Master Course Syllabus

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

Semester: Spring
Year: 2025
Course Prefix: CS
Course and Section #: 3530-601
Course Title: Data Management for Data Science
Credits: 3

Course Description

Prerequisite(s): CS 3520 and University Advanced Standing
Covers advanced relational databases and issues related to managing non-relational data sets. Has two major components: (1) advances knowledge in relational database and skills in using SQL and database indexing; and (2) introduces NoSQL databases such as a document-oriented database, key-value database, column-oriented database, graph database, and Hadoop system and data warehousing. Justifies the need for NoSQL databases, and shows how they are implemented in database systems. Presents criteria that decision makers should consider when choosing between relational and non-relational databases and techniques for selecting the NoSQL database that best addresses specific use cases.

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

The objective of this course is to introduce students to the various topics related to NoSQL Databases. We will discuss advanced topics related to RDMS, various NoSQL databases and why each database is a potential candidate for a Data Science application. Students are expected to create a database containing data and provide queries to extract the data. The student will also create queries to extract data from the databases created with each NoSQL database used. Python scripts are also required to perform searches on each of the databases selected.

Course Materials and Texts

- Docker

- Pgadmin
- Instructor Supplied Materials

Course Requirements

Course Assignments, Assessments, and Grading Policy
Homework Assignments / Projects (approximately 80% of final grade)

- You must complete all programming assignments as specified in the assignment description (requirements). Do not deviate from the requirements without permission.
- On programming projects, there will be no partial credit for incomplete work. You will receive all the points for a given assignment or none of the points.
- You will not receive any credit for assignments that are not submitted correctly.
- At the grader's discretion you may be allowed to make corrections and re-submit assignments that contain errors.
- Your instructor may add questions to the discussion board for which your contribution will be graded. Grade points for such questions will be added to assignment scores as indicated in the question.

Exam (approximately 20% of final grade)

- There is one open-book comprehensive exams.
  Exam times will be posted in the course schedule
  Exams are open-book.
  Exams cannot be made up.

Course Grading
Grades will be assigned based on the following scale-
94% and above A
93%-90% A-
88%-90% B+
84%-87% B
80%-83% B-
75%-79% C+
70%-74% C
65%-69% C-
60%-64% D+
56%-59% D
51%-55% D-
50% and below E

Required or Recommended Reading Assignments

- Materials freely available
- Instructor Supplied Materials

General Description of the Subject Matter of Each Lecture or Discussion

- NoSQL Considerations
- RDMS - PostgreSQL

- RDMS Details - PostgreSQL
- RDMS Replication - PostgreSQL / MySQL
- New SQL - CockroachDB
- Document Databases - MongoDB
- Graph Databases - Neo4j
- Hadoop
- Key Value Database - Redis
- Column Oriented Database - Cassandra
- Cloud Databases - Snowflake / RDS
- Data Warehouses

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.