STA 4211 Design and Analysis of Experiments
Fall 2016
Section 183H MWF 3rd period, 9:35am-10:25am, FLO 100

Instructor Deborah Burr, 116C Griffin-Floyd Hall (FLO); Office Hours: MWF 12:45-1:45pm, or by appointment; Email: `burrøstat .ufi .edu` (put "4211" in the subject line); Phone: 273-2973 (Do not leave a message.) I do not use Canvas email.

Teaching Assistant Wei Xia, FLO 101C, Office Hrs Tues 9-1 1am

Required Materials

Textbook Kutner, Nachtsheim, Neter, and Li, *Applied Linear Statistical Models,* 5th ed., Vol. II (Chapters 15-30, Appendix A).

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

Course Notes On Canvas. Unit 1 is available now. The course notes are an outline of what I will go over in class and are *not* a substitute for class attendance.

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`. Also download Rstudio from `http : / /www. rstudio . com` (Desktop free license).

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, covariance models, and models with nested random factors. Further topics such as Latin squares, incomplete block designs, and response surface methodology, will be covered as time permits. 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. The course is divided into three units: Unit 1 One-way Analysis of Variance (ANOVA), Unit 2 Balanced Two-way ANOVA, Unit 3 Unbalanced Two-way ANOVA and More Complex Designs.

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

Homework/Project:		25%
Exam 1:	Monday September 26 (8:20pm, location TBA)	25%
Exam 2:	Friday October 28 (8:20pm, location TBA)	25%
Exam 3:	Monday December 5 (8:20pm, location TBA)	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 nine weekly homeworks and a project. Homeworks will be posted at least one week before the due date. Information on the project is on the Canvas site now. You may get help with homework problems, but the final write-up of your report must be your own. `SeeHomeworkInstructions.pdf` for more detailed instructions. Some homework questions 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.

Exams There will be three exams; one of the exams will incorporate the academic learning compact (ALC) instrument for statistics majors. On each of the three 4211 exams, 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." You will be asked to do some of these on the tests; bring a calculator to all exams. The ALC exam is a 20-item, multiple-choice test on statistical concepts mostly from Statistics 1 which is a requirement of the Florida Board of Governors. Topics on this exam are listed in `AppliedTopics .pdf` under Files on Canvas.

Course Policies

Communication Use email only for administrative matters. Email me only at the UF email address `burr⌀stat.uf 1. edu,` and put the course number in the subject line; do not use Canvas email. See me or a TA in person for content questions. It's ideal to ask questions right after class.

Homework Homework is due at the beginning of the lecture on the due date. Homework submitted on Canvas will be accepted up until 11:59pm on the due date, with a ten-point penalty for homeworks submitted after class begins. Your homework percentage score will be taken out of 250 points. The total possible points will be around 275 points, giving you approximately a 25-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 Thur 15 Dec 3-5pm. 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.