

STA 4211 Design and Analysis of Experiments

Spring 2016

Section 2A23 MWF 6th period, 12:50pm-1:40pm, FLO 100

Instructor Deborah Burr, 116C Griffin-Floyd Hall (FLO); Office Hours: MWF 1:55-2:40pm, or by appointment; Email: burr0stat.ufl.edu (put “4211” in the subject line). Phone: 273-2973 (Do not leave a message.)

Teaching Assistant Ruoxuan Xiang, FLO 101C, Tuesday 10:40am - 12:40pm

Required Materials

Textbook Kutner, Nachtsheim, Neter, and Li, *Applied Linear Statistical Models Vol. II*, 5th ed. (Bookstore has big paperback.)

E-book on R Peter Dalgaard, *Introductory Statistics with R*, 2nd ed. Available at UF library.

Scientific calculator You need one which will compute the mean and standard deviation automatically. You will use it for tests. A graphing calculator is allowed.

Statistical Software We will use the free statistical computing language R; download it in the first week of the semester from [http : / /www. r-pro ject. org](http://www.r-project.org)

Top Hat account We will use TopHat for taking attendance, and for automatic grading of “active-learning questions” and in-class quizzes. See [tophat. com](http://tophat.com) for information. Sign up by Wednesday January 13; follow instructions in the email you were sent by Top Hat. Cost: \$24

Prerequisite STA 4210, Regression Analysis.

Course Description This course is on the basic principles of experimental design (control, randomization, and blocking), and the analysis of data gathered by a number of typical designs. The course begins with the completely randomized design for experiments with a single factor, then moves on to randomized blocks and two-way factorial experiments. Model equations, index notation for ANOVA models, decomposition of the sum of squares, estimation of effects, F tests, and graphical methods for displaying the data and for checking assumptions are common themes for all designs. Several methods of multiple comparisons will be covered. More complicated models will include higher-way factorials, latin squares, incomplete blocks, models with nested factors, and covariance models. The course will end with response surface methodology. Together with linear regression models, the models for analysis of variance are cases of the general linear model, for which matrix notation and linear algebra are commonly used. This connection with regression models, and other connections, will be brought out throughout the course.

Grading Your final course grade will depend on your course score based on the following four components with their respective weights:

Homework/Quizzes:		25%
Exam 1:	Monday February 8 (8:20pm, location TBD)	25%
Exam 2:	Wednesday March 16 (8:20pm, location TBD)	25%
Exam 3:	Friday April 15 (8:20pm, location TBD)	25%

The assignment of letter grades will be determined as follows (cutoffs will be no stricter than indicated, and may be relaxed): A 93-100; A" 90-92; B+ 87-89; B 80-86; B" 77-79; C+ 74-76; C 67-73; D 50-66; E < 50

Homework There will be about six homeworks and multiple quizzes. A typical homework will require you to carry out a data analysis, and produce a report of the analysis. You are expected to gain proficiency in using R through the homeworks. You may get help with homework problems, but the final write-up of your report must be your own. Quizzes will consist of a few short-answer questions; they will often require short calculations but will also stress vocabulary and concepts.

Exams There will be three exams. On each exam, there will be several questions which describe an experiment, give R output from the analysis, and ask you to interpret the output. In analysis of designed experiments, quite a few calculations can be done "by hand," that is, don't require a computer. You will be asked to do some of these on the tests; bring a calculator.

Course Policies

Communication Use email for administrative matters; see me or a TA in person for content questions. It's ideal to ask questions right after class.

Homework Homework must be turned in at the beginning of the lecture on the due date. Late homework will not be accepted. Your homework percentage score will be taken out of 250 points. With quizzes and classroom participation points, the total possible points will exceed 280 points, giving you approximately a 30-point "cushion" possible on your homework score. Percentage score on homework is capped at 100%.

Exams The exams are closed-book, closed-notes. You may bring one 8.5 x 11 sheet of notes to each exam. Bring a picture ID, your calculator, pencils and erasers. Makeup exams must be approved before the time of the exam and will be given only in case of medical or family emergencies (which must be appropriately documented). All work must be entirely your own.

The exams are unit tests, not cumulative. There is no final exam. The final exam period for the course is Thursday April 28 12:30-2:30pm. This will be used for makeup tests.

Disabilities If you need to request accommodation due to a disability, please register with the Dean of Students office. The Dean of Students will provide documentation, which you then bring to me.