CIS 5353-115, 80411, Data Analytics and Management

Fall 2023

Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

Course Dates: August 28, 2023 – October 20, 2023 This is a 100% online course and uses the A&M-Central Texas Canvas Learning Management System [https://tamuct.instructure.com/].

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Dr. Lavanya Elluri

Office: Founders Hall 3230

Email: <u>elluri@tamuct.edu</u> (email is the preferred mode of communication)

Office Hours

I am available to all students virtually on an appointment basis. Please send an email to the above address to schedule an appointment. All appointments will be confirmed by an email sent from me to your Warrior email account. When emailing to schedule a meeting, please utilize only your Warrior account.

Student-instructor interaction

I check my university email many times a day and typically respond within 24 to 48 hours of receiving emails on weekdays. Email is the preferred mode of communication.

Emergency Warning System for Texas A&M University-Central Texas

SAFEZONE. SafeZone provides a public safety application that gives you the ability to call for help with the push of a button. It also provides Texas A&M University-Central Texas the ability to communicate emergency information quickly via push notifications, email, and text messages. All students automatically receive email and text messages via their myCT accounts.

Downloading SafeZone allows access to push notifications and enables you to connect directly for help through the app.

You can download SafeZone from the app store and use your myCT credentials to log in. If you would like more information, you can visit the <u>SafeZone</u> website [www.safezoneapp.com].

To register SafeZone on your phone, please follow these 3 easy steps:

- 1. Download the SafeZone App from your phone store using the link below:
 - o <u>iPhone/iPad</u>: [https://apps.apple.com/app/safezone/id533054756]
 - <u>Android Phone / Tablet</u> [https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp]
- 2. Launch the app and enter your myCT email address (e.g. {name}@tamuct.edu)
- 3. Complete your profile and accept the terms of service

For updates on COVID information, please monitor the University website

[https://www.tamuct.edu/covid19/]

COURSE INFORMATION

Course Overview and description

The course covers fundamental concepts and principles of data analytics and its role in supporting/enhancing organizational decision-making and predictions. Special emphasis on trends, challenges, and applications, analytic methods, tools, technologies, infrastructure, and strategies for data analytics and data management including data privacy and ethics. The course also focuses on how data analytics techniques can be applied to solve marketing and management problems.

Course Objective or Goal Student Learning Outcomes

Successful completion of this course should enable students to:

- Describe data science, data analytics, business analytics, and big data with their role in the corporate world.
- Describe and differentiate between descriptive, predictive, and prescriptive analytics.
- Demonstrate an understanding of the current trends and critical challenges faced by organizations in dealing with data.
- Develop critical skills necessary for a data analyst or data scientist.
- Describe and carry out effective data visualization.
- Describe and carry out exploratory data analysis.
- Work with time-series data, detect trends, seasonal patterns, and forecasting.
- Carry out optimization using linear programming.
- Use a general linear model and logistic model.
- Detect outliers.
- Perform Price bundling.
- Calculate Lifetime Customer Value.
- Perform market segmentation with cluster analysis.
- Perform association rule mining or market basket analysis.
- Identify insights that enhance decision-making and predictions in the organizations with the help of example case studies.
- Identify ethical issues with predictive analytics.

Competency Goals Statements (certification or standards)

None

Required Reading and Textbook(s)

Foreman, J. W., Jennings, G., & Miller, E. (2014). Data smart: Using data science to transform

information into insight (Vol. 1). Indianapolis: Wiley.

Optional (Reference) Textbook:

Winston, W. L. (2014). Marketing analytics: Data-driven techniques with Microsoft Excel. John Wiley & Sons.

Siegel, E. (2016). Predictive analytics: the power to predict who will click, buy, lie, or die.

Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services, Wiley, ISBN: 978-1-118-87613

R for Data Science, O'Reilly, ISBN: 978-1-491-91039-9

Note: A student of this institution is not under any obligation to purchase a textbook from a university-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Reading Assignments: All assigned chapters will be used for class. There may be supplementary reading material used for canvas discussions. Students are expected to study the assigned readings for canvas discussions (if any).

