THE UNIVERSITY OF WINNIPEG

APPLIED COMPUTER SCIENCE

Course Number: ACS-3902-002
Course Name: Database Systems
Course Webpage: https://nexus.uwinnipeg.ca/

Instructor Information

Instructor: Ron McFadyen
E-mail: r.mcfadyen@uwinnipeg.ca
Office Hours: Tuesdays   1:00pm – 2:00pm   3D21
Class meeting time: Tuesday/Thursday   11:30am – 12:45pm   3D01

Important Dates

1. First Class: Tuesday January 9, 2024
2. Reading Week (no classes):   February 18-24, 2024
3. Term Test 1:   Tuesday February 13, 2024
4. Term Test 2:   Tuesday March 12, 2024
5. Final Withdrawal Date w/o academic penalty*:   Friday March 15, 2024
6. Last Class: Thursday April 4, 2024
7. Final Exam: TBD
8. University closures: Louis Riel Day   Monday February 18, 2024
                          Good Friday   Friday March 29, 2024

*A minimum of 20% of the work on which the final grade is based will be evaluated and available to the student before the voluntary withdrawal date.

Course Objectives / Learning Outcomes

- Introduce Relational and NoSQL models with emphasis on Relational.
- Provide the foundation for database design and implementation required by systems analysts, designers, programmers, and data modelers.
- Introduce techniques utilized in the various stages of a database software development cycle.
- EERDs, database languages, functional dependencies, normalization, physical data storage.

Evaluation Criteria

1. **Assignments: 20%**
    - 4 assignments worth 5% each and due by midnight on due dates.
    - All assignments are to be completed individually.
    - Late assignments are subject to a late penalty of 20%. Assignments submitted later than 1 day after the deadline will not be accepted.
    - All work is to be submitted electronically via Nexus in the format prescribed within the assignment instructions.
    - Students are responsible for backing up and protecting their assignment work, and for reviewing their assignments before submission to ensure the correct files are submitted. Allowances for technical issues, loss of data, or submission errors will not be considered.

2. **Midterm Tests: 30%**
    - Midterm Test #1: 15%
    - Midterm Test #2: 15%

3. **Final Exam: 50%**
    - The final exam is cumulative. The date and time of the final exam will be announced by the University during the term.

Course Tools (free to download for personal use)

- **PostgreSQL**
  The database management system used in the course is PostgreSQL. It is expected that students use PostgreSQL for all assignments involving databases.
  https://www.postgresql.org).

- **pgAdmin4**
  A graphical user interface for running SQL in postgreSQL.
  https://www.pgadmin.org/download/

- **DBeaver Community**
  A SQL editor suitable for interacting and working with relational databases.
  https://dbeaver.io/

- **Enhanced Entity Relationship Modeling Tool**
  An EERD drawing tool.
  https://www.acs.uwinnipeg.ca/rmcfadyen/CreativeCommons/index.htm

- **FlySpeed SQL Query**
  Create SQL queries using a graphical user interface.
  https://www.activedbsoft.com/download-querytool.html

Test / Exam Requirements
- Photo ID is required for the final exam.
- The use of computers, calculators, phones, or other electronic devices is not permitted during exams.
- Term tests and final exams are closed book.

Students should contact the instructor as soon as possible if extenuating circumstances require missing a lab, assignment, test, or examination. A medical certificate from a practicing physician may be required before any adjustments are considered.

Students with documented disabilities, temporary or chronic medical conditions, requiring academic accommodations for tests/exams (e.g., private space) or during lectures/laboratories (e.g., note-takers) are   encouraged to contact Accessibility Services (AS) at 204-786-9771 or accessibilityservices@uwinnipeg.ca to discuss appropriate options. All information about a student's disability or medical condition remains confidential.
https://www.uwinnipeg.ca/accessibility-services.

Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide opportunity for students to make up work examinations without penalty. A list of religious holidays can be found in the 2019-20 Undergraduate Academic Calendar online at
http://uwinnipeg.ca/academics/calendar/docs/important-notes.pdf

Final Letter Grade Assignment

Historically, numerical percentages have been converted to letter grades using the following scale. However, instructors can deviate from these values based on pedagogical nuances of a particular class, and final grades are subject to approval by the Department Review Committee.

A+	90 – 100%	B+	75 – 79%	C	60 – 64%
A	85 – 89 %	B	70 – 74%	D	50 – 59%
A-	80 – 84%	C+	65 – 69%	F	below 50%

Required Text Book / Reading List

- Elmasri/Navathe, Fundamentals of Database Systems, 7th edition, Addison-Wesley, ISBN# 978-0-133970777
- Class Notes will be available on Nexus

Prerequisite Information

- ACS-2814 (or the former ACS-2914) with a minimum grade of C

Regulations, Policies, and Academic Integrity

Students are encouraged to familiarize themselves with the Academic Regulations and Policies found in the University Academic Calendar at:
https://uwinnipeg.ca/academics/calendar/docs/regulationsandpolicies.pdf
Particular attention should be given to subsections 8 (Student Discipline), 9 (Senate Appeals) and 10 (Grade Appeals).

