THE UNIVERSITY OF WINNIPEG

APPLIED COMPUTER SCIENCE

Course Number: GACS/4902-001
Course Name: Advanced Database Systems
Course Webpage: acs.uwinnipeg.ca/ychen2/advancedDBNotes.html

Instructor Information

Instructor: Dr. Yangjun Chen
E-mail: y.chen@uwinnipeg.ca
Office Hours: 4:00 pm - 5:00 pm on Mon. and Wed.
12:00 – 3:00 pm Friday

Class meeting time: Mondays/Wednesdays 11:30-12:45 pm 3D03

Important Dates

1. First Class: Wednesday, September 4, 2024
2. Reading Week (no classes): October 13-19, 2024
3. Midterm Test: Monday, October 23, 2024
4. Final Withdrawal Date w/o academic penalty*: Wednesday November 13, 2024
5. Last Class: Wednesday December 4, 2024
6. Final Exam: TBA
7. University closures: Truth and Reconciliation Day Monday, September 30, 2024
   Thanksgiving Monday, October 14, 2024
   Remembrance Day Monday, November 11, 2024
8. Make-up classes for holiday closures: Tuesday, December 3, 2024
   Wednesday, December 4, 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

The course is a continuation of ACS-3902/3 (Database Management Systems). It deals with advanced topics in database design, use, and administration.

Concretely, the knowledge on the following topics will be established:

1. System implementation and client/server architectures
2. Query processing and optimization
3. Transaction processing, concurrency, and recovery, which form the basis of OLTP systems
4. Security
5. Enhanced entity-relationship modelling
6. Object-oriented database management systems
7. Spatial and temporal data management
8. Data mining
9. Graph databases

Evaluation Criteria

4 assignments 20%

Four assignments, worth 5 marks each

- Due at 11:59:59 pm on due dates
- No late assignment will be accepted, or under special circumstances accepted with 20% off for each late day.
- All assignments are to be completed individually and only submitted via email to the teaching assistant

1 midterm examination 25%
1 final examination 55%

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

Test/Exam Requirements

- Midterm and final exams will be delivered in person on campus.
- Photo ID is required for the final exam.
- The use of computers, calculators, phones, or other electronic devices is not permitted during exams.
- Midterm and final exams are closed book.

Students should contact the instructor as soon as possible if extenuating circumstances require missing a 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 2024-25 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(s)/Reading List

Elmasri/Navathe, Fundamentals of Database Systems, **3rd, 4th, 5th, 6th or 7th edition**, Addison-Wesley, ISBN# 0-8053-1755-4
Class Notes are available on the web page: http://www.acs.uwinnipeg.ca/~ychen2.

Prerequisite Information* (This information can be found in the UW General calendar)

A grade of at least C in both ACS-2947/3 and ACS-3902/3

*Make sure that you have the necessary prerequisites to take this course. If you have not successfully completed the above listed courses, it is in your interest to go to student registration office and officially drop the course. Otherwise, the registration office will do it on your behalf.

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). Use of AI Tools is prohibited in this course: students may face an allegation of academic misconduct if using them to do assignments.

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.

Tentative Course Outline and Schedule

Chapter 2 (6th ed.)	Database system architecture and the system catalog
Chapter 11 (6th ed.)	Concepts for object-oriented databases
Chapter 13 (6th ed.) (and lecture notes)	Introduction to SQL Programming Techniques
Chapter 15 (5th ed.) (and lecture notes)	Query processing and optimization
Chapter 18 (6th ed.) (and lecture notes)	Indexing structures for files
Chapter 21 (6th ed.)	Transaction processing concepts
Chapter 22 (6th ed.)	Concurrency control techniques
Chapter 23 (6th ed.)	Database recovery techniques
Chapter 24 (6th ed.)	Database security and authorization
Chapter 4 (6th ed.)	Enhanced entity-relationship modelling
Lecture notes	Spatial and temporal Databases, Graph Databases Data mining

Note: all topics listed on the outline may not be covered.

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.