



TEXAS A&M UNIVERSITY
SAN ANTONIO

CSCI 4314:600 Big Data Systems CRN 25177

Department of Computational, Engineering, and Mathematical Sciences

College of Arts and Sciences

Course Syllabus

Class Modality Time:	Online Synchronous W 7:00 pm - 9:45 pm
Place	Zoom
Class Duration:	Jan 20, 2026 - May 12, 2026
Instructor:	Dr. Robert Vinaja Office: Business & Library Building 441J Tel: 210-784-2329 E-Mail: Robert.Vinaja@tamusa.edu Student emails will receive a reply within two business days.
Course Website:	https://tamusa.blackboard.com/
Office Hours:	Monday 8:30 – 11:00 am (online) Friday 8:30 – 11:00 am (online) Tuesday 10:00 am – 11:00 am - (online) and by appointment
Office Hours Link:	https://tamusa.zoom.us/j/4513131703 Meeting ID: 451 313 1703

Catalog Course Description: This course introduces the concepts, principles, and applications of big data systems. The course focuses on big data management systems, where the scale of data is often much larger than traditional data management systems and tools can handle. It covers the development of efficient solutions for different types of data, including relational, distributed, graph, NoSQL, NewSQL, machine learning, and neural networks. Additionally, it covers the data from various disparate sources, often characterized by noise, and generated at a very high rate.

Course Objectives: The objective of the course is to provide a basic understanding of the concepts, principles, and techniques of big data systems and how to apply them in the context of the design and implementation of big data applications.

Prerequisites: A grade of “C” in CSCI 2436, or by the program coordinator’s approval. Students who do not meet the pre-requisites must contact the instructor immediately.

ABET Assessment: The Computer Science program at Texas A&M University-San Antonio is ABET-accredited by the Computing Accreditation Commission (CAC) of ABET. As part of the ongoing process, students will be assessed on course and program level outcomes based on various courses. The materials from this course may be used for assessing such program level outcomes, and hence students are required to follow appropriate guidelines for submission of course work, as well as the necessary rigor to ensure mastery and retention of the course outcomes. More specifically, the ABET outcome measured for the course is

Outcome 2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.

Learning Objectives: Upon completion of this course, the student will be able to:

- 1) Explain the design and architecture of systems used for big data processing
- 2) Apply tools and techniques required in handling large amounts of datasets
- 3) Understand, identify, and evaluate connections within data using link analysis,
- 4) Apply machine learning as a service for forecasting, synthetic data generation, synthetic data generation, masking, anonymization, deanonymization

Required Materials:

To be purchased

- CENGAGE UNLIMITED. Instead of just buying the textbook by itself, you will buy the Cengage Unlimited code that includes **both the textbook and other additional resources**. Cengage Unlimited, 1 term (4 months), 1st Edition ISBN: 9780357700006 Please notice that this is **NOT Cengage Unlimited Books** (\$69), but Cengage Unlimited (that **includes all Cengage platforms**) about \$130
- Cortex ERPSIM. This is a simulation game from HEC Montreal. **DO NOT PURCHASE YET.** Wait for additional instructions before purchasing.

https://www.sas.com/en_ca/learn/academic-programs/resources/cortex-analytics-simulation-game.html#the-scenarios

- Computer Hardware: You will need a computer with an internet connection, a **webcam**, a microphone, and speakers/headphones. Also, it is recommended that you have two devices with internet access.

Available on the library website (but can purchase if you prefer to have your own printed copy)

Machine Learning for Business Analytics: Concepts, Techniques, and Applications with Analytic Solver Data Mining
4th Edition (2023) ISBN: 9781119829836

Data Mining for Business Analytics: Concepts, Techniques and Applications in Python Galit Shmueli,
Peter C. Bruce, Peter Gedeck, Nitin R. Patel
ISBN: 978-1-119-54986-4

Additional Free Items

- You will need to use additional software to complete class assignments. These tools do not require a purchase. Instructions and website links or additional software will be provided.
- **Time:** You are expected to spend 4-8 hours per week for the course. Based on the background, some student may require more time. Time spent may be longer when assignment/exams are due.

Other Recommended / Reading Materials: Additional reading materials are available on the course website as recommended by the instructor.

