Course Outline

School:	Eng. Tech. & Applied Science
Department:	Information and Communication Engineering Technology (ICET)
Course Title:	Advanced Database Concepts
Course Code:	COMP 214
Course Hours/Credits:	56
Prerequisites:	COMP 122
Co-requisites:	N/A
Eligible for Prior Learning, Assessment and Recognition:	Yes
Originated by:	John Bailey
Creation Date:	Fall 2008
Revised by:	Ilia Nika, Bim Harlal
Revision Date:	Fall 2011
Current Semester:	Fall 2019
Approved by:	ppesikan c/o

Chairperson/Dean

Students are expected to review and understand all areas of the course outline.

Retain this course outline for future transfer credit applications. A fee may be charged for additional copies.

This course outline is available in alternative formats upon request.

Acknowledgement of Traditional Lands

Centennial is proud to be a part of a rich history of education in this province and in this city. We acknowledge that we are on the treaty lands and territory of the Mississaugas of the Credit First Nation and pay tribute to their legacy and the legacy of all First Peoples of Canada, as we strengthen ties with the communities we serve and build the future through learning and through our graduates. Today the traditional meeting place of Toronto is still home to many Indigenous People from across Turtle Island and we are grateful to have the opportunity to work in the communities that have grown in the treaty lands of the Mississaugas. We acknowledge that we are all treaty people and accept our responsibility to honor all our relations.

Course Description

This course is intended to expand the student's knowledge of business databases using data RDBMS and NoSql driven systems. The course introduces students to the steps required to install and configure a database server and development system. Then, it expands on the students' knowledge of SQL by introducing more complex syntax than that covered in the first database course. Topics covered include SQL advanced queries, advanced data and table manipulation commands, basic security, triggers, functions, procedures, and packages, NoSql document management, CRUD operations and data queries, indexing and aggregation techniques. The course will include a project to develop the database back-end for a "commercial" web application.

Program Outcomes

Successful completion of this and other courses in the program culminates in the achievement of the Vocational Learning Outcomes (program outcomes) set by the Ministry of Advanced Education and Skills Development in the Program Standard. The VLOs express the learning a student must reliably demonstrate before graduation. To ensure a meaningful learning experience and to better understand how this course and program prepare graduates for success, students are encouraged to review the Program Standard by visiting http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/. For apprenticeship-based programs, visit http://www.collegeoftrades.ca/training-standards.

Course Learning Outcomes

The student will reliably demonstrate the ability to:

1. Install database software and developer system.
2. Write SQL and NoSql commands to:
   a. Aggregate data.
   b. Perform inner, outer, left or right joins.
   c. Perform joins using relational set operators.
   d. Relate data in collections.
3. Write SQL commands to perform advanced data and table manipulation in the context of a prescribed business problem.
4. Explain the basic concepts of security and the responsibilities of a database administrator.
5. Write PL/SQL procedures, triggers, functions, and packages to access and manipulate data.
6. Create the back-end to a software application using, functions, procedures, packages and triggers.

Essential Employability Skills (EES)

The student will reliably demonstrate the ability to*:

1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.
3. Execute mathematical operations accurately.
4. Apply a systematic approach to solve problems.
5. Use a variety of thinking skills to anticipate and solve problems.
6. Locate, select, organize, and document information using appropriate technology and information systems.
7. Analyze, evaluate, and apply relevant information from a variety of sources.
8. Show respect for diverse opinions, values belief systems, and contributions of others.
9. Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.
10. Manage the use of time and other resources to complete projects.
11. Take responsibility for one's own actions, decisions, and consequences.

**There are 11 Essential Employability Skills outcomes as per the Ministry Program Standard. Of these 11 outcomes, the following will be assessed in this course.*

Global Citizenship and Equity (GC&E) Outcomes

N/A

Text and other Instructional/Learning Materials

Text Book(s):

Casteel, Joan. 2013. Oracle 11g: PL/SQL Programming, 2nd Edition. Cengage Learning.

