

Syllabus  
Psychology 610  
Statistical Analysis of Psychological Experiments

TAs:	Katy Kortenkamp	Professor Moore
Office hrs:	Room 459 Psychology 11-12 Tues & by appt	Office Hours: To be announced in class, and by appt. Call, email or contact me after class to make an appointment if you need help.
Phone:	262-8023	
email:	<a href="mailto:kvkorten@wisc.edu">kvkorten@wisc.edu</a>	<a href="mailto:cfmoore@wisc.edu">cfmoore@wisc.edu</a> ; 263-4868

The goal of this course is to provide students with the basic principles of analysis of variance, and with the basic principles of designing experiments. Topics will include between-subject, within-subject, mixed and nested designs, random factors, constructing contrasts, orthogonal contrasts, polynomial trends, simple effects, and multiple comparisons. At the end of the course, we will cover dummy coding for multiple regression analysis of nonorthogonal designs in order to establish the relationship between anova and multiple regression.

Required text: Keppel & Wickens, *Design and analysis*, 4<sup>th</sup> ed.

Handouts, old exams, and some readings will be posted on the web for download.

Recommended: Other books ordered for the bookstore as "recommended" are to enhance your personal library if you wish.

### Grades

Grades will be based on midterms, homework assignments, and final exam:

Homework: 20%                      Project 15%

Midterms: 35%

Final: 30%

Homework due dates will be announced with the assignments. Late homework will be penalized. Each homework will include a component in which you will be asked to apply the experimental design or statistical technique to a research content area of your choice. This is to help you relate the course content to actual research practice. The project will be an analysis and write-up of a data set. More information will be given about the requirements of the project later in the semester.

The final exam will be comprehensive. It will be given at the scheduled time: Wed Dec 20 at 12:25 pm.

### Study Advice

1. Read your book with your calculator in your hand. This is in order to make sure you understand where the numbers in the text came from. Study the problems in the text that have worked out solutions. Use your calculator so you have to think it through as you go. (Some might use a spreadsheet instead of a calculator.)

2. With all the emphasis on calculating, make sure you keep the main points in mind. What are the null hypotheses being tested? What does the null hypothesis mean in the context of the particular study? What is the main principle on which the calculations are based?
3. Review the lecture material within 24 hours after class. The best study method is to re-copy your notes, elaborating them so they really make sense. When you find things that are unclear to you, then you can bring up a question at the start of the next class, or in conference with one of us (TA or instructor). And when you ask a question, chances are that several others have the same question and are just too shy to ask it.

Dates to be  
Announced

Reading

Topic

-----	Review of hypothesis testing and sampling distribution concepts
Chap. 1	Design of Experiments
Chap. 2	Specifying Sources of Variability
Chap. 3	Variance Estimates and the Evaluation of the F Ratio
Chap. 7	Assumptions and Other Considerations
Chap. 4	Analytical Comparisons Among Treatment Means (skip pp. 73-75 on directional hypotheses)
Chap. 5	Analysis of Trend. Braver & Sheets (1993).
Chap. 6	Simultaneous comparisons and control of Type I error. Seaman et al. (1991)
Chap. 8	Effect size, power (read lightly for main points)

#### MIDTERM I

Chap. 10	Introduction to the Factorial Design
Chap. 11	Rationale and Rules for Calculating the Major Effects (read sections 11.6 and 11.7 lightly)
Chap. 12	Detailed Analysis of Main Effects and Interaction (sections 12.1 & 12.2)
	Loftus, G. R. (1978). On interpretation of interactions. <i>Memory &amp; Cognition</i> , 6, 312-319.
	Rosnow, R. L., & Rosenthal, R. (1989). Definition and interpretation of interaction effects. <i>Psychological Bulletin</i> , 105, 143-146.
	Wahlsten (1991). Sample size to detect interactions.
Chap. 12 & 13	Continuing Factorial Anova
Chap. 21	The Three Factor Design; Basic Analysis (read 21.4 lightly)
Chap. 22	The Three Factor Design; Simple effects and interaction contrasts
Chap. 26	Other Higher Order Designs

Chap. 24 & 25 Designs with nested and random factors

## MIDTERM II

Chap. 16 & 17 Introduction to Within-Subjects Designs (read 16.3 lightly; skip 17.4 & 17.5 for now; read 17.6 lightly)

Birnbaum (1999). How to show that  $9 > 221$  ...

Chap. 18 The Two-Factor Within-Subjects Design

Bakeman & McArthur, 1996; Picturing repeated measures.

*Behavior Research Methods & Instrumentation*, 28(4), 584-589.

Chap. 19 The Mixed Two-Factor Within-Subjects Design

Chap. 20 The Mixed Two-Factor Within-Subjects Design: Analysis of Interactions

Chap. 3.5, 14 Unequal Sample Size and Dummy Coding

Chap. 17.4 Latin square designs.

Chap. 17.5 Fractional factorial designs

There will be 2 midterms. The final exam covers all the material and will be given at the time scheduled in the timetable.

Project: The goal of the project is to help you to integrate your ‘book learning’ into the real world of data analysis. You will benefit most from the project if you use real data of your own or from your lab group, and if you spend time not just analyzing the data but also thinking about the meanings of the results. A handout with the requirements for the project will be given later.

UW System Rules require that courses with a teaching assistant include a policy statement about how to deal with a complaint about a T.A.:

Occasionally a student may have a complaint about a T.A. If you have a complaint about your T.A., you are always welcome to discuss the matter directly with the T.A. or the course instructor. If you do not feel comfortable discussing a complaint directly with the T.A., you should discuss the matter with the instructor responsible for the course. If you do not feel that the instructor has resolved the complaint to your satisfaction, then you should speak to Jill Cohen Kolb (Instructional Program Manager, Rm 430 Psychology, 262-3955, [jcohenkolb@wisc.edu](mailto:jcohenkolb@wisc.edu)), or the Department Chair, Professor Joseph Newman (Room 238 Psychology). If you believe the T.A. or anyone else in the University (including me) has discriminated against you because of your religion, race, gender, sexual orientation, or ethnic background, you should also take your complaint to the Equity and Diversity Resource Center (Room 179A Bascom Hall, 263-2378; <http://www.wisc.edu/edrc/>). If your complaint has to do with sexual harassment in the Psychology Department, you should also take your complaint to Jill Cohen Kolb, the Psychology Department sexual harassment contact person. You may also take complaints about sexual harassment to the university’s Equity and Diversity Resource Center.