

Research Design & Analysis I

PSY/EDUC 6600

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Required Text:

- Cohen, B. H. (2013). *Explaining psychological statistics, 4th Ed.* Hoboken, NJ: Wiley & Sons

COURSE OVERVIEW & LEARNING OUTCOMES

The purpose of the course is to provide students with an introduction to fundamental research design and statistical procedures focused on the behavioral sciences. Students will learn how to differentiate and appropriately select the best statistical methods for use in various research designs and analytical problems.

Primary emphasis for the course will be on interpreting information about a research project in order to select the appropriate test to use. Instruction will focus on the statistical techniques of *t*-tests, ANOVA, correlation, simple linear regression, and non-parametric tests. Students will be expected to understand the basics of these data analytic techniques in order to run and interpret each analysis and effectively write a coherent and comprehensive results section based on results.

Objectives

After successful completion of the course students should be able to:

1. Describe and apply basic statistical methods to research problems
2. Demonstrate appropriate use of descriptive statistics to explore an existing dataset and determine appropriate statistical analyses to use
3. Create appropriate graphic representations of data and results
4. Explain statistical significance testing and types of errors in hypothesis testing
5. Interpret results of statistical significance and measures of effect size
6. Write about results of statistical significance and measures of effect size

Fundamental Concepts

After successful completion of the course, students should understand the correct method to use in a variety of situations as well as be able to apply and interpret characteristics of the following concepts:

1. Sample versus population characteristics
2. Identification and differentiation of normal distribution characteristics
3. Calculation, description and interpretation of measures of effect size
4. Working understanding of descriptive statistics such as mean, median, mode, standard deviation, variance, etc
5. *z*- and *t*-test application and understanding
6. Correlation and related relationships
7. Introduction to simple linear regression

8. 1-way Analysis of Variance (ANOVA)
9. Factorial Analysis of Variance (ANOVA)
10. Introduction to data analysis for nominal and ordinal data
11. Introduction to data analysis for non-normal distributions

UNIVERSITY & COURSE POLICIES

Academic Integrity and Honesty Policy:

Any academic dishonesty will not be tolerated. If a student is caught engaged in academic dishonesty in this course, he or she risks failing the course and being subject to academic discipline including the imposition of university sanctions. For more information, please see the university policy on cheating.

For the purposes of this course, students are encouraged to work together. Discussing the assignment together will not be considered cheating. However, all submitted work should be original. Any student caught submitting identical or closely related work will at the minimum receive zero (0) credit for the assignment and at a maximum a failing grade in the course and be turned in to the appropriate university personnel. The types of activities that would be considered academic dishonesty are as follows: actively copying answers or otherwise using the work of another student on an exam; using the answers of another student on an assignment without having done the work yourself; soliciting other students or agencies to complete and submit work for you.

Students with Disabilities/Requests for Accommodations:

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC). Please contact the DRC prior to or as early in the semester as possible. Alternate formats for course content are available with advanced notice.

Contacting the Disability Resource Center (DRC):

- On Campus: Room 101 of the University Inn
- Phone: 435-797-2444
- Website: <http://www.usu.edu/drc/>

Inclusivity Statement:

Pivotal to Utah State University's mission is the need to embrace and value the diversity of its members. Acknowledging the uniqueness of each individual, we seek to cultivate an environment that encourages freedom of expression. Because the University is a community where inquiry is nurtured and theories are tested, every individual has the right to feel safe to express ideas that differ from those held by other members of the community. However, all persons who aspire to be part of our campus community must accept the responsibility to demonstrate civility and

respect for the dignity of others. Recognizing that the proper balance between freedom of expression and respect for others is not always apparent or easy to achieve, we must continually challenge each other and ourselves in an atmosphere of mutual concern, good will and respect. Therefore, expressions or actions that disparage an individual's or group's ethnicity, gender, religion, sexual orientation, marital status, age or disability are contrary to the mission of Weber State University and will are not acceptable in classroom discussion.

Use of Technology:

The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. Students using cell phones, tablets, or laptops for anything other than course work will be asked to leave. Students are permitted to use devices during class for note-taking and other class-related work only.

Emergency Closure Statement:

Due to the applied nature of this course, if for any reason the university is forced to close for an extended period of time, class will be cancelled and assignments will be adjusted accordingly. This may include dropping an assignment altogether or rearranging delivery of course topics to cover more in any one class. Look for announcements from the university on Aggie e-mail or the website and from the instructor on the course Canvas page.

Contacting the Instructor:

If at any point any student has questions or problems during the course of the semester, please feel free to contact the instructor. Use of the Canvas email system as the initial contact point for the instructor is recommended. Please allow 48 hours for a response.

