BUSA 421 Data Mining
COURSE SYLLABUS: Fall Semester 2023

INSTRUCTOR INFORMATION

Instructor: *Joe Brodnax, CAP®*

Office Location: *BA 315C*
Virtual Office Hours: 2:00 – 2:30 pm T/TH, 7:00-7:30 pm T, & By Appt.

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Preferred Form of Communication: Email
Communication Response Time: Within 48 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 but not required.
- 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 Viya for Learners 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® Viya for Leaners (free from SAS® - will be learned in class). See Technology section.

Course Description

This course provides students with a foundation in basic data mining, data analysis, and predictive modeling concepts. Using practical application assignments, 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® Viya) 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 and strategies
- To equip the students with a strong quantitative and analytical foundation in which to employ in solving problems
- Prepare the students to understand the results from data analysis and apply those results from a business perspective in helping to make better decisions moving forward

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® Viya for Learners

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® Viya for Learners 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%-89.9%

C = 70%-79.9%

D = 60%-69.9%

F = 59% or Below

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

Assignments/Tests	Percentage
Assignments	35%
DM/ML Terms Quiz (2)	20%
Mid Term Exam	20%
Final Exam	25%
	100%

Assessments

There are 8 assignments which include both material assignments directly relating to the content material in the course and application assignments which provide the student an opportunity to apply machine learning knowledge and skills. Each assignment is 12.5% of the 30% for the assignments weighting distribution. Descriptions of the assignments will be posted as they are assigned. All assignments are individual assignments 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**. Each student will have at least one week to complete each assignment. These assignments give the student an opportunity to apply what they have learned in each module.

Note: Compliant with COB Student Learning Objective 5: Students will be analytical problem solvers in business environments.

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

Of note: All assignment 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 assignment and exam. The due date in D2L is when the assignment is due as noted within the document and the end date in D2L is when the assignment closes and the student will not be allowed to submit.

There are two quizzes, each worth 50% of the 20% for the quiz weighting distribution. And there is a midterm exam worth 20% and final exam worth 25% 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 virtual lectures, virtual discussion, reference material, and assignments. 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 48 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.

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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

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

COURSE OUTLINE / CALENDAR

BUSA 421 Data Mining
Class Schedule
Fall 2023 - Prof. Brodnax

Week #	Week Of	Lecture Material / Activities	Assignments/Notes
Week 1	Aug 28	Welcome & Course Introduction / Introduction to Data Mining Part 1	SAS Setup, Assignment 1
Week 2	Sep 04	Introduction to Data Mining Part 1 (Complete) / Introduction to Data Mining Part 2	SAS Setup (Complete)
Week 3	Sep 11	Introduction to Data Mining Part 2 (Complete) / Understanding and Preparing Data / Using Data & Data Tasks / Dimension Reduction	Assignment 2
Week 4	Sep 12	Dimension Reduction (Complete) / Pattern Discovery using Cluster Analysis	Quiz 1
Week 5	Sep 25	Pattern Discovery using Cluster Analysis (Complete) / Simple Linear Regression / Assignment Lab	Assignment 3 (A)
Week 6	Oct 02	Simple Linear Regression (Complete) / Multiple Linear Regression / Categorical Data in Linear Regression Models (Self Study)	Assignment 4
Week 7	Oct 09	Multiple Linear Regression (Complete) / Complete Assignments	
Week 8	Oct 16	Mid Term Review / Mid Term Exam	Mid Term Exam
Week 9	Oct 23	Time Series Analysis – Moving Average / Time Series Analysis – Exponential Smoothing (Complete) / Linear Optimization Analysis in Data Mining / Assignment Lab	Assignment 5 (A)
Week 10	Oct 30	Integer Linear Optimization Analysis / Binary Linear Optimization Analysis / Sensitivity Analysis	Assignment 6
Week 11	Nov 06	Capital Budget Optimization Analysis / Monte Carlo Simulation	Assignment 7 (Cert)
Week 12	Nov 13	Quiz 2 Review / Quiz 2	Quiz 2
Week 13	Nov 20	Decision Analysis & Decision Trees / Random Forest / Thanksgiving Break	Assignment 8
Week 14	Nov 27	Predictive Machine Learning / Neural Networks	
Week 15	Dec 04	Data Mining Model Verification & Validation / Closing Remarks / Final Exam Review Material	Final Exam Review - Preparation
Week 16	Dec 11	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 assignments document.

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