



Fall 2021: Comp 4150: Advanced and Practical Database Systems
(with Oracle SQLPLUS, PL/SQL and Front-end Tools)

Classes: Mondays: 2:30pm – 5:20pm (Online Through Black Board Collaborate Virtual Class Room). To attend classes, Log on to Black Board <http://blackboard.uwindsor.ca>. Then, click on Virtual classroom, and join Comp 4150 Class session for the day.

Instructor: Dr. C. I. Ezeife

Office: LT 5103

Phone: (519) 253-3000 ext. 3012 Office hours:

e-mail: cezeife@uwindsor.ca M: 12:00pm – 1:00pm (and by appointment)

GA/TA Information: Updated GA/TA office hours can be found through the GA/TA link on blackboard course page or directly through

<https://cezeife.myweb.cs.uwindsor.ca/courses/60-415/hours/index.html>

Note: Office hours will be held through MSTeams. The following link is for joining the MSTeams group for class during my office hours:

<https://teams.microsoft.com/l/channel/19%3aHvtyX03mJjA9YJXE23IRg4zDr7FxZ8ahWFFZxKOkY7o1%40thread.tacv2/General?groupId=c86ddeed-6438-458f-989a-b5696fee0284&tenantId=12f933b3-3d61-4b19-9a4d-689021de8cc9>

Course web page: <http://blackboard.uwindsor.ca>, or directly through:

<http://cezeife.myweb.cs.uwindsor.ca/courses/60-415/415index.html>.

Course Prerequisites: COMP-3150 and COMP-3300

Required Materials:

C.I Ezeife, *Course Notes for Comp-4150 (60-415)*, Advanced and Practical Database Systems, University of Windsor, Fall 2021.

Elmasri, Ramez and Navathe, Shamkant (2016). *Fundamentals of Database Systems*, 7th edition, Pearson. Isb-13: 978-0-13-397077-7; isbn-10: 0-13-397077-9.

Benjamin Resenzweig and Elena Rakhimov, “Oracle PL/SLQ by Example”, publisher: Pearson PTG, 2015 edition 5, Print ISBN: 9780133796780, 0133796787; ISBN(e-text): 9780133798531, 0133798534.

Reference Materials:

Ben Forta, *SQL in 10 Minutes a Day*, Sams Teach Yourself, 2020, 5th edition, Pearson, Print ISBN: 9780135182796, 0135182794, eText ISBN: 9780135182864, 0135182867.

Catherine M. Ricardo, Susan D. Urban, *Databases Illuminated*, 2017, 3rd edition, Jones & Bartlett Learning, ISBN: 978-1-284-05694-5.

Raghu Ramakrishnan/ Johannes Gehrke, *Database Management Systems*, third edition, WCB/McGraw-Hill, 2003.

Ullman & Widdom (2008). *First Course in Database Systems*, third edition, Pearson, isbn-10:013600637X; isbn-13: 9780136006374.

Online self study guide for homeworks and labs: The Gradiance web link (for Elmasri and Navathe Database book class): <http://infolab.stanford.edu/~ullman/pub/stud-guide.html>

COURSE OBJECTIVE

This course covers both advanced theoretical database materials as well as specific database application development tools needed in the industry. The course completes database design and theory initiated in COMP-3150 and then adds database application development languages.

Students will be exposed to the running environments (e.g., their compilers (e.g. Sqlplus)) and applying these on the database theory and design of the first part to develop full application. The goal is to learn tools for building a complete database application using a database management system (DBMS).

COURSE CONTENT

Part A: DBMS components (Advanced)

- Database design with normal forms, SQL DDL and DML (as in Comp 3150, Ch. 14)
- SQL Programming Techniques (Ch. 10 of book)
- Web Database Programming using PHP (Ch. 11)
- XML Extensible Markup Language (Ch. 13)
- Introduction to Transaction Processing (Ch. 20)
- Concurrency Control Techniques (Ch. 21)
- Database Recovery Techniques (Ch. 22)
- Introduction to NOSQL Systems (Ch. 24)
- Database Security and the DBA (Ch. 30)

Part B: Oracle Database Development

- Oracle PL/SQL

Part C: Database Application Development (with a GUI front-end)

- Using any of the techniques from parts A and B in a project with accessible front-end such as MS Access, PHP with MySQL, any other (eg. SQL developer with Oracle DBMS).

