and II errors.
13. Formulate hypothesis tests involving samples from one and two populations.
14. Select the appropriate technique for testing a hypothesis and interpret the result.
15. Use linear regression and ANOVA analysis (one-way and factorial) for estimation and inference, and interpret the associated statistics.
16. Use appropriate statistical techniques to analyze and interpret applications based on data from disciplines including business, social sciences, psychology, life science, health science, and education.

General Education Information

- Approved College Associate Degree GE Applicability
    - AA/AS - Comm & Analyt Thinking
    - AA/AS - Mathematical Skills
- CSU GE Applicability (Recommended-requires CSU approval)
    - CSUGE - B4 Math/Quantitative Reasoning
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
    - IGETC - 2A Math/Quan Reasoning

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Essay Examinations
    - Example: For each of the following types of statistical tests, describe an experiment which would be analyzed with that test and explain why that test is more appropriate than the other two for that experimental design. -- Independent samples t-test -- One-way ANOVA -- Chi-square test for best fit Rubric Grading.
- Objective Examinations
    - Example: Which combination of factors is most likely to produce a significant value for an independent-measures t statistic? A. large samples and small variance B. large samples and large variance C. small samples and small variance D. small samples and large variance
- Problem Solving Examinations
    - Example: An investigator is interested in the effects of sleep deprivation on attention. She assigns subjects randomly to one of three conditions: •Normal = no sleep deprivation (they get 7 – 8 hours of sleep) •24 hours = 24 hours of sleep deprivation •48 hours = 48 hours of sleep deprivation After this treatment, each person is then tested on an auditory vigilance task, in which tones are presented at random times over the course of an hour. Occasionally a tone is shorter than usual, and the person must identify these tones. The number of short tones correctly identified is the person's score. (The number of short tones identified is a measure of attention). There are six people in each group. State the null and alternative hypotheses, and complete the ANOVA table below (NOT SHOWN). The means for the three groups are 77, 62, and 49. Perform a post hoc test to determine which mean differences are significant. Rubric grading.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. As the instructor lectures on calculating probability based on z-scores, problems are presented in a slide presentation and the students are asked to calculate the solutions before the answers are revealed and explained.

Distance Learning

1. After viewing a recorded lecture on the one-way ANOVA, students download a worksheet from LMS in which a complete example is covered, from the stating of the hypotheses to the reporting of the results. The final numerical answers (but not the calculations) are provided for some parts of the worksheet so students can check their understanding of the material. The student scans the completed worksheet with a smartphone and uploads it.

Typical Out of Class Assignments
Reading Assignments

1. Read the chapter on measures of central tendency. In preparation for class, apply the concepts of mean, median, and mode to a set of data.
2. Read the chapter on z scores. Describe how to calculate them and explain why they are useful in interpreting data in preparation for class.

Writing, Problem Solving or Performance

1. Imagine you have a test of anxiety for which $\mu = 65$ and $\sigma = 8$. Someone receives a score of 75. However, you convert the distribution to one with a $\mu = 100$ and $\sigma = 10$. What would that score on your exam be when converted for this new distribution? 2. As the principal of a private high school, you are interested in finding out how the training in mathematics at your school compares with that of the public schools in your area; you suspect that the training at your school is superior. For the last five years, the public schools have given all graduating seniors a mathematics proficiency test. The mean was $\mu = 78$, but the standard deviation is unknown. The 41 graduating seniors at your private school this year took the test and had a mean of 83. The sum of squares was 5953.6. State the null and alternative hypotheses, calculate the value of t and the effect size, interpret your results, and write them in APA format.

Other (Term projects, research papers, portfolios, etc.)
Required Materials

- Essentials of Statistics for The Behavioral Sciences
  - Author: Gravetter, Wallnau, Forzano
  - Publisher: Cengage
  - Publication Date: 2018
  - Text Edition: 9th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Essential Statistics for the Behavioral Sciences
  - Author: Privitera
  - Publisher: Sage
  - Publication Date: 2017
  - Text Edition: 2nd
  - Classic Textbook?:
  - OER Link:
  - OER:
- Statistics for Psychology
  - Author: Aron, Coups, Aron
  - Publisher: Pearson
  - Publication Date: 2013
  - Text Edition: 6th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Essentials of Statistics for the Behavioral Sciences
  - Author: Nolan and Heinzen
  - Publisher: Worth
  - Publication Date: 2019
  - Text Edition: 4th
  - Classic Textbook?:
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Calculator required (scientific calculator not required).