



COMP 3005 B Winter 2021

Database Management Systems

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Instructor: Louis Nel (<http://www.scs.carleton.ca/%7Eldnel>)

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USEFUL LINKS:

culearn (<https://www.carleton.ca/culearn>)

sqlite.org (<https://www.sqlite.org/index.html>)

SQL syntax (<https://www.sqlite.org/lang.html>)

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COMP 3005 (B) Database Management Systems

COURSE OUTLINE

Lectures	Mon, Wed 2:30-4:00 location: Online (Blended Delivery) You must be available during class times for tests. Lecture content will be asynchronous
Instructor	Louis Nel (http://www.scs.carleton.ca/~ldnel)

Calendar Description:

COMP 3005 [0.5 credit]**Database Management Systems**

Introduces students to concepts of database management systems, database design and file structures. Topics include: entity-relationship modeling and object oriented database design, data models (relational, network and object oriented), the relational algebra, SQL, normalization theory, physical data organization, object oriented databases and OQL.

Precludes additional credit for BUSI 3400 (<http://calendar.carleton.ca/search/?P=BUSI%203400>).

Prerequisite(s): COMP 1805 (<http://calendar.carleton.ca/search/?P=COMP%201805>) or MATH 1800

(<http://calendar.carleton.ca/search/?P=MATH%201800>) with a minimum grade of C-, plus: COMP 2402

(<http://calendar.carleton.ca/search/?P=COMP%202402>) or (SYSC 2004 (<http://calendar.carleton.ca/search/?P=SYSC%202004>)) and SYSC 2100 (<http://calendar.carleton.ca/search/?P=SYSC%202100>)).

Lectures three hours a week.

Course Description:

IMPORTANT: This offering of the course is being affected by the current COVID-19 restrictions. The course will be a blended course with lecture content being delivered asynchronously by posted videos and powerpoints. The official class time will be used to hold quizzes synchronously -test to be done at a scheduled time for a prescribed duration. There will also be synchronous office hours and question and answer sessions using Zoom meetings.

The course covers the principles involved in the design and implementation of relational databases and applications that use them. The assignments will provide practice in the specification, design, and implementation of a relational databases and applications that makes use them, as well as theory of relational table design (normalization theory). Course topics include:

- Introduction to relational and other database models
- Entity-Relationship modeling
- Query models including Relational Algebra and Relational Calculus
- Relational database design and normalization
- The SQL query language
- Using SQLite from command line interface
- Using a relational database with simple web applications and RESTful API servers
- Physical Database Organization and Implementation Issues
- Data structures (B+ Trees) used in database indexing
- Optional Topics (Time permitting):
 - Transaction Processing Concepts
 - Concurrency Control Concepts

Textbook:

The course will be taught from lecture slides and demonstration code available to students on the course website. The course notes are based largely on the recommended text mentioned below.

Note: course notes will be updated as the course progresses so check revision numbers from time to time to see that you have the latest versions.

The recommended textbook is: Elmasri and Navathe, "Fundamentals of Database Systems" 7th edition, Addison Wesley (earlier editions of the book are fine also for this course).

Some recommended texts or materials will be provided in the resources section of the course web site. The resources section will be updated as the course proceeds and students are encouraged to contribute to the resources list.

Course Material Copyright Notice:

We remind you that lecture and course materials, including power point presentations, outlines, videos, code examples, and similar materials, are protected by copyright. The professor is typically the exclusive owner of copyright and intellectual property of the course materials unless otherwise noted. You may take notes and make copies of course materials for your own private (educational) use. You may not, however, reproduce or distribute lecture notes and course materials publicly or use them for commercial purposes without my express written consent.

This notice has been added, in part, because course content has ended up on public sites like OneClass, Course Hero and GitHub without permission. Many students are eager to post work on GitHub but you have to be careful not to include copyrighted work of others.

