

*PVAMU Course Syllabus*

## **Educational Statistics**

**Department of Educational Leadership & College of Education  
Counseling**

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**Office Hours:** **M 1 - 2; T 10 – 11; W 9 – 12 , 1 – 2; R 9 – 12**

**Course Location:** **NW Center**

**Class Meeting Days & Times:** **Monday 5:30**

**Course**

**ADMN 5093**

**Abbreviation and Number:**

**Catalog**

**Description:**

Basic educational statistics course for master's degree candidates in counseling. Includes concepts and operations as applied to frequency distributions, graphing techniques, measurement of central tendency and variability, normal distribution curves, sampling theory and tests of significant differences between related and independent samples. Computer application packages and their utilization in classrooms and social agencies are also introduced.

**Required Text:** Spatz, Chris (2008) *Basic Statistics: tales of distributions*. (9th ed). Belmont, CA. Wadworth/Thompson Learning. ISBN-10: 0495383937 | ISBN-13: 9780495383932

You will also need a calculator capable of computing squares and square roots. You **SHOULD** bring your calculator to EVERY class meeting.

**Access to  
Learning  
Resources:**

PVAMU Library:  
phone: (936) 261-1500;  
web: <http://www.tamu.edu/pvamu/library/>  
University Bookstore:  
phone: (936) 261-1990;  
web: <https://www.bkstr.com/Home/10001-10734-1?demoKey=d>

This course is in part based on the "E-FOLD-P" model of the College of Education. The acronym refers to the preparation of educators as facilitators of learning for diverse populations.

The major goals of this model are

1. To prepare professionals as problem solvers, critical thinkers, and decision makers who are able to communicate these skills to others.
2. To prepare professionals as facilitators of growth and development who exhibit a positive self-esteem and self-concept and are able to transmit these effective components to others.
3. To prepare professionals as reflective and continual learners who initiate and distribute knowledge and skills and utilize effective teaching practice
4. To prepare professionals who understand and appreciate human diversity and demonstrate global awareness.

**Course Goals or Overview:**

The goals of this course are to

1. Explain, calculate and interpret descriptive statistics including: basic terminology, scales, notation, frequency distributions, measures of central tendency, measures of dispersion, and the normal distribution..
2. Read and analyze basic charts and graphs, contingency tables based on computerized data results.
3. Explain, calculate, and interpret inferential statistics including probability and hypothesis tests.
4. Identify and apply the correct statistical techniques for specific research questions.

**Course Objectives**

At the end of this course, the student will be able to

1. Discriminate between: descriptive statistics and inferential statistics; populations and parameters, samples and statistics.
2. Use standard summation notation.

3. Construct and utilize grouped and ungrouped frequency distribution tables, histograms.
4. Identify distributions' shapes (skewness, modality).
5. Discriminate between random and nonrandom sampling procedures.
6. Summarize the differences among nominal, ordinal, interval, and ratio scales of measurement.
7. Discuss the relationship between scale of measurement and choice of inferential statistic.
8. Discriminate between discrete and continuous variables.
9. Given an example of psychological research, identify independent, dependent, and extraneous variables.
10. Compute mean, median, mode, range, interquartile range, and standard deviation.
11. Use SPSS in performing statistical computations.
12. Compute and utilize percentiles and percentile ranks.
13. Compare and contrast three different measures of central tendency and three measures of variability.
14. Compute and utilize  $z$ -scores and other standard scores.
15. Use the normal curve table to obtain areas under the curve given values of  $z$  and vice versa.
16. Describe how one would empirically construct the sampling distribution of a specified statistic (mean, median, mode, difference between means, etc.).
17. Explain the logic used in hypothesis testing, referring to null and alternative hypotheses, sampling distributions, critical values, rejection and nonrejection regions, alpha, exact significance level ( $p$ ), and test statistics.
18. Define Type I and Type II errors, alpha, beta, and power. Succinctly define  $p$ , the exact significance level, and state the decision rule that compares  $p$  to alpha and decides whether or not to reject a null hypothesis.
19. Produce, utilize, and discriminate between directional and nondirectional hypotheses, and one- and two-tailed probabilities.
20. Describe the sampling distribution used to test hypotheses about means when the population variance is unknown. Referring to the distribution of sample variances, explain why the sampling distribution used to test hypotheses about means when population variance is unknown is different from a normal curve and how it is different from a normal curve.
21. Give a simple example explaining the concept of degrees of freedom.
22. Explain how to construct a 95% confidence interval for some parameter. Explain what "95% confidence" means.
23. Define and give (or recognize) examples of independent samples designs vs. correlated samples designs (within subjects or repeated measures and matched pairs or randomized blocks). Be able to choose and compute the inferential statistic appropriate for a particular design.
24. List and explain the assumptions of the independent  $t$ -test.
25. Construct and interpret bivariate scatter plots.
26. Explain the utility of the coefficient of determination.
27. Describe the assumptions involved in testing null hypotheses about bivariate regression coefficients.
28. Describe the possible effects of **a**) range restriction and **b**) extraneous variance upon the value of  $r$ .

