CSE 5330: Database Systems
Fall 2023

Instructor Information

Instructor: Dr. Abhishek Santra

Email Address: abhishek.santra@uta.edu

Office Hours (on MS Teams): T/Th 11 AM to 12 PM; *Appointment sheet link available on Canvas.*

Research URL: https://itlab.uta.edu/ (For BS/MS/PhD Research Opportunities)

Teaching Assistant Information

Teaching Assistant: Mr. Rutvij Gadhiya

Email Address: rbg0290@mavs.uta.edu

Office Hours: M/W 1 PM to 2 PM at ERB 501

Course Information

Section Information: CSE 5330-003 (Mode: ONCAMPUS)

Time and Place of Class Meetings: Tu/Th 12:30 PM to 1:50 PM, PKH 102

Description of Course Content: Database system architecture; management and analysis of files, indexing, hashing, and B+-trees; the relational model and algebra; the SQL database language; database programming techniques, database design using Entry-Relationship, extended E-R, and UML modeling; basics of normalization. Introduction to database security, query processing and transaction management.

Objectives: This is an introductory (first) database course for graduate students and an elective course for undergraduates. It is useful for non-cse major graduate students as well if they foresee the use of a DBMS as part of their graduate work. The objective of this course is to give the student a thorough understanding of the Relational database management system (RDBMS) usage fundamentals – from an end user's perspective. In this course, the emphasis is on the concepts underlying various functionalities supported by a DBMS. The emphasis of this course is to gain sufficient understanding of a Relational DBMS, Designing a relational Database, SQL, and its usage, from an end-user/application perspective, to maximize the benefits of a DBMS usage.

Course Outline: The course will cover the DBMS fundamentals as part of three modules.

- *Module I:* Requirement Analysis, Application Design using ER and Extended ER models, Relational Concepts, Translation of EER to relations.

- *Module II:* Relational Algebra, SQL (Beginner and Complex Queries), Normalization

- *Module III:* Overview of Storage Structures (e.g., Disk resident B+ tree and Hash data structures), Basics of Query Processing, Concurrency Control and Recovery

Prerequisites: Knowledge of data structures, sets, functions and relations

Student Learning Outcomes: A clear understanding of the relational model. A detailed Understanding of Extended Entity-relationship modeling, relational algebra, normalization, and SQL. Modeling a Data-oriented problem to DBMS and developing querying and interactive interfaces.

Required Textbooks and Other Course Materials
- Fundamentals of Database Systems by R. Elmasri and S. Navathe, Sixth Edition, Addison Wesley.
  - 7th edition can also be used, available at UTA Bookstore (https://www.bkstr.com/texasatarlingtonstore/product/fundamentals-of-database-systems-440912-1), Price: 43.96 USD to 213.50 USD
- Lecture slides will be posted on canvas.

Descriptions of major assignments and examinations: Since the emphasis of this course is on learning how to map your real-world application to a DBMS and use a DBMS for managing your data, querying, and generating reports from a business perspective, there will be a single semester-long project that will have several phases. It will start with the identification of a real-world application of your interest, doing a requirements analysis, coming up with an ER/EER representation for the application, mapping the ER diagram to relations (or schema), normalizing them, populating the relations, and executing several types of complex queries. The project will be done in stages and points are accumulated over the entire semester. The final phase of the project involves coding and needs to be demonstrated for grading. We will use ORACLE DBMS on Omega for this project.

Grading Information

Grading: Each student will be assigned a final numerical score, based on the break-up discussed below,

- **Project [39%]:** There will be 4 phases in the hands-on semester long project. More details for each phase will be provided later. *Phase 1: 0%, Phase 2: 12%, Phase 3: 12%, Phase 4: 15%*

- **Tests [45%]:** There will be 3 in-class tests. *Test 1: 12%, Test 2: 15% and Test 3: 18%*

- **Pop-Quizzes [5%]:** 2 to 4 in-class pop quizzes will be conducted on any day of the semester. *No prior notice will be given.*

- **Student Team Presentation [3%]:** Students will be asked to make an in-class presentation on the project experiences.

- **Homeworks [8%]:** There will be a preliminary homework **[2%]** and an SQL homework on a large IMDb database **[6%]**.

