CIS 5353 – 115, 60250, Data Analytics and Management

Summer 2022

Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

June 6, 2022 – July 29, 2022
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: Rahul Dwivedi, Ph.D.
Office: 323H
Phone: NA
Email: *rahul.dwivedi@tamuct.edu or Canvas Inbox. Email is the preferred mode of communication.*

Office Hours

Due to the recent surge in the COVID omicron variant and changing social distancing requirements, physical office hours are not available. You can email me and schedule a virtual visit using an online meeting software such as Zoom or WebEx. This virtual meeting can be requested on any day of the week between Monday and Friday provided availability of the instructor.

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. Apart from office hours, 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 SafeZone 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 iPhone/iPad: [https://apps.apple.com/app/safezone/id533054756]

- o [Android Phone / Tablet](https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp)
  [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

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 general linear model, logistic model, and naïve Bayes classifier.
- Detect outliers.
- Perform Price bundling.
- Calculate Lifetime Customer Value.
- Perform market segmentation with cluster analysis.
- Perform association rule mining or market basket analysis.
- Measure effectiveness of advertising.
- 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. (Referred to as DS later)

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

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

Optional (Reference) Textbook:

Provost, F., & Fawcett, T. (2013). Data Science for Business: What you need to know about data mining and data-analytic thinking. " O'Reilly Media, Inc.".

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 along with assigned readings will be used for class and/or canvas discussions. Students are expected to study the assigned readings before each class session.

Supplementary Material: The course textbook will be supplemented with other materials that may include research papers readings, handouts, oral presentations, industry articles, videos including TED talks, research paper readings, case studies, power point 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

Course Requirements:

Examinations: There will be two exams. Each exam will be worth 30 points. The exam(s) may have two parts (more on this later): multiple-choice questions (answered online via Canvas) and analytics problems to be solved/submitted via MS Excel spreadsheets or using the R programming language.

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 independently.

Individual homework: There will be four individual homework. Students will get two weeks to work on the individual homework assignments. Each homework is worth 5 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
- Data classification with naïve Bayes classifier
- Linear and logistic regression
- Optimization modeling
- Forecasting
- Outlier detection
- Association rules mining or market basket analysis
- Price bundling
- Customer lifetime value

Homework's turned in after the due date is considered late. **1 point will be deducted for each day the homework is late.** Special circumstances need to be discussed with the instructor ahead of time when possible. **Note that students may choose to turn in the homework assignments either using MS Excel or using R/RStudio.**

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 www.scholar.google.com or University library databases to find research papers for theories). https://is.theorizeit.org/wiki/Main_Page 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/RStudio.** 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.

The due date for the individual project is the last day of the summer semester i.e., July 29th at midnight (11:59 PM). Special circumstances need to be discussed with the instructor ahead of time when possible.

Grading Criteria Rubric and Conversion

Item	Quantity	Points	Total / Percent
Exams	2	30	60
Individual Homework's	4	5	20
Semester long individual project using MS Excel or R/RStudio	1	20	20
Total			100

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

	Percent earned by Student	Max points	Points to be added to the final grade
Exam 1	78%	30	23.4
Exam 2	85%	30	25.5
Homework 1	60%	5	3
Homework 2	75%	5	3.75
Homework 3	90%	5	4.5
Homework 4	100%	5	5
Semester long individual project report	70%	20	14
TOTAL		100	79.15

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

Grades will not be curved (in the above example, the student with 79.15 will receive a C NOT a B).

Posting of Grades

All student grades will be posted on the Canvas Grade Book and students should monitor their grading status through this tool. Grades will be posted within two weeks after the availability date.

Grading Policies

Refer to the late policy for individual homework assignments above.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

Week	Dates	Content	Readings	Assignments
1	June 6th – June 10th	Course Welcome, Faculty introduction, and overview of course objectives, and 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	Read the Syllabus in-depth. Chapter 1 of PA. Chapter 1 from DS and Chapter 1 from MA	Homework 1 is available.
	June 13th – Deadline to drop 8-week classes with no record			
2	June 13th – June 17th	Summarizing data with Excel charts and functions. Cluster analysis for market segmentation.	Chapters 2 and 3 from MA. Chapter 2 from DS.	
3	June 20th – June 24th	Naïve Bayes classifier. Optimization modeling	Chapters 3 and 4 from DS.	Homework 1 is due. Homework 2 is available.
4	June 27th – July 1st	Exam – 1	Ch. 1, 2, 3 and 4 from DS; Ch. 1, 2, 3 from MA	
	July 4th – Independence Day (University Closed)			
5	July 5th – July 8th	Linear and logistic regression.	Chapter 6 from DS.	Homework 2 is due. Homework 3 is available.
6	July 11th – July 15th	Forecasting and using the S curve to predict sales of a new product. Outlier detection.	Chapters 8 and 9 from DS. Chapter 26 of MA.	Homework 4 is available.