Course Requirements every student must fulfill in order to succeed in course:

1. Students should check the Course Calendar, Announcements, and Messages (e-mail) systems in Blackboard on a regular basis.
2. Students should keep current with all course assignments, quizzes, and examinations.
3. Students should ask questions and communicate with the instructor either in class, online, off-line or during office hours.
4. For all classwork, exams, quizzes etc., if a student is completing it off-campus, then they are responsible for availability of internet connectivity. Extensions will be granted for lack of availability of internet connections only if the instructor is notified.

Grading Policy: The final course grade will be based on your performance on the quizzes, exams, assignments and class participation using the following weights:

EVALUATION

GRADES	Points
ATTENDANCE/PARTICIPATION	100
HOMEWORK SETS	500
MID TERM EXAM	100
FINAL EXAM	300
TOTAL	1000

Grades will be based on the following percentage ranges:

A = 900 - 1000

B = 800 - 899

C = 700 - 799

D = 600 - 699

Examinations and Quizzes: There will be mandatory mid-term exams and a mandatory final exam (as per university schedule). Missing an exam will result in a grade of zero for that exam and may result in a fail grade in the course. The exam/quiz materials will come from lecture notes, the textbook, and class discussions. Questions will emphasize understanding and applications of concepts and topics covered in class. Additional details about the format for the exams will be provided in advance. You are expected to read every chapter in advance.

Assignments/ Research papers: There will be several assignments and projects during the course. Individual assignment statements and due dates will be posted through Blackboard. The research papers will provide an opportunity for an in-depth investigation of specific topics. Additional instructions and requirements for the research papers and projects will be provided as separate handouts at the course website.

Make up and Late Assignment policy:

Exams: As a general rule, make-ups or late submissions will **NOT** be offered or accepted for any missed exams/quizzes. If you miss an exam for a valid documented excuse, then the grade for the missed exam will be replaced with a grade equivalent to the percentage score in the final exam. If you miss the final exam, you must contact the instructor within 24 hours and provide valid proof of your special situation. If you miss class and miss the pop quiz for that day, there is no make-up for the pop-quiz, but you can complete one of the extra credit activities to get extra points.

Assignments: All assignments must be (100%) complete and (100%) accurate before submitted. No incomplete/incorrect submissions will be accepted. Late submissions will be assessed a grade reduction penalty. The grade reduction penalty will be specified in the instructions for the assignment. The grade reduction penalty for late assignments will be waived only if you have a valid **documented** extra-ordinary circumstance such as an excused official university activity, a severe illness, or a dire emergency.

Attendance is a direct component of your semester grade, in addition a situation may affect your grade if it causes you to miss assignments. E-mail me if you have a valid excuse but **do not submit any documentation until requested.**

Class conduct and civility code: Everyone in class is expected to follow all rules in the student handbook, as well as common courtesy during classroom lectures and discussions in class and online, including the following:

1. Attendance may be taken at the beginning or the end of the class.

2. It is the students' responsibility to obtain and be able to use the required materials and software for this class.
3. Student must retain copies of all assignments and graded work for verification purposes. Keep copies of all computer files and e-mails.
4. If you will not be able to complete this course, dropping from this class is your responsibility.
5. For any questions about the exams and assignments, a student should contact the instructor, before the day they are due, so the instructor may have enough time to provide feedback.
6. All communications will be via e-mail communications to the Texas A&M University e-mail account, and students are expected to use their school provided email account. The instructor will reply to a student e-mail messages and voice messages within 24 hours during weekdays.
7. All assignment submissions must be uploaded to Blackboard by the due date/time.
8. If the instructor is not in the Zoom classroom at the scheduled time, please wait for 30 minutes. After 30 minutes, you can leave with no penalty. I will make every effort to notify you if a personal emergency will prevent me from attending a session or if a session has been cancelled.

Anyone violating these policies may be subject to disciplinary actions.

Class attendance and Participation: A vital part of every student's education is regular attendance of class meetings. Any absences tend to lower the quality of a student's work, and frequent or persistent absences may result in a failing grade. You are responsible for any missed instruction or assignments. If you miss any information you should get it from a classmate. If you have excused absences, you must make arrangements as soon as you are back to class. Advance notice to the instructor may be required, when possible. **Do not submit any documentation for the absence unless requested.** Students are responsible for the materials covered in class.

Do not e-mail me about absences or lateness, instead provide an explanation in the submission dropbox for the related assignment.

Class **participation** makes the class more interesting and enhances the learning experience. Students are strongly encouraged to ask questions and participate in class discussions and problem solving. Classroom participation includes pop quizzes related to computer assignments, discussion of chapters, cases and additional materials. **If you miss class and miss the pop quiz for that day, there is no make-up for the pop-quiz.** As an option you can do an extra credit assignment to gain additional points.

E-mail communication, phone calls and office visits are not part of classroom participation.

The course is intensive and challenging and you are expected to master the materials presented in class.

The structure of the class makes your individual study and preparation outside of class extremely important. Reading the assigned chapter(s) and having some familiarity with them before class will be very useful for understanding lectures. Each student will be expected to spend enough time in the preparation of the assignments.

Broader Use of Generative AI Permitted Within Guidelines

Use of artificial intelligence (AI) tools, including ChatGPT, is permitted in this course for students who wish to use them **except for exams**. To adhere to our scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to generate content without proper attribution qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

NOTE: Guidance for how to cite AI-generators, like ChatGPT, can be found here <https://apastyle.apa.org/blog/how-to-cite-chatgpt>

Spring 2026 CSCI 4314:600 Class Schedule

The provisions and information set forth in the schedule below are intended to be informational and not contractual in nature. The instructor reserves the right to amend, alter, change, delete or modify the provisions of the schedule.

DATE	Chapter and Topic	DUE W 11:59 p.m.
1/21/2025	Syllabus; SQL Review; Python Review; Linux Review	
1/28/2025	Data Warehousing; Overview of the Process; Data Visualization; Evaluating Predictive Performance	Homework Set 1
2/4/2025	Multiple Linear Regression; Logistic Regression;	Homework Set 2
2/11/2025	Handling Time Series. Forecasting; Smoothing Methods	Homework Set 3
2/18/2025	KNN, Trees; Dimension Reduction; Cluster Analysis,	Homework Set 4
2/25/2025	Discriminant Analysis; Neural Nets & Machine Learning EXAM	Homework Set 5 EXAM
3/4/2025	Neural Nets & Machine Learning,	Homework Set 6,
3/11/2025	SPRING BREAK- NO CLASS	
3/18/2025	Association Rules and Collaborative Filtering,	Homework Set 7
3/25/2025	Combining Methods; Text Mining & NLP;	Homework Set 8
4/1/2025	Data pipelines: Link Analysis	Homework Set 9
4/8/2025	Hadoop; NoSQL DB	Homework Set 10
4/15/2025	Spark; PySpark	Homework Set 11
4/22/2025	Graph Databases Mining Social Network Graphs	Homework Set 12
4/29/2025	Additional Topics/ Review/Presentations	
5/13/2025	Final Exam	

The text in the remaining sections is a compilation of University policies at:
[Academic Planning \(tamusa.edu\)](https://academicplanning.tamusa.edu)



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IMPORTANT POLICIES AND RESOURCES

University Email Policy and Course Communications

All correspondence between professors and students must occur via university email accounts. You must have your Jaguar email account ready and working. If it is not working, contact the help desk at helpdesk@tamusa.edu or at 210-784-HELP (4357). If you don't hear back within 48 hours, contact them again. They have many requests during the first part of the semester, so you may need to follow up with them.

Academic Accommodations for Individuals with Disabilities

Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us at the website or email us at dss@tamusa.edu. Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their academic accommodation with Disability Support Services and their instructors as soon as possible.

Academic Learning Center

All currently enrolled students at Texas A&M University-San Antonio can utilize the Academic Learning Center for subject-area tutoring. The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the Tools section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784- 1307, or visiting the Central Academic Building, room 202. Online tutoring is also available for after hours and weekend assistance.

While tutoring hours may change based on tutor schedules and availability, the current tutoring hours for MATH in the ALC are as follows:

Day of the Week	Appointments Available	Walk-in Tutoring (no appointment needed)
Monday	8:00 AM – 6:00 PM	9:00 AM – 5:00 PM
Tuesday	8:00 AM – 6:00 PM	9:00 AM – 5:00 PM
Wednesday	8:00 AM – 6:00 PM	9:00 AM – 5:00 PM
Thursday	8:00 AM – 6:00 PM	9:00 AM – 5:00 PM
Friday	8:00 AM – 5:00 PM	11:00 AM – 4:00 PM

Counseling/Mental Health Resources

As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, visit our website, call 210-784-1331 or visit Madla 120 between the hours of 8:00 AM and 5:00 PM.

All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. Crisis support is available 24/7/365 by calling the SCC at 210-784-1331 or through the TELUS student support App.

The [TELUS Student Support App](#) provides a variety of mental health resources to include 24/7/365 support for in the moment distress, crisis support, an anonymous peer-to-peer support network, mental health screenings, podcasts, and articles to improve your mental wellbeing.

Emergency Preparedness

JagE Alert is Texas A&M University-San Antonio's mass notification system. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit the [Jag E Alert System website](#). You can access more information about [Emergency Operations Plan and the Emergency Action Plan on our website](#). Download the [SafeZone App](#) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance

According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended by the published Census Date (the first week of class). Any student receiving federal financial aid who does not attend prior to the published Census Date (the first week of class) will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Jaguar Writing, Language, and Digital Composing Center (WLDDC)

The Jaguar Writing Center provides writing support to graduate and undergraduate students in all three colleges as well as faculty and staff. Writing tutors work with students to develop reading skills, prepare oral presentations, plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as e-portfolios, class presentations, or other digital multimedia projects.

The Writing Center offers face-to-face, synchronous online, and asynchronous digital appointments. Students can schedule appointments with the Writing Center in JagWire under the Student Services tab. Click on Writing, Language, and Digital Composing Center to make your appointment. Students wanting to work in real time with a tutor can schedule an Online Appointment. Students wishing to receive asynchronous, written feedback from a tutor can schedule an e-Tutoring appointment. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on the [Writing Center's website](#). The Writing Center can also be reached by emailing: writingcenter@tamusa.edu.

Meeting Basic Needs

Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to [submit a CARE report for support](#). Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources. The [General's Store is a food pantry](#) that is available on campus as well.

Military Affairs

Veterans and active-duty military personnel are welcomed and encouraged to visit the Office of Military Affairs for any question involving federal or state VA Education Benefits. Visit the Patriots' Casa building, room 202, or to contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210)784-1397.

Religious Observances

Texas A&M University-San Antonio recognizes the wide variety of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided with an opportunity to make up any examination, study, or course work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule

Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination

Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual on our campus and within our state, nation, and world. All decisions and actions involving students and employees are to be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, based on race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the University's Civil Rights Officer at 210-784-2061 or titleix@tamusa.edu. Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university. If you have experienced any form of sex discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking based on sex, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and

harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related sex-based misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students

Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide reasonable accommodation for pregnant students as it would be provided to a student with a temporary medical condition that is related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784- 2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources. Young Jaguars can support parenting students with daycare if students meet this criteria: (1) must be enrolled in classes at Texas A&M-San Antonio in the current semester, (2) must be Pell eligible or a single parent, (3) child(ren) must be aged 3 to 12-years-old, and (4) child(ren) must be enrolled in Pre-K-3 through 6th grade. For more information, please contact Young Jaguars at youngjaguars@tamusa.edu or call (210) 784-2636.

Students' Rights and Responsibilities

The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, gender identity, gender expression, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university students' rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty, and administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, [Student Code of Conduct](#), on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notifications.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the [Student Code of Conduct](#) or visit the resources available in the [OSRR website](#).

Important Dates: Spring 2026 Regular 16-Week Session

January 13	Tuition and Fee Payments deadline
January 19	Marting Luther King Jr. Day – No Classes
January 20	First Day of Class
February 4	Census Date
March 6-23	Midterm grading period
March 9-14	Spring Break
April 3	Study Day – No classes
April 17	Last day to drop with an automatic withdrawal
May 1	Last day to drop a course or withdraw from the university
May 4	Last Day of Classes
May 5	Study Day – No classes
May 6-12	Final Exams
May 19	Commencement

The complete academic calendar is available online: <https://www.tamusa.edu/academics/academic-calendar/index.html>