

Experimental Design

Stat 514 - Fall 2018

TR 3:00 - 4:15 WANG 2555

Instructor	Bruce A. Craig
Office	MATH 250
Office Hours	M 3:00 - 4:30, W 3:00-4:30, or by appt
Phone	4-6043
Email	bacraig@purdue.edu
Web Page	http://www.stat.purdue.edu/~bacraig/stat514.html

Textbook : Design and Analysis of Experiments (8th Edition) - Montgomery

Course Objectives : To be able to plan an experiment in such a way that the statistical analysis results in valid and objective conclusions. To learn a variety of experimental designs and be able to choose an appropriate design for a specific study. To be able to perform the proper statistical analysis and draw valid conclusions from a specific experiment.

Computing : We will primarily use SAS output in lectures, homework, and exams. SAS code will be provided on the course Web page for all output presented in class. Statistical software, such as JMP, SPSS, R, and MATLAB, can be used for homework and the project but you are responsible for finding technical support as needed.

Breakdown of Grade : The final grade is based on a total of 500 points broken down into Homework 125 pts, Exams (3) 300 pts, and a Project 75 pts. The general policy is 90% for an A, 80% for a B, etc. Cutpoints may be lowered but will never be raised. Plus/minus grades are given when appropriate. The group project will begin on about the third week and conclude with a written summary and a class presentation the last week of class. Each exam focuses on the course material covered since the previous exam but it will still contain earlier material due to the repetition of concepts.

Attendance : Attendance is optional but you are responsible for any announcements and the material covered during the lecture. If you cannot attend an exam at the assigned time because of an unplanned but legitimate reason (e.g., sickness, family emergency), a make-up exam will be scheduled. If you have another reason, such as a job interview or plan to attend a conference, you must notify me at least two weeks prior to the exam in order to decide on the legitimacy of the reason and the possibility of rescheduling the exam. Arranging cheap airfare home prior to the final is never a legitimate reason.

Emergencies : In the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes that may be necessitated by a revised calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website.

Homework : Homework will primarily be due Thursdays by 11:59 PM. They can be turned in via Blackboard or shortly before or after class. Homeworks turned in afterward will not receive credit so it is best to turn a partially completed homework than nothing at all. Homeworks cannot be made up. Due date exceptions may be arranged if discussed at least four days in advance. Expect around 11 hws during the semester. The lowest homework score will be dropped when computing the final HW grade. They will be handed out at least a week in advance so you can work around potential conflicts. All homeworks will be graded by a grader and then checked by me before their return. Should you have questions regarding the scoring, talk to me as I will keep the official homework grades. I reserve the right to look at all exercises should there be a question regarding partial credit.

HOMEWORK POLICY

Your homework must have the exercises presented in order. The solutions must be clearly readable (hand written or word processor) and easy to follow. These solutions should include all relevant graphs and tables appropriately labeled and described. You are limited to a maximum of three pages per exercise (unless discussed with me). Any graph or table that is turned in without comment or spans across more than one page will be ignored. You can use a word processor or editor to edit or cut and paste specific software output. Providing extra output (or not highlighting the important information) can result in a loss of points. You are permitted to discuss the homework exercises with fellow students but each must write up their own solution. Failure to follow this policy will result in an initial warning, followed by a 50% reduction in points, then a 100% reduction in points.

Important Dates : –These will be updated through the summer–

- Tues Oct 9th - NO CLASS (October Break)
- EXAM I (in evening - TBD)
- EXAM II (in evening - TBD)
- Tues Nov 20th - NO CLASS (replaced by evening exams)
- Nov 22nd - NO CLASS (Thanksgiving)
- EXAM III (During finals week - TBA)

Other Helpful Texts :

- A First Course in Design and Analysis of Experiments - Oehlert (2000)
- Analysis of Messy Data - Milliken and Johnson (2009)
- Statistical Principles for the Design of Experiments - Mead, Gilmour, and Mead (2012)
- Statistics for Experimenters - Box, Hunter, and Hunter (2005)
- SAS for Mixed Models - Littell, Milliken, Stroup, Wolfinger, and Schabenberger (2006)

Course Schedule :

Chapter(s)	Description	Approx. Time
2	Overview of Design Principles and Hypothesis Testing	1 wk
3,12,14	Completely Randomized Design	3 weeks
4	Randomized Block Designs	3 weeks
5,14	Factorial Designs	1 week
12	Mixed Models/Random Effects	1.5 weeks
13	Nested Designs, Split Plot, Repeated Measures	3.5 weeks
6,7,8	Fractional Factorial Designs	1 week
11	Response Surface Methods	1 week