

**McCoy College of Business Administration**  
**TEXAS STATE UNIVERSITY**  
**Department of Computer Information Systems and Quantitative Methods**  
**QMST 5334—ADVANCED STATISTICAL METHODS FOR BUSINESS**  
**Fall 2014**

**INSTRUCTOR:** Dr. Tahir Ekin **TEL:** 512-245-3297  
**OFFICE:** McCoy 411- Avery 464 L (Thursdays)  
**OFF. HOURS:** M: 12:30 - 13:30, T: 16:50 -18:20 and R: 15:50 -18:20 (Round Rock) Or by appointment  
**E-MAIL:** t\_e18@txstate.edu

Section	SCHEDULE Time	Room
002	R 18:30 – 21:20	Avery 363

**COURSE DESCRIPTION:**

The course provides the quantitative foundation for business analysis and decision-making. Topics include: regression analysis, mathematical programming, simulation and other analytical/modeling techniques with wide applicability in decision-making and problem solving in all functional areas of business.

**COURSE MATERIALS:**

**TEXTBOOK:**

Business Analytics: Data Analysis & Decision Making, Fifth Edition, Authors: Christian Albright and Wayne L. Winston, Publisher: Cengage Learning, ISBN-10: 1133629601, ISBN-13: 9781133629603

[http://www.cengage.com/search/productOverview.do?Ntt=38326851717577764128166351812142979700&N=16+4294922239&Ntk=P\\_EPI](http://www.cengage.com/search/productOverview.do?Ntt=38326851717577764128166351812142979700&N=16+4294922239&Ntk=P_EPI)

Additional reading will be assigned as necessary.

- Access to a laptop with Internet Connection
- Microsoft Office (Word, **Excel**)
- R Software (freely available: <http://www.r-project.org/> )

**Additional reading:**

Access to [E-brary](#) for the following reference books/readings:

- 1) Kazmier, L. J. (2003) Schaum's Easy Outline : Business Statistics, McGraw-Hill.
- 2) Karris, S. T. (2007) Mathematics for Business, Science, and Technology, 3rd Ed, Orchard Publications.
- 3) Cramer, D. (2003) Advanced Quantitative Data Analysis, McGraw-Hill Education.
- 4) Online Statistics Handbook: <http://www.itl.nist.gov/div898/handbook/index.htm>
- 5) *McGraw Hill Custom Textbook (Color E-Book)*. ISBN: 9781121553996  
<https://create.mcgraw-hill.com/shop/#/catalog/details/?isbn=9781121553996>
- 6) <http://www.openintro.org/stat/down/OpenIntroStatSecond.pdf>

**LEARNING OBJECTIVES:**

- Understand regression techniques and other popular statistical procedures and know when they can be useful to business problems;

- Understand mathematical modeling (optimization) techniques and be able to formulate applicable business problems using appropriate mathematical modeling techniques and solve the problems;
- Be able to read, understand and interpret properly the statistical analysis results and optimization models and solutions;
- Be able to do straightforward statistical analyses and mathematical modeling yourself.

**SKILLS AND KNOWLEDGE YOU ARE EXPECTED TO BRING INTO THIS COURSE:**

- Knowledge on the basic statistical concepts and methods to include descriptive analysis, probability distribution, expected value, variance, standard deviation, normal distribution, sampling distribution, confidence intervals and hypothesis testing for one population
- Knowledge of MS Office 2007/2010 products
- Knowledge of use of functions, formulas and graphing capabilities in MS Excel
- Ability to familiarize yourself with the MS Excel Add-ins

**PREREQUISITES:** BA 5353 or equivalent

**COURSE POLICIES:**

**A. INSTRUCTIONAL METHODOLOGY:**

Lecture, class discussion, self-directed learning

**B. ATTENDANCE:**

Regular class attendance is expected. While class attendance will not be taken every class, students who come to class will receive information during lecture that will assist in performing well on exams and homework. Being on time for class is also expected. It is your responsibility to find out what material was covered, should you miss a class.

