Multivariate Statistics for the Behavioral Sciences
M 4:00-6:30
Robert T McKibben Education 269/127

Professor: Steven Estrada, PhD
Office: ED 215 S
Email: estradasm@sfasu.edu

Phone: 936-468-1415, leave message
Office Hours: WTH: M 1-3, T 1-2, Wed 1-3
or by appointment

Final Exam: Take Home, Finals Week; same place

Mandatory:

Note: Additional reading will be assigned throughout the semester delivered online through D2L.

Optional:
Psychological Association (6th ed.). Washington, DC.

Course Description
Course covers statistical methods and research designs applicable to psychological research.
Students are exposed to experimental and non-experimental designs. Particular attention is given
to correlation, simple regression, and multiple regression. Along with hand calculations,
computer-based data analyses will also be performed.

Program Learning Outcomes:

<table>
<thead>
<tr>
<th>PLO</th>
<th>Proficiency Level</th>
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</thead>
<tbody>
<tr>
<td>1. The student will demonstrate statistical skills. Advanced to Mastery</td>
<td>Advanced to Mastery</td>
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<tr>
<td>2. The student will demonstrate research design skills. Mastery</td>
<td>Mastery</td>
</tr>
<tr>
<td>3. (a) The student will demonstrate effective &amp; professional writing skills. (b) The student will respect and use critical and creative thinking, skeptical inquiry, and, when possible, the scientific</td>
<td>Mastery</td>
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<tr>
<td>4. The student will demonstrate a solid general psychology knowledge base.</td>
<td>Intermediate</td>
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<tr>
<td>5. The student will demonstrate an understanding of the ethics of the psychology profession.</td>
<td>Advanced to Mastery</td>
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STUDENT LEARNING OUTCOMES

By the end of this course, students should be able to…

- Discuss the importance of statistics and why they are necessary in virtually every field of study.
- Define and describe a number of basic statistical concepts, including descriptive and inferential statistics.
- Describe the formulas underlying a number of statistical tests in order to fully understand what those tests are trying to accomplish.
- Use quantitative skills to understand and analyze graphs used to depict results of experiments.
- Adopt the logic of research design and identify the rationale for certain designs and how they relate to the choice of statistical analysis.
- Use statistical software packages (e.g., SPSS) to analyze and graph scientific data.

I know this is all very stressful, if you are having some mental health issues, know there are resources here at SFA to help you.

On-campus Resources:
SFASU Counseling Services
www.sfasu.edu/counselingservices
3rd Floor Rusk Building
936-468-2401
SFASU Human Services Counseling Clinic
www.sfasu.edu/humanservices/139.asp
Human Services Room 202
936-468-1041

Crisis Resources:
Burke 24-hour crisis line 1(800) 392-8343
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741

Performance Evaluation:

Grades will come from the following: Weekly Assignments, Lead discussion (paper presentation), Group Participation, Final Exam, and the Final Paper.

Desire2Learn: Students have access to course information, announcements, and grades via Desire2Learn at https://d2l.sfasu.edu. It is your responsibility to stay up-to-date.

Assignments (Letter Grade): There will be eight assignments covering the previous weeks topics and lectures. These assignments will be posted on D2L or handed out in class. They will consist of quizzes, calculation work, short answer, and essay questions. Each assignment will be graded with letter grades.
One assignment will be to complete the assessment quiz. Completion of this assignment is an automatic A, as this will not be graded.

A second assignment is to complete the Coursera course, “What is Data Science?” Found her: https://www.coursera.org/programs/career-academy-faculty-staff-c5tlf/learn/what-is-datascience?authProvider=sfasu&fromClip=sfc_page_course_link~kIuf0

Overall grade will be determined by overall performance:

- 8 assignments:
  - A: 6-8 As, No Ds or Fs
  - B: 4-5 As; 6-8 Bs, No Ds or Fs
  - C: 3-4 As; 5-6 Bs; 7-8 Cs, No Fs
  - D: not reaching criteria, two or more F's
  - F: two or more F's

**Lead Paper Presentation (Letter Grade):** Each student will lead a class discussion covering selected readings. Some topics (but not all) are as follows:

- Problems and Alternatives to Null Hypothesis Significance Testing
- Mediation and Moderation
- Replication Crisis in Psychological Science
- Bayesian Analysis
- Issues in Science and Research in Psychology
- Advanced Estimation Procedures
- Meta-analytic approaches
- Issues in Sampling
- Forecasting and Regression approaches
- P-curve analysis
- And others….