LEARNING OUTCOMES

Students who successfully complete this course will be able to:

§ Design normalized databases for real life applications.

§ Create database schemas, instances, indexes, views with Oracle SQL DDL & DML and SQLplus.

§ Understand Concurrency control, Database Recovery, Transaction management, database administration.

§ Query and develop database applications with Oracle Database programming language PL/SQL.

§ Query and develop database applications with GUI based front-end.

NOTE: By successfully completing this course, students would have progressed through much of the training needed to acquire some of the Oracle Certifications (SQL, SQLplus, PL/SQL, etc.) as well as covered database theories needed to start graduate studies specialization in database area. Consult the Oracle web site for details regarding certification if needed.

Lectures:

Students are urged to attend all given formal lectures with tentative schedule as:

Comp-4150 (60-415) TENTATIVE SCHEDULE (Fall 2021)

Week	Activity
1 (Sep. 9)	Part A: Review of course outline, DBMS components – DB design and normal forms, SQL DDL & DML (as in Comp 3150)

2 (Sep. 13)	Advanced DBMS – Introduction to SQL Programming Techniques. Beginning of project design phase 1 (application requirements, table designs, extensive use of Sqlplus commands and SQL statements in implementing specific features of the database application) ((Chapter 10).
3 (Sep. 20)	Web Database Programming Using PHP (Chapter 11).
4 (Sep. 27)	XML: Extensible Markup Language (Chapter 13) (hand in Lab Ex 1 due Sep. 27)
5 (Oct. 4)	Part B: PL/SQL attributes, data types & variables. Use also Oracle PL/SQL by Example book. (hand in project phase 1 due Oct. 4) **
6 (Oct. 11)	Thanksgiving Day, Reading Week (Sat. Oct. 9 to Sun. Oct. 17; No classes).
7 (Oct. 18)	Part B: PL/SQL – data types & variables, program format, reading and displaying output. (begin of project phase 2 – implement nearly all components of the application using PL/SQL codes exploiting advanced features of the language)
8 (Oct. 25)	PL/SQL-variable initializations, use of Savepoint, conditional control, exception handling, cursors, procedures. PL/SQL –functions, package body, stored code, overloading modules, triggers, PL/SQL tables. (Part A and Part B to date); (hand in Lab Ex 2 due Oct. 25)
9 (Nov. 1)	Part A continues: Introduction to Transaction Processing, Concurrency Control Techniques, Database Recovery Techniques. (Chapters 20, 21, 22) (hand in project phase 2 due Nov. 1) **
10 (Nov. 8)	Introduction to NOSQL Systems, Database Security and the DBA. (Chapters 24, 30) (hand in Lab Ex 3 due Nov. 8)
11 (Nov. 15)	Part C: Learning to use a Front-end tool introduced already in Parts A and B to build a database application as a project. Tools used are: PHP with MySQL, MS Access with a front-end language, building Java programs with JDBC connectivity, Sql Developer with Oracle DB, etc. Hand in project phase 2. (Class Test due Nov. 15) **
12 (Nov. 22)	Part C: Learning to use a Front-end tool introduced already in Parts A and B to build a database application as a project. Tools used are: PHP with MySQL, MS Access with a front-end language, building Java programs with JDBC connectivity, Sql Developer with Oracle DB, etc. Hand in project phase 2. (hand in project phase 3 due Nov. 22) **
13 (Nov. 29)	Project demonstrations; project phase 3 involves implementing the complete database application with a front end (project presentation due Nov. 29 or Dec. 6) **
14 (Dec. 6)	Project demonstrations; project phase 3 involves implementing the complete database application with a front end (project presentation due Nov. 29 or Dec. 6) **

*All schedules presented in this document are only tentative and subject to possible revisions in the course of the term. Any changes will be announced in class or will be posted on the course website.

