UVU UTAH VALLEY UNIVERSITY™

Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Course Prefix: CS
Course Title: Database Theory

Year: 2025
Course and Section #: 3520-X01
Credits: 3

Course Description

Prerequisite(s): Matriculation to computer science or software engineering and University Advanced Standing
Introduces the underlying theories of Relational Database Management Systems (RDBMS) as well as their practical use retrieving data using both embedded SQL and relational algebra. Implements queries that start from simply joining, selecting, and projecting data, then progresses to more complex data retrieval techniques that require the use of set operations, sub-queries, and group by having clauses. Discusses entity-relationship (ER) modeling, creating a RDBMS from an ER model, B+ Trees, ACID transactions, normalization, locking, concurrency issues, and alternatives to an RDBMS.

Course Attributes

This course has the following attributes:
☒ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☐ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information
Instructor Name: Craig Bell

Student Learning Outcomes

1. Become familiar with Entity Relationship and Relational Database modeling and be able to use modeling to define a normalized database.
2. Understand the techniques for data normalization and why we need to normalize data to facilitate data retrieval.
3. Become familiar with and utilize mathematics, that is the foundation of the relational implementation of a database system.
4. Utilize an SQL approach to query a database system.
5. Become familiar with transaction processing and the approaches used in a distributed information system to enable database transaction processing.

Course Materials and Texts

- Python 3.7 or latest
- MySQL
- MySQL Workbench
- DBeaver Community
- ZyBooKs

Course Requirements

Course Assignments, Assessments, and Grading Policy
Case Studies (10% of final grade)

- This is an individual assignment.
- Case study assignments are on zyBooks. Check the link in Canvas.
- Check the canvas schedule for a case study due date. You can submit a case study if you miss it; however, there is a 10% daily penalty.

Challenge Activities (5% of final grade)

- Challenging activity assignments are on zyBooks. Check the link in Canvas.
- Check the canvas schedule for a challenging activity due date. If you miss a challenge activity, you can still submit it; however, there is a 10% daily penalty for two days.

Quizzes (10% of final grade)

- Quizzes are in Canvas. This is an individual assignment.
- Check the canvas schedule for Quiz due dates. If you miss a quiz cutoff date, you miss the quiz and cannot make it up.
- All quizzes are required; they are open-book and will cover materials from reading assignments and challenge activities in any preceding lessons.

Labs (10% of final grade)

- Labs and assignments are on Canvas. Lab assignments are on zyBooks. Check the link in Canvas.

Grading

- This course includes lectures, homework, and exams. Homework assignments are crucial to develop a full understanding of the material. Because this is a 3000-level course, students should expect to spend time on homework every week. The practical programming aspects of this class will be assigned as lots of small homework assignments.

Late/Incorrect Submissions (Read carefully)

- Incorrect submissions will have a 10% grade reduction.
- There will be a 10% reduction for each day, up to a maximum of three days. After three days, it will be considered missing, and the grade will be 0 (zero).
- Missing work will not be graded.

IMPORTANT: if a file is corrupt (i.e., the instructor cannot open it), it will not be considered incorrect. If the wrong version of a submission is submitted and the student wants an updated version to be considered for grading, a 10% penalty will be applied.

- Study Cases   10 percent
- Challenge Activities   5 percent
- Quizes   10 percent
- Exam   20 percent
- Individual Assignments / Labs   10 percent
- Projects   15 percent

- Group Project   30 percent

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Total grade   100 percent

Grades will be assigned according to the following schedule:
- 94% & above A   73 – 76%   C
- 90 – 92%   A-   70 – 72%   C-
- 87 – 89%   B+   67 – 69%   D+
- 83 – 86 %   B   64 – 66%   D
- 80 – 82%   B-   60 – 63%   D-
- 77 – 79%   C+   0 – 59%   E

There are individual assignments.
Check the canvas schedule for a Lab due date. If you miss a Lab, you can still submit it; however, there is a 10% daily penalty.

Projects (15% of final grade)
- Projects and assignments are on Canvas. Check the link in Canvas.
- There are individual assignments.
- Check the Canvas schedule for a Lab due date. If you miss a project, you can still submit it; however, there is a 10% daily penalty. After two days, it is considered missing.

Exam (20% of final grade)
- The midterm will be on Canvas. This is an individual assignment.
- The Midterm will cover Modules 1-9
- Check the canvas schedule for the midterm due date. If you miss the midterm cutoff date, you miss the midterm and cannot make it up.
- The open-book exam will cover material from reading assignments and challenge activities in preceding lessons.

Group Project (30% of final grade)
- Group Project instructions and rubric will be on Canvas.

- Check the canvas schedule for the Group Project due date. If you miss the Group Project cutoff date, you miss the Group Project and cannot make it up.
- Design and implement a transactional database
    o Example – Grocery store – Airbnb (A simple system process)
    o **Group of 4 students**
    o All four students must participate
    o Peer reviews (on Canvas)
    o Groups should be defined before midterm (you choose your own team)
    o Prepare written report
    o A template will be sent later
- Video presentation should be uploaded into Canvas (Video link or the actual video)
- It should be a professional presentation – Max 5 minutes (No more than 5 minutes and no less than 5 minutes)

Required or Recommended Reading Assignments
- ZyBooks Reading Modules

- ZyBook Labs
- Instructor supplied learning Materials

General Description of the Subject Matter of Each Lecture or Discussion
- Module 1: - Introduction to Databases
- Module 2: Relational Databases
- Module 3: Complex Queries
- Module 4: Database Design
- Module 5: Data Storage
- Module 6: Transaction Management
- Module 7: Database Architecture
- Module 8: Complex Data Types
- Module 9: Database Programming

Required Course Syllabus Statements

Generative AI

The purpose of education is learning. Learning happens by honest effort; there are no shortcuts. Your role is (and will be, in your professional life) to understand tools and concepts and to use them to solve practical problems.

When you submit work, you are claiming that it is your own work and that you understand how and why it works. It is appropriate to use external resources, including web sites and other students, to identify useful tools and concepts and to learn how to use them. It is not appropriate to copy work from external resources, regardless of how little of the work is copied. Uploading code to a website that makes it available to others is plagiarism, whether you intend to make it available. Do not read another student's code unless explicitly authorized. If you are unsure about what is or is not acceptable, ask your instructor.

Use of ChatGPT (or other similar platforms) as a learning assistant, not as a crutch. If you use it, cite it at the top of your code. You are responsible for making sure that any code or content does what it is supposed to do and says what you want it to say. Don't accept anything it generates at face value without checking it critically. These days potential employers will expect you to know how to use tools like ChatGPT to generate code, so it is a skill we need to teach you. If it helps you learn some things faster, it's GREAT because we can spend class time on more interesting topics. Just remember: If you REALLY want to be good, work for it.

Using Remote Testing Software

☒ This course does not use remote testing software.

☒ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities

Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity

At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX

Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation

UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as

participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.

To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.