EDP 380C 6 - Statistical Analysis for Experimental Data

Fall 2017 Lecture: TTh 9:30am-11:00am Lab: Th 8:30am-9:30am SZB 432

Instructor
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Office Hours
W: 9:30-11am
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Course Overview

- This course focuses on analysis of variance (ANOVA) and includes the following topics: simple analysis of variance with follow-up comparisons, factorial designs and follow-up comparisons, repeated measures design, and analysis of covariance.
- The goals of this course are to provide students with an understanding of the principles underlying commonly used experimental design and analysis approaches. Specifically, students will learn to select an appropriate experimental design given a research question of interest, develop a working knowledge of how to analyze data arising from commonly used experimental designs, and be able to properly interpret and communicate analysis results.
- The prerequisite for the course is EDP 380C 2-Fundamental Statistics or equivalent.

Required Course Material

- Assigned Chapters from: Stevens, J. (2007). *Intermediate Statistics: A Modern Approach* (3rd ed.). New York, NY: Lawrence Erlbaum Associates, Taylor & Francis Group.
- Class notes, available on our Canvas website in the *Files* section. Class notes will be posted prior to the day on which the notes are discussed in class and may be retrieved on Canvas: http://canvas.utexas.edu/
- Selected Articles posted on our Canvas course website in the *Files* section. See the Selected Articles Reference List on Page 5 of the syllabus.

Course Assessment

1. Exams: There will be 3 in-class exams administered. Each exam will cover material from the lessons since the last exam (unless otherwise specified). You will need a calculator for the exams for calculations. You may use one 8.5" X 11," two-sided page of notes during the exam (however, students will likely be much better prepared if they don't need to rely on it). Missed exams may not be made up unless arrangements have been made prior to class.

2. Homework: There will be four graded assignments, each designed to give students a chance to apply and practice the concepts learned in class and in the lab. You will have approximately 1 week to complete homework assignments 1-4. These will typically involve using SPSS to solve ANOVA problems or require that you interpret published results. Assignments are due as specified in class, and should be submitted on time for full earned credit. Late work will be accepted for full earned credit IF AND ONLY IF arrangements are made with me PRIOR TO DUE DATE. Otherwise, 5% of the points possible will be deducted for each weekday the assignment is late. Please work alone on all homework assignments. For an SPSS Introduction/Orientation, go to:
https://stat.utexas.edu/images/SSC/documents/SoftwareTutorials/SPSS_GettingStarted.pdf

Access to SPSS

- IBM SPSS is available in the following campus labs: MEZ 2.104 (5 copies).
- You may purchase a 6-month or 1-year student license of IBM SPSS (Standard Grad Pack) for $39.99 or $64.99, respectively. Visit the following: http://www.onthehub.com/spss/
- You may also access SPSS using the College's virtual desktop system. See the following for instructions: https://wikis.utexas.edu/display/coeito/About+CoE+Desktop

Course Grades

Your homework and exams will be averaged according to the percentages (weights) shown. Grades will be posted to our Canvas website (in the *My Grades* section) – please periodically check for any keypunch errors. Final grades will then be assigned based on the scale below:

Assessment	*Weight*
Total homework points converted to a percentage	40%
Total exam points converted to a percentage	60%

Overall Course Percent	*Grade*
93% - 100%	A
90% - 92%	A-
87% - 89%	B+
83% - 86%	B
80% - 82%	B-
77% - 79%	C+
73% - 76%	C
70% - 72%	C-
below 70%	F

Unless a computational error has been made, grades will not be changed after the end of the semester.
No Extra Credit: Your course grades are based only on the above information. There will be no extra-credit opportunities.
Grades of "Incomplete:" Unless the student can demonstrate that near catastrophic events have led to a case of extreme hardship, grades of "Incomplete" will not be given.
Attendance: Attendance will not be part of your grade. Students who attend class, of course, tend to be better prepared for assignments.

Academic Integrity

Following the University's honor code, students are expected to maintain absolute integrity and a high standard of individual honor in scholastic work. All student work must be completed with the utmost honesty, which includes acknowledging the contributions of other sources to your scholastic efforts; avoiding plagiarism; and completing assignments and exams independently unless expressly authorized otherwise.

Accommodations For Persons With Disabilities

Students with disabilities who require special accommodations need to get an accommodation letter that documents the disability from the Services for Students with Disabilities (471-6259 voice or 471-4641 TTY for users who are deaf or hard of hearing). This letter should be presented to the instructor in each course at the beginning of the semester and accommodations needed should be discussed at that time. Five business days before an exam, the student should remind the instructor of any testing accommodations that will be needed. See the following website for more information: http://ddce.utexas.edu/disability/.

Religious Holidays

A student who misses an examination, work assignment, or other project due to the observance of a religious holy day will be given an opportunity to complete the work missed within a reasonable time after the absence, provided that he or she has properly notified the instructor. It is the policy of the University of Texas at Austin that the student must notify the instructor at least fourteen days prior to the date he or she will be absent to observe a religious holiday. For religious holidays that fall with the first two weeks of the semester, the notice should be given on the first day of the semester. The student will not be penalized for these excused absences, but the instructor may appropriately respond if the student fails to complete satisfactorily the missed assignment or examination within a reasonable time after the excused absence.

Campus Carry

Please see the campus carry website for more information.

Other Suggested References

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Edwards, A. L. (1985). *Experimental Design in Psychological Research* (5th ed.). New York, NY: Harper & Row.

Glass, G. & Hopkins, K. (1996). *Statistical Methods in Education and Psychology* (3rd ed.). Boston, MA: Allyn and Bacon.

Howell, D. (1997). *Statistical Methods for Psychology* (4th ed.). Belmont, CA: Duxbury Press.

