AUBURN UNIVERSITY
Department of Educational Foundations, Leadership, and Technology
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Office Hours: Tues. 3:00 p.m. – 4:00 p.m.
Other times by appointment

1.   **Course Number and Title:** ERMA 7300 Educational Design and Analysis I

        Credit: 3 Semester Hours (Lecture 3)

        Prerequisites: ERMA 7200 or Departmental Approval

2.   **Date:**   August 2012

3.   **Required Manual:** Green & Salkind, N. (2011). Using SPSS for Windows and
        Macintosh: Analyzing and Understanding Data (6th ed.). NY: Prentice Hall.

        Recommended: (a) Calculator with basic algebraic functions and
        (b) mechanical pencil that takes 0.9mm or 0.7mm size lead. Use black color lead
        and HB or B hardness.

4.   **Course Description:**

The focus of this course is on the concepts, procedures, applications, interpretations, and
reporting of basic and practical statistical procedures related to educational problems.
Specifically, the course covers an introduction to SPSS, applications of basic descriptive
and inferential statistics and their applications to education. Content includes sampling,
reliability and validity, and hypothesis testing. Statistical procedures include inferences
using the t-tests, one-way and two-way analysis of variance F-test, and one-way repeated-
measures analysis of variance. In addition, the course is designed to assist students in
applying theory and applications to practical situations, so that they may begin to develop
and apply their own critical thinking and decision-making skills as future professional
educators. The content for this course is planned to provide successful experiences which
lead to development of basic and practical knowledge and skills in using SPSS to perform
statistical procedures to investigate educational problems.

Objectives, Content, Student Activities, and Student Evaluation

5.   Course Objectives:

The following objectives are designed to develop students' competence in knowledge, applications, and interpretations of basic and practical statistical procedures to educational problems. We will cover the following topics as time permits.

A. Use research and statistical terminology appropriately and accurately

B. Demonstrate knowledge of the following subject matter:

   a. Basic algebraic symbols and mathematical and measurement concepts
   b. Descriptive statistics
   c. Research problems, variables, and measurement scales
   d. Distributions—binomial, normal, t, z, F (others may be added as time permits)
   e. Random sampling and probability
   f. Reliability and validity
   g. Hypothesis testing, decision rule, and alpha level
   h. Type I and Type II error
   i. Power
   j. Effect size
   k. One sample and two sample tests of significance
   l. T-tools
   m. One-way and two-way analysis of variance
   n. One-way repeated measures
   0. Multiple comparisons
   p. Statistical tests and assumptions

C. Use a hand calculator to perform the following procedures

   a. Solve basic algebraic problems related to measurement concepts
   b. Solve probability problems
   c. Calculate descriptive statistics
   d. Calculate area under the normal curve (integration not required) and binomial distribution
   e. Calculate z-tests, t-tests, F tests
   f. Calculate power
   g. Calculate effect size

D. Use statistical software (SPSS) to perform the following procedures.

   a. Descriptive statistics
   b. Power
   c. Effect size
   d. One sample and two sample tests of significance
   e. T-tools

f. One-way and two-way analysis of variance
g. One-way repeated measures
h. Multiple comparisons

E. Evaluate educational problems in terms of the appropriate analysis to perform and conduct the procedures.

F. Interpret results of statistical analyses.

6.   Course Content and Schedule:
Following topics will be covered to the extent that time allows.

A.   Course Overview

1.   Introduction
2.   Synopsis of course
3.   Course syllabus
4.   Background survey
5.   Pretest

B.   Creating Variables and Computing Descriptive Statistics using SPSS

1. Creating variables
2. Descriptive statistics for qualitative variables
3. Descriptive statistics for quantitative variables

C.   Student's t Test for Single Sample
1. t distribution
2. Applications of one-sample t test
3. degrees of freedom
4. Confidence intervals
5. Testing the significance of Pearson *r*
6. Interpreting results of single sample t test
7. Reporting results of single sample t test