Letter grades (A,B,C,D,F) compiled from both presentations will be earned based on depth of understanding, response to Estrada questions, stimulation of class discussion, and overall clarity of presentation.

**Group Participation Points (Letter Grade):** For each scheduled class period (14 classes), you are to create TWO questions concerning the topics covered. These questions are to be formatted in essay format and can be questions to which you know the answer (covered in lecture or presentation) or a question concerning the topic that does not have an answer. Keep track of the dates for your questions. You are responsible for questions on presentation days as well. Your questions are turned in on the last day of classes.

<table>
<thead>
<tr>
<th># of A's out of 14</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>Questions for 13-14 Lectures</td>
<td>A</td>
</tr>
<tr>
<td>10-12 Lectures</td>
<td>B</td>
</tr>
<tr>
<td>8-9 Lectures</td>
<td>C</td>
</tr>
<tr>
<td>6-7 Lectures</td>
<td>D</td>
</tr>
<tr>
<td>less than 6 Lectures</td>
<td>F</td>
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</table>
Final Exam (Letter Grade): Exam will be comprehensive and consist of short answer, essay, and calculation problems. The exam will cover material from lectures, readings, and assignments. The exam will be take-home and be given on the last day of class, due the last day of final week.

Research Paper (Letter Grade): Each student is required to submit a research article using a multivariate technique written in APA format. The analysis for this paper is to be run on data obtained from an open-source database (see below). The paper is to include a title page, methods (defining your database and the variables used in your analysis) and results sections. Following is a list of possible open-source databases. Other open-source databases (the Census, Data.gov) or other collected data can be used with professor’s approval. This assignment may change if the pandemic intervenes.

Open-Source databases

1. APA LIST OF OPEN-SOURCE DATABASES


2. UCLA Repository of Databases

http://guides.library.ucla.edu/c.php?g=180221&p=1188487

3. The BRFSS - Behavioral Risk Factor Surveillance System

Turning Information Into Public Health

The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. For many states, the BRFSS is the only available source of timely, accurate data on health-related behaviors.

BRFSS was established in 1984 by the Centers for Disease Control and Prevention (CDC); currently data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. More than 350,000 adults are interviewed each year, making the BRFSS the largest telephone health survey in the world. States use BRFSS data to identify emerging health problems, establish and track health objectives, and develop and evaluate public health policies and programs. Many states also use BRFSS data to support health-related legislative efforts.” http://www.cdc.gov/BRFSS/index.htm

4. The YRBSS - Youth Risk Behavior Surveillance System

The Youth Risk Behavior Surveillance System (YRBSS) monitors six types of health-risk behaviors that contribute to the leading causes of death and disability among youth and adults, including—

- Behaviors that contribute to unintentional injuries and violence
Sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, including HIV infection
• Alcohol and other drug use
• Tobacco use
• Unhealthy dietary behaviors
• Inadequate physical activity

YRBSS also measures the prevalence of obesity and asthma among youth and young adults.
YRBSS includes a national school-based survey conducted by CDC and state, territorial, tribal, and local
surveys conducted by state, territorial, and local education and health agencies and tribal governments.
http://www.cdc.gov/healthyyouth/yrbs/index.htm


Summary: “The National Longitudinal Study of Adolescent Health (Add Health) is a longitudinal study of a
nationally representative sample of adolescents in grades 7-12 in the United States during the 1994-1995
school year. The Add Health cohort has been followed into young adulthood with four in-home interviews, the
most recent in 2008, when the sample was aged 24-32. Add Health combines longitudinal survey data on
respondents' social, economic, psychological and physical well-being with contextual data on the family,
neighborhood, community, school, friendships, peer groups, and romantic relationships, providing unique
opportunities to study how social environments and behaviors in adolescence are linked to health and
achievement outcomes in young adulthood.