Huck, S. W., & Cormier, W. H. (1996). *Reading Statistics and Research* (2nd ed.). New York, NY: Harper & Row.

Huitema, B.E. (1980). *The Analysis of Covariance and Alternatives*. New York: John Wiley.

Jaegar, R. (1993). *Statistics: A Spectator Sport* (2nd ed.). Newbury Park, CA: Sage.

Keppel, G. (1991). *Design and Analysis: A Researcher's Handbook* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Kirk R.E. (1995). *Experimental Design: Procedures for the Behavioral Sciences* (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Pedhazur, E. & Schmelkin, L. (1991). *Measurement, Design, and Analysis: An Integrated Approach*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Toothaker, L.E. (1991). *Multiple Comparisons for Researchers*. Newbury Park, CA: Sage.

Calendar

Following are the topics to be covered and the readings that students are expected to be doing, whether or not the material is explicitly addressed in class. Students should keep up with the readings. Topics and assignment due dates are subject to change, if we don't move as quickly as anticipated. Exam dates will not change.

DATE	LAB	LECTURE TOPIC	READINGS	HW Due
8/31	No Lab	Course Introduction Statistics Refresher	Chapter 1 Article #1	
9/5		Statistics Refresher		
9/7	1-Introduction to SPSS (*optional*)	One-Way Analysis of Variance (ANOVA)	Chapter 2	
9/12		One-Way ANOVA	Article #2	
9/14	2-One-Way ANOVA	Outliers & Assumptions		
9/19		Follow up Comparisons	Article #3	
9/21	3-Post Hoc Comparisons	General Linear Model Power	Chapter 3	
9/26		Power		
9/28	No Lab	***Exam 1***		
10/3		Introduction to Factorial ANOVA	Chapter 4	
10/5	4-Power	Two-Way ANOVA	Article #4	***HW1***
10/10		Two-Way ANOVA		
10/12	5-Two-Way ANOVA	Two-Way ANOVA		
10/17		Higher Order Factorial ANOVA		
10/19	6-Two-Way ANOVA	Higher Order Factorial ANOVA	Article #5	***HW2***
10/24		Higher Order Factorial ANOVA		
10/26	7-Three-Way ANOVA	Higher Order Factorial ANOVA		
10/31		***Exam 2***		
11/2	No Lab	Introduction to Repeated Measures ANOVA	Chapter 5	
11/7		Repeated Measures ANOVA	Article #6	
11/9	8-Introduction to Repeated Measures	Repeated Measures ANOVA		
11/14		Repeated Measures ANOVA	Article #7	
11/16	9-More Repeated Measures ANOVA	Repeated Measures ANOVA		
11/21		Introduction to Analysis of Covariance (ANCOVA)	Chapters 6 & 7	***HW3***
11/23	Thanksgiving	***No Class***		
11/28		ANCOVA	Article #8	
11/30	10-ANCOVA	ANCOVA		
12/5		ANCOVA	Article #9	***HW4***
12/7	No Lab	***Exam 3***		

Selected Articles Reference List

1. Jackson, M., & Cox, D. R. (2013). The principles of experimental design and their application in sociology. *Annual Review of Sociology, 39*, 2.1-2.23.
   - *A good primer for the use of experimental designs in social and behavioral sciences.*

2. Strayer, D. L., & Johnston, W. A. (2001). Driven to Distraction: Dual-task studies of simulated driving and conversing on a cellular telephone. *Psychological Science, 12*(6), 462-466.
   - *An example of a one-way ANOVA.*

3. Armstrong, R. A., Slade, S. V., & Eperjesi, F. (2000). An introduction to analysis of variance (ANOVA) with special reference to data from clinical experiments in optometry. *Ophthalmic and Physiological Optics, 20*(3), 235-241.
   - *A user friendly and brief discussion of post hoc and planned comparisons.*

4. Lee, R. M., & Robbins, S. B. (1998). The relationship between social connectedness and anxiety, self-esteem, and social identity. *Journal of Counseling Psychology, 45*(3), 338-345.
   - *Study 2 is an example of a two-way ANOVA.*

5. McJunkin, L. M. (2009). Effects of stereotype threat on undergraduate women's math performance: Participant pool vs. classroom situations. *Emporia State Research Studies, 45*(2), 27-31.
   - *An example of a three-way ANOVA*.

6. Adams. S. L., Roxe, D. M., Weiss, J., Zhang, F., & Rosenthal, J. E. (1998). Ambulatory blood pressure and Holter monitoring of emergency physicians before, during, and after a night shift. *Academic Emergency Medicine, 5*(9), 871-877.
   - *An example of a one-way repeated measures ANOVA*.

7. Barr, R. S., Culhane, M. A., Jubelt, L. E., Mufti, R. S., Dyer, M. A., Weiss, A. P., Deckersbach, T., Kelly, J. F., Freudenreich, O., Goff, D. C., & Evins. A. E. (2008). The effects of transdermal nicotine and nonpsychiatric controls. *Neuropsychopharmacology, 33*, 480-490.
   - *An example of a three-way repeated measures ANOVA (split-plot).*

8. Aronson, J., & Inzlicht, M. (2004). The ups and downs of attributional ambiguity: Stereotype vulnerability and the academic self-knowledge of African American college students. *Psychological Science, 15*(12), 829-836.
   - *An example of a one-way ANCOVA with a two-way ANOVA bonus!*

9. Ben-Zeev, T. Fein, S., & Inzlicht, M. (2005). Arousal and stereotype threat. *Journal of Experimental Social Psychology, 41*, 174-181.
   - *An example of a two-way ANCOVA with three-way ANOVA bonus!*