

IE 5318-005/006/007 / Fall 2014
Applied Regression Analysis

Professor: Victoria (Tory) Chen, 420J Woolf Hall.

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Classes: MWF 10:00–10:50AM in 208 Woolf Hall. **Office Hours:** MF 2:00–3:00PM, W 4:00–5:00pm.

GTA: Khan Haque; Email: khanmdariful.haque@mavs.uta.edu. **GTA Office Hours:** TBD.

Required Text: *Applied Linear Statistical Models, Fifth Edition* by Michael H. Kutner, Christopher J. Nachtsheim, John Neter, William Li, 2004; OR *Applied Linear Regression Models, Fourth Edition* by Michael H. Kutner, Christopher J. Nachtsheim, and John Neter, 2004.

Prerequisite: IE 3301 or IE 5317 or some introductory probability/statistics course.

OIT Course: On campus students may take the *free* two-hour SAS Introductory Short Course on Friday, August 29, 1:00–3:00PM in UH 04 lab (see <http://www.uta.edu/oit/cs/statistics/classes.php>).

Description: An in-depth study of one predictor variable followed by the matrix approach to multiple linear regression. Topics include estimation, prediction, analysis of variance, residual analysis, transformations, multicollinearity, model selection, weighted least squares, ridge regression, robust regression.

Student Learning Objectives: At the end of this course, students should be able to: (1) understand fundamental concepts of linear regression, (2) perform a proper linear regression analysis on real data, and (3) interpret the analysis.

Exams: Both the midterm and final will be open book, open notes, and open calculator. Copies of the required text are not permitted and will be confiscated if brought to an exam. Please bring your UTA ID card to all exams. Students must sign an academic honesty statement on the exam. Report cheating to me.

Projects: There will be two projects, each consisting of two parts: the proposal and the full report. You may work in groups of two or three. For the proposal, your group must clearly state the problem of interest, describe the variables to be studied, reference the source of data, and present preliminary plots of the raw data to justify the applicability of SLR/MLR. Data may be collected by the group itself or may be obtained from outside sources (e.g., journals, internet). The proposal should be submitted via email to vchen@uta.edu. The full report should include data and complete analysis with good discussion. Both reports should be typewritten. Further description of the report requirements will be handed out in class. Any form of copying (including from past students' reports) will be reported to the university.

Homework Policy: You may discuss in groups (including SAS work). However, you must write up your assignment separately, written in your own words, with your own calculations and the necessary supporting computer output. Any form of copying (including from past assignments) will be reported to the university.

Makeup Policy: A makeup test will be given if the student provides *legitimate written documentation* proving an illness or emergency. If necessary, I may request additional information to verify the validity of your documentation. If you cannot attend an exam, you should make every effort to contact me beforehand.

Regrading Policy: If you would like a test/project regraded, you must submit a written statement which clearly explains the reason you would like a regrade. Please note that the *entire* test/project will be regraded.

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, attendance will be taken approximately 4 times during the semester. Students present will earn an attendance point. Each student's accumulated attendance points are added to the raw score of the final exam.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 9 hours per week of their own time in course-related activities, including reviewing lecture content, reading required materials, completing assignments, etc.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current graduate catalog.

Academic Integrity: All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, Section 2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/ses/fao>).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities, such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week, *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located via the stairs down the hall from the classroom. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Grading (tentative):

5% each	2 Homework Assignments (SLR, MLR): Last assignment is due Monday, November 24th.
20%	Midterm in class Friday, October 10th.
20%	SLR Project: proposal due Wednesday, September 24th, report due Wednesday, October 22nd.
25%	MLR Project: proposal due Wednesday, November 5th, report due Wednesday, December 3rd.
25%	Final in classroom Monday, December 8th, 8:00–10:30AM.

Letter grades correspond to the following score system:

A = 90–100; B = 80–89; C = 70–79; D = 60–69; F = below 60.

Course Outline (tentative): Chapters based on Kutner et al. (2004)

0. Statistics Review: Descriptive Statistics and Data, Basic Probability, Normal Distribution, Inferential Statistics
1. Simple Linear Regression (SLR)
 - 1.1 The Simple Linear Regression Model: 1.1–1.5
 - 1.2 Fitting the Regression Line: 1.6–1.8
 - 1.3 Inferences on β_0 and β_1 : 2.1–2.3
 - 1.4 Inferences on the Regression Line: 2.4, 2.6
 - 1.5 Prediction Intervals: 2.5
 - 1.6 The Analysis of Variance Table: 2.7–2.8
 - 1.7 Correlation: 2.9
 - 1.8 Residual Analysis: 3.2–3.8
 - 1.9 Transformations and Nonparametric Regression: 3.9–3.10
2. Multiple Linear Regression (MLR)
 - 2.1 The Multiple Linear Regression Model: 6.1
 - 2.2 Matrix Approach to Multiple Linear Regression: 6.2 (refer to Ch. 5)
 - 2.3 Fitting the Regression Model: 6.3–6.4
 - 2.4 Analysis of Variance: 6.5
 - 2.5 Inferences and Prediction: 6.6–6.7, 6.9
 - 2.6 Model Adequacy: 6.8
 - 2.7 Building the Regression Model – Part I: 7.1–7.3, 7.5–7.6, 8.1–8.2
 - 2.8 Building the Regression Model – Part II: 9.1–9.6, 10.1–10.6
 - 2.9 Building the Regression Model – Part III: Ch. 11

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911.