D.   Paired (Correlated) Samples t Test

1. Applications of the paired samples t test
2. Assumptions of correlated samples t test
3. Using graphs to display results
4. Interpreting results of paired samples t test
5. Reporting results of paired samples t test

E.   Independent Samples t Test

1. Applications of independent samples t test

2. Assumptions of independent samples t test
3. Effect size statistic
4. Using graphs to display results
5. Interpreting results of independent samples t test
6. Reporting results of independent samples t test

F.   One-way Analysis of Variance (ANOVA)

1. F distribution
2. Applications of one-way ANOVA
3. Assumptions of one-way ANOVA
4. Interpreting results of one-wayANOVA
5. Reporting results of one-way ANOVA

G.   Two-way and Higher-way ANOVA

1. Applications of two-way ANOVA
2. Assumptions underlying two-way ANOVA
3. Effect size statistics for two-way ANOVA
4. Follow-up analyses for significant main effect (pair-wise comparisons0
5. Follow-up analyses for significant interaction effects
6. Using graphs to display results
7. Interpreting results
8. Reporting results

H.   One-way Repeated Measures

 7.   Course Requirements/Evaluation:

A.   Read all assigned materials prior to class and be prepared to respond to questions in

       class.

B.   Complete all tests and the final examination.

Final grades will be based on the following:

1. Test 1(Midterm)	50 points
2. Test 2	50 points
3. Project*	100 points
Total	200 points

        The following grading scale will be used.

93% - 100% = A (Superior; Consistently well-prepared; very high performance)

81% - 92% = B (Above average performance; consistently prepared)
71% - 80% = C (Average to above average performance; usually prepared)
60% - 70% = D (Unacceptable performance)
Below 60% = F (Failing)

* In place of a final examination, each student will develop a final project in written form and or presentation to the class. Specific instructions will be provided by the professor.

8. **Class Policy Statements:**

The following guidelines should help students to know the course expectations that will help them to complete the course requirements successfully.

A. There will be no unannounced quizzes in this class. However, it is strongly recommended that students read the material before coming to class. Each student's grade in this course is based on his/her own performance and not in comparison to the performance of others.

B. Academic dishonesty is an offense that will be reported to the Academic Honesty Committee.

C. Attendance/Absences: Attendance is required at each class meeting. It is the **student's responsibility to arrange for a classmate** to take notes for him/her and to get a copy of all handouts for him/her in the event of an absence.

D. Accommodations: Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternative time can be arranged. To set up this meeting, please contact me by e-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with the Program for Students with Disabilities at 1244 Haley Center, 844-2096 (V/TT).

E. Honesty Code: The University Academic Honesty Code will apply to this class.

F. Professionalism: As faculty, staff, and students interact in professional settings, they are expected to demonstrate professional behaviors as defined in the College's conceptual framework. These professional commitments or dispositions are listed below:

--Engage in responsible and ethical professional practices

--Contribute to collaborative learning communities

--Demonstrate a commitment to diversity

--Model and nurture intellectual vitality

9. **Justification for Graduate Credit**

Graduate courses "should be progressively more advanced in academic content than undergraduate programs" and should "foster independent learning" (SACS guidelines 3.6.1 and 3.6.2). Further, the guidelines presented in the Statement of Clarification of the Definition and Use of 6000-level courses as approved by the Graduate Council, May 21, 1997 apply:

Factors to consider in evaluating a course for graduate credit include but are not limited to the following:

--use of specific requisites

--content of sufficient depth to justify graduate credit (materials beyond the introductory level)

--content should develop the critical and analytical skills of students including their application of the relevant literature

--rigorous standards for student evaluation (all students in a 6000-level course must be evaluated using the same standards)
--course instructor must hold graduate faculty status or be approved by the Dean of the Graduate School

10.   **Methodologies and Course Evaluation:**

A variety of teaching techniques and strategies will be used in the instruction of this course. The principal methods of instruction include, but may not be limited to lecture, demonstration, and question/answer sessions. Students will evaluate the course using a checklist of criteria.

Please check email before each class meeting in case there are any announcements.

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