Lamar University
Department of Mathematics

MATH 5300-01: Regression Analysis
Fall 2017 Syllabus
TR 2:20-3:40; L-118

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Office Hours: TR 11:00-12:00; 1:20-2:20, others by appointment
Textbook: Introduction to Linear Regression Analysis (5th edition) by Montgomery, Peck, and Vining
Prerequisites: Grade of C or better in MATH 3370 or its equivalent

Catalog Description: Simple linear regression, theory of least squares, multivariate analysis, theory of the general linear model, application to real life data, modeling, and interpretation of numerical results along with computer-generated graphics in regression analysis

Learning Outcomes: Upon completion of the course students will:

(1) Apply the simple linear regression model;
(2) Define the theory of least squares and explain its use in statistics;
(3) Solve problems using the multiple linear regression model;
(4) Explain the model adequacy checking for model assumptions;
(5) Utilize regression to analyze and to model real life data;
(6) Perform modeling with software, MINITAB or SPSS;
(7) Interpret graphical and numerical results from the MINITAB, SPSS, or other statistics software in regression analysis.

Lectures/Discussions: Chapters 1, 2, 3, 4, 5, 7, 8, 9, 10, and 11 of the text will be covered. See the following list of course topics contained respectively in those chapters. The course topics will be mainly conveyed through the traditional lecture format. If you should have difficulties in the course, please stop by L-203 or L-209 during my office hours for help.

1. Simple linear regression model
2. Least-squares estimation of the parameters
3. Hypothesis testing on the slope and intercept
4. Interval estimation in simple linear regression
5. Prediction of new observations
6. Coefficient of determination
7. Some considerations in the use of regression
8. Multiple regression models
9. Estimation of the model parameters

10. Hypothesis testing in multiple linear regression
11. Confidence intervals in multiple regression
12. Hidden extrapolation in multiple regression
13. Multicollinearity
14. Residual analysis for model adequacy
15. Variance-stabilizing transformation
16. Transformations to linearize the model
17. Analytical methods for selecting a transformation
18. Generalized and weighted least squares
19. Polynomial models in one variable
20. Polynomial models in two or more variables
21. Variables selection and model building
22. Stepwise regression methods
23. Multicollinearity diagnostics
24. Robust regression
25. Nonlinear regression
26. Logistic regression models

Grading Policies: There will be two tests for the course. Each of the two tests will count 25% of your final grade. The second test will be given on the date of your final exam. Since this course is cross-listed with Math 4313, an undergraduate course, graduate students for graduate credit must complete, in addition to the work required of the undergraduate students, an independent project in written form. The specific format for the project will be given around the mid of the semester. The statistical software required for the project is MINITAB. The project will count 20% of your final grade. Homework will be assigned regularly. It is expected that you solve all assigned problems. You can expect the tests to contain problems similar to those assigned in the homework. Homework will count 20% of your final grade. Missed work can be made up only if there is extenuating circumstance. It is expected that you will be regular and punctual in attendance. Class participation will count 10% of your final grade. The grading scale is as follows: A 90-100; B 80-89; C 70-79; D 60-69; F<59.

Final Exam: Tuesday, December 12, 2017, 2:20 - 3:40

Electronic Devices: Electronic devices are not allowed during class period except the case that you use an e-book for the course. Please turn off or silence your phones, and put your iPads and iPods away.

Important Dates:

September 20 - last day to drop or withdraw without consulting with the instructor
October 6 - last day to drop or withdraw without academic penalty
November 10 - last day to drop or withdraw with academic penalty
December 12 - final examination

Important Information for Students

Lamar University expressly prohibits intimidation and harassment of students, faculty, staff, or applicants. http://dept.lamar.edu/studentaffairs/handbook.htm

Drop Policy: Please make note of the three dates indicated in this drop policy. Any drop will be your responsibility; I will not drop a student from the course.
***September 20, 2017*:** (Census Date-Six Drop Rule does not apply) A student may drop or withdraw without consulting with the instructor. The Six Drop Rule does not apply to a drop before 5:00 PM.
***October 6, 2017*:** (Six Drop Rule applies) A student may drop or withdraw from the course without academic penalty and receive a Q, however, the Six Drop Rule applies. The student will consult with the instructor and the Records Office to initiate a drop.
***November 10, 2017*:** (Six Drop Rule applies) Last day to drop or withdraw with academic penalty; the student must be passing the course at the time of the requested drop in order to receive a Q. The drop form, including all required signatures, must arrive in the Records Office by no later than 4:00 PM. No drop is allowed after this date except in extreme extenuating circumstances. Any "late drop" must be approved by the instructor, department chair, college dean, and provost.

Academic Integrity: Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Students are specifically warned against all forms of cheating and plagiarism. The *Lamar University Student Handbook* clearly reads: "Any student found guilty of academic dishonesty in any phase of academic work will be subjected to disciplinary action. Punishable offenses include, but are not limited to, cheating on an examination or academic work which is to be submitted, plagiarism, collusion, and the abuse of source materials." One aspect of the *Handbook*'s definition of cheating includes "purchasing or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm." Plagiarism is defined as "the appropriation and the unacknowledged incorporation of another's work or ideas into one's own and submitted for credit." Faculty members in the College of arts and Sciences investigate all cases of suspected plagiarism. Any student who is found cheating in this course will receive a course grade of F.
http://dept.lamar.edu/studentaffairs/handbook.htm

Accommodations: Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations. If you are

registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course.

Campus Closure: In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage (www.lamar.edu) for instructions about continuing courses remotely.

Emergency Procedures: Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at: http://www.lamar.edu/about-lu/administration/risk-management/index.html.
Following are procedures for the first two:

Severe Weather:

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter:

- **CALL -** 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID -** If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY -** Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND -** Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

Course Evaluations: You will have an opportunity to evaluate all aspects of this course in a formal process to be completed online near the end of the term. You will receive an email reminder through your LU account.

While I have made a sincere effort to ensure that this syllabus is correct, changes may be required. I will announce any substantive changes during a regularly scheduled class. If you find an error or omission, please advise me at once so that the other members of the class may be advised.

Revised: 08/15/2017, P.C.