Supplementary Material: The course textbook may be supplemented with other materials that may include research paper readings, handouts, oral presentations, industry articles, videos including TED talks, case studies, PowerPoint presentations, etc. Students must know how to search for and download research papers/articles from the Web (more specifically from Google scholar (www.scholar.google.com).

COURSE REQUIREMENTS

Examinations: There will be two exams. Each exam will be worth 25 points. The exams will consist of analytics problems (problems to be solved using Excel or R or Python with or without data).

The exams will all be open book / open notes and will be available via Canvas. For the exams, you will be required to know not only the material from the textbook chapters but also material from the class lectures such as PowerPoint slides and any supplementary/additional material provided. You must know to work with MS Excel (optionally R or Python) independently.

Discussion posts: There will be two discussion posts during the semester. Each discussion post is worth 5 points. Students are required to make at least one post (either independently or as a reply to another student's post) to earn points. The discussion may be based on a case study or

real-life scenario involving organizational use of analytics, an industry article, etc. The discussion posts will have a timeline within which students are required to post their responses.

Individual homework: There will be two individual homeworks. Students will get two weeks to work on the individual homework assignments. Each homework is worth 10 points and may cover one or more of the following topics (in no order):

- Data visualization using MS Excel
- Data formatting and exploration using MS Excel
- Market segmentation with clustering
- Linear and logistic regression
- Optimization modeling
- Forecasting
- Outlier detection
- Moving from spreadsheets into R

Semester-wide individual project: There will be one semester-long data analytics project worth 20 points. The student must choose a freely available secondary data source from the Web (more on this during the second or third week of the class) and pose some research questions in the form of hypotheses based on some underlying theories (may use <u>www.scholar.google.com</u> or University library databases to find research papers for theories).

<u>https://is.theorizeit.org/wiki/Main_Page</u> is also a useful resource for IS theories. There are many sources of secondary data available on the Web, you are free to explore and are not restricted to a specific type of data or application domain.

The aim of the project is to use the data analytics techniques learned during the class to test the verifiability of the proposed research questions or hypotheses. Note that students may choose to turn in the individual project either using MS Excel or using R/R Studio or using Python. Students are not required to turn in the data or the programming code but must submit a written report in the form of a research paper (guidelines for the write-up will be provided soon). Although it is not a requirement to come up with new research problem(s), students are encouraged to do so.

Grading Criteria Rubric and Conversion

Item	Quantity	Points	Total / Percent
Exams	2	25	50
Discussion posts	2	5	10
Individual Homework's	2	10	20
Semester long individual project using MS Excel or R/RStudio or Python	1	20	20
Total			100

Exams, discussion posts, homework assignments, and the individual project will receive a numeric score (0-100) each. These scores will be totaled to ultimately be converted to letter grades of A, B, C, D, or F as shown in the example below:

89.5 - 100 = A 79.5 - 89.49999 = B 69.5 - 79.49999 = C 59.5 - 69.49999 = D Below 59.5 = F

Posting of Grades

All student grades will be posted on the Canvas Grade Book and students should monitor their grading status through this tool.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

Dates	Content	Readings	Assignments
Week 1	Course Welcome, Faculty	Read the	Discussion post
08/28 - 09/03	introduction, and overview of	Syllabus in-	1 is available and due.
	course objectives, and	depth.	
	expectations.		
	Understanding Data Science, Data Analytics and Big Data. Introduction to Data Analytics. Introduction to predictive analytics. Using MS Excel for data exploration and formatting: Formatting cells, inserting charts, filtering and sorting, Pivot tables, VLOOKUP and OpenSolver	Chapter 1	
Week 2 09/04 - 09/10	Cluster analysis for market segmentation.	Chapter 2	Homework 1 is available.
Week 3 09/11 - 09/17	Optimization modeling	Chapter 4	Homework 1 is due.
Week 4 09/18 - 09/24	Linear and logistic regression.	Chapter 6	Discussion post 2 is available and due. Exam 1 will be available from Sep 21 st .
Week 5 09/25 - 10/01	Exam – 1.	Ch. 1, 2, and 4 from DS	
Week 6 10/02 - 10/08	Forecasting	Chapter 8	Homework 2 is available.

