

James I Perkins College of Education

Human Services Department
School Psychology Program
EPS 651.020 Multivariate Statistics
Fall 2019

Instructor: Luis E. Aguerrevere Ph.D.

Office: HSTC 105B

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Other Contact Information:

Course Time & Location: 7:15 to 9:45PM
HSTC 318

Office Hours: Tuesday 9-10 AM, Tuesday and
Friday 3-5PM or by appointment.

Credits: 3

Email: aguerrevle@sfasu.edu

Prerequisites: Admission to graduate school and EPS 550 Research Methods or its equivalent.

I. Course Description: (brief paragraph)

The course examines 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.

NASP Domains addressed by this course:

Domain 1: Data-Based Decision Making and Accountability- School psychologists have knowledge of varied models and methods of assessment and data collection for identifying strengths and needs, developing effective services and programs, and measuring progress and outcomes.

Domain 9: Research and Program Evaluation- School psychologists have knowledge of research design, statistics, measurement, varied data collection and analysis techniques, and program evaluation sufficient for understanding research and interpreting data in applied settings.

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]
 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., effect size), and analysis of small, contrived data sets.

IV. Evaluation and Assessments (Grading):

1. Two major statistics projects: 20% each totaling 40% of the total grade. For these projects the instructor will post data that the student must interpret using appropriate statistical analyses.
2. 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 during the end of the semester research event.
3. Homework (20%): Every week, students will have to complete a task that requires the use of a statistical analysis covered in the previous class meeting.

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

Rubric for Statistics Projects	Points Possible	Points Earned
Introduction/Title:	30	
Title is clear and in the form of a question	10	
Introduction clearly describes the question that is being investigated	10	
Introduction clearly states the hypotheses for the question of interest	10	

Graphs and Summary Statistics:	40	
Appropriate graphs are used (help answer the overall question of interest)	10	
Graphs are accurate and neat	10	
Appropriate summary statistics are calculated (help answer the overall question of interest)	10	
Summary statistics are calculated correctly (SPSS output is included)	10	
Discussion and Conclusions:	30	
Conclusion clearly and correctly addresses the question of interest	10	
Conclusion is supported by the appropriate inferential procedure	10	
Appropriate generalizations are made with supporting evidence	10	

Study Specifics:

Your abstract (500 words max) and Poster should 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) - sixth edition.**

Note: Your study SPSS output should be submitted with the abstract.

GRADES

A = 90–100 % B = 80– 89.9% C = 70 -79.9 % D = 60- 69.9% F < 60 %

V. Tentative Course Outline/Calendar:

LECTURE

DAY	Topic	Required Reading	Homework due
Aug 26	Syllabus and review of concepts 1		
Sept 2	Review of Concepts 2, Graphs and SPSS	Chapter 1,2,3 and 4	
Sept 9	The linear model: Correlations and Partial Correlations	Chapter 8	Chapter 1 Task 3, Chapter 2 Tasks 6, 7 and 8 Chapter 3 Tasks 1 and 3 Chapter 4 Task 7
Sept 16	The linear model: Multiple Regression (I)	Chapter 9	Chapter 8 Tasks 1, 4 and 5
Sept 23	The linear model: Multiple Regression (II)	Chapter 9	Chapter 9 Tasks 1 and 4
Sept 30	The linear model: Moderations and Mediations	Chapter 11	Chapter 9 Tasks 5
Oct 7	Project 1		Chapter 11 Tasks 1,2 and 3
Oct 14	GLM: Review of Z and T tests	Chapter 10	
Oct 21	GLM: ANOVAs and MANOVAs	Chapter 12 and 17	Chapter 10 tasks 1,2,3,4
Oct 28	GLM: Factorial Designs (Mixed ANOVA's)	Chapter 14	Chapter 12 Task 5
Nov 4	GLM: Repeated Measures and Mixed designs	Chapter 15 and 16	Chapter 14 Task 9

Nov 11	Factor Analysis	Chapter 18	Chapter 16 Task 2
Nov 18	Project 2		Chapter 18 Task 2
Nov 25	Thanksgiving		
Dec 2	Research Event		
Dec 9	Study Abstract Due		

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

Required Texts and Software:

Text

Andy Field's *Discovering Statistics Using IBM SPSS Statistics 5th edition* (2018).

You also find homework databases and other important resources on the website:

<https://edge.sagepub.com/field5e>

Software

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

Recommended Texts

Tabachnick, B.G., & Fidell, L.S. (2013). *Using Multivariate Statistics* (6th ed.) MA: Allyn and Bacon.

