

BER 345, Educational Statistics
Spring, 2006

Department of Educational Studies in Psychology, Research Methodology, and Counseling
Program: Educational Research
Credit Hours: 3
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CATALOGUE DESCRIPTION:

Statistical methods in education; graphs, charts, frequency distributions, central tendencies, dispersion, correlation, sampling errors, estimation, and hypothesis testing. Prerequisite: MATH 100 or higher-numbered mathematics course.

CONCEPTUAL FRAMEWORK:

Preparation of Professionals as Reflective Practitioners and Ethical Decision Makers: Experiences in academic programs are devoted to developing individuals' understanding of *knowledge construction, learning, pedagogy, and responsible professional practice in the contexts of education*. The University of Alabama's College of Education seeks to prepare professionals who value and demonstrate *reflective practice and ethical decision making through respecting diversity, honoring difference, and promoting social justice*.

KNOWLEDGE BASE

BER 345 will address knowledge construction and reflective practice. Responsible professional practice, ethical decision making, and respecting diversity will be discussed as necessary practices when conducting research.

OBJECTIVES:

1. The student will be able to demonstrate knowledge of statistical terms.
2. The student will be able to differentiate between descriptive and inferential statistics.
3. The student will be able to identify types of data.
4. The student will be able to identify types of variables.
5. The student will be able to identify the measurement level for each variable.
6. The student will be able to identify the four basic sampling techniques.
7. The student will be able to organize data using frequency distributions.
8. The student will be able to represent data in frequency distributions graphically using histograms, frequency polygons, and ogives.
9. The student will be able to summarize data using the measures of central tendency, such as the mean, median, and mode.
10. The student will be able to summarize data using the measures of variation, such as the

- range, variance, and standard deviation.
11. The student will be able to identify distributions as symmetrical or skewed.
 12. The student will be able to interpret the Central Limit Theorem.
 13. The student will be able to find the probability of compound events using the addition rule.
 14. The student will be able to find the probability of compound events using the multiplication rule.
 15. The student will be able to construct a probability distribution for a random variable.
 16. The students will be able to find the mean, variance, and expected value for a discrete random variable.
 17. The student will be able to find the probability for X successes in n trials of a binomial experiment.
 18. The student will be able to find the probabilities for outcomes of variables using the hypergeometric distributions.
 19. The student will be able to find the area under the standard normal distribution, given various z values.
 20. The student will be able to identify the position of a data value in a data set using percentiles.
 21. The student will be able to find probabilities for a normally distributed variable by transforming it into a standard normal variable.
 22. The students will be able to find the confidence interval for the mean when σ is unknown and $n > 30$.
 23. The student will be able to identify Type I and Type II errors.
 24. The student will be able to interpret the level of significance.
 25. The student will be able to state the null and alternative hypotheses.
 26. The student will know the steps in testing hypotheses about the μ .
 27. The student will be able to test inferences about a single mean.
 28. The student will be able to test inferences about two independent samples using t .
 29. The student will be able to test inferences about two dependent samples using t .
 30. The student will be able to test proportions using the z test.
 31. The student will be able to test the difference between two proportions.
 32. The student will be able to test a distribution for goodness of fit using chi-square.
 33. The student will be able to test two variables for independence using chi-square.
 34. The student will be able to draw a scatter plot for a set of ordered pairs.
 35. The student will be able to find the correlation coefficient.
 36. The student will be able to interpret the correlation coefficient.
 37. The student will be able to find the equation of the regression line.
 38. The student will be able to find the coefficient of determination.
 39. The student will be able to use SPSS® for certain statistical procedures.

COURSE METHODS

Lectures will be conducted using the whiteboard, overhead, and PowerPoint presentations. Students will have hands on work in the computer lab on SPSS® as well as hands on work using a scientific calculator.

ATTENDANCE:

Classroom attendance is strongly recommended since the tests will be drawn from classroom lectures. Not all material discussed in class is in the textbook. Also, your assignments will involve using SPSS® on a pc, which will be demonstrated in class. I reserve the computer lab at various times during the semester in order to give the instruction. At that time, the student is able to complete the assignment in class. I do not give makeup lab sessions. Nor do I give individualized computer instruction if you miss class or cut the lab session. Three or more absences will result in a 10 point penalty on your final grade. Class points will be assigned at the discretion of the instructor. These points may include in class assignments, pop quizzes, participation, etc. These points CANNOT be made up. If you are not in class when class points are assigned, then you will not receive the points. If you are late to class, leave early, or miss a class **get the notes from someone in the class**. ASSIGNMENTS ARE TO BE TURNED IN ON TIME! **I WILL NOT ACCEPT LATE ASSIGNMENTS**. Doctor's excuses or other excuses will not be accepted as assignments are assigned and explained at least two weeks before they are due. Please do not ask. I will drop the lowest assignment grade, therefore if you fail to turn in an assignment it will be considered the drop grade. Failure to turn in more than 1 assignment will result in a zero for each assignment not turned in. If you are not going to be in class, assignments can be placed in my mailbox in room 306 Carmichael, shoved under my office door, brought to class by another student, or e-mailed. I must receive the assignment prior to class in order to receive credit. **WARNING!!! POWER FAILURES, COMPUTER CRASHES, AND COMPUTER VIRUSES ARE NOT ACCEPTABLE EXCUSES FOR FAILING TO TURN IN AN ASSIGNMENT**. There are several computer labs available on campus for your use. If you miss test 1 or test 2 you will take a comprehensive final. The grade made on the comprehensive final will be the grade for the missed test and test 3. Since the comprehensive final is not the same test taken by the other students, any possible extra points added to the missed test and/or test 3 will not apply. Failure to take test 3 at the scheduled time will result in an "I" for the semester. A makeup test will be given at the convenience of the professor. If you miss both test 1 and test 2, you will receive a zero for one of the tests. The comprehensive final will only replace test 1 or test 2. I do not reschedule tests. Please make your plans accordingly. If there are conflicts, the above rules apply.

