

Applied Statistical Analysis

EDUC – 6560

Section 001



Course Instructor:

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335 Education Building

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Course Time and Location:

ENLAB 248

Mondays 1:30-4:30

Essential Questions for this Course

- What is quantitative research?
- How does data inform our world?
- How are data analyzed?

IDEA Standards:

- Gaining factual knowledge (terminology, classifications, methods, trends)
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
- Learning to apply course material (to improve thinking, problem solving, and decisions)

Course Description:

Applied introduction to statistical methods commonly used in educational, social, and health sciences. Coverage of data types, data base creation, data exploration and visualization; use of statistical software to compute descriptive and inferential statistics, including correlation, regression, group comparisons (t-tests, ANOVA), and categorical methods.

Course Outcomes:

- Select and develop an appropriate data collection instrument for conducting social sciences research.
- Discuss the methods to assess issues in validity and reliability of measurement instruments.
- Utilize the appropriate descriptive and/or inferential statistics for analyzing data.
- Using SPSS/PC, run analyses required addressing a given set of research objectives.
- Interpret data and present results about a given set of data.

Course Resources:

- Course Website – We will be utilizing Utah State University’s Canvas system for course management. Assignments, readings, and grades will be posted on Canvas.
- Required textbooks:
 - Field, A. (2013). *Discovering statistics using SPSS, 4th edition*. London: SAGE Publications. [book website: <http://www.sagepub.com/field4e/>]
 - DeVellis, R. F. (2011). *Scale development: Theory and application, 3rd edition*. Los Angeles: SAGE Publications.
- Suggested
 - Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 3rd Edition*. Los Angeles: SAGE Publications.
- Free access to SPSS: apps.usu.edu
 - Purchase student license: https://usu.service-now.com/usu/catalogs_home.do - \$70

Overview of Course/Expectations and Procedures

Class Attendance

You should make every attempt to be at every class session. I hope that you will find the activities, discussions, and demonstrations helpful and insightful. Furthermore, the class lectures and activities will be absolutely essential for you to meet the requirements of some of the assignments in this course. However, as human beings, we sometimes get sick or have extenuating circumstances. Please remember, if you are feeling ill to contact the appropriate health services organization.

Class Participation

You are also expected to participate in class activities and discussions. Research demonstrates that the quality of the classroom environment depends on the interaction of the students and the teacher. This class will be highly interactive and discussion-based.

Assigned Readings

You are expected to read all required assignments for the week before class. Class discussions and participation in the group activities will not be effective unless readings are completed.

Assignment Deadlines

Assignments are due on the date they are listed in this syllabus unless officially changed by the instructor. All changes in assignment due dates will confirmed via e-mailed to all students. **No late work will be accepted.** If you have an extenuating circumstance, please notify the instructor prior to due dates. (Note: Some writing assignments may require multiple submissions. The new date listed on the feedback will count as the next deadline for that assignment.)

Grading Return Rate on Assignments

Because the professor believes in Mastery Learning, students are encouraged to resubmit papers to demonstrate complete and full understanding of the content material. As a result, the grading and feedback in this course may be quite demanding on the professor. As a result, please allow 2-3 weeks to receive completed grades on major assignments.

USU Policy and Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities: <http://personnel.usu.edu/policies/403.htm>.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students. The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Plagiarism

Plagiarism includes knowingly "representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling.

Grievance Process (Student Code)

Students who feel they have been unfairly treated [in matters other than (i) discipline or (ii) admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: http://studentlife.tsc.usu.edu/stuserv/pdf/student_code.pdf (Article VII. Grievances, pages 25-30).

Sexual Harassment

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at 797-1266.

Students with Disabilities

The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille."

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Course Fees

Courses that utilize course fees are required to identify the amount of the course fee and explain the purpose of the course fee on the syllabus given to students. Course fee information not included on the syllabus will result in the course fee automatically being deleted.

WRITING EXPECTATIONS

This course assumes graduate level competency in expression through writing. The course requires students to demonstrate proficiency in writing content and mechanics. Peer review and proofing among students is encouraged. *All assignments are expected to be word-processed.*

COURSE ASSIGNMENTS and EXPECTATIONS		Percent of Final Grade
Participation and Professionalism		10
Mid-term examination		15
T-Test Homework		10
Correlation Homework		10
Regression Homework		10
Statistics Organizer		10
Research Synthesis		15
Final Examination		20
TOTAL		100

ASSIGNMENT DESCRIPTIONS

Participation and Professionalism

Attendance and in class participation are important. However, occasions arise where other activities take priority. If you plan to miss a class, please contact the instructor prior to class (unless it is an emergency). Frequent absences will be dealt with on a case-by-case basis. Assignments due on expected absences are still due on that due date. Excessive absences and lack of in class participation will result in an up to 10% reduction in professionalism. *Class participation and keeping up with course content is important. There may be times when in-class exercises will be assessed or (short) pop quizzes are given.*

Statistics Organizer

In order to use the information beyond the course, you will need to develop your own organizer that addresses the following: statistical procedure, appropriate circumstances for use, assumptions of the statistical test, key statistics and their meaning, important notes or variations. You need to develop this organizer early and keep up with it through the semester. Put more directly, this is your statistics cheat sheet.