There are no exact cutoffs for letter grades. In this course range-based letter grade assignment will be done using the class average and standard deviation. Based on the student's final numerical score, the letter grades will be distributed according to the following rubric

Final Numerical Score (say, *x*)	Letter Grade
(Average + 0.25 * Std. Dev.) <= *x* <= 100	A
(Average – 2 * Std. Dev.) <= *x* < (Average + 0.25 * Std. Dev.)	B
(Average – 4 * Std. Dev.) <= *x* < (Average – 2 * Std. Dev.)	C
(Average – 6 * Std. Dev.) <= *x* < (Average – 4 * Std. Dev.)	D
0 <= *x* < (Average – 6 * Std. Dev.)	F

The above is an initial grading proposal. The instructor reserves the right to re-distribute the percentages and cutoffs, if deemed necessary. Throughout the semester, the instructor will be sharing the class statistics to help students assess their position in the class. Students are expected and encouraged to keep track of their performance and seek guidance from the instructor if their performance drops below satisfactory levels.

For the project, as part of the final document, what has been designed and implemented by each team member should be clearly stated and documented. All team members will get the same grade (including same penalty in case of plagiarism, collusion, etc.) on the project. Hence, choose your project partner wisely. Change of partners during the semester will not be allowed.

Assignment and Deadlines:

- **All the assignments must be submitted through Canvas.** We will NOT take hardcopy or email submission, unless the university verifies that Canvas was malfunctioning or unavailable.

- **Everything is due by 11:59pm on the due date.** The deadline is automatically managed by Canvas.

- **Regrading:** Once the score of a test/pop-quiz/project/homework/presentation is posted on canvas, you will have 3 business days to dispute it and get it re-evaluated. No re-evaluation will be entertained after the 3 day period. For projects, as part of the document, what has been designed and implemented by each partner (if it is done as a team) should be clearly stated and documented. *All team members will get the same score/penalty on the project.*

Make-up Exams: No makeup tests, pop-quizzes or exams will be given.

Expectations for Out-of-Class Study: Beyond the time required to prepare for and attend each class meeting, students enrolled in this course should expect to spend at least an additional 3 hours per week in course-related activities, including reading required materials, completing assignments, preparing for tests, etc. Meet the instructor or the TA for any doubts on projects or class lecture material.

Course Schedule (Separate Sheet): Posted on Canvas as a separate document by the 1st day of classes which clearly indicates the test dates and project assignments and due dates in addition to the details of material covered in each lecture. Note that class schedule, test, home work, and project due dates are tentative. Project deadlines and test/presentation dates may be changed (with notice) based on the progress made in the class. Please note that pop quizzes can be conducted on any day of the semester without any prior notice. The course officially ends on the day of the final exam. Class schedule will be updated if any changes are made and announced in the class. "*As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. – Abhishek Santra*"

Institutional Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:
- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey

- Final Exam Schedule

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

The outcome of any cheating, plagiarism or collusion either on the project or on the test/hw will be an automatic Fail grade (F) in the course. For projects, all members of the team will receive the same grade/penalty; so choose your partner wisely and make sure you are aware of what your partner is doing!

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Also, switch on the notifications on Canvas to stay up to date with all the activities, especially to receive the Canvas announcements.

The students are requested to **CC the instructor and the TA(s) in every email,** using the email ids given in the syllabus. The subject line of the email must be according to the template **[<CourseNumber>-<SectionNumber] <Query>.** *Example: [CSE5330-003] Request for Appointment.* Only emails that meet the above requirements will receive a response.

Additional Information

Face Covering Policy: Face coverings are not mandatory; all students and instructional staff are welcome to wear face coverings while they are on campus or in the classroom.

Attendance: At the University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance.

As the instructor of this section, I will take attendance in the class sporadically. Attendance is mandatory in this class. If you cannot make it to any lecture, you must inform me via e-mail **prior to the start of that lecture attaching proper signed and dated medical documents from the medical authority whom you have visited for your condition clearly stating that you are unfit to attend the lecture in-person.** E-mails after the lecture is over will not be acceptable. Emergency situations will be reviewed per specific circumstance. If you miss more than 3 lectures without prior notification, excluding the emergency situations, you may receive a failing grade or reduction in your course grade. All students are expected to be available for the entire semester as specified in the university calendar: https://www.uta.edu/uta/acadcal.php. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a

mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Emergency Exit Procedures: Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Students are encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at Emergency Communication System.

Academic Success Center: The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: Academic Success Center (https://www.uta.edu/student-success/course-assistance). To request disability accommodations for tutoring, please complete this tutoring request form (https://www.uta.edu/student-success/course-assistance/tutoring/request).

The IDEAS Center (https://www.uta.edu/ideas/) **(**2nd Floor of Central Library) offers **FREE** tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

Emergency Phone Numbers

Enter the UTA Police Department's emergency phone number into your own mobile phone. In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Information

Research or General Library Help
Ask for Help
- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources
- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)
- Study Room Reservations (openroom.uta.edu/)