

STAT 221. QR: Statistical Methods II

Course:	STAT 221	Instructor:	Tokunbo Fadahunsi, PhD.
Section:	A	Office:	306 Mansfield House
Semester:	Fall 2018	Office Hours:	TWR 3:00 PM - 4:00 PM
Lecture Room:	LAFAYE L300		or by Appointment
Meeting Time:	MWF 1:15 PM - 2:30 PM	Email:	afadahun@uvm.edu

Course Description: Multiple regression and correlation. Basic experimental design. Analysis of variance (fixed, random, and mixed models). Analysis of covariance. Computer software usage.

Expected Learning Outcomes: Upon successful completion of this course, students will be able to

1. Determine and utilize the appropriate statistical methodology for the data analysis of a given setting (within those methodologies discussed in class).
2. Conduct and interpret pairwise inferences of means, variances, and proportions.
3. Identify statistically significant main effect and interaction factors and parameter contrasts within the linear model setting.
4. Select a regression model that contains the most significant explanatory variables from a given set of variables.
5. Utilize residuals to assess model fit.
6. Interpret and present statistical results in a meaningful way to answer the scientific question of interest.

Required Text

Title: *Applied Regression Analysis and Other Multivariate Methods*
Author: Kleinbaum D.G., Kupper L.L., Nizam A. & Rosenberg E.S.
Edition: 5th
Publisher: CENAGE Learning
Note: *A copy of the text will be on reserve in the Bailey Howe Library.*

Prerequisite: STAT 143 or STAT 211; or STAT 141 and Instructor permission equivalent, i.e. Kleinbaum et al., Ch 1-4.

Topics: The course will cover material from the chapters listed below with additional topics as time allows.

Topics	Chapters
Straight-Line Regression Analysis	5
The Correlation Coefficient and Regression Analysis	6
The Analysis of Variance Table	7
Multiple Regression Analysis: General Considerations	8
Testing Hypothesis in Multiple Regression	9
Correlations: Multiple, Partial, and Multiple Partial	10
Confounding and Interaction	11
Regression Diagnostics (brief coverage, time permitting)	14
One-Way Analysis of Variance	17
Two-Way ANOVA with Equal Cell Numbers	19

Software: We will use the JMP (a SAS product) for most analyses discussed in class. To download JMP 12.0 or newer, <http://library.uvm.edu/services/statistics/software.php>, go to software archive under the JMP tab (this leads a secure site, so you will need your NetID and password to proceed). You can select either the Windows or the Macintosh platform, and click on Download JMP Pro now. JMP will be saved to a compressed zip folder once it is finished downloading. Click on the JMP zip file. For windows installation, select JMPPro12Win>JMP>>JMP_Pro>12_0>Windows>setup>exe. Run setup_exe and request the default settings.

You may use any statistical software package of your choice for doing homework. UVM has site licenses for JMP, SAS and SPSS and these statistical packages are all available to the UVM community at no charge. R is also free and can be downloaded from <cran.r-project.org>. Once here, click either “Download R for Windows” or “Download R for Mac (OS) X.” Then follow instructions to download R.

Grading Policy: Final letter grades are based on the total number of points earned out of a possible 540. Your total number of points earned will be divided by 540 and compared to the following percentage scale as follows:

- A: 90 – 100
- B: 80 – 89
- C: 70 – 79
- D: 60 – 69
- F: 00 – 59

Course Assessments: Points earned towards the final total are based on two midterm exams, a final exam, homework assignments and class activities.

Assessment	Points	
	Each	Total
Homework assignments (8, drop lowest)	15	105
Class activities (8, drop lowest)	5	35
Midterm Exams (2)	100	200
Final Exam		200
Grand Total		540

Assessment Details:

1. **Blackboard** Assignments and course information will be posted and regularly updated on Blackboard. **Late homework will not be accepted.**
2. **Exams:** The tentative date for each exam is indicated in the class schedule, but the final determination of the test date and material covered on each exam will be announced in class prior to the exam.

Attendance/Make-up Policy: Attendance will not be formally taken during lectures, but attendance is strongly recommended. Consistent with UVM guidelines, students absent from regularly scheduled examinations because of authorized University activities will have the opportunity to take them at an alternate time. Make-up exams for absences due to any other reason require prior arrangement with the instructor, if possible, and will be given at the discretion of the instructor.

Academic Assistance: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students and faculty to create reasonable and appropriate accommodations via an accommodation letter to professors with suggested accommodations as early as possible each semester. Also, students need to let me know about their accommodations as soon as possible. If you’ll need to take an exam at the proctoring center, you must schedule the test a week or more in advance. Contact ACCESS: A170 Living/Learning Center; 802-656-7753; access@uvm.edu; or www.uvm.edu/access.

Expectations and UVM Policies: Students are expected to act in accordance to the rules outlined in the University’s Policy Statements.

- **Laptops, Cell phones:** To be respectful of the learning environment and silence your electronics during class. Don’t text, check your phone, IM, or surf during class; if you have a legitimate need to do these things, leave the room quietly. If you do these things in class, you will be asked to leave.
- **Religious Holidays:** If you need to miss class to observe a religious holiday, please submit the dates of your absence in writing by the end of the second full week of the semester.

- **Absences:** If you are missing class due to a serious personal/health issue and you believe that the circumstances require some flexibility in course expectations, you must contact your college's Student Services. Once I receive their documentation, I will consider their recommendations for adjusting course expectations. If you are missing class due to a University sponsored activity, you must provide an official University letter outlining the dates and purpose. I will determine if any adjustments to course expectations will be necessary.
- **Academic Integrity:** Your commitment as a student to learning is evidenced by your enrollment at the University of Vermont. The Code of Academic Integrity requires you to be honest in all your academic course work. Faculty members are required to report all suspected infractions to the Center for Student Ethics and Standards. Cheating or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) may result in a failing grade in the course and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. Academic Integrity Policy.
- Code of Student Rights and Responsibilities.
- FERPA Rights Disclosure.
- Diversity at UVM and in the College of Engineering and Mathematical Sciences.

Tentative Schedule

Date(s)	Date	Topics
1	8/28 - 8/30	Review STAT 141/215 concepts, Straight-Line Regression Analysis
2 - 3	9/4 - 9/13	Correlation Coefficient and Straight-line Regression Analysis, The Analysis-of-Variance Table
4 - 6	9/18 - 10/4	Multiple Regression Analysis: General Considerations, Statistical Inference; Correlations: Multiple, Partial, and Multiple Partial
7	10/9	Exam 1
7 - 8	10/11 - 10/18	Confounding and Interaction in Regression, Dummy Variables in Regression
9 - 11	10/23 - 11/6	Regression Diagnostics, Polynomial Regression, Selecting the Best Regression Equation
11	11/8	Exam 2
12	11/13 - 11/15	One-Way Analysis of Variance
13	11/19 - 11/23	Thanksgiving Recess
14 - 15	11/28 - 12/5	Randomized Blocks: Special Case of Two-Way ANOVA, Two-Way ANOVA with Equal Cell Numbers
16	12/14	Final Exam, Friday, 12/14/18, 10:30 AM - 1:15 PM