** in schedule means assignment is handed out and/or is due that week.

COURSE EVALUATION

Work	Mark (out of 100%)
Project phase 1 (due week 4: Oct. 4, 2021)	10%
Project phase 2 (due week 8: Nov. 1,2021)	10%
Project phase 3 (completed)(due week 11: Nov. 22, 2021)	25%
Project presentation & report (due week 11: Nov. 29, 2021)	10%
Lab-like Exercises: DB design & SQL, PL/SQL and front-end tool(due weeks 4, 8 and 10: Sept. 27; Oct. 25; Nov. 8,2021)	15%
Class Test (due week 11: Nov.15, 2021)	30%

CONVERSION OF MARKS (% marking scheme used for Fall 2021)

Only raw % scores are assigned in course work and meaning of scores in transcripts are:

% Score	Grade	% Score	Grade	Comments
90-100	A+	63-66.99	C	In computing a student's average, grades from 0% to 22% are calculated as 22%. Grades from 23% to40% calculated as 40%. Grades from 40% to 49% are calculated as is into the student's average. All grades are recorded in the transcript as is. All grades below 50% are considered failures. (see mark/grades descriptor page of calendar www.uwindsor.ca/calendar for details).
85-89.99	A	60-62.99	C-	
80-84.99	A-	57-59.99	D+	
77-79.99	B+	53-56.99	D	
73-76.99	B	50-52.99	D-	
70-72.99	B-	0-49.99	F	
67-69.99	C+			
				The University of Windsor uses a percentage marking and grading scale

ASSIGNMENT & EXAMINATION TENTATIVE SCHEDULE

	Handed Out (Mondays)	Due Date (Mondays)
Lab Exercise 1 ()	Sept. 13, 2021	Sept. 27, 2021
Lab Exercise 2 ()	Sept. 27, 2021	Oct. 25, 2021
Lab Exercise 3 ()	Oct. 4, 2021	Nov. 8, 2021
Project Phase 1 ()	Sept. 13, 2021	Oct. 4, 2021
Project Phase 2 ()	Sept. 27, 2021	Nov. 1, 2021
Project Phase 3 ()	Oct. 4, 2021	Nov. 22, 2021
Project Presentation/Report	-----	Nov. 29, 2021
Midterm Test ()	-----	Nov. 15, 2021 (In class)

IMPORTANT DATES (as in University calendar www.uwindsor.ca/calendar)

Thurs., Sept. 9th, 2021 Classes begin.
 Wed., Sept. 22nd, 2021Final day for registration revisions (Add/Drop).
 Sat., Oct. 9, 2021 – Sun., Oct. 17, 2021 Study Week (No classes).
 Mon., Oct. 11, 2021 Thanksgiving Day (No classes).
 Wed., Nov. 17, 2021 Last day for voluntary withdrawal from courses.
 Last day to receive partial refund for withdrawal from courses
 Wed., Dec. 8, 2021 Last day of classes
 Sat., Dec. 11, 2021 Fall term final examinations begin
 Tue., Dec. 21, 2021 Fall term final examinations end
 Thurs., Jan. 6, 2021 Winter 2022 session begins

ASSIGNMENTS AND COURSE WORK

ASSIGNMENTS AND COURSE WORK

1. On the course project, students can work on project teams of not more than 2 persons in a team. Students can also work individually. Project teams have to be approved by the instructor within the first two weeks of classes and specific contributions and tasks completed by each team member, have to be clearly described with each completed project phase.
2. Note that the project presentation class is compulsory for all.

Description of course project:

Each project team is required to develop a student information system or an E-Commerce database system with varying levels of advanced features using a front end tool that connects to a back-end database server such as SQL Developer with Oracle 11g or PHP with MySQL.

Phase 1: design a student information system/E-Commerce database system, the tables, the queries, the interfaces, the constraints, indexes, views, relating your design to components of the DBMS. Store your database using either Oracle Sqlplus, MySQL, MS Access, etc.

Purpose of phase 1: going through this project phase enables students learn use of DBMS and its components like SQL as well as Sqlplus statements in building real life application.

Schedule of when this is done: wks 2, 3, 4 (due in wk 5)

Phase 2: implement components of the application using PL/SQL codes exploiting advanced features of the language.