ISBN: 978-1133947363

Online Resource(s):

www.oracle.com

www.mongodb.com

Evaluation Scheme

- Midterm: Weeks 1 - 6
- Assignment 1: Nested queries and sub-queries
- Assignment 2: Chapters 1 and 2
- Assignment 3: Create a stored procedure.
- Final Project: Final project consists of the database programming for a business application.
- Final Test: Weeks 8 - 13

Evaluation Name	CLO(s)	EES Outcome(s)	GCE Outcome(s)	Weight/100
Midterm	1, 2, 3	1, 2, 3, 4, 5, 7, 11		25
Assignment 1	2, 3	1, 2, 3, 4, 5, 7, 11		10
Assignment 2	2, 3, 4	1, 2, 3, 4, 5, 7, 11		10
Assignment 3	5	5		10
Final Project	2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11		20
Final Test	2, 3, 5	1, 2, 3, 4, 5, 7, 11		25
Total				100%

If students are unable to write a test they should immediately contact their professor or program Chair for advice. In exceptional and well documented circumstances (e.g. unforeseen family problems, serious illness, or death of a close family member), students may be able to write a make-up test.

All submitted work may be reviewed for authenticity and originality utilizing Turnitin®. Students who do not wish to have their work submitted to Turnitin® must, by the end of the second week of class, communicate this in writing to the instructor and make mutually agreeable alternate arrangements.

When writing tests, students must be able to produce official College photo identification or they may be refused the right to take the test or test results will be void.

Student Accommodation

The Centre for Accessible Learning and Counselling Services (CALCS) (http://centennialcollege.ca/calcs) provides programs and services which empower students in meeting their wellness goals, accommodation and disability-related needs. Our team of professional psychotherapists, social workers, educators, and staff offer brief, solution-focused psychotherapy, accommodation planning, health and wellness education, group counselling, pscyho-educational workshops, adaptive technology, and peer support. Walk in for your first intake session at one of our service locations (Ashtonbee Room L1-04, Morningside Room 190, Progress Room C1-03, The Story Arts Centre Room 285, Downsview Room 105) or contact us at calcs@centennialcollege.ca, 416-289-5000 ext. 3850 to learn more about accessing CALCS services.

Use of Dictionaries

- Any dictionary (hard copy or electronic) may be used in regular class work.

Program or School Policies

N/A

Course Policies

N/A

College Policies

Students should familiarize themselves with all College Policies that cover academic matters and student conduct.

All students and employees have the right to study and work in an environment that is free from discrimination and harassment and promotes respect and equity. Centennial policies ensure all incidents of harassment, discrimination, bullying and violence will be addressed and responded to accordingly.

Academic honesty is integral to the learning process and a necessary ingredient of academic integrity. Academic dishonesty includes cheating, plagiarism, and impersonation. All of these occur when the work of others is presented by a student as their own and/or without citing sources of information. Breaches of academic honesty may result in a failing grade on the assignment/course, suspension or expulsion from the college.

For more information on these and other policies, please visit www.centennialcollege.ca/about-centennial/college-overview/college-policies.

Students enrolled in a joint or collaborative program are subject to the partner institution's academic policies.

PLAR Process

This course is eligible for Prior Learning Assessment and Recognition (PLAR). PLAR is a process by which course credit may be granted for past learning acquired through work or other life experiences. The PLAR process involves completing an assessment (portfolio, test, assignment, etc.) that reliably demonstrates achievement of the course learning outcomes. Contact the academic school to obtain information on the PLAR process and the required assessment.

Semester:	Fall 2019	Professor Name:	Patrick Gignac
Section Code:	001 and 002	Contact Information:	pgignac@centennialcollege.ca
Meeting Time & Location:	see schedule		

Topical Outline (subject to change):