ASSIGNMENTS & GRADING

Attendance (5pts x 13)

Due to the applied nature of this course, attendance is required. Assignments will be discussed during class. Each day of participation will be worth 5 points for a total of 70 points. 65 points make up the attendance portion of your final grade, leaving the potential for 5 extra points for students with perfect attendance.

Statistics in the Real World Assignments (15pts x 5)

Data is an ever-present part of society anymore. Unfortunately, this data is not always presented in responsible ways. This assignment is meant as an exploration of what data is out there in the real world, with an eye toward responsible data practices. Each student is required to bring in articles, data, or news stories from the popular media that reflect some use of data. Students are required to bring in the data, discuss what it is meant to represent (research question), which variables are included (independent and dependent variables), how trustworthy the data is (source) and whether or not the display of data accurately represents the story

intended to be told. As this is meant to represent the everyday data experience, research articles should not be used, however data pulled from research articles and reimagined in the popular media forum may be used. Students are expected to complete this activity five (5) times throughout the semester, and no more than one (1) article may be presented each week by a student.

Weekly Book Assignments (25pts x 12)

There will be 13 weekly assignments. Each assignment will require running a statistical analysis, graphically displaying results, and describing these results in a written description formatted to meet APA guidelines. There will be a conceptual and application component to each assignment. Assignments are due a week and a day after being assigned. It is to your benefit to have as much of your assignment completed by the class prior to the due date, as the last 15 minutes of class will be dedicated to answering assignment related questions. Your lowest assignment score during the semester will be dropped. The remaining 12 assignments will be worth 25 points each.

Statistics Exams (100pts x 3)

Three exams will be given during the semester. These exams will assess conceptual understanding of the concepts covered up to the exam date. Exams are not intended to be comprehensive, although many of the concepts in statistics build upon one another, or are otherwise related. Exams are worth 100 points and consist of both an online multiple choice/short-answer format (30pts) and a take home portion (70pts). No late work will be accepted for exams.

Late Work Policy

Late assignments are accepted with a penalty. Assignments turned in prior to the next class period will receive a 10% penalty. Those turned in within two class periods of the due date will receive a 20% penalty. Late work will not be accepted beyond this range. No late exams will be accepted.

Changes in Course Assignments and Schedule:

The instructor reserves the right to adjust course readings, assignments, and test dates to best attain the objectives of the course. Any changes will be announced in class. Canvas should be considered the official source for all due dates and information.

Points Breakdown

Attendance (5pts x 13)	65 pts
Statistics in the Real World (25pts x 5)	75 pts
Weekly Book Assignments (25pts x 12)	300 pts
Exams (100pts x 3)	300 pts
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Total	790 points

Grading Scale:

A	93-100%	C	73-75%
A-	89-92%	C-	69-72%
B+	86-88%	D+	66-68%
B	83-85%	D	62-65%
B-	79-82%	F	Below 62%
C+	76-78%		

COURSE CALENDAR

Date	Topic	Chapter	Due Date	Assignment Due
30-Aug	Introduction, Mean, Median, Mode & Variability	Ch1, Ch3		
6-Sep	Displaying Data	Ch2	7-Sep	Assignment 1
13-Sep	Hypothesis Testing, Probability & the Normal Curve	Ch4, Ch5	14-Sep	Assignment 2
20-Sep	Significance Testing, z-Scores & One-Sample t-Test	Ch5, Ch6	21-Sep	Assignment 3
27-Sep	Independent-Samples t-Test	Ch7, Ch8	28-Sep	Assignment 4
4-Oct	Paired-Samples t-Test	Ch11	5-Oct	Assignment 5
10-Oct	Quiz 1 DUE			
11-Oct	One-Way ANOVA	Ch12, Ch13	12-Oct	Assignment 6
18-Oct	One-Way & Factorial ANOVA	Ch13, Ch14	19-Oct	Assignment 7
25-Oct	Factorial ANOVA	Ch14	26-Oct	Assignment 8
1-Nov	Repeated Measures ANOVA	Ch15	2-Nov	Assignment 9
8-Nov	NO CLASS			
14-Nov	Quiz 2 DUE			
15-Nov	Correlation & Simple Linear Regression	Ch9, Ch10		
22-Nov	Correlation & Simple Linear Regression	Ch9, Ch10	23-Nov	Assignment 10
29-Nov	Categorical Data Analysis	TBD	30-Nov	Assignment 11
6-Dec	Non-Parametric Data Analysis	TBD	7-Dec	Assignment 12
			14-Dec	Assignment 13
17-Dec	Quiz 3 DUE			