STAT 304 - Applied Linear Regression

STAT 304/ Spring 2019

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Office Hours: 1:10-2:10 AM, Monday, Wednesday Friday,
10:00-11:00 AM,Thursday,
and by appointment.

Meeting Time: 12:00-1:00PM

Meeting Place: 305 Life Sciences

Required Text: *Regression Analysis by Example 5th Edition,* by Chatterjee and Hadi.

Course Objective: The objective of this course is to understand how to create and analyze models in order to extract information contained in a set of data. In our study of applied linear regression, we will become familiar with statistical software and learn how to apply it to problems in regression analysis. Further, we will learn how to effectively communicate our statistical findings in a manner that is both appropriate for our intended audience and technically precise.

Intended Learning Outcomes: By the end of this course, students will be able to …
…understand how to select and interpret a statistical model.
…understand the connections between regression analysis and the design of experiments.
…effectively communicate the information contained in a set of data using regression analysis.
…understand the role statistical software plays in regression analysis.
…understand the limitations of regression analysis and the assumptions necessary to use it.

Content: We will cover most of chapters 1 through 12 in the text. Included in these chapters is:

- Simple Linear Regression
- Multiple Linear Regression
- Regression Diagnostics
- Using Qualitative Variables as Predictors
- Transformations of Variables
- Weighted Least Squares
- Analysis of Collinear Data
- Variable Selection Procedures
- Lasso and Ridge Regression
- Logistic Regression

Tests: There will be three tests during the semester. They will be on

- Friday February 8th
- Friday, March 15th
- Wednesdayt, April 17th

Homework: Homework will be assigned and graded for both completeness and correctness.

Projects: Throughout the semester we will be completing projects to better understand the material we are covering and master methods for data analysis using statistical software. The goal of these labs is to become comfortable with analyzing data and with creating, testing, and interpreting statistical models. Presentation and clarity will be a very

important aspect of the projects and all projects will be completed using Rmarkdown. Projects will include analysis of local real estate, marathon results, water quality, and sports analytics.

Final Exam: The final exam will be cumulative and will be given on Wednesday, April 24th, 8:30AM-11:30AM.

Grading: Grades will be assigned based on written assignments, tests, and a final exam.

Tests	40%
Assignments	40%
Final Exam	20%

A *tentative* guideline for determination of grade will then be:

A	> 93	B	83 – 86.9	C	73 – 76.9	D	63 – 66.9
A-	90 – 93	B-	80 – 82.9	C-	70 – 72.9	D-	60 – 62.9
B+	87 – 89.9	C+	77 – 79.9	D+	67 – 69.9	F	< 60

MCSP Conversation Series: Attending at least three MCSP conversation series event is required. Within one week of the lecture, a one page reflection paper will be due and will count as a quiz grade.

Special Note: There will be no class on Monday, March 11th.

Missed Test: I will not give make-up tests. If you miss a test and have discussed it with me before the class takes the test, I will use your final exam grade for replacement.

Make-up Work: No make-up work will be accepted. Any excused work will be replaced by the final exam.

Expected Hours of Work: This course expects you to spend at least 12 hours of work each week inside and outside of class.

Attendance: Attendance is required and expected and is crucial to be successful in this course. An absence that is not discussed with the instructor prior to class is considered unexcused. Regardless of whether the absence is excused or not, you are responsible for all the material covered in class.

Technology: Scientific calculators, Mathematica, R, Minitab will be used throughout the semester in the classroom and on assignments. Cell phones are expected to be turned off before entering the class and computers will be used in the classroom exclusively for academic purposes.

Academic Integrity System: The Roanoke College Academic Integrity System applies to all graded work in this course. Students are responsible for understanding and adhering to the Academic Integrity System. Among other things the Academic Integrity System prohibits giving or receiving unauthorized aid, assistance, or unfair advantage on academic work. Please note that having a phone or unauthorized electronic device out during a test is an academic integrity violation.