Week 7 10/09 - 10/15	Outlier detection & Using R	Chapters 9 & 10	Homework 2 is due.
Week 8 10/16 - 10/20	Exam – 2	Ch. 6,8,9 and 10	Individual Project is due.

Important University Dates

Refer to important university dates from the current Academic Calendar, available at: https://www.tamuct.edu/registrar/academic-calendar.html

TECHNOLOGY REQUIREMENTS AND SUPPORT

- Required Microsoft Excel (the textbook examples are compatible with MS Excel 2007, 2010, and 2011, but I guess later versions of Excel are backward compatible with these earlier versions).
- Dptional R with RStudio. If you are using R/RStudio to analyze data and work on homework assignments, exams and projects either partially or completely, R can be downloaded from <u>https://www.r-project.org/</u> and RStudio from <u>https://www.rstudio.com/products/rstudio/download/</u>
- c. Optional Python/Python IDE such as Pycharm (<u>https://www.jetbrains.com/pycharm/download/#section=windows</u>) or Anaconda Navigator (<u>https://www.anaconda.com/products/distribution</u>) or any other Python IDE

Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer supports any version of Internet Explorer.

Logon to A&M-Central Texas Canvas [https://tamuct.instructure.com/] or access Canvas through the TAMUCT Online link in myCT [https://tamuct.onecampus.com/]. You will log in through our Microsoft portal.

Username: Your MyCT email address. Password: Your MyCT password Canvas Support

Use the Canvas Help tab, located at the bottom of the left-hand menu, for issues with Canvas. You can search the support articles or use the Email, Call, or Chat buttons at the bottom of the support pop-up to contact the Canvas Help Desk.

For issues related to course content and requirements, contact your instructor.

Online Proctored Testing

Texas A&M University-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification

or proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio requires use of the Chrome web browser with their custom plug in installed.

Other Technology Support

For log-in problems, students should contact Help Desk Central, 24 hours a day, 7 days a week.

Email: <u>helpdesk@tamu.edu</u> Phone: (254) 519-5466 <u>Web Chat</u>: [http://hdc.tamu.edu] Please let the support technician know you are an A&M-Central Texas student.

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES

Warrior Center for Student Success

The Warrior Center for Student Success is a comprehensive academic support department at A&M-Central Texas, dedicated to fostering an environment of excellence and empowerment among its student body. The center offers a wide range of programs and services to ensure every student reaches their full potential, and is a haven for students seeking guidance, resources, and a strong support network to excel in their educational journey.

ADA Access and Accommodations: Texas A&M University-Central Texas ensures that students with disabilities have equal access to educational opportunities by providing appropriate accommodations and support services. If you believe you have a physical, learning or socio-emotional disability requiring reasonable accommodations, please visit <u>Access and Inclusion</u> [https://www.tamuct.edu/student-affairs/access-inclusion.html] for more details or contact the Office of Access and Inclusion, WH-212; (254) 501-5836. Any information you provide is private and confidential.

Success Coaching and Peer Mentoring: Our experienced Success Coaches work one-on-one with students to develop personalized action plans, set academic goals, and build effective study strategies, time management skills, and resilience. Our Peer Mentors provide a valuable support system, offering guidance, encouragement, and a relatable perspective to help students navigate their academic and personal challenges. For more details call 254-501-5836 or 254-501-5928 or visit <u>Academic Support</u> [https://www.tamuct.edu/student-affairs/academic-support.html]. Click the link to schedule a session (virtual or in-person) with a success coach <u>bit.ly/3q7uB50</u> or visit WH, 111.

Testing Services: We offer a secure and comfortable environment for students and members of the community to take courses and distance learning exams, as well as placement tests and professional certification exams. Our Testing Service also offers resources and support referrals for testing related challenges (test anxiety, learning disabilities, etc.) and supports all approved ADA accommodations. Call (254) 519-5830 or visit the <u>Testing Center</u> [https://www.tamuct.edu/testing-center/].

