

ERSH 8310, Fall 2009
Applied Analysis of Variance Methods in Education
Syllabus

Professor

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Course Information

Wednesdays: 4:40 pm – 7:40 pm;
Lecture: 4:40-6:40 - G5 Aderhold Hall
Lab: 6:40-7:40 – 228 or 223 Aderhold Hall

Prerequisite

ERSH 6300 (Applied Statistical Methods in Education) or equivalent

Office Hours

Wednesday: 3pm-4pm; 8pm-9pm; by appointment

Teaching Assistants:

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Course Objectives

This course is intended to be an *applied* statistics course, meaning all statistical topics will be taught in an application-centered manner. I have two goals for students of this course:

- (1) To become knowledgeable consumers of the statistical methods presented in this course.
- (2) To be able to properly obtain and use the statistical methods presented in this course.

It is my philosophy that becoming knowledgeable about applied regression techniques does not require your understanding or recitation of intricate mathematical proof. Rather, becoming knowledgeable revolves around the fundamental properties of each method:

- The situational appropriateness and motivation.
- The inferences that can be made from the technique.
- Methods of obtaining statistical estimates (including statistical computing).
- Knowledge of the underlying assumptions (and how to test if these are violated).

To reach these goals, lectures will feature some examples, and students will have frequent opportunities to practice what has been taught.

Be advised – this course will challenge you, and will require a significant amount of work. Reading the textbook and attending class are keys to your success. With your effort, however, by the end of the semester you will be able to use (or apply...) analysis of variance methods in many situations.

Required Textbook

Keppel, G. & Wickens, T. D. (2004). Design and Analysis: A Researcher's Handbook, 4th Ed. New Jersey: Pearson.

Prerequisite

This course assumes you have taken ERSH 6300 (Applied Statistical Methods in Education) or an equivalent course. If you have not taken this course, you will be at a significant disadvantage which may slow your growth (and the growth of the students who have taken the prerequisite). I will be asking those of you who have not taken the prerequisite to withdraw from this course.

Statistical Computing

Application of the methods taught in this course will be implemented using SPSS as the primary statistical package. SPSS is an easy-to-use program that can provide estimates for all of the statistical methods to be presented this semester. If you are already familiar with another package, you may use that package. Be advised that all examples and solutions will feature SPSS, and I cannot provide you any help with any other package.

SPSS is available to you in three ways:

1. You can purchase SPSS through UGA's MSD at https://www.msd.uga.edu/catalog/product_items.php?product_id=1177.
2. The computer lab in room 227/228 Aderhold or room 223 Aderhold and various labs throughout campus have SPSS installed on all computers. For a list of College of Education maintained labs and hours visit <http://www.coe.uga.edu/oit/instruction/labclass/labspecs.html>.

Course Website/Technology

This course will feature extensive use of the new e Learning Commons technology. All necessary information will be posted on eLC, and is accessible to students who have registered for the course at <http://elc.uga.edu>.

Course Grading System

The final grade will be determined based on the weighted average of the homework assignments, and the two tests using the following weights:

Homework/Quizzes	30%
Midterm	35%
Final	35%

My goal is for everyone to succeed in this course, learn the material, and receive an A. I reserve the right to round grades upward but grades will never be rounded downward. Course grades will be determined by the weighted average of the homework, midterm, and final grades, and will be given according to the scale on the following page.

<u>Percentage of Points</u>	<u>Grade</u>
100-90	A
89-85	A-
84-80	B+
79-75	B
74-70	B-
69-65	C+
64-60	C
59-55	C-
54-50	D
Below 50	F

Academic Honesty

All students are expected to abide by the University of Georgia student honor code. You can view the UGA academic honesty policy at <http://www.uga.edu/honesty/>. All midterm and final answers must be your own and not be copied or paraphrased from anyone else's answers.

