THE UNIVERSITY OF WINNIPEG

APPLIED COMPUTER SCIENCE

Course Number: ACS-4904-001 / GACS-4904-001
Course Name: **Data Warehousing**
Course Webpage: https://nexus.uwinnipeg.ca/d2l/le/content/72549/Home

Instructor Information

Instructor: Ron McFadyen
E-mail: r.mcfadyen@uwinnipeg.ca

Office Hours:	Tuesdays	12:00 pm - 1:00 pm	3D21
Class meeting time:	Tuesdays/Thursdays	10:00 am - 11:15 am	3D04

Important Dates

1.	First Class:		Tuesday, September 2, 2025
2.	Midterm Test 1:		Thursday, October 2, 2025
3.	Reading Week (no classes):		October 12-18, 2025
4.	Midterm Test 2:		Tuesday, November 4, 2025
5.	Final Withdrawal Date w/o academic penalty*:		Wednesday, November 12, 2025
6.	Last Class:		Wednesday, December 3, 2025**
7.	Final Exam (Comprehensive):		TBD
8.	Final Exam Period:		December 8-20, 2025
9.	University closures:	Truth and Reconciliation Day	Tuesday, September 30, 2025
		Thanksgiving	Monday, October 13, 2025
		Remembrance Day	Tuesday, November 11, 2025**
10.	Make-up classes/labs on holiday closures:		Wednesday, December 3, 2025

*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.
**Wednesday December 3 is the makeup day for Tuesday November 11.

Course Objectives / Learning Outcomes

This course introduces students to the architectural framework for data warehousing including extracting, cleansing, and transforming data (ETL), building and maintaining the warehouse, meta data, dimensional analysis and multidimensional modeling. Dimensional modeling is covered in detail (star schemas: fact tables, dimension tables, aggregation, snowflakes, slowly changing dimensions, bridge tables, recursive hierarchies, fact table types, etc.). Storage structures (HOBI, bit-map indexes, etc.) as they apply to data warehousing are discussed. Students work with advanced SQL features such as merge, lag, lead, cube, rollup, etc.

Evaluation Criteria

1. **Assignments**: 20%
    - All assignments are to be completed individually.
    - 4 assignments worth 5% each and due by midnight on due dates.
    - Late assignments are accepted, up to 1 day, with 20% off.
    - All work is to be submitted electronically via Nexus.
    - Programming questions may require .java, .js, .json, or .sql files.
    - Non-programming questions are answered using a word processor or drawing software and submitted as .pdf files or .txt files as may be required.
    - Further details and submission procedure will be stated in each assignment.

    Course tools:
    The database management system used in the course is PostgreSQL. PostgreSQL is free to download to your own computing environments (see https://www.postgresql.org).

2. **Midterm Tests:** Test 1 20%, Test 2 20%
    During the regular class time (see Important Dates).

3. **Final Exam:** 40%
    Cumulative.
    Date, time to be announced.

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.
- Midterm 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 2025-26 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

- Star Schema, The complete reference by Adamson, ISBN-13 978-0071744324
- Class Notes will be available on Nexus

Prerequisite Information

- ACS-3902(3) 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

In ACS-4904 individual assignment and deliverable documents will clearly outline what AI tools can be used for.

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://www.uwinnipeg.ca/policies/docs/policies/copyright-policy.pdf

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
- Exam and Proctoring: https://www.uwinnipeg.ca/privacy/zoom-test-and-exam-proctoring.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, order may vary)

- Fundamentals
  - Analytical databases and dimensional design
  - Data warehouse architecture
  - Stars and cubes
- Multiple stars
  - Fact table per process
  - Conformed dimensions
- Dimension design
  - More on dimension tables
  - Hierarchies and snowflakes
  - More slow change techniques
  - Multi-valued dimensions and bridges
  - Recursive hierarchies and bridges
- Fact table design
  - Transactions, snapshots, and accumulating snapshots
  - Factless fact tables
  - Type-specific stars
- Performance
  - Derived schemas
  - Aggregates
- Tools and Documentation
  - Design and business intelligence
  - Design and ETL
  - How to design
- HOBI & Time-HOBI
- Indexes

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.

In order to ensure a safe and comfortable learning environment for everyone, we kindly ask that all students refrain from wearing or using scented products while attending class.