UNIVERSITY OF WATERLOO

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CS 338 Fall 2026

Computer Applications in Business: Databases

Section 001

Class Schedule

Course	Meet Days	Meet Time	Location	Instructor(s)
CS 338 001 [LEC]	**Tue, Thu** *Sep 9 - Dec 8*	11:30AM - 12:50PM	MC 2054	David Toman david@uwaterloo.ca

schedule data automatically refreshed daily

Instructional Team

Instructor

David Toman
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Email: david@uwaterloo.ca
Office: DC3344
Office hours: Thursday 2:30-4pm or by appointment
Sections LEC 001

Office Hours and Discussion Forum

There are two primary ways to receive help with course material.

1. The first is to pose questions on the piazza web page. In this case, we will attempt to answer questions in a timely fashion.

2. The second is to attend office hours. These are scheduled for mornings from 11:00am to noon on Tuesdays and Thursdays for the duration of the course.

Course Description

Calendar Description for CS 338

A user-oriented approach to the management of large collections of data. Methods used for the storage, selection, and presentation of data. Common database management systems.

View requirements for CS 338 (1)

Course Web Site and This Document

The authoritative course web site is https://cs.uwaterloo.ca/~david/cs338/ (2) for which all registered students should have access. A document version of the outline is available online, and is the source for course related information. Any updates to this information will be made to said document, in particular, the timing for study tasks and assignment submissions. It is therefore a good idea to review or download a fresh copy on a regular basis.

Prerequisites

The lectures do not assume any prior knowledge of databases. However, you must brush up your skills in the following three areas:

1. elementary math (sets, relations);
2. basics of complexity theory (e.g., the O-notation, etc.); and
3. basic programming skills.

Learning Outcomes

No explicit learning outcomes defined for this course.

Course Objectives

The overall objectives for this course are for students to learn the following:

1. why one might use a *database management system* (DBMS) (what are the benefits of doing so);
2. how to code applications using a DBMS;
3. how to design databases; and
4. a basic understanding of how a DBMS works.

A particular focus of the course is on the relational model of data, and on the SQL language, the standard interface to a *relational* DBMS (RDBMS).

Tentative Class Plan

Schedule (tentative):

Current study tasks are as follows:

- **09/10**: Introduction to the Course, Introduction to Database Management Ch. 1 (Ch. 1),
- **09/14-18**: The Relational Data Model: data model, query languages Ch. 3 (Ch. 5) More on the relational model: safe queries and integrity constraints,
- **09/21-25**: Introduction to SQL
- **09/28-02**: More on SQL
- **10/05-09**: SQL with duplicates and NULL values Sec. 4.3.2, 5.1.2-5.1.9 (Sec. 8.4.2, 8.5.2-8.5.9),
- **10/12-16**: *Reading Week*
- **10/19-23**: Application Development and SQL Sec. 5.1.1, 5.1.6 (Sec. 8.5.1, 8.5.6)
- **10/26-30**: Introduction to ER Modelling Ch. 8 (Ch. 4)
- **11/02-06**: ER to Relational Mapping SQL Data Definition, Views, and Security Sec. 15.1-15.2, 15.5 (Sec. 10.1-10.2, 10.5)
- **11/09-13**: Dependencies and Normal Forms Sec. 2.2, 5.3 (Sec. 2.2, 8.8), Ch. 9 (Ch. 7), Ch. 24 (Ch. 23)
- **11/16-20**: Query/Update Execution Ch. 19 (Ch. 15) Database Tuning
- **11/23-27**: Concurrent Access to Data and Transactions Ch. 21 (Ch. 17)
- **11/30-04**: Data Integration and Advanced Topics
- **12/07-08**: **REVIEW for final exam**

Learning Material

The course core consists of eleven modules covering a progression of eleven topics. There are PDF files of all slides used for all modules located on the course site. For each module, there will be the following files:

1. The PDF file is used for presentation in class; and
2. source code for examples used on the slides in text form (if applicable).

The topics will be covered in a timed incremental fashion, with each topic allotted approximately one week. Slides for Module i will generally be available for download at the end of week $i - 1$ at the latest, or at the start of classes. At the start of week $i + 1$, students are expected to have completed reviewing the slides and assigned reading for Module 1 through Module i.

