

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

Course Information

Instructors:	Abdelghny Orogat	Lecture Location:	Check Carleton Central
Email:	abdelghny.orogat@carleton.ca	Lecture Time:	Section A: Tuesday: 17:35 pm - 18:55 pm Thursday: 17:35 pm - 18:55 pm
Office Hours:	Posted in Brightspace		
Teaching Assistants:	Posted in Brightspace		
TAs Office Hours:	TA office hours start in the second week. Office hours' dates and times can be found on Brightspace .		
Prerequisites:	COMP 1805 with a minimum grade of C-, and either COMP 2402 or (SYSC 2004 and SYSC 2100).		

For information about Carleton's academic year, including registration and withdrawal dates, see [Carleton's Academic Calendar](#).

Course Description

This course provides a thorough introduction to database systems, covering core topics such as SQL, relational design, and application development. It also introduces advanced concepts like query optimization and NoSQL models, preparing students to work with both traditional and modern data management systems.

List of Discussed Topics:

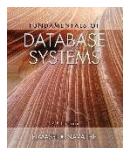
- Relational Model.
- Comprehensive SQL Coverage (DDL, DML, DQL).
- Relational Database Design.
- Application Development.
- Physical Storage Systems & Data Storage Structures.
- Query Processing & Optimization.
- NO SQL Types (Document-Oriented, Graph-Oriented with various examples like MongoDB, RDF, SPARQL, Neo4J).

Textbook

The textbooks are not mandatory in the course and are meant to be used as an extra source of reference to complement the topics discussed in class.



Avi Silberschatz, Henry F. Korth, and S. Sudarshan. Database System Concepts. Seventh Edition. McGraw-Hill. ISBN 9781260084504. **(Optional - \$47.00)**



Ramez Elmasri and Shamkant B. Navathe: Fundamentals of Database Systems. Seventh Edition. ISBN 9780133970777 **(Optional - \$246.00)**

Marking Scheme

Grading Components	Weighting	Note (<i>No component's weight will transfer to another</i>)
Assignments	30%	Cannot submit one: For all students, only the best 4 out of 5 assignments will count. (<i>No other exceptions for any reasons</i>)
Project	30%	Cannot submit on time: Do the following . (<i>No exceptions</i>)
Final (Centrally Scheduled Exam)	40%	Cannot attend: You must defer it . No other solutions.

Topics, Assignments, and Final Project: Coverage, Release Dates, and Deadlines

Week	#	Topic	Assignments	
Week 1	1	Database Introduction and Course Outline		
Week 2	2	Relational Algebra		
	3	Tuple Relational Calculus		
Week 3	4	SQL - DDL and DML	A1 Two weeks: 15-Sep to 28-Sep Topics: RA, TRC, and Simple SQL	
	5	SQL (DQL: SELECT-FROM-WHERE-...)		
Week 4	6	SQL (DQL: AGR()-GROUP BY-HAVING-SETS-...)		
	7	SQL (DQL: Complex Queries and SubQueries)		
Week 5	8	SQL (DQL: VIEWs-INDEX-FUNCTIONs-...)	A2 Two weeks: 29-Sep to 12-Oct Topics: SQL and ER	
	9	Entity-Relationship (ER) Model		
Week 6	10	Entity-Relationship (ER) Mapping		
	11	Functional Dependencies and Normalization Theory		
Week 7	12	Application Development	Final Project Release 15-Oct-2025	
	13	Project Discussion		
Week 8	14	Fall break, no classes.		
	15	Fall break, no classes.		
Week 9	16	Physical Storage	A3 Two weeks: 27-Oct to 9-Nov Topics: Application Development and Functional Dependencies and Normalization	
	17	Data Storage Structures and Indexing		
Week 10	18	Query Processing		
	19	Query Optimization		
Week 11	20	NO SQL - Introduction	A4 Two weeks: 10-Nov to 23-Nov Topics: Physical Storage Systems, Query Processing and Optimization	
	21	NO SQL - Document-Oriented Database (MongoDB)		
Week 12	22	NO SQL - Graph-Oriented Database (Directed Edge-Labelled Graph [RDF])		
	23	NO SQL - Graph-Oriented Database (Directed Edge-Labelled Graph [SPARQL])		
Week 13	24	NO SQL - Graph-Oriented Database (Property Graph [Neo4J])	A5 One week: 24-Nov to 30-Nov Topics: NoSQL	Final Project Due 01-Dec-2025
	25	NO SQL - Graph-Oriented Database (Property Graph [Neo4J-CYPHER])		
Week 14	26	NO SQL - Vector DB (Milvus)		
	27	Research Topic: Text-to-SQL		

