Course Syllabus
Statistics 467: Applied Linear Regression Models Spring 2019

Department of Mathematical Sciences
Central Connecticut State University

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***Office Hours*:** Tuesday & Thursday: 10:05 AM– 11:35 PM; Wednesday: 1:00 PM – 3:00 PM.

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Course Description: The course provides an introduction to the most commonly used model in statistical data analysis. Simple linear regression, multiple regression, least squares estimators, inference, hypothesis testing, analysis of variance, and statistical model-building strategies are covered. Regression diagnostics, analysis of complex data sets and scientific writing skills are emphasized. Methods are illustrated with data sets drawn from the health, biological, and social sciences. Computations require the use of a statistical software package such as Open Source R.

***Prerequisite*:** STAT 416 and Admission to the Master degree or equivalent with a grade of C- or higher

***Textbook for Linear Models*:** Applied Linear Regression Models by M.K. Kutner, C.J. Nachtsheim, and J. Neter, 4th edition, McGraw-Hill/Irwin, Inc., 2004. ISBN 0-07-301466-4

Topics Covered: Chapters 1-9 of linear models textbook will be covered in this course. See details in the course schedule section below.

Required Software: The software we will be using for this course is ***Open Source R***. Information about this software and how to download and install the software, visit CRAN home page at http://cran.r-project.org/. As a service to you, I have provided you with the PowerPoint R tutorial and the online version of R textbook Note that, you may choose to use other software in this course (see next section

below), but due to my time constraint, I would not be able to answer your questions if you may have any difficulty with it.

How Will This Course Work? The course is divided into two parts. To see which chapter covers which dates, see the course schedule section. *All work due for a particular week must be done by the date and time indicated (which is Eastern Time): no exceptions*. To avoid last minute computer glitches etc you should get your work in as early as you can. Computer glitches which make your report or other work late will cause points to be docked, just as it would if you were submitting the material to your business manager. Your grade will be based on the online homework assignments, exam and the final project – the weights for all of these are given in the Course Assignments grid below.

Course Assignments:

Assignment	Points of Course Grade
Introduce Yourself Thread	2 bonus points
Seven Online Quizzes based on Chapters 1-7 of linear models textbook	70
Final Project: Linear Models	70

Grading Scale: The grading scale for this class is pretty standard. It would be based on your total cumulative points including the bonus points you have earned.
A: 130 or above; **A-**: 126-129; **B+**: 122-125; **B**: 116-121; **B-**: 112-117; **C+**: 108-111; **C**: 102-107; **C-**: 98-101; **D+**: 94-97; **D**: 88-93; **D-**: 84-92; **F**: below 84.

Withdrawal Policy: After **April 22**, withdrawals are allowed only under extenuating circumstances and require approval of the course instructor, department chair, and dean of the School of Engineering, Science & Technology.

How Much Time Should I Spend Studying and Working on the Course? Never for a moment lose sight of the fact that this is a challenging graduate-level course, and will require your best effort, especially in an online environment. Therefore, if you are to succeed in this course, you will have to set aside a significant amount of time for studying, assignments, projects, and exams. Undergrad courses typically require at least 8-10 hours of student work each week. If you do not make that commitment, your chances of success are greatly diminished.

Lecture Notes: The textbook for Linear Models explains most of the materials very nicely and discusses the practical examples followed by these materials. However, I will provide the lecture notes for several topics from first couple of chapters that could show further simplifications for those materials, along with different sets of examples. So, the best way to learn the subject is to read the textbook material covered. In addition, *you are encouraged to raise questions in the threaded discussions and try to answer questions that being asked by your fellow classmates***.** Note that, I also provide R code, along with the outputs for the examples discussed in my lecture notes.

Threaded Discussions: Participation in the threaded discussions is viewed as a very important part of the online learning process. Feel free to post new items to the Discussion Thread for each week. These can be questions, comments, or response to someone's posting.

The Introduce Yourself threaded discussion is required. Participation in the threaded discussions is very important and recommended. For the Introduce Yourself threaded discussion, you are required to make one original post of your own, and to respond to at least one other student's posting. **This will give 2 bonus points**, *if you address all the items completely*. Go to the welcome page to see the links. Get to know your fellow classmates, and you will find that we have a special group of people here.