7	July 18th – July 22nd	Price bundling. With Power Comes Responsibility. Calculating Customer Lifetime Value. Market Basket Analysis.	Chapters 5, 19, and 29 of MA. Chapter 2 of PA.	Homework 3 is due.
8	July 25th – July 29th	Exam – 2	Ch. 6,8 and 9 from DS; Ch. 5, 19, 26, and 29 from MA.	Homework 4 is due.
July 29th – Deadline to withdraw from the University for 8-week classes				

Important University Dates

Refer to important university dates from the current Academic Calendar, or share the link: https://www.tamuct.edu/registrar/academic-calendar.html]

TECHNOLOGY REQUIREMENTS AND SUPPORT

Microsoft Excel. The University's computer labs are equipped with Microsoft Excel software. Students are also required to properly cite the references (in APA 6 or 7 formats) used in their individual project reports.

Optional: R and RStudio. Although most computer labs are also equipped with R and RStudio certain packages may not have been installed on them. Students may also download this software on their laptop computers from https://www.r-project.org/ and https://www.rstudio.com/products/rstudio/download/ respectively.

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 link, located at the bottom of the left-hand menu, for issues with Canvas. You can select "Chat with Canvas Support," submit a support request through "Report a Problem," or call the Canvas support line: 1-844-757-0953.

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

Online Proctored Testing

A&M-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

also requires the Chrome web browser with their custom plug in.

Other Technology Support

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

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

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES

Drop Policy

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

[https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpId=https://eis-prod.ec.tamuct.edu:443/samlsso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-be43-f02a4202f612].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar's Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar's 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 Registrar's 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.

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 Office of Student Conduct. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

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

If you know of potential honor violations by other students, you may submit a report, [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

Academic Accommodations

At Texas A&M University-Central Texas, we value an inclusive learning environment where

every student has an equal chance to succeed and has the right to a barrier-free education. The Warrior Center for Student Success, Equity and Inclusion is responsible for ensuring that students with a disability receive equal access to the university's programs, services and activities. If you believe you have a disability requiring reasonable accommodations, please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information, please visit our Access & Inclusion Canvas page (log-in required) [https://tamuct.instructure.com/courses/717]

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit Student Affairs [https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these requirements and guidelines online, please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender–including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University's Title IX Coordinator.

Tutoring

Tutoring is available to all A&M-Central Texas students, both virtually and in-person. Student success coaching is available online upon request.

If you have a question, are interested in becoming a tutor, or in need of success coaching contact the Warrior Center for Student Success, Equity and Inclusion at (254) 501-5836, visit the Warrior Center at 212 Warrior Hall, or by emailing WarriorCenter@tamuct.edu.

To schedule tutoring sessions and view tutor availability, please visit Tutor Matching Services [https://tutormatchingservice.com/TAMUCT] or visit the Tutoring Center in 111 Warrior Hall.

Chat live with a remote tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

University Writing Center

Located in Warrior Hall 416, 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. For the Summer 2022 semester, the hours of operation are from 10:00 a.m.-4:00 p.m. Monday thru Thursday in Warrior Hall 416 (with online tutoring available every hour as well) with satellite hours available online only Monday thru Thursday from 6:00-9:00 p.m. and most 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 WCOnline at [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu 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.

University Library

The University Library provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 400,000 eBooks and 82,000 journals, in addition to the 96,000 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. Schedule an appointment here [https://tamuct.libcal.com/appointments/?g=6956]. 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 work spaces, 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 Library website

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

OPTIONAL 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 Title IX webpage [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 your concern shows you care. You can complete the referral online

[https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the Behavioral Intervention Team 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, exam 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.
- Late penalty will be applied to individual homework(s) submitted after due dates. Refer to late submission policy for these items above.
- Plagiarism check will be carried out using plagiarism check software built into Canvas available from university. Rephrasing and citing sources properly or quoting with proper citations are important for case study presentation.

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 prefer email to phone conversations.
- 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.

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