Purpose of phase 2: The goal of this project phase is to be familiar with database application development using PL/SQL Oracle database language.

Schedule of when this is done: wks 5, 6, 7, 8 (due in wk 9).

Phase 3: putting it all together; which involves implementing the database application using SQL, PL/SQL, a front-end exploiting advanced features.

Purpose of phase 3: This project phase allows learning database application development with a front-end.

Schedule of when this is done: wks 9, 10, 11, 12, 13 (due in wk 12).

Note that the lab exercises give credit for learning to complete phases of the project.

1. Completed report must be handed in early by deadline. Late reports will not normally be accepted.
2. All reports must be neatly done. Report should include a title page clearly marked on the outside with students' names, student numbers, course and instructor's name.
3. No make-up tests will generally be given for missed tests. Proven cases of emergency when presented may cause the weight of missed test to be added to the final exam.
4. All parts of the course must be done to obtain a final grade in the course.

NOTE:

Students are informed that all schedules presented in this document are only tentative and subject to possible revisions in the course of the term. Any changes will be announced in class and on the web page.

Student Evaluation of Teaching (SET)

Note that SET forms will be completed by students during the last two weeks of classes.

PENALTIES AND DISCIPLINARY ACTION FOR DEFICIENT TERM WORK

1. Presentation attendance is compulsory.
2. While collaboration with course mates is encouraged for discussing class topics, students are expected to develop individual research abilities in the area and hand in projects and reports prepared individually by themselves. In other words, cheating is not allowed in this course.

Other Important Policies

Note that no student is allowed to take a course more than two times without permission from the Dean.

ASSIGNMENTS AND COURSE WORK

5. There will be 3 individual assignments, 2 midterms and a final examination.
6. Completed individual assignments must be handed in electronically on the day and time on which they are due.
7. All assignments should be handed in electronically **through blackboard**, <http://blackboard.uwindsor.ca>.
8. **Online assignment and test submissions require that students submit individual files in accepted formats (.pdf, .doc, .txt, .jpeg) and not in any other needing-to-convert or packaged file format (such as .zip or .rar) or marks may be lost.**
9. Late assignments will not normally be accepted.

10. No make-up tests will be given for missed tests. If a test is missed for medical reasons (valid Student Medical Certificate completed by a physician shown), the weight of the student's final examination is increased by the weight of the missed test.
11. **Final examination must be taken to obtain a final score in the course. If a final exam is missed for valid medical or emergency reason (proof needed), student is allowed to write a makeup final exam in the first week of the following term, for all students who missed final exam.**
12. After final examination marks and all course marks are converted into a final exam score, only students who completed all course work (including class participation marks) may be rounded up to the next grade level if their total mark falls short by less than 1%. Thus, there are other prizes for completing all course work other than learning the materials and the necessary skills to handle higher level courses and be prepared for jobs.
13. The following confidentiality agreement and statement of honesty will need to be signed by students for all handed-in course work to discourage and prevent academic dishonesty and cheating. Note that if two assignments are found to be a copy of each other, a mark of 0 will be assigned to both assignments.

CONFIDENTIALITY AGREEMENT & STATEMENT OF HONESTY

I confirm that I will keep the content of this assignment/examination confidential.

I confirm that I have not received any unauthorized assistance in preparing for or doing this assignment/examination. I confirm knowing that a mark of 0 may be assigned for copied work.

Student Signature

Student Name (please print)

Student I.D. Number

Date

Preparation for lectures (VERY IMPORTANT)