Avoiding Academic Misconduct: Academic dishonesty is a very serious offense and will be dealt in accordance with the University's policies.

Detailed information can be found at the following:

- Academic Misconduct Policy and Procedures:
  https://www.uwinnipeg.ca/policies/docs/policies/academic-misconduct-policy.pdf and
  https://www.uwinnipeg.ca/policies/docs/procedures/academic-misconduct-procedures.pdf
- About Academic Integrity and Misconduct, Resources and FAQs:
  https://library.uwinnipeg.ca/use-the-library/help-with-research/academic-integrity.html

Uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) involves "aiding and abetting" plagiarism. Students who do this can be charged with Academic Misconduct.

Academic Integrity and AI Text-generating Tools: Students must follow principles of academic integrity (e.g., honesty, respect, fairness, and responsibility) in their use of material obtained through AI text-generating tools (e.g., ChatGPT, Bing, Notion AI). If an instructor prohibits the use of AI tools in a course, students may face an allegation of academic misconduct if using them to do assignments. If AI tools are permitted, students must cite them. According to the MLA (https://style.mla.org/citing-generative-ai/), writers should
- cite a generative AI tool whenever you paraphrase, quote, or incorporate into your own work any content (whether text, image, data, or other) that was created by it
- acknowledge all functional uses of the tool (like editing your prose or translating words) in a note, your text, or another suitable location.
- take care to vet the secondary sources it cites.

If students are not sure whether they can use AI tools, they should ask their professors.

Non-academic misconduct: Students are expected to conduct themselves in a respectful manner on campus and in the learning environment irrespective of platform being used. Behaviour, communication, or acts that are inconsistent with a number of UW policies could be considered "non-academic" misconduct. More detailed information can be found here:

- Respectful Working and Learning Environment Policy https://www.uwinnipeg.ca/respect/respect-policy.html,
- Acceptable Use of Information Technology Policy
- https://www.uwinnipeg.ca/policies/docs/policies/acceptable-use-of-information-technology-policy.pdf
- Non-Academic Misconduct Policy and Procedures: https://www.uwinnipeg.ca/policies/docs/policies/student-non-academic-misconduct-policy.pdf and https://www.uwinnipeg.ca/policies/docs/procedures/student-non-academic-misconduct-procedures.pdf

Copyright and Intellectual Property: Course materials are the property of the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides—irrespective of format. Students who upload these materials to filesharing sites, or in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor/presenter before, for example, photographing, recording, or taking screenshots of slides, presentations, lectures, and notes on the board. Students found to be in violation of an instructor's intellectual property rights could face serious consequences pursuant to the Academic Misconduct or Non-Academic Misconduct Policy; such consequences could possibly involve legal sanction under the Copyright Policy: https://copyright.uwinnipeg.ca/basics/copyright-policy.html

Privacy

Students have rights in relation of the collecting of personal data the University of Winnipeg
- Student Privacy: https://www.uwinnipeg.ca/privacy/admissions-privacy-notice.html
- Zoom Privacy: https://www.uwinnipeg.ca/privacy/zoom-privacy-notice.html

Class Cancellation, Correspondence with Students and Withdrawing from Course

When it is necessary to cancel a class due to exceptional circumstances, the course instructor will make every effort to inform students via uwinnipeg email and Nexus.

Students are reminded that they have a responsibility to regularly check their uwinnipeg e-mail addresses to ensure timely receipt of correspondence from the University and/or the course instructor*.*

Please let course instructor know if you plan on withdrawing from the course. Note that withdrawing before the VW date does not necessarily result in a fee refund.

Topics to be covered (tentative)
The order and timing of these topics may change as the term progresses. The relevant chapters of the accompanying text are identified with each topic to assist students with companion reading to the lecture material.

1. Ch 5 The relational data model and relational database constraints
2. Ch 6 Basic SQL
3. Ch 7 More SQL: complex queries, triggers, views, and schema modification
4. Ch 8 The relational algebra
5. Ch 3 Data modeling using the entity-relationship (ER) model and Information Engineering Notation
6. Ch 4 The enhanced entity-relationship (EER) model and Using Information Engineering Notation
7. Ch 9 Relational database design by ER- and EER-to-relational mapping
8. Ch 14 Database Normalization
9. Ch 16, 17 File structures: hashing (linear hashing), indexing (B+tree)
10. Ch 24 NOSQL Databases
11. As time permits: Data Warehousing and Conceptual Modeling

A permitted or necessary change in mode of delivery may require adjustments to important aspects of course outlines, like class schedule and the number, nature, and weighting of assignments and/or exams.