UNIVERSITY POLICIES

Academic Misconduct:

Academic misconduct by students includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student commit an act of academic dishonesty. The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct. Please refer to <http://registrar.ua.edu/policies/> for the revised *Codes of Conduct*.

Equal Treatment:

The instructor and students in this course will act with integrity and strive to engage in equitable verbal and non-verbal behavior with respect to differences arising from age, gender, race, physical ability, and religious preferences.

Reasonable Accommodations:

To request disability accommodations, please contact the Office of Disability Services at 348-4285. It is located at 220 Research Drive, Box 870185. After initial arrangements are made with that office, please contact me for any course accommodations that may be necessary. It will be necessary to provide me with written notification from the Office of Disability Services.

Students in need of reasonable accommodations relative to class attendance or arrival, course requirements, or related aspects of performance are to initiate such requests with the instructor prior to their anticipated need. Such requests will be accommodated within constraints of fairness and timeliness with regard for all other students enrolled for the course.

Plagiarism:

Plagiarism is the act of representing the words, data, works, ideas, computer program or output, or anything not generated by the student as his or her own. Plagiarism may be inadvertent or purposeful; however, plagiarism is not a question of intent. All suspected incidences of plagiarism must be reported by the course instructor to the Assistant Dean. Plagiarism is considered a serious act of academic misconduct and may result in a student receiving an F in the course and being suspended from The University. For more information, see <http://facultysenate.ua.edu/handbook/append-c.html>

REQUIRED TEXT:

Bluman, A. G. (2007). *Elementary statistics: A step by step approach* (6th ed). Boston: McGraw-Hill.

CALCULATOR:

You will need a scientific calculator that does mean, standard deviation, and correlation. The recommended calculators are TI-34II, TI-30X II S, TI-30X II B. I will not spend class time giving instruction for other calculators. These calculators are relatively inexpensive. The price ranges from \$15 to \$20.

WebCT

Copies of the syllabus, handouts, and PowerPoint presentations can be downloaded from WebCT. It is your responsibility to have the information in class. I will also use WebCT for communication purposes (e-mail). I suggest checking you e-mail, daily. Failure to check e-mail is not a valid excuse for missed messages.

COURSE REQUIREMENTS:

Three tests will be given. The final exam will be test 3, it will not be comprehensive. The tests can be either free response, multiple choice, or both. There will be several short assignments

given. **No late assignments will be accepted.** You may give the assignment to someone in class to bring or fax the assignment if you are not going to be in class.

EVALUATION PROCEDURE:

Test 1	100 points
Test 2	100 points
Test 3	100 points
Class Points	25 points
Assignments 5 @ 30 points each	<u>150 points</u>
Total	475 points

450 - 436	A+	372 - 360	B-	300 - 283	D
435 - 418	A	359 - 346	C+	382 - 270	D-
417 - 405	A-	345 - 328	C	below 270	F
404 - 391	B+	327 - 315	C-		
390 - 373	B	314 - 301	D+		

GRADES

All grades are final. If you fail to answer questions on the tests or on the assignments or do not turn in part of an assignment you will not be given a chance to redo. Also, remember failing to turn in an assignment is a zero for that assignment. The semester grade is FINAL. There will be no changes in grades except for cases of error in recording the grade and/or a mistake in grading on my part. Please do not ask to redo an assignment or ask for extra credit assignments in order to elevate a grade.

Date	Course Outline Topics and Homework	Chapters
Jan 17	Introduction, terms, frequency distributions, graphs Homework: page 27, nos. 7-9, 12; page 44, nos. 11, 13; page 59, no. 10	1, 2
Jan 24	Central tendency, variation, percentiles Homework: pages 163-164, nos. 1(omit d), 4,5,12 Computer Lab	3
Jan 31	Correlation and Regression Homework: page 577, nos. 1, 2, eliminate c for each also determine r^2 and write an explanation for r^2 Computer Lab	10
Feb 7	Review for test ASSIGNMENT 1 DUE	

Feb 14	Test 1	
Feb 21	Probability Homework: Review exercises on pages 229-230, 1-16 odd, 19, 23, 25-41 odd, omit 39 ASSIGNMENT 2 DUE	4
Feb 28	Probability and Binomial Distributions Homework: pages 279 - 280; nos. 6,8,9,14,16,18,22, 29,30,31	5
Mar 7	Normal Distribution Homework: pages 339-340; nos. 2,4,6,7,9,11, page 331; nos. 23-24 ASSIGNMENT 3 DUE	6
Mar 14	Review for test	
Mar 28	Test 2 ASSIGNMENT 4 DUE	
Apr 4	Confidence intervals and sample size Homework: pages 387-388: nos. 12-23	7
Apr 11	One Sample Hypothesis Testing Homework: page 426-427: nos. 5-10 page 434: nos. 5, 7-9	8
Apr 18	Two Sample Hypothesis Testing Homework: Pages 492-493; nos. 2-3; page 506; nos. 2-3; page 514-515; nos. 3,4,6 Computer lab	9
Apr 25	Chi-Square Homework: page 593; nos. 5-6; pages 606-607; nos. 8, 16, 18 ASSIGNMENT 5 DUE Computer lab	11
May 2	Catch up and Review ASSIGNMENT 6 DUE	
May 9 7:00 - 9:30 PM	Test 3	

