



Educational Research and Measurements 8310
Applied Analysis of Variance Methods in Education
Spring Semester 2007
Instructor: Seock-Ho Kim

Syllabus

Course Description and Objective

Experimental design and the analysis of data from experiments, including orthogonal analysis of variance for single and multifactor designs, randomized block, repeated measures, and mixed models. Computer applications and the reporting results using APA style (*Graduate Bulletin* 2005-2006). Prerequisite: ERSH 6300

Textbooks

- Keppel, G., & Wickens, T. D. (2004). *Design and analysis: A researcher's handbook* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Green, S. B., & Salkind, N. J. (2005). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Huck, S. W. (2004). *Reading statistics and research* (4th ed.). Boston, MA: Allyn and Bacon.

Suggested Supplementary Texts

- American Psychological Association (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.
- Kirk, R. E. (1995). *Experimental design: Procedures for the behavioral sciences* (3rd ed.). Pacific Grove, CA: Brooks/Cole.
- Maxwell, S. E., & Delaney, H. D. (2000). *Designing experiments and analyzing data: A model comparison perspective*. Mahwah, NJ: Erlbaum.
- Winer, B. J., Brown, D. R., & Michels, K. M. (1991). *Statistical principles in experimental design* (3rd ed.). New York: McGraw-Hill.

Assignments, Examinations, and Evaluation

A number of exercises will be assigned and each student is expected to complete the exercises independently. All work must be completed and turned in on time. All work should be lucid, orderly, and self-contained. A set of computer exercises will also be assigned. Specific requirements for the computer exercises will be distributed later.

There will be two midterm examinations on February 13 (Tuesday, 2:00–3:15 pm) and on April 3 (Tuesday, 2:00–3:15 pm), and a final examination on May 8 (Tuesday, 3:30–6:30 pm). The final examination hours are based on the final examination schedule. The examinations will be administered in class. The examinations will be composed predominately short answer items. Copies of sample examinations will be distributed later.

Grades will be based on completion of the assigned exercises (15%), on the computer exercises (10%), and on the three examinations (25% each). Grades will be assigned as follows: A (above 95%), A⁻ (between 90% and 95%), B⁺ (between 85% and 90%), B (between 80% and 85%), B⁻ (between 75% and 80%), and C or worse (below 75%). Full attendance of lectures is required.

All academic work must meet the standards contained in “A Culture of Honesty.” Students are responsible for informing themselves about those standards before performing any academic work. The link to more detailed information about academic honesty can be found at: <http://www.uga.edu/ovpi/honesty/acadhon.htm>

Advice

On any aspect of the course, see Seock-Ho Kim, 325U Aderhold from 1:00 pm to 2:00 pm on Tuesday and Thursday or by appointment. For appointments or replies to brief questions, send email to shkim@uga.edu or call me at 706-542-4224 (office) or 706-310-1218 (home). If I am not available when you call 706-542-4224, you may also call and leave a message at 706-542-4110 (i.e., the main office of the Department of Educational Psychology). If you leave a message, I will probably reply by email, rather than call you back.

Class Procedures and Activities

The class will be conducted so as to maximize understanding of key statistical concepts. To facilitate this intention, most class sessions will include one or more of the following:

- Illustration of key concepts developed through assigned readings.
- Identification and discussion of these concepts in actual research settings.
- Analysis and discussion of selected problems involving these concepts.

The computer lab (618 Aderhold) has been scheduled for this class on nearly every other Thursday (2:00–3:15 pm). There are a total of six computer sessions, and we may meet in the computer lab.

Course Outline

January 9

Chapter 1. Experimental Design

January 11

Chapter 2. Sources of Variability and Sums of Squares

January 16

Chapter 3. Variance Estimates and the Evaluation of the F Ratio

January 18

Lab 1. Lesson 24 (Green & Salkind)

January 23

Chapter 4. Analytical Comparisons Among Means

January 25

Chapter 5. Analysis of Trend

January 30

Chapter 6. Simultaneous Comparisons

February 1

Lab 2. Chapter 11H (Huck)

