BUSA 421 Data Mining
COURSE SYLLABUS: Fall Semester 2020

INSTRUCTOR INFORMATION

Instructor: *Joe Brodnax, CAP®*

Office Location: *BA 315C*
Virtual Office Hours: T/TH: 10:00-10:45; 2:00-2:30; M 11:00–12:00 (via YouSeeU Virtual Classroom); Additional virtual office hours will be provided as part of virtual lab sessions (TBA)

University Email Address: *Joe.Brodnax@tamuc.edu*
Office Phone: 903.886.5692
Office Fax: 903.886.5693

Preferred Form of Communication: Email
Communication Response Time: Within 24 hours

COURSE INFORMATION

Primary Reference Textbook(s)
INFORMS Analytics Body of Knowledge by James J. Cockran
ISBN: 9781119483212
Discovering Knowledge in Data: An Introduction to Data Mining by Daniel Larose
ISBN: 9780470908747
Data Mining for Business Analytics: Concepts, Techniques, and Applications by Shmueli, Bruce, Yahav, et. al.
ISBN: 9781118879368

Notes Regarding Course Learning Materials
- The recommended books are good reference material <u>but not required</u>.
- Some examples are from the recommended books. Some examples are developed according to the open learning materials from SAS as well. Learning materials such as the primary data sets will be provided as required.
- Accompanying the data mining material (lecture slides/videos) from the course, the instructor will be using advanced Excel and SAS guides, topic slides, and YouTube open lecture examples. Excel Solver (Analysis and Analytics add-on) and SAS University Edition will be the tools used in implementing the data mining applications.

Software Required

Access to Microsoft Office 2013 or later Excel Solver & Power Point. SAS® University Edition Studio, Guide, and Data Miner (free from SAS®). See Technology section.

Course Description

This course provides students with a foundation in basic data mining, data analysis, and predictive modeling concepts. Using practical business cases and projects, students will learn data analysis and data mining implementation techniques for business knowledge insights through a process of inference, model fitting, and learning from examples. The goal of the course is to teach students fundamental data mining techniques that are commonly used in practice. Data mining topics include linear classifiers, clustering, dimension reduction, classification and prediction methods, decision trees, time series analysis, optimization analysis, simulation methods, regression models, and model training/testing/evaluation.

Students will learn data mining from two perspectives: First, how to use an information technology tool (eg: SAS® Data Miner) to analyze data sets. Second, determine what the analysis results mean to business organizations. The two collections of knowledge will introduce students to data mining practices and data driven decision making in business operations and process management.

At the end of this course, students will not only understand fundamental data mining techniques, but will also understand the implications of the analysis result set to the business organization.

Learning Objectives

- To provide students with an understanding of data mining techniques and use of these techniques to perform appropriate data analysis in deriving an optimal knowledge base in meeting business goals/strategies

- To equip the students with a strong statistical foundation in which to employ in solving problems

- Prepare the students to understand the results from the data analysis and apply those results from a business perspective

Student Learning Outcomes

- Students will be able to demonstrate knowledge of data mining concepts, processes, and perform data analysis using data mining and statistical techniques

- Students will be able to interpret results from data analysis and how to apply those results to business problems, goals, and organizational strategies

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Using the Learning Management System, Microsoft Office Excel with Solver extension, SAS® University Edition (eg: Data Miner)

Instructional Methods

This course uses lecture/discussion videos (see technical section below), Microsoft Power Point (lecture and tutorial slides), Microsoft Office Excel w/ Solver, SAS® University Edition Studio, Guide, Data Miner and Learning Management System (see technical section below) including virtual sessions for course content, lab support, and office hours. Supplemental videos and documents will be provided to help reinforce course content.

Student Responsibilities

The University expects regular attendance by students in each course (whether in class or web based). Class attendance/participation is useful to the student as a means of acquiring knowledge and clarification. Frequent access to the course content and material is expected (both online and face/face classes). The instructor has access to login metrics for each student. Class participation is the active engagement in questions and answers, taking part in analyses of business situations, and contribution to material addressed in class. Additionally, students should check their official university email daily for information and guidance that may be provided by the course instructor.

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% or Below

The three major criteria used to determine the grades earned for the course are as follows:

Assignments/Tests	Percentage
Business Case Study (4 @ 12.5% each)	50%
Mid Term Exam	20%
Final Exam	30%
	100%

Assessments

There are four Data Mining Business Cases which include applying weekly course material directly to the Business Case Problem. Each Business Case is 12.5% of the 50% for the weighting distribution. Descriptions of the Business Cases will be posted as they are assigned. All Business Cases are individual efforts and are to be the result of the student's own work. **Using someone else's words/code/tool execution or ideas as if they were your own is plagiarism and fall within the academic integrity guidelines as noted below**. All Business Cases submitted will be evaluated for authorship and editing. These Business Cases give the student an opportunity to apply what they have learned each week.

