STA 4210 Regression Analysis Fall 2020
Class No. 19115, MWF 2nd period, 8:30am–9:20am
Asynchronous lectures. Office hours MW during class time.

Instructor Deborah Burr, 116C Griffin-Floyd Hall (FLO); Office Hours: MW 8:30am - 9:20am, or by appointment, held via Zoom (see course website for Zoom Personal Meeting ID); Email: `burr@stat.ufl.edu` (put "STA 4210" in the subject line).

Teaching Assistant Lei Yang; Email `yang.lei@ufl.edu`

Online Course Site: `elearning.ufl.edu`

Contact Hours There are three contact hours per week; these will mainly occur in prerecorded lectures which will be available before each scheduled class time (asynchronous lectures). There will also be office hours each Monday and Wednesday during the scheduled class hour.

Course Communication

    Discussion forum in Canvas

    Zoom office hours (Instructor hrs are MW during class time.)

    E-mail for administrative matters only (Put "STA 4210" in the Subject line)

Required Materials

    Lecture notes Will be posted under Files on course website. The course notes are an outline of what I will go over in lecture and are *not* a substitute for watching the video lectures.

    Textbook Kutner, Nachtsheim, Neter, and Li, *Applied Linear Statistical Models*, 5th ed., Volume I (Chapters 1–14, Appendix A)

    Scientific Calculator You need one which will compute the mean and standard deviation automatically. This is for carrying out short computations to illustrate statistical methods which are covered in the text and in lecture. (You can choose to use a spreadsheet, or R, for this purpose instead.)

    Statistical Software We will use the free statistical computing language R; download it in the first week of the semester from `http://www.r-project.org`. Also download Rstudio from `http://www.rstudio.com` (Desktop free license).

Suggested Text Tilman M. Davies, *The Book of R*, e-book on Course Reserves.

Prerequisite STA 3024, or STA 3032, or STA 4321 and STA 2023, or MAS 3114 and STA 2023, or MAS 4105 and STA 2023

Course Description The course is primarily on the linear regression model, for which the main techniques are rooted in the method of least squares. Procedures are motivated by applications. Mathematical results are stated and explained, and occasionally derived. A course in mathematical statistics is helpful but not strictly required. The focus is on carrying out and explaining the methods. After some review of basic statistics, the course proceeds systematically through the simple regression model, the multiple regression model, the matrix formulations of both these models, and a number of related tools such as model diagnostic measures, collinearity statistics, and variable selection procedures. Computations will be carried out in the R statistical programming language.

Main Course Objectives

1. With two quantitative variables, be able to carry out simple regression analysis and to correctly interpret such an analysis.

2. Know the multiple linear regression model in its matrix form, including all the common variations on this model (eg. continuous predictors, categorical predictors, square and interaction terms).

3. Be able to carry out and interpret inference procedures for the various types of multiple regression model, including the quadratic regression model.

4. Know what are the purposes of diagnostic methods in simple and multiple regression; be able to carry out several common diagnostic procedures and interpret them.

5. Know what multicollinearity is, why it is an issue in multiple regression, and how to analyze and deal with its presence.

6. Know several measures of model performance (R^2, adjusted R^2, and Akaike's Information Criterion), how to compute and interpret them for a multiple regression model.

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

Weekly homeworks:	On lecture topics	60%
Project #1	Simple linear regression; due Wed 23 Sept 8:00pm	12%
Project #2	Regression with two predictors; due Wed 28 Oct 8:00pm	14%
Project #3	Quadratic regression; due Wed 2 Dec 8:00pm	14%

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$^-$ 90–92.9; B$^+$ 87–89.9; B 82–86.9; B$^-$ 79–81.9; C$^+$ 76–78.9; C 70–75.9; C$^-$ 67–69.9; D$^+$ 64–66.9; D 60–63.9; D$^-$ 55–59.9; F < 55

Homework There will be weekly homeworks on lecture topics, every week except when a project is due, which together count 60% of your grade. Homework must be turned in on time each week. Homework will be automatically submitted on Canvas when it is due. Late homework will not be accepted. Show your work clearly on homeworks; to get credit for an answer, it is not sufficient to simply report a numerical answer.

There are three projects, each of which requires you to write a report of a data analysis. The analysis will be guided by questions in the assignment; however, student initiative in carrying out additional analysis steps is invited. Each project submission should consist of a single computer document which is uploaded on Canvas. In Project 1 the R output from a data analysis will be given to you; in Projects 2 and 3, you will write and run the R code and produce the output yourself.

Course Policies

Netiquette You are expected to follow rules of common courtesy in all class discussions, email messages, threaded discussions, and chats. See
`https://stat.ufl.edu/files/NetiquetteGuideforOnlineCourses-LLC.pdf`.

Privacy of zoom classes Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded.

If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared.

Honor Code You may discuss homeworks and projects with other students, with the TA, or with the instructor. You are expected to demonstrate your own understanding of the question by producing a written response in your own words; **your final write-up must be your own work**. Refer to the UF Honor Code at `http://www.dso.ufl.edu/sccr/process/student-conduct-honorcode/`.

Disabilities Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, `www.dso.ufl.edu/drc/`) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluations Students are expected to provide professional and respectful feedback

on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at `http://gatorevals.aa.ufl.edu/students/`. Students will be notified when the evaluation period opens (usually near the end of the semester), and can complete evaluations through the email they receive from GatorEvals, or in their Canvas course menu under GatorEvals. Summaries of course evaluation results are available to students at `http://gatorevals.aa.ufl.edu/public-results/`.