Tutoring and Supplemental Instruction Services: Our team of qualified Tutors and Supplemental Instructors assist students in various non-writing subjects, promoting academic comprehension and enhancing learning outcomes. Click the link to schedule a tutoring session with a TAMUCT tutor (virtual

or in-person) or view tutor availability <u>bit.ly/43Q6wNz</u>. You may also chat live with a remote tutor 24/7 for a variety of subjects through our partnership with Tutor.com, an online tutoring platform that is free to all TAMUCT students. To learn more please visit <u>Tutoring</u>

<u>Services</u> [https://www.tamuct.edu/student-affairs/academic-support.html#tutoring] or call (254) 501-5836 or visit the Tutoring Hub in Warrior Hall, 111.

Academic Integrity:

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. All academic misconduct concerns will be referred to the Student Conduct Office. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more information regarding the <u>student conduct process</u>, [https://www.tamuct.edu/student-affairs/student-conduct.html].

If you know of potential honor violations by other students, you may <u>submit a referral</u>, [https://cm.maxient.com/reporting.php?TAMUCentralTexas].

Drop Policy

If you discover that you need to drop this class, you must complete the <u>Drop Request</u> Dynamic Form through Warrior Web.

[https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpId=https://eisprod.ec.tamuct.edu:443/samIsso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2 f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-be43f02a4202f612].

Faculty cannot drop students; this is always the responsibility of the student. The Records and Admissions Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Records and Admissions Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Records and Admissions Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

Pregnant and/or Parenting Students Rights and Accommodations

Texas A&M University-Central Texas supports students who are pregnant, experiencing pregnancyrelated conditions, and/or parenting. In accordance with requirements of <u>Title IX and related guidance</u> <u>from US Department of Education's Office of Civil Rights</u>, the Associate Dean in the Division of Student Affairs, (254) 501-5909, can assist students who are pregnant, experiencing pregnancy-related conditions, and/or parenting by provide flexible and individualized reasonable accommodations. Students should seek out assistance as early in the pregnancy as possible through the <u>Pregnancy &</u> <u>Parenting webpage</u> [https://www.tamuct.edu/student-affairs/pregnant-and-parentingstudents.html]. For more information, please visit <u>Student Affairs</u> [https://www.tamuct.edu/studentaffairs/pregnant-and-parenting-students.html]. If you would like to read more about these <u>requirements and guidelines</u> online, please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

<u>Title IX of the Education Amendments Act of 1972</u> specifically prohibits discrimination against a student based on pregnancy, childbirth, false pregnancy, termination of pregnancy, or recovery from any of these conditions [https://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.html].

Students experiencing any form of discrimination due to any of these conditions are encouraged to reach out to the Title IX Coordinator, 254.519.5716, <u>titleix@tamuct.edu</u>, Founders Hall 317B, or the Associate Dean of Student Affairs, 254.501.5909, Warrior Hall 105.

Title IX Rights and Reporting Responsibilities

Texas A&M University-Central Texas is committed to creating a safe and open learning environment for all students. If you or another student has experienced any form of gender discrimination or sexual misconduct, including sexual harassment, sexual assault, dating/domestic violence, and/or sex-based stalking, help and support are available. Our university strongly encourages all members of our campus community to report incidents and seek support for gender discrimination and sexual misconduct through the Title IX Office. You may contact the Title IX Office at 254.519.5716, <u>titleix@tamuct.edu</u>, Founders Hall 317B, or learn more by visiting the <u>Title IX webpage</u> [https://www.tamuct.edu/compliance/titleix.html].

Please be aware that that under <u>Title IX</u>, <u>Texas Senate Bill 212</u>, and <u>System Regulation 08.01.01</u>, [https://policies.tamus.edu/08-01-01.pdf] all university employees are mandated reporters and are required to disclose information about suspected or alleged violations as listed above and defined in System Regulation 08.01.01. If the Title IX Office receives information about an incident, they will reach out to offer information about resources, rights, and procedural options as a member of the campus community. Although I have an obligation to report, you will, in most cases, control how your case will be handled. When working with the Title IX Office you will have access to resources and accommodations but also have the opportunity to express if you wish to move forward with an investigation. Our goal is to make sure you are aware of the options available to you as a student. Community members are not required to respond to this outreach.