Learning Outcomes:

By the end of this course, students will be able to apply core concepts of database systems, including relational algebra, SQL, normalization, and ER modeling. They will develop practical skills in designing and querying both relational and NoSQL databases (e.g., MongoDB, RDF/SPARQL, Neo4J, Milvus), and understand key techniques in query processing and optimization. The course also emphasizes analytical thinking, inclusive teamwork, and responsible data management in real-world and research contexts.

Notes

1. Collaborating on assignments is strictly disallowed. If found, all students involved will be given a mark of **0** and the case will be reported to the office of the Dean of Science.
2. If you need help, please see a TA or the instructor during their office hours.
3. Posting assignment solutions on discussion boards before the due date and time is prohibited and the student involved will be given a mark of **0** for the assignment.
4. Assignments must be submitted to Brightspace in order to be marked. Assignments are allowed to be submitted **one day late** with a 10% **penalty**. After one day, no submission will be accepted.
5. Never email any assignment to the TAs or the instructor! Technical problems do not exempt you from this requirement, so if you wait until the last minute and then have issues with your connection, you will still receive a mark of zero. Consequently, you are advised to:
 - Periodically upload your progress (e.g., upload your progress at least daily).
 - Attempt to submit your final submission at least one hour in advance of the due date and time.
6. Any issues regarding the assignments should be brought to the attention of the TA who marked them (only if the TA does not address the problem to your satisfaction should you bring the matter to the instructor). However, this has to be done **no later than two weeks** after the marks of this assignment/midterm are posted. After this time, **no remarking will be done**.
7. The final covers everything learned in class.
8. Students must have at least **45%** for the final to pass the course.

Undergraduate Academic Advisors

The Undergraduate Advisors for the School of Computer Science are available in Room 5302HP; or by email at scs.ug.advisor@cunet.carleton.ca. The undergraduate advisors can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit, and the remaining requirements for graduation. The undergraduate advisors will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services, and Writing Tutorial Services.

SCS Computer Laboratory

Students taking a COMP course can access the SCS computer labs. The lab schedule and location can be found at: <https://carleton.ca/scs/tech-support/computer-laboratories/>. All SCS computer lab and technical support information can be found at: <https://carleton.ca/scs/tech-support/>. Technical support staff may be contacted in-person or virtually, see this page for details: <https://carleton.ca/scs/tech-support/contact-it-support/>.

SCS Laptop Requirement

Every student that has been enrolled in a 1000-level (i.e., first year) course offered by the School of Computer Science after the 2020/2021 school year is required to have a laptop. This includes COMP1001, COMP1005, and COMP1006. For more information, please visit <https://carleton.ca/scs/scs-laptop-requirement/> and then review the requirements at <https://carleton.ca/scs/scs-laptop-requirement/laptop-specs/>.

University Policies

Students with Disabilities: Academic Accommodations for Students with Disabilities If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre](#) website.

Survivors of Sexual Violence. As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities. Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see [the policy](#).

More about Academic Accommodation (Pregnancy Obligation, Religious Obligation, etc): The accommodation request processes are outlined on the Academic Accommodations website (<https://students.carleton.ca/course-outline/>).

Student Academic Integrity Policy. Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found [here](#).

Plagiarism. As defined by the Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science. Standard penalty guidelines can be found [here](#).

Unauthorized Co-operation or Collaboration. Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

Chat GPT/Generative AI Usage. Students are encouraged to use AI tools to support their learning and deepen their understanding of course topics. **However**, unless explicitly stated otherwise, the use of AI systems for completing graded assignments is strictly prohibited and will be considered academic misconduct. This includes, but is not limited to, chatbots or code generators (e.g., ChatGPT, Google Gemini, Microsoft Copilot), research assistants (e.g., Elicit), and image generators (e.g., Stable Diffusion, DALL-E). An exception is made for basic grammar and punctuation tools (e.g., Grammarly), which may be used for written submissions.

Student Rights & Responsibilities. Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See [the 7 Rights and Responsibilities Policy](#) for detail regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.