Software:

You will need the following software for doing course assignments. All software should be freely available and should run on Windows, Mac OS, and Linux. Classroom demos may be Windows 10, Mac OSX, or Linux. Assignments must be submitted in the format specified in the assignment. Assignments in other formats will not be graded.

Software

SQLite <http://www.sqlite.org/> (<https://www.sqlite.org/index.html>)

Relational Database:

SQLite will be our course SQL database. See resources section of course website for more details.

We will likely use some web technologies of COMP 2406 to wrap our SQLite databases in a client-server web app. See the resources section of the course website for more information. (<https://nodejs.org/en/>) The last two assignments will require you to present your term database as a web app.

App Development
Platform

The applications will involve using simple HTML webpages accessing a database server coded in javascript and based on the node.js javascript execution environment.

It is not expected that you have taken COMP 2406 but you will be expected to learn the required technology based on demonstration code we provide.

Many of the assignments will require design work presented as a report and these must be submitted as .pdf files (not word, html, xml, etc). Don't assume that the markers have specific word processing apps or programming development environments.

Written Design Assignments

You will need diagramming tools for ER diagrams and word processing for design exercise. You can use whatever you want but assignment submissions **MUST** be in .pdf

.pdf scans of handwritten work will not be accepted -your work should look professional.

Important: this is a large class and we will adopt a zero-tolerance policy for work not submitted in the requested format. Submissions that do not comply will not be graded.

Compression only .zip accepted (not rar, or tar, etc.)

Assignments Submission:

We will be using electronic submission of assignments using Carleton's culearn (<https://culearn.carleton.ca>) system. Electronic submission enforces strict deadlines. Only assignments accepted to culearn will be graded. No assignments will be accepted late or directly by email or in other forms. TA's are not allowed to accept assignments directly.

Teaching Assistants:

A schedule for TAs will be posted on the course website.

Marking Scheme:

deliverable	value	comment
Assignments	65%	5 or 6 assignments equally weighted All assignments are individual work. Count All but one (drop worst mark). There will be an ongoing individual term project. In the final stages you will need to embed your database inside a simple web application application.
Tests	35%	There will be 6 quizzes, roughly one every other week. There not be a final exam. The quizzes will be accessed in culearn. They are synchronous and need to be done at the scheduled time in culearn. (Count all but the worst mark, that is, count 5/6 tests)
Final Exam	0%	There will NOT be a final exam

Missed assignments and tests: You may miss 1 assignment and one test for medical, compassionate, or other reasons. If you miss more than that a mark of 0 will be used for the other missed assignments or tests when the final grade is computed. (In effect, we no longer need doctor's notes for missed work, but if you miss more than the allowed number a mark of 0 will be used for any missed work).

IMPORTANT: If you wish to appeal a mark (assignment, tutorial or midterm) you must make the appeal within two weeks of the mark being posted on culearn. After this we will not be obliged to entertain appeals or change marks.

Collaboration is encouraged but cheating, or copying, is not allowed. You may work together and consult but any work you hand in must be your own and judged to be unique. Any two assignments judged to be too similar will both receive a grade of 0, and will be handled as a formal academic offence -see calendar for details.

Course Web Page:

As well as being announced in class, all important information, such as course news, assignments, TA hours, instructor office hours, will be available on the course web page at <http://www.scs.carleton.ca/~ldnel/3005winter2021> (<http://www.scs.carleton.ca/~ldnel/3005winter2021>). It is your responsibility to check this web page frequently for new information and announcements. Paper copies of outlines and assignments will not be provided. We will not use mass emails for routine announcements but might use them in exceptional circumstances.

Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; by telephone at 520-2600, ext. 4364; or by email at undergraduate_advisor@scs.carleton.ca. The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

Information on University Academic Accommodations

Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

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, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf (<https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>)

Religious obligation

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, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf (<https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>)

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. carleton.ca/pmc

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 its 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 (<https://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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf> (<https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>)

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline (<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. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar, Section 14, Page 59.

Plagiarism

As defined by 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.

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.