Syllabus – STOR 455
Fall 2019 (August 20 – December 4)
Section 001, TuTh 11:00am-12:15p
Hanes 120

Instructor:	Jan Hannig	**Phone:**	(919) 962-7511
Office:	330 Hanes	**E-mail:**	jan.hannig@unc.edu
Office Hours:	M 2:00 – 3:00 PM	**Course home page on**	
	W 9:30 – 10:30 AM	https://hannig.cloudapps.unc.edu/STOR455	
	and by appointment		
Teaching Assistant: Weiwei Li		**E-mail:**	weiweili@live.unc.edu
TA Office:	B7 Hanes	**TA Office Hour:** M 9:00 – 10:00 AM	

Target Audience: Undergraduate students in STAN major, and any other and is recommended for students throughout the natural and social sciences who are interested in applying regression analysis in their research and/or understanding the statistical concepts underlying the methodology.

Prerequisites: STOR 155 or equivalent. Some familiarity with matrix algebra recommended, but not required.

Required Text:

- Graybill and Iyer, REGRESSION ANALYSIS: Concepts and Applications. Available for free at http://www.stat.colostate.edu/%7Ehari/regression_book/index.html

Optional Text:

- Michael H. Kutner, Christopher J. Nachtsheim & John Neter, Applied Linear Regression Models, McGraw-Hill.

Course Format: Traditional lecture

Course Outline: This course presents regression analysis and related techniques. The topics include simple and multiple linear regression, matrix representation of the regression model, statistical inferences for regression model, diagnostics and remedies for multicollinearity, outlier and influential cases, polynomial regression and interaction regression models, model selection, weighted least square procedure for unequal error variances, and ANOVA model and test. Statistical software R will be used throughout the course to demonstrate how to apply the techniques on real data.

Programming Requirement: Throughout the course, we will be taking advantage of the R programming language. Before the course, you should download R, R-studio and R-markdown. All are free and directions are on Sakai. Also on Sakai are tutorials for getting

used to R. I recommend these for everyone in the class and you don't have to wait for the semester. They should be especially useful if you are new to R or new to programming in general.

Assessment: Your grade will be based on two midterm exams (40% of the grade) a project (10% of the grade), a final exam (30% of the grade), and homework sets (20% of the grade).

Important dates:

Final Exam:	see the published university schedule
Midterm exam:	Thursday, September 26
	Thursday, November 7
Class Project	Due: Tuesday, November 19
Homework:	Homework sets will be usually assigned every Tuesdays and due next week at the beginning of the class. Submissions are handled through Sakai website. Late/missed homework will receive a grade of zero.

Exams: Exams will be multiple choice and entirely closed book, closed notes. Missed exams will receive a grade of zero. Any student needing to be excused from the final exam due to the 3 Final Exams in 24 hour period rule must bring a written Dean's Excuse and discuss the situation with the instructor at least two weeks prior the end of the semester.

Homework: Problems will be posted on my website and will be due in a week at the start of the class. **No late homework will be accepted.** You are allowed to work with other students on the homework problems; however, verbatim copying of homework is absolutely forbidden and constitutes a violation of the Honor Code. Therefore, each student must ultimately produce his or her own homework to be turned in and graded. You are also encouraged to ask me for help on homework problems after attempting to solve the problems on your own.

Note: Material covered will be available on Sakai well ahead of each class session. The Honor Code https://studentconduct.unc.edu/sites/studentconduct.unc.edu/files/documents/Instrument.pdf will be observed at all times in this course. This course will participate in the Carolina Course Evaluation. Each student should feel comfortable approaching the Instructor with any concerns he/she has with the course. If there is a concern which cannot be resolved with the Instructor or with which the student does not feel comfortable approaching the Instructor, you may confidentially contact the Director of Undergraduate Studies at the STOR Department: Prof. Zia, 356 Hanes Hall, (919) 843-6022, ziya@email.unc.edu . For all questions on registration, contact Christine Keat, 321 Hanes Hall, (919) 962-2307, keat@unc.edu .

The instructor reserves the right to make any changes he considers academically advisable. It is your responsibility to attend classes and keep track of the proceedings.

Tentative Class Schedule

Date	Material	Assignment
20-Aug	Introduction	Homework 1
22-Aug	Case Study 1, Part 1	
27-Aug	Review of Ideas from STOR155 (distribution, Normal distribution)	Homework 2
29-Aug	Case Study 1, Part 2	
3-Sep	Review Inference (confidence intervals, tests)	Homework 3
5-Sep	Inference (two populations tests)	
10-Sep	ANOVA	Homework 4
12-Sep	Simple linear regression, introduction	
17-Sep	Simple linear regression, diagnostics and inference	Homework 5
19-Sep	Case Study 2, Part 1	
24-Sep	Review for midterm	(No homework, midterm)
26-Sep	Midterm	
1-Oct	Matrix Algebra	Homework 6
3-Oct	Multiple Linear Regression, introduction	
8-Oct	Multiple Linear Regression, diagnostics and inference	Homework 7
10-Oct	Case Study 2, Part 2	
15-Oct	ANOVA for linear regression, R^2	Homework 8
17-Oct	Fall Break, no class	
22-Oct	Model Selection, Outlier Detection	Homework 9
24-Oct	Case Study 3	
29-Oct	Advanced Regression Diagnostics	No homework (class project)
31-Oct	Polynomial Regression, Transformations	
5-Nov	Review for midterm	(No homework, midterm)
7-Nov	Midterm 2	
12-Nov	Interactions and Weighted Least Squares	No homework (class project)
14-Nov	Other Topics (LASSO, ridge regression, bootstrap)	
19-Nov	Logistic Regression, introduction	Homework 10
21-Nov	Logistic Regression, diagnostics and inference	
26-Nov	Review for final, student evaluation of teaching	No homework (Thanksgiving)
28-Nov	Thanksgiving, no class	
3-Dec	Review for final,	