Late Business Cases are highly discouraged. A penalty of 15% per day (including weekends) will be assessed on late Business Case. Under NO circumstances will Business Case more than two days late be accepted. No extra credit assignments are available.

Of note: All Business Cases due dates and exam times are US Central Time Zone. Please note that D2L will have a due date and end date noted for each Business Case and exam. The due date in D2L is when the Business Case is due as noted within the document and the end date in D2L is when the Business Case closes and the student will not be allowed to submit.

There are two exams. The midterm exam worth 20% and final exam worth 30% for each respective weighting distribution. Exams will consist of multiple-choice format but may include short answer or fill-in-the blank questions. Exams are always timed so preparation and familiarity with the material is important. The focus of the questions is on the course material but may include material from lectures, virtual discussion, reference material, and Business Cases. Data mining tools are required for some of the questions, so preparation for the exam by following the examples provided in the discussion videos and working the exam review questions is very important.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:
https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

Email is the preferred form of communication. Please be sure to include the course (number and section) to ensure a timely response. Emails are generally answered within 24 hours with the exception of weekends. When you have technical issues, please be sure to include screenshots as appropriate. Class slides, assignment descriptions, and the recording of grades are provided through MyLeo. Class announcements (e.g. change in assignment dates) will be sent to the student's email on record when available. **It is the students' responsibility to regularly check their University email.**

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

The University expects regular attendance by students in each course (whether in class or web based). Class attendance/participation is useful to the student as a means of acquiring knowledge and clarification. Frequent access to the course content and material is expected (both online and face/face classes). The instructor has access to login metrics for each student. Class participation is the active engagement in questions and answers, taking part in analyses of business situations, and contribution to material addressed in class. Additionally, students should check their official university email daily for information and guidance that may be provided by the course instructor.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: https://www.britannica.com/topic/netiquette

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Office of Student Disability Resources and Services
http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

COVID Statement

A&M-Commerce requires the use of face-coverings in all instructional and research classrooms/laboratories. Exceptions may be made by faculty where warranted. Faculty have management over their classrooms. Students not using face-coverings can be required to leave class. Repetitive refusal to comply can be reported to the Office of Students' Rights and Responsibilities as a violation of the student Code of Conduct.

Students should not attend class when ill or after exposure to anyone with a communicable illness. Communicate such instances directly with your instructor. Faculty will work to support the student getting access to missed content or completing missed assignments.

COURSE OUTLINE / CALENDAR

BUSA 421 Data Mining
Class Schedule
Fall 2020 - Prof. Brodnax

Week #	Chapters	Week Of	Lecture Material / Activities	Assignments/Notes
Week 1		Aug 24	Welcome & Course Introduction / Introduction to Data Mining Part 1	SAS Setup, Welcome Virtual Session
Week 2		Aug 31	Introduction to Data Mining Part 1 (Complete) / Introduction to Data Mining Part 2	SAS Setup (Complete)
Week 3		Sep 07	Introduction to Data Mining Part 2 (Complete) / Understanding and Preparing Data / Using Data & Data Tasks / Dimension Reduction	
Week 4		Sep 14	Dimension Reduction (Complete) / Pattern Discovery using Cluster Analysis	Business Case 1, Lab Virtual Session
Week 5		Sep 21	Pattern Discovery using Cluster Analysis (Complete) / Simple Linear Regression	
Week 6		Sep 28	Simple Linear Regression (Complete) / Multiple Linear Regression / Categorical Data in Linear Regression Models (Self Study)	
Week 7		Oct 05	Multiple Linear Regression (Complete) / Time Series Analysis – Moving Average / Time Series Analysis – Exponential Smoothing	Business Case 2, Lab Virtual Session
Week 8		Oct 12	Time Series Analysis – Moving Average / Time Series Analysis – Exponential Smoothing (Complete) / Mid Term Review / Mid Term Exam	Mid Term Exam
Week 9		Oct 19	Linear Optimization Analysis / Sensitivity Analysis (Self Study) / Integer Linear Optimization Analysis / Binary Linear Optimization Analysis: Logistical Distribution Problem	
Week 10		Oct 26	Optimization (with Binary Analysis)	Business Case 3, Lab Virtual Session
Week 11		Nov 02	Monte Carlo Simulation	
Week 12		Nov 09	Data Analysis / Decision Tree / Random Forest	
Week 13		Nov 16	What If Analysis / Predictive Machine Learning	Business Case 4, Lab Virtual Session
Week 14		Nov 23	Neural Networks / Thanksgiving Break	
Week 15		Nov 30	Data Mining Model Verification & Validation / Closing Remarks / Final Exam Review Material	Final Exam Review - Preparation
Week 16		Dec 07	Final Exam	Final Exam

Note: The week of assignments is when the assignment is provided, not the due date. The due date is noted in the assignment document.

*The descriptions and timelines contained in this syllabus are subject to change at the discretion of the instructor.