



Course Database: Application Development (2015-2016)

Code / Version PROG3200 (100)

Total Hours 45

Credits 3

PreRequisite(s) PROG2220 (100) Database: S.Q.L.

CoRequisite(s)

Course Description

Building on Database: Fundamentals, this course introduces techniques used in developing client server database applications including triggers, stored procedures, form generation, report generation and script generation from Entity Relationship Diagrams. Particular attention is paid to Data Definition Language, Data Management Language and data migration.

PLAR Eligible: Yes

Course Outcomes

Successful completion of this course will enable the student to:

1. Create server-side application components with PL/SQL constructions such as stored procedures, triggers, and packages.
2. Compare different models of concurrency control and the impact of these models on application performance and semantics.
3. Explain the semantics of SQL queries and DML statements and the notion of query equivalence.
4. Contrast different data storage mechanisms used within database systems and their impact on application performance.
5. Apply database theory and industry best-practices to physical database design and administration.

Essential Employability Skills addressed in this course			Taught	Reinforced	Assessed
Communication	<ul style="list-style-type: none">Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audienceRespond to written, spoken, or visual messages in a manner that ensures effective communication				
Numeracy	<ul style="list-style-type: none">Execute mathematical operations accurately				
Critical Thinking and Problem Solving	<ul style="list-style-type: none">Apply a systematic approach to solve problemsUse a variety of thinking skills to anticipate and solve problems			X	X
Information Management	<ul style="list-style-type: none">Locate, select, organize, and document information using appropriate technology and information systemsAnalyze, evaluate, and apply relevant information from a variety of sources			X	
Interpersonal	<ul style="list-style-type: none">Show respect for the diverse opinions, values, belief systems, and contributions of othersInteract with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals				
Personal	<ul style="list-style-type: none">Manage the use of time and other resources to complete projectsTake responsibility for one's own actions, decisions, and consequences			X	



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Unit Outcomes

Successful completion of the following units will enable the student to:

1.0 SQL statements using Oracle's PL/SQL dialect

- 1.1 Describe the sample databases used in case studies.
- 1.2 Compose Oracle SQL statements to query and manipulate sample database instances.
- 1.3 Use Oracle tools to execute and debug DML and DDL statements.
- 1.4 Demonstrate the correct syntax and usage of Oracle SQL keywords, functions, and special registers.
- 1.5 Describe the characteristics of Oracle data types and their conversion.

2.0 SQL queries and query equivalence

- 2.1 Compare various SQL operations and their duals in relational algebra.
- 2.2 Explain the differences and equivalences between types of joins, sub-selects, and sub-queries in an SQL statement.
- 2.3 Compose equivalent queries that will return the same result for any instance of a database.
- 2.4 Compose views using an SQL statement.
- 2.5 Use views and/or derived tables in combination with SQL DML statements.

3.0 Logical database designs in Oracle

- 3.1 Explain the purpose and semantics of entity-relationship (ER) diagrams.
- 3.2 Develop E/R diagrams for example use cases.
- 3.3 Generate SQL schemas from an E/R diagram using Oracle tools, and vice-versa.
- 3.4 Apply best practices to the selection of primary key formats.
- 3.5 Design appropriate constraints for a set of related tables in an Oracle database.
- 3.6 Utilize sequences within an Oracle database schema.

4.0 Batch PL/SQL programs

- 4.1 Use PL/SQL variables and data types.
- 4.2 Describe the structure and semantics of various PL/SQL program blocks.
- 4.3 Write PL/SQL programs to manipulate variables and perform number and character string operations.
- 4.4 Apply techniques for debugging PL/SQL programs.
- 4.5 Formulate more complex PL/SQL programs using IF-THEN-ELSE and other control flow statements.
- 4.6 Use SQL statements within PL/SQL programs.
- 4.7 Use cursors to retrieve data into PL/SQL programs.
- 4.8 Develop error-handling routines in PL/SQL programs using exceptions.

5.0 PL/SQL Stored Procedures, Functions, and Packages

- 5.1 Write PL/SQL stored program units.
- 5.2 Develop PL/SQL program units that utilize collection types, record types, and object types.
- 5.3 Debug PL/SQL programs using Oracle SQL Developer.

6.0 Concurrency control methods used in Oracle

- 6.1 Explain the ISO SQL Standard transaction isolation levels.
- 6.2 Explain ACID transaction definitions and the concept of serializability.
- 6.3 Contrast the impact of different concurrency control models on application behaviour, using MongoDB as an example system.

7.0 Physical database design in Oracle

- 7.1 Explain the characteristics of an ordinary B+-tree index.



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- 7.2 Give examples of how an index can improve query performance.
 - 7.3 Summarize the tradeoffs of using materialized views in query execution.
 - 7.4 Explain how table partitioning can improve query execution performance.
 - 8.0 Oracle triggers and their use in enforcing business rules
 - 8.1 Develop row and statement triggers in Oracle.
 - 8.2 Explain the characteristics of INSTEAD OF triggers.
 - 8.3 Explain the use of schema triggers in Oracle.
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Required Student Resources

Jason Price. Oracle Database 12c: SQL (First). Oracle Press (McGraw Hill).

Optional Student Resources

Kristina Chodorow. MongoDB: The Definitive Guide (2nd). O'Reilly Media.

Kristina Chodorow. Scaling MongoDB. O'Reilly Media.

Evaluation

The minimum passing grade for this course is 55 (D).

In order to successfully complete this course, the student is required to meet the following evaluation criteria:

Final Examination	40.00
Midterm Examination	20.00
Assignments (4@10%)	40.00
	<hr/>
	100.00 %

Other

Conestoga College is committed to providing academic accommodations for students with documented disabilities. Please contact the Accessibility Services Office.

Prepared By Glenn Paulley

School Information Technology

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