Required Materials & Technologies

Note: Any prices provided in course outlines are best estimates based on recent online prices and do not include shipping or taxes. Prices may vary between retailers.

This course has **no additional costs** for students.

Readings

Textbook and Online Resources

The textbook for the course is *Fundamentals of Database Systems*, by R. Elmasri and S. Navathe (5th, 6th, or 7th ed). There is suggested reading from the textbook for each module. Also, it is recommended to use SQLite when working on the study assignments, in particular, the web-based command interpreter for SQLite that can be access via the main SQLite landing page: sqlite.org. Alternatively, you can use IBM DB2 in the undergraduate student environment.

Assessments & Activities

There is no defined grading scheme for this course.

Course Evaluation: Assignments and Exams

Final grades for the course will be based on a in-class quiz, a midterm, and a final exam. There will be at least four ungraded study assignments to be used as study guides. Sample solutions for all study assignments will be provided. The weighting for the quiz, the midterm, and the final exam are as follows:

- in-class quiz, 20%,
- midterm, 30%, and
- final exam, 50%.

Note that study assignments and their sample solutions will be available for download on the course WEB site. For the dates/locations (when known) of the exams see the course web page.

Late / Missed Content

n/a

Assignment Screening

There are no graded assignments so no automated assignment screening will be utilized within this course.

Generative AI

If students wish to use AI-tools to assist with studying, to protect the privacy and security of any data entered, students should use the University's version of Co-Pilot and login with their UW ID. Data entered into other systems can be added to training sets, monitored, geolocated and even reproduced as output which may share private personal information or result in intellectual property breaches.

Administrative Policy

Student Course Evaluation

The University of Waterloo has been working hard to bring student evaluations into the modern era by eliminating the need for wasteful and time- consuming paper surveys. The current system we are using is called “evaluate”, and was developed on campus in order to meet the specific needs of the university.

The evaluation survey is available online.

COVID-19 Contingency Plan

- If in-person lectures are cancelled, the instructors will provide sufficient digital resources instead using Learn/ Bongo.
- If in-person exams are cancelled, the exams become online take-home exams.

University Policy

Mental Health: At the University of Waterloo, we are dedicated to supporting your mental and emotional well-being. Our Counselling Services offer confidential support, including individual counselling, workshops, and crisis intervention.

If you're struggling, please reach out for help at 519-888-4096 or visit their website (3) for more information.

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility.

Grievance: A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4 (4). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/ collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline (5). For typical penalties, check Guidelines for the Assessment of Penalties (6).

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (7) (other than a petition) or Policy 71, Student Discipline (8) may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to Policy 72, Student Appeals (9).

Note for students with disabilities and disabling conditions: The University of Waterloo recognizes its obligations under the Ontario Human Rights Code to accommodate students with known or suspected disabilities and disabling conditions (e.g. medical conditions, injuries, impacts of trauma such as from violence or discrimination) to the point of undue hardship. To support this obligation, AccessAbility Services (10) (AAS) collaborates with all academic departments and schools to facilitate academic accommodations for students with disabilities and disabling conditions without compromising the academic integrity of the curriculum. If you believe you may require academic accommodations (e.g., testing accommodations, classroom accommodations), register with AAS as early in the term as possible by completing the online application (11). Students already registered with AAS must activate their accommodations for each of their courses at the beginning of each term using AAS' online system. If you require assistance, contact AAS by phone (519-888-4567 ext. 35082), email (access@uwaterloo.ca) or in-person (Needles Hall North, 1st Floor, Room 1401).

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.

Reference: Links from Document

1. https://acal.fast.uwaterloo.ca/course/1269/CS/338
2. https://cs.uwaterloo.ca/~david/cs338/
3. https://uwaterloo.ca/students/health-and-well-being/counselling-appointments
4. https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70
5. https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71
6. https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties
7. https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70
8. https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71
9. https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72
10. https://uwaterloo.ca/accessability-services/
11. https://uwaterloo.ca/accessability-services/students/applying-academic-accommodations/documentation-information-forms