COMP 7071
Database Applications Development and Optimization

School	School of Computing and Academic Studies
Program	Bachelor of Science of Applied Computer Science
Course Credits	3
Minimum Passing Grade	60%
Start Date	January 05, 2026
End Date	April 17, 2026
Total Hours*	45
Total Weeks	15
Hours/Weeks	3
Delivery Type	Lecture/Lab
Prerequisite(s)	• Acceptance into the Bachelor of Science in Applied Computer Science (BScACS) program.
CRN	92301

Acknowledgement of Territories

The British Columbia Institute of Technology acknowledges that our campuses are located on the unceded traditional territories of the Coast Salish Nations of Sḵwx̱wú7mesh [1] (Squamish), səl̓ilwətaʔɬ [2] (Tsleil-Waututh), and xwməθkwəy̓əm [3] (Musqueam).

Instructor Details

Name	Rushdi Alsaleh
E-mail	rushdi_alsaleh@bcit.ca
Location	By appointment via video conferencing
Office Hours	12:20-1:30 pm on Thursday and 5:00-7:00 pm on Mondays, or anytime by appointment. By appointment via Calendly: https://calendly.com/ralsaleh/15-min-gn [4]

Course Description

This course offers an in-depth study of Database System Concepts and Architectures including, query processing, query optimization, transaction processing, concurrency control, recovery, parallel databases, distributed databases and access control. Design of storage and file structures including different indexing and hashing organizations are also discussed. ACID (Atomicity, Consistency, Isolation and Durability) property and non-ACID complied database are discussed. Various database languages are discussed including Data Definition Language (DDL) and Data Manipulation Language (DML). Comparative analysis with alternative data models and database systems is conducted. Assignments will reinforce learning through designing and constructing a database from conceptual, to logical model to final physical deployment.

Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

- Design effective relational data models and database deployment architectures based on the storage requirements of an application.
- Facilitate data storage and access by designing suitable SQL statements.
- Evaluate efficiency of non-relational data models such as extended-relational, object-oriented and JSON/XML in addressing the data storage needs in comparison to relational database systems.
- Develop storage structures suitable for temporal and spatial data.
- Use indexes, RAID, query optimizers, and apply schemes such as data partitioning to ensure that data retrieval meets the performance requirements.
- Use indexes, RAID, query optimizers, and apply schemes such as data partitioning to ensure that data retrieval meets the performance requirements.
- Apply integrity constraints and other functional dependencies to ensure data integrity.
- Utilize recovery logs and implement RAID and replicated database architectures for recovery and fault tolerance.
- Develop native, web and mobile apps that integrate with the database systems to evaluate effectuality of the underlying database in addressing the OLTP requirements.

Learning Resources

(Recommended) A. Silberschatz, H.F. Korth, S. Sudarshan; Database System Concepts, 7th Edition; McGraw-Hill ISBN 9780078022159

Lecture Notes and Sample Code examples will be provided. Online Resources will be utilized.

Evaluation Criteria

Criteria	%	Comments
Assignments	45%	3 assignments of 15 marks each to be done individually or in small groups
Project	15%	to be done in small groups
Midterm	15%	
Final	25%	

Attendance Requirements

Attendance Requirements

Regular attendance in lectures, seminars, and labs is seen as critical to student success, and may be monitored by faculty.

Unapproved absence of 2 or more classes may result in failure or forced withdrawal from the course or program.

Please see Policy 5101 - Student Regulations: https://www.bcit.ca/files/pdf/policies/5101.pdf [5]

Other information

Student Surveys (Instructional Assessments Online) - You'll complete an online survey near the end of this course to share feedback with your instructor. Surveys are anonymous, and results are released only after all final grades are submitted.

How to Access - Look for an email around Week 10 sent to your myBCIT email with a link to your survey. Click the link and choose the correct course from the "Active Tasks" list.

In-class time - Your instructor may provide 15 minutes of class time for completing the survey (individually).

Troubleshooting - If you don't receive the link or have issues, email bcit_feedback@bcit.ca before Week 11.

Tip - Make sure the survey you complete matches both your course CRN and your instructor.

Professionalism - Please provide honest, specific, and constructive feedback in your comments—your voice makes a difference.

Questions? Contact PDS Coordinator: Kirsty Barclay-Estrup**.**

Course Schedule and Assignments

Week #/Number	Outcome/Material Covered
Week 1	Relation and Non-Relational Data Models - A Review
Week 2	Object Relational Mapper (ORM)
Week 3	Relational Database Design
Week 4	SQL - A Review
Week 5	Stored Procedures and Triggers
Week 6	Database APIs
Week 7	Integrity Constraints and Input Validation
Week 8	Midterm
Week 9	Transactions - Concurrency Control and Recovery
Week 10	Physical Storage Structure - Indexes and Hashing
Week 11	Query Processing and Optimization
Week 12	Distributed Transactions
Week 13	Replication
Week 14	Project Presentation/Demo
Week 15	Final Exam

Course topics

See list on course schedule.