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
1	Introduction to course: Distribution and explanation of course outline. Review SQL DML and DDL.	Course Outline	Understand the course requirements, Students will be able to install and configure both the database and the client environment using Oracle Universal Installer.	Review of course outline, and hands-on demonstration of SQL Developer environment. Lecture and demonstration of Oracle 11g installation.		
2	Sequences Indexes Synonyms Simple views Complex views Dropping a view	Online material.	Students will be able to write SQL commands to: create and use sequences create indexes and synonyms Students will be able to write complex SQL statements to: Create, alter, and drop tables, table columns, views, and indexes, and manage tables, views, and indexes using tools such as clusters, sequences, etc.	Lecture on syntax in lecture periods, and practice exercises in lab class.		
3	Single row subqueries Multiple row subqueries Multiple column subqueries Null values Correlated subqueries Nested Subqueries Merge statements	Online materials	Students will be able to write SQL queries to group rows of data in a table. Students will be able to write: Advanced queries using correlated subqueries, EXISTS, inner and outer joins, and relational set operators such as UNION, INTERSECT, and MINUS.	Lecture on syntax in lecture periods, and practice exercises in lab class.	Assignment 1	
4	Application Models PL/SQL tools Database samples PL/SQL Block	Chapter 1 and 2 Introduction PL/SQL and Block Structures	Students will understand the basic PL/SQL structures such as conditional statements, loops, etc.	Lecture on syntax in lecture periods, and practice exercises in lab class.		

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
	Structures Variables Decision structures Loops					
5	Query in a PL/SQL block Data retrieval DML statement in a block Record variables Collections of data Bulk processing Implicit and explicit cursors Cursor variables Exception handlers Commenting code	Chapter 3 and 4 Handling Data	Students will be able to write moderately complex PL/SQL programs, including cursors, and simple exception handling.	Lecture syntax in lecture periods, and practice exercises in lab class.	Assignment 2	
6	Procedures Creating a procedure Calling a procedure Using describe and dbms_output Subprograms Scope of variables Error handling Removing procedures Creating a stored function Using the OUT parameter Multiple RETURN statements Passing parameter values	Chapter 5 and 6 Procedures and Functions	Students will be able to write sophisticated business rules and application logic in the form of procedures. Students will be able to write sophisticated business rules and application logic in the form of procedures and functions.	Lecture on contents and syntax in lecture periods, and practice exercises in lab class.		
7	Review and Test	Online materials Review	Review and Test	Review and practice testing.	Midterm Test	
8	Packages Creating Packages Invoking package constructs Forward	Chapter 7 Packages	Students will be able to write sophisticated business rules and application logic in the form of packages.	Lecture on chapter contents and syntax in lecture periods, and practice exercises in lab class.		

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
	declarations in packages One time only procedures Managing SQL restrictions for packaged functions REF CURSOR Granting privileges Deleting packages.					
9	Local Dependency Activity Package dependencies Remote object dependencies Graning program unit priviliges Compilation.	Chapter 8 Dependencies, Privileges, Compilation	Students will understand the role of dependencies, privileges and compilation in PL/SQL structures.	Lecture on chapter contents and syntax in lecture periods, and practice exercises in lab class.	Assignment 3	
10	Triggers Syntax Creating and testing Compound triggers ALTER trigger Deleting triggers	Chapter 9 Triggers	Students will be able to write application logic in the form of triggers.	Lecture on chapter contents and syntax in lecture periods, and practice exercises in lab class		
11	Unstructured data Install and configure Mongo	Install and configure MongoDB server and client. Using the CLI client and other client interfaces. Why use NewSQL(NoSQL) JSON and BSON. Document and schema design Data types	Students will be able to discuss relevant issues related to using an RDBMS vs a NoSql database server.	Lecture on chapter contents and syntax in lecture periods, and practice exercises in lab class		
12	Basic CRUD Operations using NoSql	Explore the syntax for creating databases, collections and data. Querying collections. Updating and deleting	Students will be able to insert, update, delete and retrieve data from a NoSql database.	Lecture on chapter contents and syntax in lecture periods, and practice exercises in lab class		

Week	Topics	Readings/Materials	Weekly Learning Outcome(s)	Instructional Strategies	Evaluation Name	Evaluation Date
		data from connections				
13	Projection, Limits, Sorting and Aggregation Indexing	Formatting data output and creating indexing	Students will be able to retrieve and display data in format that is more readable and easier to interpret.	Lecture on chapter contents and syntax in lecture periods, and practice exercises in lab class	Project Due	
14	Review and Final Test	Review materials.	Test	Review lecture.	Final Test	