1. **Attendance at all lectures is highly recommended.** Students should **read the course text and notes ahead of lectures.** A detailed schedule is given on this document. Lectures are not substitutes for student reading. **Students who do not read ahead may find themselves lost in the lectures.**
2. **Individual Assignments:** Students should attempt to complete individual assignments by the suggested completion dates. This will help you prepare for materials to be covered in subsequent lectures, and for tests.
3. **Time Required for Course Work:** Students should set aside a total of about 10 hours weekly for work related to this course. This enables them devote 3 hours to lecture material preparation, 3 hours to attending lectures, and 3 to 4 hours for working towards completing individual assignments and tests.
4. **Course Blackboard / Web Page:** Answers for individual assignments, lab exercises and tests will be made available only on the Blackboard page (not web page) so that students can revise concepts that were misunderstood, and assess their own progress. Students' marks are also posted on this page and students should keep track of their marks and report any discrepancies.
5. **Computing Resources Available for Course Work:** Computing laboratories will be available from the second week of the semester onwards. The CS laboratories are located on the third floor of Lambton Tower and Erie Hall (called Java lab (ER 3150) and X-lab). The Leddy library, general IT services laboratories at the basement of the Computer Centre are also available to students. Students can also connect to campus machines (from their home PCs or laptop) to work online.

PENALTIES AND DISCIPLINARY ACTION FOR DEFICIENT TERM WORK

While collaboration with course mates is encouraged for discussing class topics, students are expected to develop individual learning and research abilities in the area and hand in assignments prepared individually by themselves. In other words, cheating is not allowed in this course.

Policies on Repeating Courses/ Classroom Evacuation

1. Note that no student is allowed to take a course more than two times without permission from the Dean.
2. Check www.uwindsor.ca/emergency and posted copy in class for Classroom evacuation instructions in case of emergency.

Policy on cheating

The professors and teaching assistants will report any suspicion of cheating to the Director of the School of Computer Science and/or assign a mark of 0 for any submitted work that is copied or allowed to be copied by other students. If sufficient evidence is available, the Director will begin a formal process according to the University Senate Bylaws. The instructor will not negotiate with students who are accused of cheating but will pass all information to the Director of the School of Computer Science. The following behaviour will be regarded as cheating (together with other acts that would normally be regarded as cheating).

1) **Copying assignments solutions from the web or other students**, 2) **Allowing another student to copy an assignment from you and present it as their own work**, 3) **Copying from another student during a test or exam**, 4) **Referring to notes, textbooks, etc. during a test or exam**, 5) **Talking during a test or an exam**, 6) **Not sitting at the pre-assigned seat during a test or exam**, 7) **Communicating with another student in any way during a test or exam**, 8) **Having access to the exam/test paper prior to the exam/test**, 9) **Asking a teaching assistant for the answer to a question during an exam/test**, 10) **Presenting another's work as your own**, 11) **Modifying answers after they have been marked**, 12) **Any other behavior which attempts unfairly to give you an advantage over other students in the grade-assessment process**, 13) **Refusing to obey the instructions of the officer in charge of an examination.**

Several University of Windsor students have been caught cheating during the last few years. In most cases the evidence was sufficient to invoke a disciplinary process which resulted in various forms of punishment including letters of censure, loss of marks, failing grades, and expulsions. Do not cheat, if you are caught and found guilty, you could be thrown out of the university and will have to explain why when you go looking for a job.

Policy on Recording of Lectures:

Students are not generally allowed to record lectures in this class as all necessary recording or posting of lectures will be taken care of by the instructor. Below is the Senate policy on recording of lectures and use of any such posted recording by the instructor.

Any recording of lectures or guest lecturer/classmate presentations by students can be used only for the purposes of private study by the individual student. The recording (including any transcriptions or any translation to any other form) cannot be shared, distributed, emailed, posted online or otherwise disseminated or communicated in any form or to any other person (including fellow classmates) unless written consent has first been obtained from the instructor or presenter.

Link to Senate policy on recording of lectures is given below:

<https://lawlibrary.uwindsor.ca/Presto/content/Detail.aspx?ctID=OTdhY2QzODgtNjhYi00ZWY0LTg2OTUtNmU5NjEzY2JkMWYx&rID=MjEy&qrs=RmFsc2U=&q=KFVuaXZlcnNpdHlfb2ZfV2luZHNvcl9DZW50cmFsX1BvbGljaWVzLkFwcHJvdmVYPSgiU2VuYXRllikpIEFORCAoVW5pdmVyc2l0eV9vZl9XaW5kc29yX0NlbnRyYWxfUG9saWNpZXMuVHlwZT0oIlBvbGljeSlpKQ==&qcf=OTdhY2QzODgtNjhYi00ZWY0LTg2OTUtNmU5NjEzY2JkMWYx&ph=VHJ1ZQ==&bckToL=VHJ1ZQ==&rrtc=VHJ1ZQ==>

Support for Students

Mental Health: <http://www.uwindsor.ca/studentcounselling/299/resources>

Feeling Overwhelmed?