Homework*:** Weekly or bi-weekly homework assignments will be given in this course. You will find the link for weekly or bi-weekly homework assignments in the "Lecture Notes***" on the homepage. Although these will not be collected for grading; however, a bonus up to 2 points will be rewarded to those who will complete all of assigned homework problems correctly, and turn in neatly written answers to all questions by the end of this semester. E-mail or US mail copies are acceptable. Actively solving these problems are strongly recommended and the best way to learn the course material. Note that you have the opportunity to brainstorm with each other through threaded discussion, share ideas if you wish, and ask questions. Moreover, you may ask questions about R; however your solutions, of course, must be your own.

Online Quizzes: There are seven online quizzes in this course for the linear models part. You must take the quizzes on or before the due date **(see the due dates on Page 4)**. Quizzes must be taken at any time before the due date – no make-up quizzes will be given. **Note that, if you don't like your grade on the first attempt, then you may take it again (maximum two attempts). The higher of your two grades will be entered as your grade**.

Final Project: There is one major Linear Modeling Project Assignment this semester based on ***Open Source R***. Note that you may use other software to do any part of this project that you feel it would be more convenient for you. **The final project will be available on April 4th, due "in my hands" by dropping off into my office/mailbox or must be emailed via BL email by May 9th on or before 5:00PM ET. If you wish, you could mail via US Mail (first class or priority) or the equivalent (Fed Ex, etc.).**

Submitting the Final Project: When you open the Final Project, please read carefully the instructions on how to submit your work. You will be asked to submit one electronic copy via BL email. However, you could send your hard copy via US Mail on or before due date. US Mail (first class or priority) or the equivalent (Fed Ex, etc.) is acceptable. **Do NOT fax it**. My mailing address is at the top of this syllabus. If you do not turn the final project in by its due date, **you will fail the course**. Moreover, there will be not given an incomplete grade for this course. **If procrastination is a problem for you, then please don't take this course**.

Caveat: You need to be comfortable and proficient with computers and the Internet environment. Online education is not for everyone! You should be mature and work well independently, and you need to be comfortable with the Blackboard Learn platform. You are responsible for all material assigned during the semester, the content of the texts and chapters covered. **Reading the textbook is required**.

Course Schedule: The course schedule is given below. The due dates are final, *no exceptions.*

Week	Start Date	Topics (Part-I: Linear Models)	Readings
1	Jan. 22	Simple Linear Models	Sections 1.1-1.5
2	Jan. 28	Estimation in the Simple Linear Models	Sections 1.6-1.8
		Quiz1-Ch1 Due on Feb 4th at 11:55PM ET	
3	Feb 4	Inferences in the Simple Linear Models Interval Estimation of the Mean Response	Sections 2.1,2.2 Section 2.4
4	Feb 11	Prediction of New Observation ANOVA and other Approaches to Regression Analysis	Section 2.5 Sections 2.7-2.9
		Quiz2-Ch2 Due on Feb 18th at 11:55PM ET	
5	Feb 18	Residual Analysis F Test for Lack of Fit, Transformations	Sections 3.2-3.3 Sections 3.7-3.9
		Quiz3-Ch3 Due on Feb 25th at 11:55PM ET	
6	Feb 25	Simultaneous Inferences concerning Parameters, Mean Responses, and New Observations	Sections 4.1-4.4
		Quiz4-Ch4 Due on March 4th at 11:55PM ET	
7	March 4	Matrix Approach to Simple Linear Regression	Sections 5.9-5.13
		Quiz5-Ch5 Due on March 11th at 11:55PM ET	
8	March 11 March 18	**Spring Recess – No Classes** Multiple Regression Models: Residuals, ANOVA	Sections 6.1-6.3
9	March 25	and Inferences in Multiple Reg.	**Sections 6.4-6.6**
10	April 1	Estimation of Mean response and Prediction of New Observation Diagnostics and F Test for Lack of Fit	Sections 6.7 Sections 6.8-6.9
		Quiz6-Ch6 Due on April 8th at 11:55PM ET	
		Final Project posted on April 4th	
11	April 8	Extra Sums of Squares and Tests concerning Reg. Coefficients	Sections 7.1-7.3
12	April 15	Partial Determination Multicollinearity and Its Effects	Section 7.4 Section 7.6
		Quiz7-Ch7 Due on April 22th at 11:55PM ET	
13	April 22	Work on Final Project	
14	April 29	Work on Final Project	
15	May 6	Work on Final Project	
		Final Project: Linear Models Due: May 9th at 5:00PM ET	

Cheating: Cheating on any part of an exam will result in an automatic F in the course. Cheating includes, but is not limited to, receiving assistance from a class member or a non-class member on an exam and assisting a class member on an exam.