LiveText Statement:

This course uses the LiveText data management system to collect critical assessments for students who are Perkins College of Education majors (undergraduate, graduate, and doctoral) or majors in other colleges seeking educator certification through the Perkins College of Education. Students who do not have an existing LiveText account will receive an access code via the SFA email system within the first week of class. You will be required to register your LiveText account, and you will be notified how to do this via email. If you forward your SFA e-mail to another account and do not receive an e-mail concerning LiveText registration, please be sure to check your junk mail folder and your spam filter for these e-mails.

If you have questions about obtaining or registering your LiveText account, call ext. 1267 or e-mail SFALiveText@sfasu.edu. Once LiveText is activated, if you have technical questions, call ext. 7050 or e-mail livetext@sfasu.edu. Failure to activate the account and/or submit the required assignment(s) within the LiveText system may result in course failure.

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

Classroom behavior should not interfere with the instructor's ability to conduct the class or the ability of other students to learn from the instructional program. Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This policy applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. 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 iCare: Early Alert Program at SFA. Information regarding the iCare program is found at <http://www.sfasu.edu/judicial/earlyalert.asp> or call the office at 936-468-2703.

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.

Code of Ethics for the Texas Educator:

The Texas educator shall comply with standard practices and ethical conduct toward students, professional colleagues, school officials, parents, and members of the community and shall safeguard academic freedom. The Texas educator, in maintaining the dignity of the profession, shall respect and obey the law, demonstrate personal integrity, and exemplify honesty and good moral character. The Texas educator, in exemplifying ethical relations with colleagues, shall extend just and equitable treatment to all members of the profession. The Texas educator, in accepting a position of public trust, shall measure success by the progress of each student toward realization of his or her potential as an effective citizen. The Texas educator, in fulfilling responsibilities in the community, shall cooperate with parents and others to improve the public schools of the community. This chapter shall apply to educators and candidates for certification.

Please go to TAC 247.2 – Code of Ethics and Standard Practices for Texas Educators. This can be found at [https://texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac_view=4&ti=19&pt=7&ch=247&rl=Y](https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=19&pt=7&ch=247&rl=Y).

To complete Certification/Licensing Requirements in Texas related to public education and other professional settings, you will be required to:

1. Candidates must undergo a criminal history background check prior to clinical teaching and prior to employment as an educator. The public school campuses are responsible for completing the criminal background check. A person who is enrolled or planning to enroll in a State Board for Educator Certification-approved educator preparation program or planning to take a certification examination may request a preliminary criminal history evaluation letter regarding the person's potential ineligibility for certification due to a conviction or deferred adjudication for a felony or misdemeanor offense.

A Preliminary Criminal History Evaluation is a non-mandatory, non-binding evaluation of an individual's self-reported criminal history. In addition, the agency obtains your name-based Texas criminal history information. The service is provided to the requestor for a **non-refundable fee**. The requestor will receive an evaluation letter by email from agency staff advising of potential ineligibility for educator certification.

You are eligible to request a Preliminary Criminal History Evaluation if:

- You enrolled or planning to enroll in an educator preparation program or
- You are planning to take a certification exam for initial educator certification, and
- You have reason to believe that you may be ineligible for educator certification due to a conviction or deferred adjudication for a felony or misdemeanor offense.

You are not eligible for a preliminary evaluation of your criminal history if you do not have a conviction or deferred adjudication for a felony or misdemeanor offense.

In addition, you must complete the fingerprinting process when you apply for certification. Participation in the evaluation does not preclude you from submitting to a national criminal history review at the time you apply for your educator certification. Your criminal history will be reviewed and you may be subject to an investigation based on that criminal history, including any information you failed to submit for evaluation.

Additional information can be found at https://tea.texas.gov/Texas_Educators/Investigations/Preliminary_Criminal_History_Evaluation-FAQs/.

2. Provide one of the following primary ID documents: passport, driver's license, state or providence ID cards, a national ID card, or military ID card to take the TExES exams (additional information available at www.texas.ets.org/registrationBulletin/ <<http://www.texas.ets.org/registrationBulletin/>>). YOU must provide legal documentation to be allowed to take these mandated examinations that are related to certification/licensing requirements in Texas. If you do not have legal documentation, you may want to reconsider your major while at SFASU.
3. Successfully complete state mandated a fingerprint background check. If you have a history of criminal activity, you may want to reconsider your major while at SFASU.

For further information concerning this matter, contact Katie Snyder Martin at 936-468-1740 or snyderke1@sfasu.edu.

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.