From time to time, students face obstacles that can affect academic performance. If you experience difficulties and need help, it is important to reach out to someone. For help addressing mental or physical health concerns on campus, contact (519) 253-3000:

- Student Health Services at ext. 7002 (<http://www.uwindsor.ca/studenthealthservices/>)
- Student Counselling Centre at ext. 4616 (<http://www.uwindsor.ca/studentcounselling/>)-
- Peer Support Centre at ext. 4551

24 Hour Virtual Support is Available

My Student Support Program (MySSP) is an immediate and fully confidential 24/7 mental health support that can be accessed for free through chat, online, and telephone. This service is available to all University of Windsor students and offered in over 30 languages. Call: 1-844-451-9700, visit

<https://keepmesafe.myissp.com/> or download the My SSP app: Apple App Store/Google Play.

A full list of on-and off-campus resources is available at <http://www.uwindsor.ca/wellness>. Should you need to request alternative accommodation contact your instructor, head or associate dean.

For the revised bylaws, go to: www.uwindsor.ca/policies

More on Senate BYLAW/POLICY 31 and 51/54 STATEMENTS AND INFORMATION

1. Student Evaluation of Teaching (SET) will be administered during the two weeks of classes.
2. Exams in this course are protected by copyright. Reproduction or dissemination of exams or the contents or format of exams in any manner whatsoever (e.g., sharing content with other students), without the express permission of the instructor, is strictly prohibited. Students who violate this rule or engage in any other form of academic misconduct will be subject to disciplinary action under Senate Bylaw 31: Academic Integrity.

3. Please read Senate Bylaw 31 on Academic Integrity procedures at the following link:

http://www.uwindsor.ca/secretariat/sites/uwindsor.ca.secretariat/files/bylaw_31_-_academic_integrity_amended_170526.pdf

Bylaw 31 defines the various types of academic misconduct that exist (e.g., plagiarism, cheating), lists and describes the stages of the process that will be followed in the event that academic misconduct is suspected or identified, and includes definitions and examples of sanctions that will be applied to first-time and subsequent offences. The rights of students and the roles that the instructors and Department Head of Kinesiology play within this process are also outlined in this bylaw. If instructors plan to use software (e.g., SafeAssign, Turnitin) to prevent plagiarism and provide students with feedback on their writing, they must indicate this in their syllabi.

4. Please read Senate Bylaw 51 on academic evaluation procedures at the following link:

http://www.uwindsor.ca/secretariat/sites/uwindsor.ca.secretariat/files/bylaw_51_-_academic_evaluation_procedures_amended_170526.pdf

Instructors should feel free to highlight specific clauses from Bylaw in full, if they wish to draw things to the attention of students (e.g., what to do if they have three or more in-term assessments within a 24-hour period).

5. Please read the Senate Policy on the Conduct of Exams and Tests at the following link:

http://www.uwindsor.ca/secretariat/sites/uwindsor.ca.secretariat/files/conduct_of_exams_and_tests_amended_sa161111.pdf

Expectations and Responsibilities (Code of Conduct and/or Classroom Behaviours)

Instructors are encouraged to describe any expectations they have of students in a code of conduct as related to classroom behaviours. Alternatively, instructors should describe the process by which students will contribute to the development of a code of conduct or expectations for classroom behaviours for the class.

Intellectual Property

Copyright of Course Materials

Lectures and course materials prepared by the instructor are considered by the University to be an instructor's intellectual property covered by the Copyright Act, RSC 1985, c C-42. Course materials such as PowerPoint slides and lecture recordings are made available to you for your own study purposes. These materials cannot be shared outside of the class or "published" in any way. Posting recordings or slides to other websites without the express permission of the instructor will constitute copyright infringement.