Public use biomarker data has been added. The Glucose/HbA1c data file contains two measures of glucose
homeostasis based on assays of the Wave IV dried blood spots: Glucose (mg/dl) and Hemoglobin A1c
(HbA1c, %). Six additional constructed measures -- fasting duration, classification of fasting glucose,
classification of non-fasting glucose, classification of HbA1c, diabetes medication, and a joint classification of
glucose, HbA1c, self-reported history of diabetes, and anti-diabetic medication use -- are also included.”
http://www.icpsr.umich.edu/icpsrweb/DSDR/studies/21600/datasets

Global Grading Scale:

<table>
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<tr>
<th>Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Minimum 3 A’s, 2 B’s</td>
</tr>
<tr>
<td>B</td>
<td>No Fs; Minimum 1 D with no Cs; or 2 Cs with no Ds</td>
</tr>
<tr>
<td>C</td>
<td>No Fs; 3 C’s with no Ds; 1 D with 2 Cs</td>
</tr>
<tr>
<td>D</td>
<td>No Fs; 2 or more Ds</td>
</tr>
<tr>
<td>F</td>
<td>Even 1 F</td>
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</table>

Attendance: Attendance will not be taken, but you are responsible for all material covered in
class. Also, announcements are made at the beginning of the class. These announcements cover
due dates, changes in scheduling, extra credit, and changes in exams. It is your responsibility to
learn the information if you do not attend class.

Penalty: Don’t be late with assignments. Show up to class. As graduate students, there is a
greater expectation on you to be professional, and I know each one of you will live up to these
expectations.
Academic Integrity (A-9.1)

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades Semester Grades Policy (A-54)

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Electronic Devices

No electronic devices of any kind will be allowed during exams (media players, headsets, cell phones, palm pilots, language translators, etc.). Laptops and cell phones may not be used during class time. Students wishing to send text messages must exit the classroom. I WILL ASK YOU TO LEAVE IF YOU CANNOT STOP LOOKING AT YOUR CELL PHONE. If you have special needs regarding language assistance, please speak with me to make arrangements.

Important Dates

The academic calendar can be found at http://www.sfasu.edu/297.asp. It contains important dates of which you need be aware.

Credit hour Justification

PSY 507 “Multivariate Statistics for Behavioral Sciences” (3 credits) is designed to cover statistical methods and research designs that are applicable to psychological research, including experimental and non-experimental designs, correlation, simple regression, and multiple
regression. Along with hand calculations, computer-based data analyses also will be performed. The course typically meets 150 minutes once a week for 15 weeks, and also meets for a 2-hour final examination period. Students typically have significant weekly reading assignments, writing assignments, are expected to take regular tests, and a final examination. These activities average at a minimum 6 hours of work each week to prepare outside of classroom hours.

EXAM SCHEDULE, DUE DATES, AND DATES OF INTEREST

- Mar 9  Beginning of SPRING BREAK
- Mar 28  Easter Break
- April 29  Take home Final Exam assigned
- May 3   LAST DAY OF CLASSES; Paper Due; Questions Due;
- May 6   Final – Take Home Due; course presentation

<table>
<thead>
<tr>
<th>Tentative Course Schedule</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>10% Syllabus and Introduction, Statistics Review</td>
<td>1 and 2</td>
</tr>
<tr>
<td>7.50% Techniques and Biases</td>
<td>4</td>
</tr>
<tr>
<td>10% GLM and Matrices and Cleaning Data</td>
<td>Notes</td>
</tr>
<tr>
<td>10% Regression and Multiple Regression</td>
<td>8</td>
</tr>
<tr>
<td>10% Moderation and Mediation</td>
<td>10</td>
</tr>
<tr>
<td>7.50% Exploratory Factor Analysis</td>
<td>16</td>
</tr>
<tr>
<td>7.50% Logistic Regression</td>
<td>19</td>
</tr>
<tr>
<td>7.50% Other Statistical Techniques</td>
<td>20</td>
</tr>
<tr>
<td>5% SPSS</td>
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<tr>
<td>25% Directed Readings</td>
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