SYLLABUS: STATISTICAL METHODS
PSYCHOLOGY 1303, FALL 2015 (CRN 13900)

Meetings: Mondays & Wednesdays, 1:30-2:50 p.m.
College of Business Administration, Room 304

Instructor: Dr. James Wood,   Psychology Building, Room 203
Phone: 747-6570   E-mail: jawood@utep.edu
Office Hours: Mondays & Wednesdays 7:15-8:45 a.m. or by appointment

Text: David Freedman, Robert Pisani, and Roger Purves (2007). *Statistics* (4th edition).
New York: W. W. Norton & Company (ISBN-13: 978-0-393-92972-0. ISBN-10: 0-393-92972-8)

Calculator: Students must purchase a simple, inexpensive calculator for use during quizzes
and exams. What is a "simple" calculator? It must perform addition, subtraction,
multiplication, division, square roots, and squares, BUT it can *not* include a
"memory" or "statistical" function. If you have a question whether your calculator
is "simple" enough, show it to the instructor before the first quiz.

Readings and Homework (must be <u>completed</u> before class on dates listed below)
(Note: Class meets *every* Monday and Wednesday, not just on the dates listed below)

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Wednesday, Sept. 2        Freedman et al. Chapter 3. The Histogram (pages 31-56)

                          Homework:
                          Exercise Set A (pp. 33-34)      1, 2, 3, 4, 5, 6, 7
                          Exercise Set B (p. 38)          1, 2, 3, 4
                          Exercise Set C (pp. 41-42)      1, 2, 3, 4
                          Exercise Set D (p. 44)          1, 2
                          Review Exercises (pp. 50-55)    1, 2, 4, 5, 7, 9


Wednesday, Sept. 9        Freedman et al. Chapter 4. The Average and the
                          Standard Deviation (pages 57-77)

                          Homework:
                          Exercise Set A (pp. 60-61)      1, 2, 3, 8, 9
                          Exercise Set B (p. 65)          1, 2, 3, 4, 5, 6
                          Exercise Set C (p. 67)          1, 2, 3, 6
                          Exercise Set D (pp. 70-71)      1, 2, 3, 4, 5, 6, 9, 10
                          Exercise Set E (pp. 72-73)      1, 2, 3, 5, 6, 8, 9,
                                                          10, 11
                          Review Exercises (pp. 74-76)    1, 3, 5, 6, 8
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Wednesday, Sept. 16     Freedman et al. Chapter 5. The Normal
                        Approximation for Data (pp. 78-96)

                        Homework:
                        Exercise Set A (p. 82)         1, 2
                        Exercise Set B (pp. 84-85)     1, 2, 3, 4(a),
                                                       5(a), 5(b)
                        Exercise Set C (p. 88)         1, 2, 3
                        Exercise Set D (pp. 89-90)     1, 2, 3, 4
                        Exercise Set E (p. 92)         1, 2
                        (Read Section 6, but don't do Exercise Set F)
                        Review Exercises  (pp. 93-95) 1, 2, 4, 5, 7, 8


Monday, Sept. 21   FIRST MIDTERM EXAMINATION.


Wednesday, Sept. 23     Note: There are two readings for today.

                        Reading A: Freedman et al., Chapter 6. Measurement
                        Error (pp. 97-105)

                        Homework:
                        Review Exercises (pp. 104-105) 1, 2, 3, 4

                        Reading B: Freedman et al., Chapter 7. Plotting
                        Points and Lines (pp. 110-116)
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                        Homework:
                        Exercise Set A (p. 111)        1, 2, 3
                        Exercise Set B (p. 112)        1, 2, 3, 4, 5, 6
                        Exercise Set C (p. 114)        1
                        Exercise Set D (p. 115)        1, 2, 3, 4, 5, 6
                        Exercise Set E (p. 116)        1, 2, 3, 4, 5, 6


Wednesday, Sept. 30     Note: There are two readings for today.

                        Reading A: Freedman et al., Chapter 8.
                        Correlation (pp. 119-140)

                        Homework:
                        Exercise Set A (p. 122)        1, 2, 3, 4, 5, 6
                        Exercise Set B (p. 128)        1, 2, 4, 6, 7, 9
                        Exercise Set C (p. 131)        1, 2, 3, 4
                        Exercise Set D (p. 134)        1, 2, 3, 4
                        Review Exercises (p. 134)      1, 3, 7, 8, 9

                        Reading B: Freedman et al. Chapter 9.  More about
                        correlation. Sections 1 & 2 only (pp. 141-146)

                        Homework:
                        Exercise Set A (p. 143)        1, 2, 3, 4, 5, 6, 10
                        Exercise Set B (p. 146)        3, 4
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Wednesday, Oct. 7   Freedman et al., *Chapter 10. Regression.*
Sections 1, 2, 3, 5, and Summary (skip section 4)
(pp. 158-169, 174-179)

Homework:
Exercise Set A (p. 161)   1, 2, 4
Exercise Set B (p. 163)   1, 2, 3
Exercise Set C (p. 167)   1, 2, 3
Exercise Set E (p. 175)   1, 2, 3
Review Exercises (pp. 176-178) 1, 2, 3, 5, 6, 9, 10

Wednesday, Oct. 14   Note: There are two readings for today.