29. Discuss the relationships among the independent  $t$ -test, the product moment correlation coefficient, and the point-biserial correlation coefficient.
30. Discuss the relationships between the product moment correlation coefficient and the chi-square analysis of 2 X 2 contingency tables.
31. Compute Pearson and Spearman Rank-order correlation coefficients.
32. State null and alternative hypotheses used in analyses of variance.
33. Given sample variance, sample mean, and sample size for each of  $k$  groups, with sample size constant across groups, compute treatment and error mean squares for a one-way independent samples ANOVA.
34. Given a set of not more than 20 scores, integers ranging from 1 to 10, divided equally into 2 to 4 one-way groups with integer means, compute by hand an independent sample ANOVA on these scores, presenting the results in a standard source table.
35. Describe the assumptions of a one-way independent sample ANOVA, comment on the violations of one or more of these assumptions, and discuss methods of correcting for violation of assumptions.
36. Give examples of how chi-square can be used to: a) test null hypotheses about variance, b) do a goodness of fit test, and c) do contingency table analyses OR, given one of these research situations, prescribe the appropriate analysis.
37. Identify two inferential statistics that use one-tailed tests of nondirectional hypotheses and explain why they do so.
38. Discuss the differences between parametric and nonparametric inferential procedures. Contrast the hypotheses they test and the assumptions they make.
39. Given a hypothetical research example with data, choose and conduct an appropriate statistical analysis. Interpret the results. Be able to compute any of the statistics mentioned in this document or in the textbook. Be able to interpret and critique published research reports using these statistics.

## Course Evaluation Methods

This course will utilize the following instruments to determine student grades:

**Exams** – written tests(multiple choice and problems) designed to measure knowledge of presented course material

A suggested way to study the material is to read the text before coming to class, listen carefully in class, follow along with the problems, take notes, reread carefully the text at home, follow the examples and answer all provided study questions.

## Grading Matrix

Instrument	Value (points or percentages)	Total
Exams	3 exams at 100 points each	300
<b>Total:</b>		<b>300</b>

### Grade Determination:

A = 285 pts or higher;

B = 255 – 284pts;

C = 225 – 254pts;

D = 195 – 224pts;

F = 195 pts or below

### Exam Policy

Exams should be taken as scheduled. No makeup examinations will be allowed except under documented emergencies (See Student Handbook). **Such an exam must be completed prior to the next class meeting and in my office during scheduled office hours. The format for a makeup exam may change.**

### *TENTATIVE WEEKLY SCHEDULE*

Date	Topic	Chapter
Week 1	Introduction	1
Week 2	Data Organization, Graphs	2
Week 3	Central Tendency, Variability	3
Week 4	Exam 1	1 – 3
Week 5	Z-scores, Correlation	4, 5
Week 6	Correlation	5
Week 7	Normal Distribution	6
Week 8	Exam 2	4 – 6
Week 9	Samples, Sampling Distribution	7
Week 10	Hypothesis Testing – One Sample Design	8
Week 11	Hypothesis Testing – Two Sample Design	9
Week 12	Chi Square	13
Week 13	ANOVA	10
Week 14	ANOVA	10
Week 15	Exam3	7,8, 9, 10, 13

### TRUE OUTCOMES

TrueOutcomes is a tool that Prairie View A&M University uses for assessment purposes. At least one of your assignments will be considered an "artifact" (an item of coursework that serves as evidence that course objectives are met) and will be loaded into both WebCT and TrueOutcomes.