**C. COURSE REQUIREMENTS:**

- **Homework (25%):** I expect you to read the material that will be discussed in class (presentation slides, book chapters, notes, manuscripts, etc.) before/after the class. In addition, there will be 6 assignments. For these assignments, a hard copy (print-out) of the written report that summarizes the results and includes the supporting graphs is due to the beginning of class. Your submission that results with your lowest grade will not be considered for the final grade computation. And the rest of each five will be counted for 5 % of your overall grade.

Please note that late submissions will not be accepted. So if you have only part of the assignment completed prior to the due date, submitting it will at least ensure partial credit.

- **Project (20%):** You will select a topic of your preference, explore data, or construct a model. Periodically, you will be asked to complete tasks and submit a brief group report. There will be certain check points in project evaluation.

For assignments and projects, working within a group which has up to 4 team members is strongly recommended. Working in groups will help you to come up with different perspectives while solving cases. However, all team members are expected to understand the assignment and their submission thoroughly as some portions of the assignments may be used in the exams. You can team up with students from the other section as well. Please email me the members in your group until the midnight of **September 4<sup>th</sup>, 2014**. One email per group is sufficient.

- **Midterm Examination (25%):** The midterm examination will cover material for the first half of the course. It will consist of two portions; take home and in class portion.

- **Final Examination (30%).** The final exam emphasizes the material discussed following the midterm.

**Make-up Examinations:** Read our exam schedule and make your arrangements. Make-up examinations will not be given unless you have a *valid and verifiable* excuse. An *approved* absence is one due to *medical* reasons or *emergencies*. I will determine what constitutes an *emergency*. Appropriate written documentation pertaining to the absence must be provided by you in order to document and determine whether or not the absence is excused. An absence that cannot be documented is unlikely to be excused.

The instructor will decide the date and time, format and content of the make-up test. A grade of **ZERO** will be recorded for the missing exam until it is replaced with the grade obtained in the makeup exam. If the final test is missed, an incomplete will be assigned and the makeup for the final exam will be taken the following semester.

**Grade Evaluation:**

Your grade will be based on your final weighted average score and the letter grade will be assigned according to the following table:

<b>Range</b>	<b>Grade</b>
[90%, 100%]	A
[80%,90%)	B
[70%, 80%)	C
[60%, 70%)	D
[0%, 60%)	F

Extra credit work is not appropriate at the graduate level.

You are responsible for material covered in class and on handouts, emails, or web postings whether or not it is in the recommended textbook.

**D. CLASSROOM CIVILITY:**

Disruptive behavior in the classroom is prohibited in Section 2.02 of Texas State's Code of Student Conduct and includes behavior that substantially or repeatedly interferes with the conduct, instruction, and education of a class. The complete Conduct of Classes policy is available at <http://www.provost.txstate.edu/pps/policy-and-procedure-statements/4-teaching/pps4-02.html>.

- A professional attitude and bearing is expected. Students who deviate from the expectation will be asked to abandon the course. The instructor reserves the right to ask you to leave the class or abandon the course if your behavior is considered to be a disturbance to the class.
- If you need to pay attention to your cell phone, leave the classroom.
- If you must read the newspaper or materials from other classes, leave the classroom.

**E. OTHER:**

**COURSE WEBSITE:**

TRACS will be used for posting of relevant course materials throughout the semester. You need a Texas State NetID to use TRACS. If you don't have one, you may want to request one as soon as possible. The website "<http://www.tr.txstate.edu/itac/netid.html>" has the details about how to obtain a Texas State NetID.

## **TRACS FORUMS:**

All course related questions should be posted in TRACS-Forums-Course Material Related Questions instead of communicating via email so that everyone can benefit from the discussion. There is another discussion forum thread created in which you can collaborate with each other regarding your profiles and class matters. For personal issues and confidential matters, you are more than welcome to email me.

## **SOFTWARE:**

You are expected to use Excel and R to perform all analysis in the class. I will demonstrate the use of this software during each class period.

The McCoy College Student Responsibilities on Learning is available at <http://advising.mccoy.txstate.edu/about/learningpolicy>.