If you or another student wishes to speak to a confidential employee who does not have this reporting responsibility, you can contact the <u>Student Wellness & Counseling Center</u>, [https://www.tamuct.edu/student-affairs/student-counseling.html], 254.501.5955, or <u>swacc@tamuct.edu</u>, located in Warrior Hall Room 207L or the Student Support Advocate, 254.501.5978 or <u>ssa@tamuct.edu</u>, located in founder Hall Room 317D.

University Library & Archives

The University Library & Archives provides many services in support of research across campus and at a distance. We offer over 350 electronic databases containing approximately 1,203,947 eBooks and 134,750 journals, in addition to the 96,879 items in our print collection, which can be mailed to

students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place virtually through WebEx, Microsoft Teams or in-person at the library. <u>Schedule an appointment here</u>

[https://tamuct.libcal.com/appointments]. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group workspaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our <u>Library website</u>

[https://tamuct.libguides.com/index]

University Writing Center

Located in Warrior Hall 416 and online, the University Writing Center (UWC) at Texas A&M University– Central Texas (A&M–Central Texas) is a free service open to all A&M–Central Texas students. The faceto-face hours of operation are from 10:00 a.m.-5:00 p.m. Monday and Thursday in Warrior Hall 416. Online tutoring is available Monday thru Thursday from 10:00 a.m.-5:00 p.m. and from 6:00-9:00 p.m. and on Saturdays from 12:00-3:00 p.m.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via <u>WCOnline</u> [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at <u>bruce.bowles@tamuct.edu</u> if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment with your favorite tutor.

OTHER POLICY STATEMENTS

A Note about Sexual Violence at A&M-Central Texas

Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Wellness and Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don't agree with their behaviors and tell survivors we will support them. Your actions matter. Don't be a bystander; be an agent of change. For additional information on campus policy and resources visit the <u>Title IX webpage</u> [https://www.tamuct.edu/compliance/titleix.html].

Behavioral Intervention

Texas A&M University-Central Texas cares about the safety, health, and well-being of its students, faculty, staff, and community. If you are aware of individuals for whom you have a concern, please make a referral to the Behavioral Intervention Team. Referring to your concern shows you care. You can complete the <u>referral</u> online

[https://cm.maxient.com/reporting.php?TAMUCentralTexas].

Anonymous referrals are accepted. Please see the <u>Behavioral Intervention Team</u> website for more information [https://www.tamuct.edu/bit]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5805.

OTHER POLICIES

Policies related to absence, grading, etc.

You are responsible for all class material presented during an absence.

- Individual homework's, discussion posts, exams and project must be submitted through Canvas and due on the specified due date/time. No email submissions will be accepted except under unforeseen circumstances.
- The instructor reserves the right to modify the course syllabus during the semester for the benefit of the students.
- The instructor reserves the right to supplement materials presented in the text with additional course material that may help the students better understand a topic(s).

Plagiarism policy: Students are strongly advised not to copy and paste material from websites, study guides (such as Chegg, Course Hero, etc.), research articles, industry articles, blog posts or any other online resources. Students must rephrase and properly cite any of the material used in their submits. All your submitted writings will be checked using an automated plagiarism check software already built into Canvas available from the University. Following point deductions will apply to your submitted writings:

- More than 30% plagiarized Not acceptable and students will not earn any points
- 21% to 30% plagiarized 70% points deducted with warning to be more careful with future submits
- 11% to 20% plagiarized 60% points deducted with warning to be more careful with future submits
- 0% to 10% plagiarized Acceptable with warning to be more careful during future submits

The above policy will be followed along with the standard University policy of Student academic conduct.

My personal statement

- I am almost always available via email and typically respond within 24 hours except on weekends. Student may also request virtual meeting via WebEx or Microsoft Teams, if required.
- I reserve the right to modify the course syllabus during the semester for the benefit of the students.
- I reserve the right to supplement materials presented in the text with additional course material that may help the students to understand the topic better.
- I reserve the right to modify grading policy rubrics. Any change to grading rubrics will be applied to current and possible future assignments.

Copyright Notice

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course instructor. Violation of copyright is against the law and Texas A&M University-Central Texas' Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.

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