

BUSI 6220 – Applied Regression Analysis Fall 2019

CLASS (DAY/TIME): W 2:00-4:50, BLB 065
INSTRUCTOR : Dr. Arunachalam Narayanan (Chalam)
OFFICE: BLB 379J
OFFICE HRS: **T 2:00 – 4:00 pm (Frisco Campus);**
W 10:00 – 12:00 noon, TH 2:00-4:00 pm, or by appointment
E-MAIL (preferred): Arunachalam.Narayanan@unt.edu

Textbooks:

1. Pardoe, *Applied Regression Modeling*, 2nd Ed., Wiley, ISBN 978-1118097281 (*recommended text —HIGHLY RECOMMENDED*)
2. Kutner, Nachtsheim, & Neter, *Applied Linear Regression Models*, 4th Ed., McGraw-Hill, ISBN 978-0073014661 (*OPTIONAL*)
3. Mendenhall and Sincich, *A second course in statistics and regression analysis*, Pearson Education, ISBN 9780321691699 (*OPTIONAL*)

Software

Preferred: Excel 2016, MINITAB 17, IBM SPSS 24/25
Good to have : STATA, R 3.4, SAS 9.4 all available at CoB.

Learning Management System (Canvas)

The course is on Canvas. Please check frequently for updates.

Course Description

BUSI 6220 Applied Regression Analysis. 3 hours. Applications of multivariate regression analysis, analysis of variance procedures, canonical correlation analysis and nonparametric statistical procedures to issues in business research involving multivariate data. Topics include building, evaluating, and validating a regression model; analyzing models using hierarchical regression, contrast coding, partial correlations and path analysis; logistic regression; and comparing parametric and corresponding nonparametric tests. Prerequisite(s): DSCI 5180 or equivalent and BUSI 6450 (may be taken concurrently with BUSI 6220).

Learning Goals

At the end of the course, you should:

1. Understand the problems and opportunities when dealing with Regression Analysis.
2. Understand the role of regression analysis in decision making:
3. Understand how Regression models can be used to analyze research data and test research hypotheses.
4. Understand how regression coefficients establish testable relationships between variables.
5. Become familiar with some major statistical packages, such as Excel, MINITAB, IBM SPSS, STATA, SAS, and R, and be able to use them and perform regression analysis.

Class Attendance

Regular class attendance and informed participation are expected.

Exams

Three exams are scheduled for the semester: two midterms and a comprehensive final exam. A basic test on statistical tools (“diagnostic test”) will be administered in the second week of class as per the BUSI 6220 course guidelines. Midterms will be administered on the days indicated in the course schedule. The final exam is comprehensive and will take place as scheduled officially by UNT. The exams will mostly consist of problem-oriented questions and will typically be closed books & notes. In addition, I may assign part of the exams as a “take-home” portion.

Quizzes

A number of short, in-class quizzes will be given. These will typically refer to the lecture material, homework problems, and case studies, presented in the current and in the previous class period.

Homework Assignments

Homework problems and exercises will be assigned throughout the semester. I expect everyone to complete the assignments on time. Assignment reports will be turned in electronically, by uploading them on Canvas. You may be asked to present your solution to the class. I strongly encourage you to work the solutions to these problems on your own. However, I also want you to feel free to exchange ideas with other students in the course (except during the exams!) Keep in mind that homework problems, appropriately modified, may re-appear as exam problems.

Case Studies and Published Papers

Case studies and papers will be discussed throughout the semester. Each one of them is trying to make an important point, which you need to understand very well, and remember throughout the semester (and, hopefully, the rest of your career as a researcher or an academic!) In the research papers, which are sampled from business journals, the focus will be on the methods/research design, and results/statistical analysis sections. You are not asked to turn in any reports on case studies or published paper readings, and there will be no grade component directly assigned to the case studies or the published papers. However, keep in mind that the main points discussed in the case studies and the papers may appear on quizzes and exams.

Project

The course has a term project. The project should involve data you collected personally, including survey data, company data, personal data, or archival data. In order to contain unnecessary involvement of UNT students as survey subjects, you are encouraged to work in groups (of 2-3 members). You may expand on work you started in your Research Methods class (BUSI 6450) or other equivalent class, as long as you perform some original data analysis. Project status updates will take place throughout the semester. Results of your analysis will be presented to class in a brief (10 min or less) presentation, during the last week of classes.

Deliverables include

- (1) your **data set** in Excel format,
- (2) your **presentation slides** in PowerPoint format, and (3) your **methods write-up** in Word format.

Statistical Software

You are expected to be able to use relevant software required for solving problems assigned as homework and for take-home portions of the exams. I will provide examples, or even step-by-step instructions from time to time, but there will still be a lot of self-learning involved. We will use IBM SPSS and MINITAB extensively in this course. We will introduce STATA and R to a smaller extent. However, you are free to use any of these statistical packages for your analysis of exam/homework questions.

Grading

Your total grade in the course is on a **600**-point grading scale. Each midterm exam is worth 100 points; the final exam is worth 150 points. Each one of 10 graded HW assignments is worth 10 points, for a total of 100 points (the lowest grade out of the 11 HW assignments will be dropped). The term project is worth 100 points. Each one of 5 quizzes is worth 10 points, for a total of 50 points. Course grades will be assigned as follows:

> 90 % = A; 80 to 89 % = B; 70 to 79 % = C; 60 to 69% = D; < 60 % = F

Academic Integrity

This course adheres to the UNT policy on academic integrity. The policy can be found at <http://policy.unt.edu/sites/default/files/06.003.pdf>. If you engage in academic dishonesty related to this class, you will receive a failing grade on the test or assignment, and a failing grade in the course. In addition, the case will be referred to the Dean of Students (for graduate courses, also the Dean of Toulouse Graduate School) for appropriate disciplinary action.