Course Structure

Homework

Homework is your time to practice and learn the statistical material. As such, this course will feature weekly homework assignments to allow for sufficient practice of the ideas and statistical techniques discussed. A typical assignment will consist of a set of practice problems from the textbook, expected to be completed within one week. **Unless otherwise noted, all assignments must be completed online through the eLC website and are due by the beginning of lecture the following week.**

Late homework will not be accepted for credit. To allow a bit more flexibility in the work requirements of the course, the lowest homework score will be dropped.

Quizzes

In the (hopefully unlikely) event I judge the book isn't being read, I will resort to administering short quizzes each week. Quizzes cannot be made up or retaken and can be administered at any time during lecture or lab.

Midterm and Final

There will be an in-class midterm and an in-class final. The tests will have two parts (1) an hour-and-a-half length "written" portion and (2) an SPSS version where tasks must be performed on SPSS to answer a set of questions. The exams will cover material in the assigned *readings, lectures, and lab sessions* up to and including those preceding the exam. The final will be comprehensive, with greater emphasis on the second half of the course.

Collaboration with Other Students

Students are allowed and ***encouraged*** to collaborate with each other on the statistical analysis portion of the ***homework assignments***. However, each student must access and submit their own piece of work through eLC. The motivation for such a rule is to mimic the situations you find outside of this classroom. Often, statistical analyses are conducted in collaboration with other researchers. However, scientific and technical writing are skills that all researchers must have, and as such, are part of the experience in this course. *Any text that is deemed to be not original (text that is copied or simply a re-wording or paraphrasing of another student's work) will be considered not original for any of the parties involved.*

Course Style and Content

Lecture Format

Most lectures will have notes (slides) available digitally, with slides available online by the afternoon of the lecture. Please check eLC before coming to class if you would like to bring a printout of the slides with you. If nothing is on eLC, then we will be having lecture without slides. If you have a data set you would like to see included in the in-class examples, I encourage you to submit it to me. I strongly encourage you to participate in lecture by asking questions whenever anything is unclear.

Reading Assignments

To be fully successful in this course, I **strongly** encourage you to read the assigned chapter(s) prior to the course when we will cover the topic. Even if you have difficulty reading the material, exposure to the information prior to lecture will aid in your understanding of the course.

How to Succeed in this Course

- Read the book (even if it doesn't make sense to you – it will eventually)
- Come to class and lab (and bring your questions about what you just read that week)
- Ask questions when you do not understand
- Come to office hours
- Do the homework (consider it practice on applying statistics)

Tentative Course Schedule (subject to change as necessary)

Date	Topic		Reading
8/19	Lecture: Lab:	Introduction; Basic Math Review; Statistics quiz SPSS Introduction (File Management; Data Simulation)	-
8/26	Lecture:	Experimental Design and Sources of Variability	Ch. 1 & 2
9/2	Lecture:	Variance Estimates and the Evaluation of the F Ratio	Ch. 3
9/9	Lecture:	Analytical Comparison Among Means; Analysis of Trends	Ch. 4 & 5
9/16	Lecture:	Simultaneous Comparisons	Ch. 6
9/23	Lecture:	The Linear Model and its Assumptions	Ch. 7
9/30	Lecture:	Effect Size, Power, and Sample Size	Ch. 8
10/7	Midterm Exam		
10/14	Lecture:	Introduction to Factorial Designs; The Overall Two-Factor Analysis	Ch. 10 & 11
10/21	Lecture:	Main Effects and Simple Effects; The Analysis of Interaction Components	Ch. 12 & 13
10/28	Lecture:	The General Linear Model	Ch. 14
11/4	Lecture:	The Analysis of Covariance	Ch. 15
11/11	Lecture:	The Single Factor Within Subjects Design; Further Within-Subject Topics	Ch. 16 & 17
11/18	Lecture:	Nested Factors	Ch. 25
11/25	No Class – Thanksgiving Break		
12/2	Lecture:	Final Review/Spill-over Time	-
12/16	Final Exam: 3:30pm-6:30pm		