

AUBURN UNIVERSITY  
Department of Educational Foundations, Leadership, and Technology  
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Office Hours: Tues. and Wed. 3:00 p.m.- 4:00 p.m.

- Course Number and Title:** ERMA 8320 Educational Design and Analysis III  
**Credit:** 3 Semester Hours (Lecture 3)  
**Prerequisites:** ERMA 7300 and ERMA 7310
- Date:** January 2009
- Required Manual:** Mertler, C., & Vannetta, R. (2005). Advanced and multivariate statistical methods (3<sup>rd</sup> ed.). Glendale, CA: Pyczak Publishing.  
**Other Course Supplements:** The professor may provide handouts from time to time to supplement the textbook and reference manual.  
**Recommended:** (a) **mechanical pencil** that takes **0.9mm or 0.7mm** size lead. Use **black color lead** and **HB or B hardness**.
- Course Description:**

The focus of this course is on the basic concepts, applications, interpretations, and reporting of statistical results related to multivariate data analysis techniques. Knowledge of the technical and/or mathematical background for these methods is not necessary for this course. Statistical procedures cover multivariate tests commonly used to solve problems in education. The course is designed to assist students in applying multivariate methods to real-life situations, so that they may begin to develop and apply their own critical thinking and decision-making skills as future professional educators. Content includes pre-analysis data screening, multivariate analysis of variance, multivariate analysis of covariance, factor analysis, discriminant analysis, path analysis, and logistic regression.

## 5. Course Objectives:

The following objectives are designed to develop students' competence in knowledge, applications, and interpretations of basic multivariate statistical procedures used in educational research. The following objectives will be covered to the extent that time allows.

A. Use research and statistical terminology appropriately and accurately

B. Demonstrate knowledge of the following subject matter:

1. Research problems, variables, measurement scales
2. Hypothesis testing, decision rule, alpha level
3. Type I and Type II error
4. Power
5. Effect size
6. Research and Procedures for
  - (a) Multivariate assumptions
  - (b) Multivariate analysis of variance (MANOVA)
  - (c) Multivariate analysis of covariance (MANCOVA)
  - (d) Factor analysis
  - (e) Discriminant analysis
  - (f) Path analysis
  - (g) Logistic regression

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

1. Check multivariate assumptions
2. MANOVA
3. MANCOVA
4. Factor Analysis
5. Discriminant Analysis
6. Path Analysis
7. Logistic Regression
7. Create and edit graphs

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

E. Interpret results of multivariate analyses.

6. **Course Content** The following content will be covered to the extent that time allows.

- A. Course Overview
- B. Logic of MANOVA
- C. Advantages of MANOVA Designs
- D. Disadvantages of MANOVA Designs
- E. Multivariate Assumptions
- F. Hotelling's  $T^2$
- G. One-way MANOVA
- H. Analysis of Covariance (MANCOVA)
- I. Factorial MANOVA
- J. K Group MANOVA
- K. Doubly Multivariate Designs
- L. Factor Analysis
- M. Discriminant Analysis
- N. Logistic Regression

7. **Course Requirements/Evaluation:**

- A. Read all assignments prior to class and be prepared to ask questions and to respond to questions in class.
- B. Complete all homework assignments.
- C. Complete all tests and the final examination.

Final grades will be based on the following:

|   |                   |
|---|-------------------|
| 1. 4 Homework Assignments<br>(25 points each) | 100 points        |
| 2. Test 1 (Mid-term examination)              | 50 points         |
| 3. Test 3 (Final examination)                 | <u>100 points</u> |
| Total   | 250 points        |

The following grading scale will be used.

- 93% - 100% = A (Superior)
- 81% - 92% = B (Above Average)
- 71% - 80% = C (Average)
- 60% - 70% = D (Below Average)
- Below 60% = F (Failing)

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. **PLEASE NOTE THESE STATEMENTS. PLEASE ADHERE TO THESE POLICIES.** ☺

Please ask for help if needed **at least 2 week days before homework** is due. Email almost anytime works well if you have a quick question. **No late homework will be graded.** Plenty of lead time is provided for students in case they have a planned or unplanned absence. The professor will provide due dates for assignments at the time assignments are made or earlier. **Only hard copies** of homework will be accepted. All assignments should be typed, double-spaced on one side of the paper, using 12-point font and dark, sharp print and **stapled in the upper left corner**. Assignments should be clean and neat. **Unstapled pages will not be graded.** For example, assignments held together with paper clips, folders, rubber bands, three-ring binders etc., **will not be accepted.** The first page should identify the student by full name, the assignment, and the date. The entire assignment must be turned in at the same time. **Partial assignments will not be graded.**

NOTE: Because of the nature of this course, students are expected to submit **computer printouts** showing results of analysis, solutions to problems, or supporting statistics for results sections. **No credit will be given for answers to questions without the supporting output.** The student should **copy and paste only the relevant part** of the computer output to a Word document, and then save and print the file to submit each assignment.

The answers to Home Work problems should be **clearly stated with the output on the SAME PAGE as the answer. Tables may not be broken between pages.** It is **O.K. to circle** appropriate statistics on the output. **NO CREDIT FOR HIGHLIGHTED ANSWERS ON THE OUTPUT, AS I WILL NOT BE ABLE TO SEE THEM CLEARLY. DO NOT USE HIGHLIGHTING.** If you circle the answer, you must also write the answer. I must be able to tie your written response to the output. **Report the answer and the relevant output only.**

**NOTE: SOLUTIONS TO PROBLEMS ON HOMEWORK MUST BE TURNED IN WITH APPROPRIATE STATISTICAL TABLES, ETC., SHOWING THE RESPONSE. IT IS ADVISABLE TO COPY AND PASTE THE APPROPRIATE STATISTICAL OUTPUT TO A WORD DOCUMENT. HOMEWORK TURNED IN WITHOUT THE APPROPRIATE OUTPUT WILL NOT BE GRADED. ALL STEPS IN THE SOLUTION MUST BE SHOWN TO RECEIVE CREDIT.**

- C. Academic dishonesty is an offense that will be reported to the Academic Honesty Committee. (See related pages in the Tiger Cub.)
- D. 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.
- E. Accommodations: Students who need special accommodations in class, as provided for by the American Disabilities Act, should arrange a confidential meeting with the instructor during office hours the first week of classes – or as soon as possible if accommodations are needed immediately. You must bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have these forms but need accommodations, make an appointment with the Program for Students with Disabilities, 1244 Haley Center, 844-2096
- F. Honesty Code: The University Academic Honesty Code and the Tiger Cub Rules and Regulations pertaining to Cheating will apply to this class.
- G. 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:**

The principal methods of instruction will be short lectures, demonstrations, and question/answer. Students will evaluate the course using a checklist of criteria.



**NOTE: This is a tentative syllabus. Changes may be necessary. Please check email BEFORE each class meeting to be sure there are no class announcements.**

**Thanks. 😊 Dr. K.**