The term “cheating” includes, but is not limited to,

- (1) use of any unauthorized assistance in taking quizzes, tests, or examinations;
- (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
- (3) the usage, without permission, of tests or other academic material belonging to a faculty member or staff of the university; or
- (4) dual submission of a paper or a project without express permission from the instructor.

The term “plagiarism” includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full or clear acknowledgment, or proper citation and reference. It also includes the unacknowledged use of materials prepared by another person or agency in the selling of term papers or other academic materials. (Source: Code of Conduct and Discipline at the University of North Texas; please check online for the most updated version and related definitions.)

Students with Disabilities

UNT complies with the Americans with Disabilities Act in making reasonable accommodations. Please see your instructor as soon as possible to discuss.

Deadlines

Dates of drop deadlines, final exams, etc., are published in the university catalog and the schedule of classes. Please be sure to stay informed about these dates.

Student Perceptions of Teaching (SPOT)

Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short Web-based survey will be available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in this feedback from my students, as I work to continually improve my teaching. I consider SPOT to be an important part of your class participation.

Campus Closures

Should UNT close campus, it is your responsibility to keep checking your official UNT e-mail account to learn if your instructor plans to modify class activities, and how.

BUSI 6220 TENTATIVE TIME SCHEDULE – Fall 2019

The schedule below is a tentative outline for the semester. It is meant to be a guide and several items are subject to change. Certain topics may be stressed more or less than indicated.

TEXTBOOK LEGEND: P=Pardoe, KNN= Kutner, Nachtsheim, Neter.

Week	Topics Covered	Readings and Exercises
1 (Aug 28)	Syllabus Lecture 1: Introduction to Simple Linear Regression, estimation of parameters <ul style="list-style-type: none"> • Analytical solution to LS estimation • Use of Excel, SPSS, MINITAB, and STATA 	P 2.1-2.3, KNN 1 HW0, HW1 Case 1: When test scores seem too good
2 (Sep 6) (Note the change in date)	Lecture 2: Inference in Regression Analysis <ul style="list-style-type: none"> • Using Excel, SPSS, MINITAB, STATA, R Diagnostic Test (1 hour duration)	P 2.3, KNN 1, KNN 2 HW2
3 (Sep 11)	Lecture 3: Model assumptions, analysis of residuals <ul style="list-style-type: none"> • Measures of Strength of Association • ANOVA approach to Simple Regression • Model assumptions 	P 2.4, KNN 2, KNN 3 HW3, Q1 Case 2: The Market Model and investment portfolio selection
4 (Sep 18)	Lecture 4: Diagnostics and remedial measures, simultaneous inference, Confidence Intervals, Prediction Intervals	P 2.6, KNN 3, KNN 4 HW 4, Q2
5 (Sep 25)	Lecture 5: Matrix approach to Simple Linear Regression	KNN 5 HW5, Q3 Project Update: Topic, group members
6 (Oct 2)	October 2, Exam 1	
7 (Oct 9)	Lecture 6: Multiple Regression Analysis <ul style="list-style-type: none"> • Matrix approach • Interpretation of coefficients • Model assumptions & residual analysis • Multicollinearity • Partial regression 	P 3.1-3.4, KNN 6, KNN 7 HW6 Project Update: Research Questions, Survey Items Case 3: The red car paradox

8 (Oct 16)	<p>Lecture 7: Nominal and Qualitative Scales</p> <ul style="list-style-type: none"> • Dummy Coding • Interaction terms <p>Quantitative Scales</p> <ul style="list-style-type: none"> • Power Polynomials • Orthogonal Polynomials • Transformations 	<p>P 4.1-4.3, KNN 8, Q4 HW 7 Case 4: Survey analysis/part 1</p>
9 (Oct 23)	<p>Lecture 8: Building the Regression Model</p> <ul style="list-style-type: none"> • Model Selection • Model Validation • Diagnostics 	<p>P 5.3, KNN 9 HW 8, Q5, Paper1 Case 5: Can regression make a case for causality?</p>
10 (Oct 30)	<p>Lecture 9: Regression Model Diagnostics</p> <ul style="list-style-type: none"> • Outliers • Influential observations 	<p>P 5.1, KNN 10 HW 9, Q6 Project Update: data collection status</p>
11 (Nov 6)	<p>November 6, Exam 2 (Monday, Nov 4: Last day to drop the course and avoid an F)</p>	
12 (Nov 13)	<p>Lecture 10: Autocorrelation in Time Series Data</p> <ul style="list-style-type: none"> • Autoregressive techniques • ACF and PACF plots 	<p>KNN 12 HW 10 Project Update: data collection status Case 6: survey analysis/part 2</p>
13 (Nov 20)	<p>Lecture 11: Additional topics of interest</p> <ul style="list-style-type: none"> • Mediation effects • Causal effects • Box-Cox transformations • Remedial measures for Multicollinearity 	<p>P 5.3, KNN 12, KNN 14 Q7, Paper 2 Project Update: data analysis status Case 7: an experiment</p>
14 (Nov 27) (<u>Thanksgiving</u> <u>Wednesday</u>)	<p>Lecture 12: Logistic Regression (May move it to Tuesday if it works for all)</p>	<p>KNN 14 HW11, Q8, Paper3 Project Update: data analysis status Case 8: gender bias in film</p>
15 (Dec 4)	<p>Term project presentations Review for the final exam (Course evaluation)</p>	<p>Final Exam take-home portion assigned Term Project presentation</p>
16 (Dec 11)	<p>FINAL EXAM</p> <ul style="list-style-type: none"> • Take-home portion due on Wednesday, Dec 11, 1:30PM • In-class comprehensive final exam: Wednesday, Dec 11, 1:30 – 3:30 pm (regular classroom) 	