The assignment(s) to be used as TrueOutcomes artifacts will be identified by your instructor.

Students are required to complete an electronic portfolio (e-portfolio) in order to complete their program. This document can be used for future employment and/or educational endeavors. More information will be provided during the semester, but for general information, you can visit the TrueOutcomes web site at: [www.trueoutcomes.net](http://www.trueoutcomes.net).”

Departmental Web Page

<http://elac.pvamu.edu>

## **SUPPORT MATERIALS**

In support of your efforts to master statistics and SPSS, the labs on campus and at the NW Campus provide SPSS on the computers. Additionally, a list of statistics help URLs are provided on the website for this course.

### **Getting Started with SPSS for Windows    by John Samuel**

<http://core.ecu.edu/psyc/wuenschk/SPSS.htm>

### **Introduction and Univariate Descriptive Statistics**

<http://stat.tamu.edu/stat30x/notes/node4.html>

Descriptive Statistics

<http://onlinestatbook.com/>

Electronic Reference Formats Recommended by the American Psychological Association

<http://www.apastyle.org/electref.html>

Text Publisher Support Page \*\*

<http://psychology.wadsworth.com>

Class material page

**WEBCT**

Class notes, practice quiz, lecture (audio), etc

Deadline Dates (Check registrar's calendar to confirm dates)

January 30	Courses dropped for non-payment; Last day to withdraw from course(s) without record
January 31	Withdrawal from courses with record ("W") Begins
February 2	Deadline to apply for a Masters Degree for Spring 2008 graduation
February 4-9	Late graduation application deadline for Spring 2008
March 31	Withdraw from Course(s) with record ("W") Ends
April 29	Last Day to Withdraw from the University (From All Courses) for the Spring. 2008 semester

## **University Rules and Procedures**

### **Disability statement (See Student Handbook):**

Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a

student requesting special accommodations must provide documentation of their disability to the SSD coordinator, Ms. Belinda Lewis, Evans Room 217, ph 936-261- 3581.

**Academic misconduct (See Student Handbook):**

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

**Forms of academic dishonesty:**

1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.
2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.
3. Fabrication: use of invented information or falsified research.
4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.

**Nonacademic misconduct (See Student Handbook)**

The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

**Sexual misconduct (See Student Handbook):**

Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

**Attendance Policy:**

Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class.

### **Student Academic Appeals Process**

Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

### **Technical Considerations for Web-Enhanced Courses**

#### **Minimum Hardware and Software Requirements:**

- Pentium with Windows XP or PowerMac with OS 9
- 56K modem or network access
- Internet provider with SLIP or PPP
- 8X or greater CD-ROM
- 64MB RAM
- Hard drive with 40MB available space
- 15" monitor, 800x600, color or 16 bit
- Sound card w/speakers
- Keyboard & mouse
- Netscape Communicator ver. 4.61 or Microsoft Internet Explorer ver. 5.0 /plug-ins
- Participants should have a basic proficiency of the following computer skills:
  - Sending and receiving email
  - A working knowledge of the Internet
  - Proficiency in the Acrobat PDF Reader
  - Basic knowledge of Windows or Mac O.S.

**Technical Support:** Students should call the Prairie View A&M University Helpdesk at 936-261-2525 for technical issues with accessing webct. The helpdesk is available 24 hours a day/7 days a week. For other technical questions, call the Office of Distance Learning at 936-261-3290 or 936-261-3282

You can send email anytime that is convenient to you, but I check my email messages continuously during the day throughout the work-week (Monday through Friday). I will respond to email messages during the work-week by the close of business (5:00 pm) on the day following **my receipt** of them. Emails that I receive on Friday will be responded to by the close of business on the following Monday.



