

1. Course Information

- Course title and code: Database II, COMPSCI 4411B (9538B)
- Academic term: Winter 2021
- There will be no laboratory or tutorial for this course

List of Prerequisites

- COMPSCI 3319A/B or COMPSCI 3120A/B

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

- Instructor: Mostafa Milani (mostafa.milani@uwo.ca)
- Teaching assistants: TBD

The preferred email address to contact the instructor and TAs is cs4411@uwo.ca. Please use your Western (@uwo.ca) email addresses when contacting the instructor and TAs, and use an email title that starts with “[CS4411B]”.

- Instructor’s office hours: Office hours: Tuesday and Thursday 2:30 - 3:30 online on Zoom (requires completing sign-up sheet)
- Teaching assistants’ office hours: TBD

3. Course Syllabus, Schedule, Delivery Mode

Databases II is an advanced course in databases with topics such as data storage and indexing, query execution and optimization, advanced concurrency control, recovery concepts, and parallel and distributed databases.

Course-level learning outcomes:

- Explain how a database stores data and allows for quick access.
- Explain how indexes and database catalogs are created in a database and their purpose.
- Explain how a database answers queries and how to choose and execute an optimal plan to run a query evaluation using a single query.
- Determine how a database evaluates queries and optimizes query evaluation when there are multiple queries.
- Determine when to use multiple databases across devices for various applications.
- Improve the performance of databases using existing techniques.
- Propose how to improve existing techniques in database by exploring research and emerging trends.

The course material will be covered asynchronously and lectures and other course materials will be posted every Monday in OWL. Office hours are via Zoom and require completing a sign-up sheet as outlined in OWL.

Table of contents (tentative):

- Functionality & Applications of Databases (Week 1, Jan 11)
- Data Storage (Week 2, Jan 18)
- Indexing and File Organizations (Week 3 and 4, Jan 25 and Feb 1)
- Query Evaluation (Week 5 and 6, Feb 8 and Feb 22)
- Query Optimization (Week 7, Mar 1)
- Transaction Management and Concurrency Evaluation (Week 8, Mar 8)
- Transaction Management and Crash Recovery (Week 9, Mar 15)
- Parallel and Distributed Databases (Week 10, Mar 22)
- Database Tuning (Week 11, Mar 29)
- Advanced Topics (NoSQL, Graph Databases, Cloud Computing, Data privacy, Machine Learning in Database Systems) (Week 12 and 13, April 5 and April 12)

The key Dates:

Class begins: Jan 11

Reading week: Feb 13-21

First assignment's deadline: Feb 21

Project proposal's deadline: Feb 28

Second assignment's deadline: Mar 14

Deadline for reflective journals collection: Mar 21

Deadline for third assignment and discussion collection: Mar 28

Deadline for final project and discussions peer reviews: April 4

Deadline for optional final project peer reviews: April 11

Class ends: April 12

Detailed Timeline:

Week 2 (Jan 18):

- Quiz (data storage),
- Reflective journal (functionality & applications)

Week 3 (Jan 25):

- Discussion (indexing)
- Reflective journal (indexing)

Week 4 (Feb 1):

- Assignment 1 (data storage and indexing) is posted

Week 5 (Feb 8):

- Quiz (indexing)
- Discussion (query evaluation)
- Reflective journal (about the quiz)

Week 6 (Feb 22):

- Assignment 2 (query evaluation and optimization) is posted
- Submit assignment 1

- Discussion (query evaluation)
- Reflective journal (query evaluation), share reflective journal entries for feedback (optional)

Week 7 (Mar 1):

- Project proposal's deadline
- Discussion (query optimization)

Week 8 (Mar 8):

- Submit assignment 2
- Reflective journal (transaction management)
- Discussion (transaction management)

Week 9 (Mar 15):

- Assignment 3 (transaction management) is posted
- Discussion (transaction management)
- Submit reflective journals collection

Week 10 (Mar 22):

- Submit assignment 3
- Discussion (parallel and distributed databases)
- Submit discussion collection

Week 11 (Mar 29):

- Quiz (database tuning)
- Submit final project
- Submit peer-reviewing the discussions

Week 12 (April 5):

- Quiz (NoSQL, graph databases, etc.)
- Submit peer-reviewing the final projects

4. Course Materials

The lectures are mainly from the following textbook, which is available online:

- [Database Management Systems, 3rd Edition](#), by Gehrke and Ramakrishnan

Supplementary:

- [Database Systems Concepts](#), 7th Edition, by Silberschatz, Korth and Sudarshan
- [Database Systems: The Complete Book](#), 2th Edition, by García-Molina, Ullman, and Widom

You should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. You are responsible for checking OWL on a regular basis.

Every Monday, the course materials for the week will be posted to OWL (<http://owl.uwo.ca>), and you must complete the activities and submit the required deliverables before the Sunday 11:59 pm.

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Quizzes	10% (Quizzes 1 and 2: 2% each, Quizzes 3 and 4: 3% each)
Reflective journals	10%
Discussion participation	10%
Assignments	40% (Assignment 1 and 2: 15% each, Assignment 3: 10%)
Project	30%

Assignments and quizzes: There are three assignments during the course and you have to follow the submission instructions provided with each assignment for submission. Quizzes are expected to be completed during week 2,5, and 11, when they are introduced.

Project: Students are expected to complete a course project. The topic of the project must be related to database systems and course material, and it will be chosen in consultation with the instructor. Students will research the topic, and present their ideas and findings in a written report and a recorded presentation at the end of the term. The written report should describe the topic or problem, existing techniques, your approach and ideas, and a critical analysis justifying your solution. You will be graded on your written report, your presentation, and other deliverables. More detail about project phases and suggested ideas will be posted on OWL.

Reflective journal entries: A reflective journal entry asks students to call upon their learning experience of the course lessons. The purpose of the journal entry is to encourage students to think about the lessons and their learning situation. For each entry, students will receive suggested questions to reflect upon. After week 6, students can share their journal entries (potentially two entries) with the instructor and the TAs and receive feedback about one of them. Students submit collections of reflective journal entries and specify their best entry to be marked. The journals will be marked based on the rubric provided posted on OWL.

Discussions: Students will sign up for prompt questions and participate in the discussion forum on OWL. The discussion instructions, submission guidelines, and evaluation rubric are on OWL. The deadline for each discussion is two weeks after it is introduced. As an optional activity with bonus marks, students are encouraged to participate in peer review of their peers' discussions based on the evaluation rubrics.

Peer-reviews: Every student will review three online discussions and three final projects. A rubric with instructions for the peer-reviews will be posted in OWL. There is no grade assigned to peer-review, but students must submit their reviews to pass the course.

Accommodated Evaluations

Late assignments will incur a late assignment penalty of 30% loss of the marks per day late (including weekends and holidays). Late submission of the final project, discussion collections, reflective journals, and peer-reviews is not accepted. There is no attendance requirement since the course is asynchronous and online. There will be no penalty for work missed for a justifiable reason with supporting documented evidence of reason. Students need to inform their professor of any situation that arises during the semester that may have an adverse effect on their academic performance, and

request, well in advance, any necessary considerations according to the policies. Failure to do so will jeopardize any academic appeals.

Passing the course is conditional to participating in discussion forums, submitting reflective journals and peer-reviews, and obtaining at least 10% from the total 20% mark that is assigned to discussions and reflective journals.

6. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf

Academic Consideration for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar:

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, https://wts.uwo.ca/identity/identities_and_access/activation.html, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.