EDP 380C-6: Statistical Analysis of Experimental Data
Spring 2016, Tues/Thur, 9:30 - 11:00 am
SZB 432

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Course Description

This course covers the principles and procedures involved in analyzing data from experimental designs, focusing in particular on the most commonly used designs. Approaches for analyzing simple (one-way) designs, factorial designs, and repeated measures designs will be presented using the analysis of variance (ANOVA) framework. Lectures will focus on developing conceptual understanding of the experimental designs and corresponding analytical models and on interpreting the results of analysis procedures. Laboratory sections will focus on using statistical software for data analysis.

Learning Goals

By the end of this course, you should be able to…
- Weigh the benefits and drawbacks of using specific experimental design.
- Choose an appropriate experimental design, given a research question of interest.
- Use software to analyze data generated from commonly used experimental designs.
- Properly interpret and communicate results of such analyses.
- Critically interpret reported results from published experiments.

Pre-Requisites

- EDP 380C-2 Fundamentals of Statistical Inference

Readings

- Occasional readings will be posted on Canvas.
- Optional textbook: Stevens, J. (2007). *Intermediate Statistics: A Modern Approach* (3rd Edition). New York, NY: Lawrence Erlbaum Associates.

Further resources

- Kirk R.E. (2013). *Experimental Design: Procedures for the Behavioral Sciences* (4th Edition). Thousand Oaks, CA: Sage Publications, Inc.
- Maxwell, S.E. & Delaney, H.D. (2004). *Designing Experiments and Analyzing Data: A Model Comparison Perspective* (2nd Edition) Mahwah, NJ: Lawrence Erlbaum Associates.
- Tamhane, A. C. (2009). *Statistical Analysis of Designed Experiments: Theory and Applications*. Wiley-Interscience.

Homework

Ungraded homework exercises will be made available approximately every two weeks. The exercises are designed to provide further opportunities for you to practice applying the techniques and concepts discussed in class. Solutions to the exercises will be posted approximately one week later.

Software

The laboratory sections will focus on using IBM SPSS for data analysis. Homework exercises can also be completed using SPSS (though students are welcome to use other software if they prefer).
- You may purchase a 6-month or 1-year student license of IBM SPSS (Standard Grad Pack) for about $60 or $100, respectively. See http://www.onthehub.com/spss/ for further information.
- You may also access SPSS using the College's virtual desktop system. See the following for instructions: http://www.edb.utexas.edu/education/ito/tutorials/connect/coe_desktop_resources/coe_desktop_overview/

Evaluation

Course evaluation will be based on three exams, with weight as noted below, plus a small number of required tasks.
- Exam 1 (30%) will be given in class on **Tuesday, 2/16/2016,** and will cover one-way ANOVA and power analysis.
- Exam 2 (30%) will be given in class on **Thursday, 3/24/2016**, and will cover two-way factorial designs, randomized block designs, and higher-order designs.
- Final exam (35%) will be a take-home exam and will cover all of the material from the course, including repeated measures designs, analysis of covariance, and aptitude-by-treatment interaction. The exam will be due on **Friday, 5/13/2015**.
- Required tasks (5%). A small number of required tasks will be assigned through Canvas, all at the beginning of the semester.

A tentative rubric for assignment of final grades is listed below. ***The instructor reserves the right to modify this rubric.*** Square brackets correspond to ≤ or ≥; rounded parentheses correspond to < or >.

A   [93, 100]
A-   [90, 93)
B+   [87, 90)
B   [83, 87)
B-   [80, 83)
C+   [77, 80)
C   [73, 77)
C-   [70, 73)
F   [0, 70)

No Extra Credit: Your course grades are based only on the above information. There will be no extra credit opportunities.

Grades of "Incomplete": Grades of "Incomplete" will not be given except in cases where the student can demonstrate extreme hardship.

Attendance: Attendance will not be taken into account for grades. Of course, students who attend class tend to be better prepared for exams.

Tentative Schedule

Date	Topics	Suggested Readings
1/19	Course introduction	
1/21	Statistics refresher	
1/26, 1/28, 2/2, 2/4	One-way ANOVA	Stevens Chp. 2
2/9, 2/11	Power analysis	Stevens Chp. 3
2/16	Exam 1	
2/18, 2/23, 2/25	Two-way factorial ANOVA	Stevens Chp. 4
3/1, 3/3	Randomized blocks	
3/8, 3/10	Higher-order factorial ANOVA	
3/22, 3/24	Review, Exam 2	
3/29, 3/31, 4/5	Analysis of covariance	Stevens Chp. 7
4/7, 4/12, 4/14	Covariate-by-treatment interaction	
4/19, 4/21, 4/26, 4/28, 5/1	Repeated measures ANOVA	Stevens Chp. 5
5/3	Review for final exam	

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.

ADA Accommodations

The University of Texas at Austin provides upon request appropriate accommodations for qualified students with disabilities. For more information, please contact the Office of the Dean of Students at 471-6259, 471-4671 TTY. If they certify your needs, I will work with you to make appropriate arrangements.

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.

Emergency Evacuation Policy

Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform the instructor in writing during the first week of class.
- In the event of an evacuation, follow the instructions of the instructor.
- Do not re-enter a building unless you're given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.