Reading A: Freedman et al., *Chapter 11. R.M.S. Error for Regression.* Sections 1-4 and Summary.
(pp. 180-195,201).   Skip section 5.

Homework:
Exercise Set A (p. 184)   1, 2, 3, 4, 5, 6, 7, 8
Exercise Set B (p. 187)   1, 2(a), 2(b), 3
Exercise Set C (p. 189)   1, 2, 3
Exercise Set D (p. 193)   1, 2, 3, 4, 5(a), 5(b),
                                   5(c), 5(d), 7
Review Exercises (p. 198)   1, 3

Reading B: Freedman et al.,
Chapter 12. The Regression Line. Sections 1 and 2
(pages 202-211). Skip section 3.

Homework:
Exercise Set A (p. 207)   1, 2, 3, 4
Exercise Set B (p. 210)   1, 2
Review Exercises (pp. 213-214) 1, 2, 4

Wednesday, Oct. 21   SECOND MIDTERM EXAMINATION

Wednesday, Oct. 28   Note: There are two readings for today.

Reading A: Freedman et al., *Chapter 13. What Are the Chances?* Sections 1 & 2 only (pp. 221-227)

Homework:
Exercise Set A (p. 225)   1, 2, 3, 4
Exercise Set B (p. 227)   1, 2, 3, 4

Reading B: Freedman et al., *Chapter 16. The Law of Averages.* Section 1 only. (pp. 273-277)

Homework:

Exercise Set (pp. 277-278)   1, 2, 3, 6, 7, 8

Wednesday, Nov. 4	*Sampling, Surveys, and Political Polls.* This reading and accompanying homework problems are posted on Blackboard.
Wednesday, Nov. 11	*Confidence Intervals.* This reading and accompanying homework problems are posted on Blackboard.
Wednesday, Nov. 18	*Null Hypothesis Testing and the Two-Group t-Test.* This reading and accompanying homework problems will be posted on Blackboard by November 11.
Monday, Nov. 30	*Effect sizes (d). Type I and Type II error. Statistical Power.* This reading and accompanying homework problems will be posted on Blackboard by November 18.
Wednesday, Dec. 2	Last day of class. Preview of Final Exam.
Wednesday, December 9	Final from 4:00 p.m. to 6:00 p.m. in College of Business Administration, Room 304

Course Objectives:

Students will be able to:
1. Create and interpret histograms.
2. Explain the meaning of the mean and standard deviation, estimate them from a histogram, scatter plot, or bar and whisker graph, and calculate them by hand.
3. Identify the main features of the normal curve, state the areas lying within 1, 2 and 3 standard deviations of the mean, convert raw variable scores into z-scores and their percentile equivalents, and convert percentiles into z-scores.
4. Interpret correlation coefficients, calculate them by hand, and estimate them from scatter plots.
5. Interpret scatter plots and explain their relationship to the correlation coefficient
6. Interpret regression equations, calculate them by hand, and draw them (approximately) on scatter plots.
7. Explain the principle of least squares and its relationship to the regression line.
8. Explain and estimate the root mean square error of the regression line at a particular point.
9. State and explain the law of averages.
10. Explain the meaning of sampling error, and confidence intervals.
11. Explain how a sampling distribution is derived, and how it differs from a sample distribution or population distribution.
12. Explain the expected value of the mean and the standard error of the mean, and estimate their value from the standard deviation of a sample.
13. Explain the expected value of the proportion and the standard error of the proportion, and estimate their value from the standard deviation of a sample.
14. Construct a 95% and 99% Confidence interval for the population mean, based on information from a sample.
15. Construct a 95% and 99% Confidence interval for the population proportion, based on information from a sample.
16. Explain the purpose and main principles of hypothesis testing, including; the null hypothesis, the alternative hypothesis, Type I error, p values, and Type II error, and statistical power
17. Explain the sampling distribution of the difference between two means, the expected value of the difference, and the standard error of the difference, and use estimates of them to perform a t-test.

Course Requirements & Grading

1. Readings. Most readings are from the textbook *Statistics* by Freedman and his colleagues. The last four readings for the course are not in this textbook, but instead will be posted as pdf files on Blackboard at least one week before they are assigned.

For the Freedman book: (a) You need the 4th edition -- earlier editions will not be adequate for the present course. (b) On Amazon.com, you can buy the 4th edition ***new*** for about $110.00, or you can buy it ***used*** for about $70, or you can ***rent*** it for about $30. Any of these options will work fine -- but one idea is this: Rent the 4th edition for $30 this semester. Then at the end of the semester, if you decide you want a permanent copy of the book, you can then buy an *old* edition (2nd or 3rd edition) for a lot less money.