## **UNIVERSITY/COLLEGE POLICIES:**

- A. DROP:** Dropping means that the student will remain enrolled in at least one hour in the current semester. A "W" will be automatically assigned if the drop procedure is completed on or before 5:00 p.m. on October 23, 2014. After this deadline the student will be unable to drop individual classes and will receive the grade earned in the course (see AAPPS 4.07 for a list of grades). It is suggested that students consult the instructor prior to dropping from the class.

**WITHDRAWAL:** Withdrawal means that the student is going to zero hours for the current semester. A "W" will be automatically assigned if the withdrawal procedure is completed on or before 5:00 p.m. on October 23, 2014. After this deadline, the student may withdraw on or before 5:00 p.m. on November 20, 2014. If the student is passing the class on the official date of withdrawal, a "W" grade will be assigned. If the student is failing the class on the date of withdrawal, a "U" grade will be assigned.

- B. ACADEMIC HONESTY:** Submission of any work for a grade for which unauthorized help has been received is termed academic dishonesty and will be grounds for a failing grade in the course. "Unauthorized" is a term used here to designate stealing, copying (with or without permission), collaboration with other individuals, or sharing programming code outside of sanctioned group activities. Students are strongly encouraged to refer to the Texas State student handbook, available at <http://www.dos.txstate.edu/handbook.html> for policies related to academic dishonesty. This instructor views any such act as a clear violation of ethical standards and will take appropriate disciplinary and punitive action.

- C. HONOR CODE:** All students are required to abide by the Texas State University Honor Code found in UPPS 07.10.01 under attachment I. The pledge for students states:

Students at our university recognize that, to insure honest conduct, more is needed than an expectation of academic honesty, and we therefore adopt the practice of affixing the following pledge of honesty to the work we submit for evaluation:

I pledge to uphold the principles of honesty and responsibility at our university.

- D. FINANCIAL AID:** Federal regulations require students to meet certain minimum academic and attendance standards in order to remain eligible for financial aid assistance. Other program-specific requirements may also exist. Additional information is available at [www.finaid.txstate.edu](http://www.finaid.txstate.edu).

- E. STUDENTS WITH DISABILITIES:** A student with a disability may require an accommodation(s) to participate in the course. They must contact the instructor as soon as possible, typically within the first two weeks of the semester. They will be asked to provide documentation from the Office of Disability Services (ODS) at that time. Failure to contact the instructor in a timely manner will delay any accommodations they may be seeking. Ongoing care by a physician does not automatically qualify you as an ODS special needs student. Students are required to file paperwork for accommodations with ODS each semester. Accommodations granted one semester do not automatically carry forward to the next. See UPPS 07.11.01 for additional information.

## Financial Aid Information

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### **Non-Attendance and Financial Aid**

If you are a Pell Grant, Iraq-Afghanistan Service Grant (IASG) or TEACH Grant recipient, federal regulations require you to have begun attending the courses for which you are enrolled and receiving these grants. If on the census date roster (e.g., 12<sup>th</sup> day of each fall and spring semester) you are reflected as not attending a course, you are assumed (for financial aid purposes) not to have begun attendance for that course. Your grant will then be adjusted or cancelled based on the courses you have actually begun attending.

### **Unofficial Withdraws and Financial Aid**

If you fail to earn a passing grade in at least one of your courses (i.e., all U's, all I's or a combination of all U's, W's or I's) during a semester, you are considered to have, for purposes of federal Title IV funds, unofficially withdrawn from the university. As a result, a federal withdrawal calculation must be performed to determine the amount of Title IV funds that you must repay. Once the amount you must repay is determined, Financial Aid and Scholarships will mail you a letter with the repayment details.

Note: A grade of U (Unearned Failing) is awarded to students who do not officially withdraw from but fail to complete a course (i.e., did not take a final exam, stopped attending, etc.) and failed to achieve the course objectives.

### **Satisfactory Academic Progress (SAP) and Financial Aid**

Federal regulations require you to meet certain minimum academic standards in order to remain eligible for financial assistance. The requirements are that you: 1) maintain a minimum cumulative Texas State GPA; 2) complete at least 70% of all your coursework; and 3) not exceed a maximum limit of attempted hours toward your degree or certificate program.

