Instructor: Luis E. Aguerrevere Ph.D.  
Course Time & Location: Tuesday 10:30Am to 1:00PM  
Info Lab 2. Library Second Floor

Office: HSTC 301  
Office Hours: Tuesdays from 1-3PM (Face to Face) and Thursdays from 2:30-4:30PM (Zoom)

Office Phone: 936-468-1153  
Credits: 3

Other Contact Information:  
Email: aguerrevle@sfasu.edu

Prerequisites: Admission to the PhD program in School Psychology and graduate school

I. Course Description: (brief paragraph)

Independent Study of the multivariate statistical methods in conjunction with artificial neural network applications for the behavioral sciences. Topics include matrix algebra, multivariate analysis of variance, multiple and logistic regression, ANOVAS, MANOVAS, principal components and factor analysis. Applications and exercises employing SPSS GradPack multivariate software provide the background for learning operations critical to fluency in the application of multivariate analysis and procedures.

II. Intended Learning Outcomes/Goals/Objectives (Program/Student Learning Outcomes):  
The complete listing of the standards associated with the PLOs, SLOs, assignments, and assessments are located on the PCOE website.

This course reflects the following core values of the College of Education:
• Academic excellence through critical, reflective, and creative thinking
• Life-long learning
• Collaboration and shared decision-making
• Openness to new ideas, to culturally diverse people, and to innovation and change
• Integrity, responsibility, diligence, and ethical behavior
• Service that enriches the community

The mission of the College of Education is to prepare competent, successful, caring, and enthusiastic professionals dedicated to responsible service, leadership, and continued professional and intellectual development.

The goals of this course are closely aligned to those of the College of Education (COE), which is to prepare competent, successful, caring and enthusiastic professionals dedicated to responsible service, leadership, and continued professional and intellectual development. As a preliminary step in this process the knowledge obtained in this course will enable candidates to develop the requisite knowledge, skills, and dispositions necessary for admission into the COE Teacher Certification Program.
This course also supports the mission of the Human Services Department. The mission of the College of Education is to prepare competent, successful, caring, and enthusiastic professionals dedicated to responsible service, leadership, and continued professional and intellectual development.

Program Learning Outcomes:

PLO 1. Practical Knowledge
- Candidates demonstrate a clear and precise understanding that school psychologists must be able to use assessment strategies to gather information and define current problem areas. Response addresses the need for assessing strengths and needs for individuals, groups, and systems.

PLO 2. Research and Program Evaluation
- Practical Knowledge, Content Knowledge and Application of Principles and Procedures
- Answer demonstrates a clear understanding of issues regarding the evaluation of research, translating research into practice, and understanding research design and statistics in sufficient depth to plan and conduct investigations and program evaluations for improvement of services.

PLO 5 Information Technology
- Candidates have a clear understanding and enthusiasm for being familiar with and being able to evaluate the appropriateness of various technologies that impact the practice of their profession.

Student Learning Outcomes:

- At the end of the course (covering NASP Domain 1), the student will:

  1. Demonstrate fluency in matrix algebra sufficient to understand and employ multivariate and neural network methodology as these systems apply to research data. [PLO 1, 5]
  2. Demonstrate fluency in basic MANOVA hand calculations sufficient to apply this methodology to research data. [PLO 1, 5]
  3. Identify and demonstrate hand calculations and computer-interactive procedures appropriate to Logistic Regression and Principal Components Analysis/Factor Analysis operations. [PLO 1, 2, 5]
  4. Determine when it is appropriate to use neural networking procedures as an alternative to traditional multivariate tests. [PLO 1, 5]
  5. Discuss the basic logic and advantages of testing for statistical interactions and employing a priori and ad-hoc procedures. [PLO 1]
  6. Explain the assumptions associated with multivariate and neural network operations. [PLO 1]
  7. Utilize and SPSS statistical software and interpret complex research findings. [PLO 1, 2, 5] univariate statistical tests. [PLO 1]
  8. Test the assumptions associated with linear and logistic regression and various multivariate tests. [PLO 1, 2, 5]
  10. Using SPSS, employ scatterplots for checking the assumptions of multiple regression procedures. [PLO 1]
  11. Differentiate between standard and hierarchical multiple regression procedures. [PLO 1, 2, 5]
  12. Differentiate between predictive vs. explanatory functions of multiple regression. [PLO 1, 5]
  13. Identify research situations in which logistic regression analysis is appropriate. [PLO 1]
  14. Identify and employ multivariate analysis of variance tests in several research applications. [PLO 1, 5]
  15. Understand and discuss the general purpose and types of research questions pertaining to multivariate analysis of covariance, main effects, interactions among variables, specific comparisons and trend analysis, effects of covariates and effect size. [PLO 1, 2, 5].
This course incorporates the Core Curriculum Objectives in the listings of course objectives and indicated in course assignments. Just as was required in the application for the inclusion in the core curriculum, faculty are asked to note how each core objective is met in the course schedule in terms of instruction and in the description of course assignments. The following lists the Core Curriculum Objectives with definitions that this course meets.

Critical Thinking. Description indicates how students will be instructed in critical thinking skills including creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.

Communication. Students will be instructed in Communication Skills to include effective development, interpretation and expression of ideas through written, oral and visual communication.

Personal Responsibility. Students will be instructed in personal responsibility to include the ability to connect choices, actions and consequences to ethical decision-making.

Social Responsibility. Students will be instructed in intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.

Empirical and Quantitative Skills. Students will be instructed in the manipulation and analysis of numerical data observable facts resulting in informed conclusions.

Teamwork. Students will be instructed in the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

III. Course Assignments, Activities, Instructional Strategies, use of Technology:

There will be no exams in this class, rather there will be assigned weekly and monthly projects. These projects will include, as much as possible, genuine data sets. Your tasks will involve analyzing the data using a multivariate technique, printing and annotating the output from SPSS, and writing up a brief results section using APA style. Other tasks will involve offering brief answers to conceptual questions, minor hand computations (e.g., with matrix algebra), and analysis of small, contrived data sets.

IV. Evaluation and Assessments (Grading):

1. Study (40%). Students will be writing a report and presenting a study using either data already collected or simulated data (created by the instructor) to answer questions related to a student’s topic of interest. Students will be writing and extended abstract following the below guidelines. Students will also present their finding in a poster session.

2. Homework (60%): Every week, students will have to complete the tasks at the end of each chapter.

The following rubric will be used for all projects and in-class activities.

<table>
<thead>
<tr>
<th>Rubric for Statistics Projects</th>
<th>Points Possible</th>
<th>Points Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction/Title:</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Title is clear and in the form of a question</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Introduction clearly describes the question that is being investigated</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Introduction clearly states the hypotheses for the question of interest</td>
<td>10</td>
<td></td>
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<tr>
<td>Graphs and Summary Statistics:</td>
<td>40</td>
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<tr>
<td>Appropriate graphs are used (help answer the overall question of interest)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Graphs are accurate and neat</td>
<td>10</td>
<td></td>
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</tbody>
</table>
Brief Paper ~5-7 pages follow the following format:

a. Introduction. must be a discussion of the scientific evidence that led you to your study. Here, you will discuss 6 articles that are relevant (similar to your study). At least half of your articles should be published within the last 5 years.

b. To effectively use the content of the 6 journal articles to support your ideas, be sure to clearly describe 1) the topic of the research being reported, 2) the research method used (and how these methods may have affected the results), 3) the researcher’s conclusions, and 4) questions raised by the research.

c. In the last paragraph of the research section of your paper, summarize the research findings and briefly state how the research relates to the topic of your paper. In this same paragraph, you should clearly and concisely describe the various SPECIFIC hypotheses on which you are basing your paper.

d. Methods. Here you will present your proposed participants, materials and design.

e. Results: Here you will present your experimental design, including the statistics you will be using and a non-statistic results. If you have not collected data, you will be provided with simulated data.

f. Discussion: You will need to explain how your results change the existing literature. Also, state in what ways you can make your study improve.

g. References. All the books and journals used for your paper should be listed alphabetically in a bibliography at the end. You should follow the style manual of the American Psychological Association (APA) - seventh edition.

**GRADES**

- **A** = 90–100%
- **B** = 80–89.9%
- **C** = 70–79.9%
- **D** = 60–69.9%
- **F** < 60%
V. Tentative Course Outline/Calendar:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 24</td>
<td>Review of Statistical Concepts</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Aug 31</td>
<td>Review of Univariate Assumptions and Stats</td>
<td>Chapter 2,3</td>
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<tr>
<td>Sep 7</td>
<td>Review of SPSS and Graph builder</td>
<td>Chapters 4 and 5</td>
</tr>
<tr>
<td>Sep 14</td>
<td>Screening data prior multivariate analysis</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Sep 21</td>
<td>Correlations and Partial Correlations</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>Sept 28</td>
<td>Multiple Regression</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>Oct 5</td>
<td>Moderation and Categorical Regression</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>Oct 12</td>
<td>Logistical Regression</td>
<td>Chapter 20</td>
</tr>
<tr>
<td>Oct 19</td>
<td>Review of t-tests and Univariate ANOVA</td>
<td>Chapters 10 and 12</td>
</tr>
<tr>
<td>Oct 26</td>
<td>Repeated Measures ANOVA</td>
<td>Chapter 15</td>
</tr>
<tr>
<td>Nov 02</td>
<td>Mixed Designs ANOVA</td>
<td>Chapter 16</td>
</tr>
<tr>
<td>Nov 09</td>
<td>MANOVAs</td>
<td>Chapter 17</td>
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<tr>
<td>Nov 16</td>
<td>Exploratory Factor Analysis</td>
<td>Chapter 18</td>
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<tr>
<td>Nov 23</td>
<td>No CLASS</td>
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<td>Nov 30</td>
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<tr>
<td>Dec 07</td>
<td>Multivariate Categorical Analyses</td>
<td>Chapter 19</td>
</tr>
</tbody>
</table>

Study due – Tuesday Dec 14th, 2021 at Midnight

VI. Readings (Required and recommended—including texts, websites, articles, etc.):

Required Texts and Software:

Text
You may also find his website useful: http://www.statisticshell.com/html/apf.html

Software
SPSS Statistics GradPack (see dealer for cost on this item)
Recommended Texts

VII. Course Evaluations:

"Near the conclusion of each semester, students in the Perkins College of Education electronically evaluate courses taken within the PCOE. Evaluation data is used for a variety of important purposes including:
1. Course and program improvement, planning, and accreditation;
2. Instruction evaluation purposes; and
3. Making decisions on faculty tenure, promotion, pay, and retention.

As you evaluate this course, please be thoughtful, thorough, and accurate in completing the evaluation. Please know that the PCOE faculty is committed to excellence in teaching and continued improvement. Therefore, your response is critical!"

In the Perkins College of Education, the course evaluation process has been simplified and is completed electronically through MySFA. Although the instructor will be able to view the names of students who complete the survey, all ratings and comments are confidential and anonymous, and will not be available to the instructor until after final grades are posted.

VIII. Student Ethics and Other Policy Information: Found at http://www.sfasu.edu/policies/

Class Attendance and Excused Absence: Policy 6.7
Regular, punctual attendance, documented participation, and, if indicated in the syllabus, submission of completed assignments are expected at all classes, laboratories, and other activities for which the student is registered. Based on university policy, failure of students to adhere to these requirements shall influence the course grade, financial assistance, and/or enrollment status. The instructor shall maintain an accurate record of each student’s attendance and participation as well as note this information in required reports (including the first 12 day attendance report) and in determining final grades. Students may be excused from attendance for reasons such as health, family emergencies, or student participation in approved university-sponsored events. However, students are responsible for notifying their instructors in advance, when possible, for excusable absences. Whether absences are excused or unexcused, a student is still responsible for all course content and assignments. Students with accepted excuses may be permitted to make up work for up to three weeks of absences during a semester or one week of a summer term, depending on the nature of the missed work. Make-up work must be completed as soon as possible after returning from an absence.

Academic Accommodation for Students with Disabilities: Policy 6.1 and 6.6
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, 936-468-3004 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/

Student Academic Dishonesty: Policy 4.1
Abiding by university policy on academic integrity is a responsibility of all university faculty and students. Faculty members must promote the components of academic integrity in their instruction, and course syllabi are required to provide information about penalties for cheating and plagiarism, as well as the appeal process.
**Definition of Academic Dishonesty**
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:
- using or attempting to use unauthorized materials on any class assignment or exam;
- falsifying or inventing of any information, including citations, on an assignment;
- 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 one’s own. Examples of plagiarism include, but are not limited to:
- submitting an assignment as one's own work when it is at least partly the work of another person;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source;
- incorporating the words or ideas of an author into one's paper or presentation without giving the author credit.

**Penalties for Academic Dishonesty**
Penalties may include, but are not limited to, reprimand, no credit for the assignment or exam, re-submission of the work, make-up exam, failure of the course, or expulsion from the university.

**Student Appeals**
A student who wishes to appeal decisions related to academic dishonesty should follow procedures outlined in Academic Appeals by Students (6.3).

**Withheld Grades: Policy 5.5**
At the discretion of the instructor of record and with the approval of the academic unit head, 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, except as allowed through policy [i.e., Active Military Service (6.14)]. If students register for the same course in future semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Student Code of Conduct: Policy 10.4**
Interference or disruption of students, faculty, administration, staff, the educational mission, or routine operations of the university is prohibited. Such activity includes, but is not limited to, behavior in a classroom or instructional program that interferes with the instructor or presenter’s ability to conduct the class or program, or the ability of others to profit from the class or program. To remain in the vicinity of activity that is disrupting normal university functions when requested to leave by a university official is prohibited. Bystanders, if their presence incites or adds to the disruption, as well as more active participants in the disruptive activity, may be in violation of this policy as well. Engaging in physical violence of any nature against any person. This includes fighting; assaulting; battering; using a knife, gun, or other weapon; or acting in a manner that threatens or endangers the physical health or safety of any person or causes a reasonable apprehension of such harm.

The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program at SFA.
SFASU values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students' mental health and wellness. Many of these resources are free, and all of them are confidential.

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

Additional Information:

EXTRA CREDIT
Students will have the opportunity throughout the semester to earn extra points to be added to the final grade. These opportunities will be offered at the instructor’s discretion.

POSTING GRADES
Grades will be posted on D2L. When grades are posted, an announcement will be posted on D2L indicating the grades for that assignment or exam have been posted. Please do not e-mail or call inquiring if grades are posted until this announcement is posted. To protect student confidentiality, students’ performance cannot be reported or even discussed over the phone, e-mail, or instant message.

IX. Other Relevant Course Information: The instructor reserves the right to change the syllabus as necessary. You are responsible for keeping up with all changes to the syllabus and for all information presented during class, regardless of whether or not you attended class.