2. Quizzes. There will be a quiz on every day that a reading assignment is due, as listed in this syllabus. Because there are 12 reading assignments, this means there will be **12 quizzes**. You may miss or drop three of these. Each of the remaining nine quizzes will count for 5% of your grade. In other words, the quizzes all together count for 45% of your total grade. There are no make-ups of any kind for quizzes.

The first quiz will be Wednesday, September 2, which is very early in the semester. Be sure to obtain a copy of the textbook right away and do the first readings and homework by September 2.

> Students who arrive more than five minutes after the beginning of a quiz (a) will not be allowed to take it, and (b) will be considered to have missed the quiz.

3. Midterm Exams. There will be **two midterm exams** during the regular class time. The first midterm will be September 21 and will cover everything in the readings and lectures up until that date. The second midterm will be October 21 and will cover everything in the readings and lectures after the first midterm and up until the date of the second midterm. The first midterm will count for 15% of your grade, and the second midterm will count for 20% of your grade.

4. Final Exam. There will be a **final exam** on Wednesday, December 9, from 4:00 p.m. to 6:00 p.m. It will cover everything in the course. In other words, it is *cumulative*. It will count for 20% of your grade.

> Students who arrive more than ten minutes after the beginning of a midterm or the final will not be allowed to take the test and will be considered to have missed it.

You will be able to access your **final grade** for this course electronically, via the Goldmine System, Touchtone Telephone, and/or UTEP student e-mails, probably around December 20. If you want to know your grade before that, send an e-mail to the instructor during the last week of classes or finals week, and the instructor will e-mail your grade to you early, after your grade on the final exam is calculated.

5. Calculation of Grades for Each Quiz, Midterm, and the Final. Grades for each quiz, midterm, and final will be calculated as follows:

    (a) The top five raw grades in the class will be averaged to yield a "Top Five Average"

    (b) Each student's raw grade will then be calculated as a proportion of the Top Five Average.

    (c) For example, assume that the top five raw grades for Quiz 1 are 12, 13, 14, 12 and 14 correct, and that Josephine's grade is 11.

      In this example, the Top Five Average for Quiz 1 is $(12 + 13 + 14 + 12 + 14) / 5 = 13$.

      In this example, Josephine's grade for Quiz 1 is $11/13 = .846$

6. Weight of Quiz and Exam Grades:

Quizzes (best 9 out of 12)	45%
Midterm Exam 1	15%
Midterm Exam 2	20%
Final Exam	20%

7. Grade Scale for Course Grade

90% or higher	A
80% or higher, but lower than 90%	B
70% or higher, but lower than 80%	C
60% or higher, but lower than 70%	D
lower than 60%	F

8. Make-ups for Midterms and Final. There are no **make-up exams** for midterms or the final without prior arrangement. If you will miss a midterm or the final, you must make arrangements BEFORE it is given. The time and date for make-up exams will be scheduled at the instructor's convenience. A make-up for a midterm must be taken within one week before or after the scheduled date for that midterm. A make-up for the final must be taken within two weeks *before* the scheduled date for the final. Failure to take a make-up exam within these limits will result in a failing grade for that test.

9. Homework. Homework problems are assigned for eeach of the 12 readings in the class, as listed in the syllabus. It is highly important that you complete all these homework problems before the day that the reading is due, as explained in the next section. However, these homework problems will not be handed in or graded, and they will not be used in computing your course grade.

10. Relationship Between Quizzes and Homework. The quiz for each reading will consist mainly of the homework questions that were assigned for that reading. In addition, some of the questions will be slightly changed versions of the homework questions or questions based on material presented in recent lectures.

If you want to do well on the quizzes, you should (a) do all the assigned readings and the associated homework problems and (b) attend the lectures and take notes. Quiz questions may be based on points that have been covered in the readings or homework but not in class. Similarly, a few quiz questions may be based on points covered in class, but not in the readings or homework.

11. Extra credit for Excel exercises. Five exercises will be offered that are intended to improve your ability to use Excel for basic statistical tasks. These exercises are not required for the class. However, you can earn extra credit if you perform these exercises correctly and submit your work within the time limits specified by the instructor. Specifically, you can increase your course grade by 1% for each correctly performed Excel exercise that you submit within the specified time period. So as an example, let us say that Josephine's grade for the course, based on Quizzes and exams, is 87%. If Josephine correctly performs all five Excel exercises and submits them on time, she can raise her grade to 92%.

More details about this Extra Credit Option will be provided by the instructor as the semester proceeds.

Except for the Excel exercises, there are no other opportunities for "extra credit" in this class.

12. Contacting the Instructor. If you want to get in touch with me or set an appointment, the best way is to send me an e-mail at **jawood@utep.edu** (please don't use Blackboard to send me messages). You are also welcome to drop by during my office hours.

13. Blackboard for this course will contain readings for this class and listings of the homework assignments. Be sure to visit Blackboard for this class regularly.

14. Information for Students With Disabilities. If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass