Syllabus For

BUAN 6v99.503 Course – Fall 2025

Classroom Safety and COVID-19 To help preserve the University's in-person learning environment, UT Dallas recommends the following:

Adhere to the University's CDC Updated Guidelines issued on January 17, 2023. All Comets are strongly encouraged to wear face coverings indoors regardless of vaccination status. Please note this represents a change in the campus guidance issued on August 23, 2022.

Accommodations for Students Who Miss Class for Reasons Unrelated to COVID-19
Students in the US are expected to attend classes in person and on campus. Students outside the US are expected to attend classes in person and on campus, no later thantwo weeks after their arrival in the US and can attend class virtually using MS Teams (link will be provided in e-learning).

Accommodations for Students Who Must Isolate or Quarantine Due to COVID-19
To keep the UT Dallas community as safe as possible, the University requires students who test positive for COVID-19 or who are close contacts as determined by thecampus contact tracing program to isolate or quarantine as applicable. Faculty will be notified by the Dean of Students' Office if a student in their class has been required to isolate (positive case) or quarantine (exposed). I will make lectures available for those students during the period the students must isolate or quarantine. Absences due to COVID-19 will not be counted against an isolated or quarantined student.

Verifying COVID-19 Isolations or Quarantines
Students need to self-report COVID-19 positive results or exposures via an online form so that university campus tracers can verify, record, and take necessary campusprecautions. Students should not attend class until cleared by campus tracers.

Vaccinations are widely available, free, and not billed to health insurance. The vaccine will help protect against the transmission of the virus to others and reduce serious symptoms in those who are vaccinated. You are encouraged to get a COVID-19 vaccine and register your vaccination status through the voluntary vaccine report form.

Proactive Community Testing remains an important part of the university's efforts toprotect our community. Tests are fast and free. Please check the Comets United webpage for additional information.

Student Safety remains an important part of the UT Dallas' efforts to protect our community. All students will adhere to the Comet Commitment. Unvaccinated Comets will be expected to complete the mandatory Required Daily Health Screening. Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action under the Student Code of Conduct – UTSP5003. All students are encouraged to read the Recommendations for Students Returning to Campus issued on August 2, 2021.

Visit Comets United webpage to obtain the latest information on the University's guidance and resources for campus health and safety.

Previous Campus Communications: a list of university announcements made in 2020-2021.

Honorlock: Online proctoring tool will be available for fully online courses and for classeswith enrolled international students who are not yet in the United States.

Student Resources

Students who have tested positive for COVID-19 or may have been exposed should not attend class in person and should instead follow required disclosure notifications as posted on the university's website (see "What should I do if I become sick?")

COVID-19 Resources
Comets United webpage: check frequently.

FAQ: check out the FAQs and reach out to your instructor or academic advisor if answers are not included.

Student Resources: a variety of resources are available to help students to obtaincounseling, health care, and academic support.

Course Information

Course Prefix, Number, Section	*BUAN 6v99.503*
Course Title	*Advanced Database with AI Analytics*
Term	*Fall 2025*
Days & Times	*Wednesday 7:00 pm - 9:45 pm*
Classroom	*JSOM 2.802*

Professor Contact Information

Professor	*Sri Kannan Srikanth*
Email Address	*kannan.srikanth@utdallas.edu*
Office Location	*SOM 2.703 | MS Teams*
Office Hours	*By appointment Office hours will be hosted on MS Teams virtually. Links to the virtual meeting will be posted on e-learning. In-person meetings can be scheduled prior or after class hours.*

Wednesday: 3:00 PM to 5:00 PM and by Appointment

Teaching Assistant (TA)	*Ruchitha Panyam*
TA Email	*rxp230080@utdallas.edu*
Office Hours	*Tuesday 4.00 PM to 6.00 PM (In person or Via Teams)*

Course Pre-requisites, Co-requisites, and/or Other Restrictions

MIS 6320 or MIS 6326 or BUAN 6320

Course Description

This course provides students with a comprehensive understanding of how to work with databases directly through Python, without relying on graphical tools. The course progresses from foundational relational database concepts to advanced topics such as NoSQL systems, distributed databases, and database optimization. Students will explore the integration of Artificial Intelligence with databases, including vector search, embeddings, and natural language querying. By the end of the course, students will have both practical coding experience and conceptual knowledge to design, optimize, and build intelligent database-driven applications.

Student Learning Objectives/Outcomes

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

1. Understand relational database fundamentals and perform CRUD operations using Python libraries.
2. Apply query optimization and indexing techniques to improve database performance.
3. Design effective data models for real-world applications, balancing normalization, performance, and scalability.
4. Gain practical experience with non-relational and distributed databases (e.g., MongoDB, Redis) and evaluate their use cases.
5. Work with AI-related database tasks, including embeddings, vector search, and retrieval-augmented generation (RAG).
6. Build and deploy AI-powered agents capable of interacting with databases through natural language queries and intelligent decision-making.

Required Textbooks and Materials

Required Texts

A textbook has not been mandated for this course. All course presentations, quizzes and assignments will be provided. Audio recordings, slides and software demos that might be needed in the course will be made available in eLearning. eLearning will be used as the central platform to provide access to class content (e.g., class slides and assignment descriptions) and the recording of grades. All announcements (e.g., change in assignment dates) will be posted in eLearning and will be sent to the student email on record in eLearning. It is thestudents' responsibility to regularly check their UT Dallas email accounts and review theAnnouncements page in eLearning.

Required Materials

You will need a laptop from the first day of class. While any operating system is fine, it is recommended that the laptop have at least 8GB of ram and about 100MB hard disk space available.

Suggested Course Materials

No mandatory textbook is required for this course. Class notes will be provided via eLearning.

Assignments & Academic Calendar

Topics, Reading Assignments, Due Dates, Exam Dates

Class Date	Topic(s)	HW, Quizzes and Projects (All duedates end at 11:59 pm)
Week 1 **August 27**	• Relational Database Review and SQL Basics • Installing and Running a Local DB	
Week 2 **September 3**	• Accessing Databases with Python (no UI) • Using sqlite3, psycopg2 (Postgres), or mysql-connector-python • Running SQL queries directly in Python scripts	
Week 3 **September 10**	• CRUD operations via Python • Managing connections and cursors • Basic Database Projects in Python	• Form Groups • **HW1: In e-Learning**
Week 4 **September 17**	• Project Introduction - Build an AI-powered Knowledge System • Introduction to ORMs • SQLAlchemy or Django ORM basics	• **HW 1: DUE** • Group Formation **DUE**
Week 5 **September 24**	• How ORMs simplify database access • Query Optimization & Indexing • Reducing query time with good schema design	• **Quiz 1** • **HW 2: In e-learning**
Week 6 **October 1**	• Database Internals • Transactions and ACID properties	• **HW2: DUE**
Week 7 **October 8**	• NoSQL Databases with Python • MongoDB and Redis • Key-value vs. document stores	
Week 8 **October 15**	• Data Modeling in Real-World Apps • Normalization vs. denormalization • Designing for performance	• **HW 3: In e-learning**
Week 9 **October 22**	• Distributed Databases & Scaling • Sharding and replication	• **Quiz 2** • **HW3**: **DUE**
Week 10 **October 29**	• Understanding Embeddings and Vectorization • Using sentence-transformers or OpenAI API to generate embeddings • Storing and managing embeddings with Python • Vector Databases and use-cases	
Week 11 **November 5**	• Indexing and querying with embeddings • Natural Language to SQL with LLMs • GPT/OpenAI API • LangChain SQL agents	• **HW 4: In e-learning**
Week 12 **November 12**	• Introduction to LangChain, LlamaIndex, CrewAI • Creating agents that can fetch, analyze, and answer DB-based questions	• **HW 4: DUE**
Week 13 **November 19**	• **PROJECT PRESENTATION BY ALL**	• **Project Write-up: DUE**
Week 14 **November 26**	• **Fall Break (No Class)**	• **HW 5: In e-learning**
Week 15 **December 3**	• **Quiz-3**	• **HW 5: DUE** • **Quiz 3**
Week 16 **December 7**	• **Final Project Submission: DUE** • **Final Project Video Submission: DUE**	

- **In addition to these classes, if needed we could have team meeting for any extra help with course material.**

Classroom Conduct Requirements Related to Public Health Measures

UT Dallas will follow the public health and safety guidelines put forth by the Centers for Disease Control and Prevention (CDC), the Texas Department of State Health Services (DSHS), and local public health agencies that are in effect at that time during the Fall 2021semester to the extent allowed by state governance. Texas Governor Greg Abbott's Executive Order GA-38 prohibits us from mandating vaccines and face coverings for UT Dallas employees, students, and members of the public on campus. However, we stronglyencourage all Comets to get vaccinated and wear face coverings as recommended by theCDC. Check the Comets United: Latest Updates webpage for the latest guidance on the University's public health measures. Comets are expected to carry out Student Safety protocols in adherence to the Comet Commitment. Unvaccinated Comets will be expectedto complete the Required Daily Health Screening. Those students who do not comply willbe referred to the Office of Community Standards and Conduct for disciplinary action under the Student Code of Conduct – UTSP5003.

Grading Policy

Grades will be determined based on your standing in class, class average and your overall performance with class participation. Depending on your performance based on the class average, your grade will be assigned. In addition to the sections mentioned there will be in-class mini quizzes and grades will be assigned for the same. All raw scores will be scaled down to 100 and percentage from the scaled score will be determined. If there are any quizzes or assignments that allow multiple attempts only the Last Attempt will be graded.

Homework	**20 points each**
Quiz	**100 points each**
Project	**100 points each**

Course Policies

Make-up exams

No make-up exams possible.

Extra Credit

None

Late Work

Will not be accepted; homework, projects and quizzes are due by the due dates provided in eLearning.

Special Assignments

There will be surprise Mini Quizzes in class which will be counted towards additional credit.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are forregistered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement anapproved Office of Student Accessibility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Attendance

Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first weekof classes. Faculty have the discretion to set an attendance policy for their in-person meetings, but the absences due to COVID-19 will not be counted against a quarantined student.

Class Participation

Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure tocomply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the securityof passwords used to access recorded lectures. Unless the Office of Student Accessibility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student Accessibility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings isrequired prior to such use unless an exception is allowed by law. Unless specified all classes are in person only.

Classroom Citizenship

Meaningful Class Participation: You are expected to actively participate in the discussionof any readings, contribute to the learning experience of the class, and meaningfully contribute to all group project work.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students.

Please see http://go.utdallas.edu/academic-support-resources.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

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