BCIT Policy

The following statements are in accordance with the BCIT Policies 5101, 4501, 5103, 5104, and 7507, and their accompanying procedures. To review these policies and procedures please click on the links below.

Attendance
In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with their instructor or Program/Department Head, stating the reason for the absence. When absences result in missed safety requirements, exams, or other deadlines, an instructor or Program/Department Head may request appropriate supporting documentation, including a medical note. For all other absences, the student is responsible to ensure they seek out missed information, preferably from a classmate or recording (when available). Please see BCIT Policy 5101 - Student Regulations [6] , and accompanying procedures, for more information.

Attempts
As stated in BCIT Policy 5103 - Student Evaluation [7] , students must successfully complete a course within a maximum of three (3) attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from their respective program. For those courses or programs that have Education Council approval, the number of attempts as stated in the evaluation section of the course outline shall apply.

Academic Integrity
It is the responsibility of all students to be familiar with the Student Code of Academic Integrity. Violations of the Code, including plagiarism, cheating, misrepresentation, and academic advantage, are prohibited and will be handled in accordance with BCIT Policy 5104 – Student Code of Academic Integrity [8] , and accompanying procedures.

Accommodation
Any student who may require accommodation from BCIT because of a physical or mental disability should refer to BCIT's Policy 4501 - Accommodation for Students with Disabilities [9] , and contact BCIT's Accessibility Services (SW1 2360, 604-451-6963) at the earliest possible time. Requests for accommodation must be made to Accessibility Services, and should not be made to a course instructor or Program area.

Any student who needs special assistance in the event of a medical emergency or building evacuation (either because of a disability or for any other reason) should promptly inform their course instructor(s) and Accessibility Services of their personal circumstances.

Human Rights, Harassment and Discrimination
The BCIT community is made up of individuals from every ability, background, experience and identity, each contributing uniquely to the richness and diversity of the BCIT community as a whole. In recognition of this, and the intrinsic value of our diversity, BCIT seeks to foster a climate of collaboration, understanding and mutual respect between all members of the community and ensure an inclusive accessible working and learning environment where everyone can succeed. Respect, Diversity, and Inclusion [10] is a supportive resource for both students and employees of BCIT, to foster a respectful learning and working environment. Any student who feels that they are experiencing discrimination or harassment (personal or human rights-related) can confidentially access this resource for advice and support. Please see BCIT Policy 7507 – Harassment and Discrimination [11] and accompanying procedure.

Students should make themselves aware of additional Education, Administration, Safety and other BCIT policies listed at https://www.bcit.ca/about/administration/policies.shtml [12]

Guidelines for School of Computing and Academic Studies

No school specific policies, please refer to main BCIT Policy.

Approved

I verify that the content of this course outline is current.
Rushdi Alsaleh, Instructor
January 04, 2026

I verify that this course outline has been reviewed.
Mirela Gutica, Program Head
January 05, 2026

I verify that this course outline has been reviewed and complies with BCIT policy.
Donna Turner, Associate Dean
January 05, 2026

Note: Students will be given reasonable notice if changes are required to the content of this course outline.

*Course hours and credits are calculated per Policy 5012 [13] and the associated procedure [14] .

Total hours – Example of 3 credit lecture/lab course:

- ***Full-time course****: 45 hours of scheduled learning*
- ***Flexible Learning course****: 36 hours of scheduled learning plus 9 hours of independent (non-scheduled, non-instructional) learning*

List of links found on this page

This list includes all links found on this page for your reference.

[1] https://www.squamish.net/
[2] https://twnation.ca/
[3] https://www.musqueam.bc.ca/
[4] https://calendly.com/ralsaleh/15-min-gn
[5] https://www.bcit.ca/files/pdf/policies/5101.pdf
[6] https://www.bcit.ca/files/pdf/policies/5101.pdf
[7] https://www.bcit.ca/files/pdf/policies/5103.pdf
[8] https://www.bcit.ca/files/pdf/policies/5104.pdf
[9] https://www.bcit.ca/files/pdf/policies/4501.pdf
[10] https://www.bcit.ca/respect/
[11] https://www.bcit.ca/files/pdf/policies/7507.pdf
[12] https://www.bcit.ca/about/administration/policies.shtml
[13] https://www.bcit.ca/files/pdf/policies/5012.pdf
[14] https://www.bcit.ca/files/pdf/policies/5012-pr1.pdf