Homework Assignments

Throughout this semester you will be asked to complete three homework assignments using SPSS to analyze existing datasets.

Research Synthesis

In this class you should begin to understand the methods and finding sections of research publications within your area of interest. You must find a minimum of five journal articles in your field with a quantitative component (look for numbers). Write a narrative review that states the research questions used, the major constructs, and the different statistical methods. Finally, write whether you believe the methods were appropriate, any other methods that may be suitable, and how the statistical information provided an insight into the research questions (in other words, what did we learn within this study that we didn't already know?).

Examinations

This course will have two examinations. The first will take occur at the mid-point of the semester and the second will be a final comprehensive examination.

GRADING SCALE (Percent)*

A = 90.0 – 100.0 B = 80.0 – 89.9 C = 70.0 -79.9 E = below 69.9

* The percentages are assigned so there are no rounding discrepancies in terms of the whole number.

COURSE OUTLINE AND SCHEDULE

Course schedule is subject to change due to availability of resource persons and students' learning needs.

Wk.	Date	Class Objective/Topic	Readings and Assignments
1	January 11	Course Induction <ul style="list-style-type: none"> • Models of Quantitative Research • Data use in the real world 	DeVellis pp. 8-16
2	January 18	Issues in Statistical Analysis Jigsaw <ul style="list-style-type: none"> • Value Added Modeling • Decision Validity and use of Aggregate Measures • Epistemological Divisions 	
3	January 25	Introduction to Statistical Terminology <ul style="list-style-type: none"> • Hypothesis, IV vs. DV, Levels of measurement, Validity and Reliability, correlational vs experimental, distributions, measures of central tendency, Standard Deviation, 	<ul style="list-style-type: none"> • Field Chapter 1 • Creswell Ch. 8 (On Canvas)
4	February 1	Statistical Terminology Continued <ul style="list-style-type: none"> • Hypothesis testing, descriptive vs. inferential statistics, effect sizes, confidence intervals. • Understanding Statistical Tables and Figures 	<ul style="list-style-type: none"> • Field Ch. 2 • DeVellis Ch. 2-4
5	February 8	Developing Psychometric Scales <ul style="list-style-type: none"> • 8 steps of scale development • Questionnaire Construction • Handling non-response error; other external validity issues 	<ul style="list-style-type: none"> • DeVellis Ch. 5
6	February 15	Introduction to the SPSS Environment: <ul style="list-style-type: none"> • Variable Set-up, Labeling, Transformations, Inclusions/Exclusions • Introduction to Creating Tables and Text for Manuscripts 	<ul style="list-style-type: none"> • Field Ch. 3 • Field Ch. 4 • <i>Research Synthesis Due</i>
7	February 22	Testing Assumptions with SPSS <ul style="list-style-type: none"> • Standardized Scores • Measures of Central Tendencies and Variability: the 3 M's, Standard Deviation, Distribution, Graphs/Plots 	<ul style="list-style-type: none"> • Field Ch. 5
8	February 29	Mid-term Examination	
-	March 7	Spring Break!	-
9	March 14	Correlations	<ul style="list-style-type: none"> • Field Ch. 7
10	March 21	Linear Regression <ul style="list-style-type: none"> • Review of Hypothesis Testing and Errors 	<ul style="list-style-type: none"> • Field Ch. 8 • <i>Correlation Homework Due</i>
11	March 28	T-tests <ul style="list-style-type: none"> • Non-parametric comparisons: Mann-Whitney, Wilcoxon signed-rank 	<ul style="list-style-type: none"> • Field pp. 213-235 • Field Ch. 9
12	April 4	Analyses of Variance: ANOVA, ANCOVA, MANOVA, etc <ul style="list-style-type: none"> • Post-hoc Analyses • Kruskal-Wallis test, Friedman's ANOVA 	<ul style="list-style-type: none"> • Field Ch. 11 and 12 • Field pp. 236-261

13	April 11	Multiple Regression, Moderation and Mediation • Review Regression	• Field Ch. 8 (Review) and 10 • <i>T-test Homework Due</i>
14	April 18	Categorical Data Analysis • Chi-square, assumptions, loglinear, logistic regression	• Field Ch. 18 and 19 • <i>Regression Homework Due</i>
15	April 25	All the things you can do! Overview of advanced statistical methods, Structural Equation Modeling, Factor Analysis, Hierarchical Linear Modeling, Item Response Theory	• DeVellis Ch. 6 Field Ch. 19, 20
F	May 1	Final Examination	• <i>Statistics Organizer Due</i>

** check Canvas weekly for additional readings