Additional program-specific requirements also exist (e.g., TEXAS Grant). You can view these SAP criteria in more detail at [www.finaid.txstate.edu](http://www.finaid.txstate.edu) by selecting *Undergraduate Aid* or *Graduate Aid* from the dropdown menu and then *Maintain My Eligibility*.

## PROJECT GUIDELINES

### (1) PROJECT OUTLINE:

In this part of the project, you will prepare a one page outline describing the problem you will investigate (analyze) by using at least one of the tools you learn in this class. For most of you this tool may consist of multiple regression. You will list the variables of interest and why you think they could be relevant in the analysis. You need to also list the reason why this analysis is of interest to you in particular. Specify the tool you will use. You will of course list the members of your group and learn how you will evaluate each other's efforts. It is due the beginning of Week 4 class. Grade 1/0

### (2) PROJECT MID EVALUATION

In this part of the project you will describe the variables you picked in (1) in detail. The data structure you have, whether these variables are ordinal, nominal, interval or ratio will be discussed. You will give some descriptive statistics (mean, median etc of the variables). Be ready to show your data. There will be a discussion with each group in class time (the date is provided in the syllabus.) Grade 1/0

### (3) FINAL REPORT & PRESENTATION

In this part of the project, you will apply the tool that you list in part 1. The maximum number of pages for the report CANNOT EXCEED 15 PAGES. Details in this section will be given as we progress along the course but if you are using multiple regression these are the tasks you need to do:

- a) An Executive Summary of your findings that you will detail in your report
- b) An Introduction that describes your problem and your approach
- c) Description of data including a discussion of the descriptive statistics and outliers
- d) Bivariate Analysis between the dependent and the independent variables
- e) A step by step discussion of model building including a discussion of variable transformations
- f) Presentation of your final and "best model"
- g) Discussion of the assumptions of your regression
- h) Validation analysis
- i) A conclusion that summarizes your findings
- j) Appendix where you put histograms, scatterplots, correlation tables etc.

The print out of the final report is due to the beginning of the final day of classes. Then, in the project presentation, you are expected to summarize your report and discuss it with the class. Grade out of 20 (15 for report, 5 for the presentation)

Your final grade will be the multiplication of the three grades from (1), (2) and (3).

## COURSE OUTLINE

\*This is a tentative schedule. Everything is subject to change if circumstances warrant. Additional reading will be assigned as necessary. T=textbook chapter, HW=homework

Week	Date	Topic	Readings / Homework Assigned	Homework/ Project Due
1	08/28	Introduction & Data Visualization	T1, T2, T3, <b>HW1</b>	
2	09/04	Sampling & Hypothesis Testing	T7, T9	
3	09/11	Hypothesis Testing, ANOVA	T9, T10, <b>HW2</b>	HW1
4	09/18	Regression	T10	PROJECT OUTLINE
5	09/25	Regression	T10, T11, <b>HW3</b>	HW2
6	10/02	Regression/ Time Series Analysis	T11, T12	
7	10/09	Time Series Analysis & Forecasting	T12, Midterm Take Home	HW3
8	10/16	<b>MIDTERM IN CLASS</b>		<b>Midterm Take Home</b>
9	10/23	Probability & Decision Analysis	T4, T6, <b>HW4</b>	
10	10/30	Decision Analysis	T6	PROJECT MID
11	11/06	Introduction to Optimization Modeling	T13, <b>HW5</b>	HW4
12	11/13	Optimization Modeling & Applications	T13, T14	
13	11/20	Optimization & Simulation	T14, T15, <b>HW6</b>	HW5
14	11/27	<b>NO CLASS-THANKSGIVING BREAK</b>		
15	12/04	Simulation & Presentation of Final Projects	T16, <b>FINAL EXAM</b>	<b>PROJECT REPORT, PROJECT PRESENTATION</b>
16	12/11			HW6, <b>FINAL EXAM</b>