February 6

Chapter 7. The Linear Model and Its Assumptions

February 8

Chapter 8. Effect Size, Power, and Sample Size

Chapter 9. Using Statistical Software

February 13

Midterm 1. Chapters 1–9, Lesson 24, Chapters 11H–12H

February 15

Lab 3. Chapter 12H

February 20

Chapter 10. Introduction to Factorial Designs

February 22

Chapter 11. The Overall Two-Factor Analysis

February 27

Chapter 12. Main Effects and Simple Effects

March 1

Lab 4. Lesson 25, Chapter 13H

March 6
Chapter 13. The Analysis of Interaction Components

March 8
Chapter 14. The General Linear Model

March 20
Chapter 15. The Analysis of Covariance

March 22
Lab 5. Lesson 26, Chapter 15H

March 27
Chapter 16. The Single-Factor Within-Subjects Design

March 29
Chapter 17. Further Within-Subject Topics

April 3
Midterm 2. Chapters 10–17, Lessons 25–26, Chapters 13H & 15H

April 5
Lab 6. Lesson 28, Chapter 14H
Chapter 18. The Two-Factor Within-Subject Design

April 17
Chapter 19. The Mixed Design: Overall Analysis
Chapter 20. The Mixed Design: Analytical Analyses

April 19
Chapter 21. The Overall Three-Factor Subjects Design
Chapter 22. The Three-Way Analytical Analysis

April 24
Chapter 23. Within-Subject and Mixed Designs
Chapter 24. Random Factors and Generalization

April 26
Lab 7. Lesson 29
Chapter 25. Nested Factors
Chapter 26. Higher-Order Designs

May 8
Final. Chapters 18–26, Lessons 28–29, Chapter 14H

Tentative Assignments

Exercises

Due Date

Set 1: Chapters 2–8

(2.1, 3.5, 4.1, 5.3, 6.1, 7.1, 8.1)

February 13

Set 2: Chapters 10–17

(10.2, 11.1, 12.3, 13.4, 14.4, 15.3, 16.3, 17.1)

April 2

Set 3: Chapters 18–26

(18.2, 19.2, 20.1, 21.3, 22.1, 23.1, 24.1, 25.3)

May 8

Note

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

January 2007

| SUN | MON | TUE | WED | THU | FRI | SAT |
|-----|-----|--------------|-----|--------------|-----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 Chap 1 | 10 | 11 Chap 2 | 12 | 13 |
| 14 | 15 | 16 Chap 3 | 17 | 18 Lab 1 | 19 | 20 |
| 21 | 22 | 23 Chap 4 | 24 | 25 Chap 5 | 26 | 27 |
| 28 | 29 | 30 Chap 6 | 31 | | | |

February 2007

| SUN | MON | TUE | WED | THU | FRI | SAT |
|-----|-----|----------------------|-----|-----------------------|-----|-----|
| | | | | 1 Lab 2 | 2 | 3 |
| 4 | 5 | 6 Chap 7 | 7 | 8 Chap 8 Chap 9 | 9 | 10 |
| 11 | 12 | 13 Mid 1 Set 1 | 14 | 15 Lab 3 | 16 | 17 |
| 18 | 19 | 20 Chap 10 | 21 | 22 Chap 11 | 23 | 24 |
| 25 | 26 | 27 Chap 12 | 28 | | | |

March 2007

| SUN | MON | TUE | WED | THU | FRI | SAT |
|-----|-----|---------------|-----|---------------|-----|-----|
| | | | | 1 Lab 4 | 2 | 3 |
| 4 | 5 | 6 Chap 13 | 7 | 8 Chap 14 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 Chap 15 | 21 | 22 Lab 5 | 23 | 24 |
| 25 | 26 | 27 Chap 16 | 28 | 29 Chap 17 | 30 | 31 |

April 2007

| SUN | MON | TUE | WED | THU | FRI | SAT |
|-----|-----|--------------------------|-----|-----------------------------------|-----|-----|
| 1 | 2 | 3 Mid 2 Set 2 | 4 | 5 Lab 6 Chap 18 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 Chap 19 Chap 20 | 18 | 19 Chap 21 Chap 22 | 20 | 21 |
| 22 | 23 | 24 Chap 23 Chap 24 | 25 | 26 Lab 7 Chap 25 Chap 26 | 27 | 28 |
| 29 | 30 | | | | | |

May 2007

| SUN | MON | TUE | WED | THU | FRI | SAT |
|-----|-----|---------------------|-----|-----|-----|-----|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 Final Set 3 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |