# LONDON CAPITAL COMPUTER COLLEGE

## Diploma in Database Administration (990) – Oracle SQL

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| **Prerequisites:** Basic knowledge of relational databases; for example, Access. | **Corequisites:** A pass or higher at Diploma level |
| **Aim:** This course offers students an extensive introduction to data server technology. The course covers the concepts of both relational and object relational databases and the powerful SQL programming language. Candidates will learn to create and maintain database objects and to store, retrieve, and manipulate data; retrieve data by using advanced techniques such as ROLLUP, CUBE, set operators, and hierarchical retrieval. Candidates will also learn to write SQL and SQL*Plus script files using the SQL*Plus tool to generate report-like output. Demonstrations and hands-on practice reinforce the fundamental concepts. Using the Oracle SQL*Plus environment, this computer-based training course uses Structured Query Language (SQL) to create and populate Oracle database tables. Candidates will acquire the skills necessary to create tables and other database objects, maintain and modify these data objects. The program details processes to follow when inserting, updating and deleting data using SQL's Data Manipulation Language, control database transactions, control both user and object level security in an Oracle database. | |
| **Required Materials:** Recommended Learning Resources. | **Supplementary Materials:** Lecture notes and tutor extra reading recommendations. |
| **Special Requirements:** The course requires a combination of lectures, demonstrations, discussions, and hands-on labs. | |

| Intended Learning Outcomes: | Assessment Criteria: |
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| 1　　Identify the purpose of a database management system (DBMS).  Distinguish a field from a record and a column from a row.  Identify the basic components of an Entity-Relationship Model.  Define the types of relationships that can exist between entities.  Identify the problems associated with many-to-many relationships and the appropriate solutions. | 1.1　Explain the purpose of normalisation<br>1.2　Describe the role of a primary key<br>1.3　Identify partial dependency and transitive dependency in the normalisation process<br>1.4　Explain the purpose of a foreign key<br>1.5　Determine how to link data in different tables  through the use of a common field<br>1.6　Explain the purpose of a structured query language (SQL) |
| 2　　Distinguish between a RDBMS and an ORDBMS.  Identify keywords, mandatory clauses, and optional clauses in a SELECT statement | 2.1　Select and view all columns of a table<br>2.2　Select and view one column of a table<br>2.3　Display multiple columns of a table<br>2.4　Use a column alias to clarify the contents of a particular column<br>2.5　Perform basic arithmetic operations in the SELECT clause<br>2.6　Remove duplicate lists, using either the DISTINCT or UNIQUE keyword<br>2.7　Combine fields, literals, and other data<br>2.8　Format output. |
| 3　　Understand how to use a WHERE clause to restrict the rows returned by a query.  Create a search condition using mathematical comparison operators.  Use the BETWEEN…AND comparison operator to identify records within a range of values | 3.1　Specify a list of values for a search condition using the IN comparison operator<br>3.2　Search for patterns using the LIKE comparison operator<br>3.3　Identify the purpose of the % and _ wildcard characters<br>3.4　Join multiple search conditions using the |

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| | | | appropriate logical operator |
| | | 3.5 | Perform searches for null values |
| | | 3.6 | Specify the order for the presentation of query results, using ORDER BY, DESC, ASC, and the SELECT clause |
| | | 3.7 | Use SQL*Plus editing commands to edit the contents of the SQL*Plus buffer |
| 4 Understand how to create a Cartesian join. Define how to create an equality join using the WHERE clause | | 4.1 | Create an equality join using the JOIN keyword |
| | | 4.2 | Create a non-equality join using the WHERE clause |
| | | 4.3 | Create a non-equality join using the JOIN…ON approach |
| | | 4.4 | Create a self-join |
| | | 4.5 | Distinguish an inner join from an outer join |
| | | 4.6 | Create an outer join using the WHERE clause |
| | | 4.7 | Create an outer join using the OUTER keyword |
| | | 4.8 | Use set operators to combine the results of multiple queries |
| | | 4.9 | Join three or more tables |
| 5 Understand how to use the UPPER, LOWER, and INITCAP functions to change the case of field values and character strings. Extract a substring using the SUBSTR function. Determine the length of a character string using the LENGTH function | | 5.1 | Use the LPAD and RPAD functions to pad a string to a desired width |
| | | 5.2 | Use the LTRIM and RTRIM functions to remove specific character strings |
| | | 5.3 | Round and truncate numeric data using the ROUND and TRUNC functions |
| | | 5.4 | Calculate the number of months between two dates using the MONTHS_BETWEEN function |
| | | 5.5 | Identify and correct problems associated with calculations involving null values using the NVL function |
| | | 5.6 | Display dates and numbers in a specific format with the TO_CHAR function |
| | | 5.7 | Determine the current date setting using the SYSDATE keyword |
| | | 5.8 | Nest functions inside other functions |
| | | 5.9 | Identify when to use the DUAL table |
| 6 Differentiate between single-row and multiple-row functions. Use the SUM and AVG functions for numeric calculations. | | 6.1 | Use the COUNT function to return the number of records containing non-NULL values |
| | | 6.2 | Use COUNT(*) to include records containing NULL values |
| | | 6.3 | Use the MIN and MAX functions with non-numeric fields |
| | | 6.4 | Determine when to use the GROUP BY clause to group data |
| | | 6.5 | Identify when the HAVING clause should be used |
| | | 6.6 | List the order of precedence for evaluating WHERE, GROUP BY, and HAVING clauses |
| | | 6.7 | State the maximum depth for nesting group functions |
| | | 6.8 | Nest a group function inside a single-row function |
| | | 6.9 | Calculate the standard deviation and |

| | | | variance of a set of data, using the STDDEV and VARIANCE functions |
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| 7 | Determine when it is appropriate to use a subquery. Identify which clauses can contain subqueries. Distinguish between an outer query and a subquery. Distinguish between correlated and uncorrelated subqueries. Distinguish between single-row and multiple-row comparison operators | 7.1 | Use a single-row subquery in a WHERE clause |
| | | 7.2 | Use a single-row subquery in a HAVING clause |
| | | 7.3 | Use a single-row subquery in a SELECT clause |
| | | 7.4 | Use a multiple-row subquery in a WHERE clause |
| | | 7.5 | Use a multiple-row subquery in a HAVING clause |
| | | 7.6 | Use a multiple-column subquery in a WHERE clause |
| | | 7.7 | Create an inline view using a multiple-column subquery in a FROM clause |
| | | 7.8 | Compensate for NULL values in subqueries |
| | | 7.9 | Nest a subquery inside another subquery |
| 8 | Understand how to create a new table using the CREATE TABLE command | 8.1 | Name a new column or table |
| | | 8.2 | Use a subquery to create a new table |
| | | 8.3 | Add a column to an existing table |
| | | 8.4 | Modify the size of a column in an existing table |
| | | 8.5 | Drop a column from an existing table |
| | | 8.6 | Mark a column as unused, then delete it at a later time |
| | | 8.7 | Rename a table |
| | | 8.8 | Truncate a table |
| | | 8.9 | Drop a table |
| 9 | Explain the purpose of constraints in a table. Distinguish among PRIMARY KEY, FOREIGN KEY, UNIQUE, CHECK, and NOT NULL constraints and the appropriate use for each constraint. Distinguish between creating constraints at the column level and table level | 9.1 | Create PRIMARY KEY constraints for a single column and a composite primary key |
| | | 9.2 | Create a FOREIGN KEY constraint |
| | | 9.3 | Create a UNIQUE constraint |
| | | 9.4 | Create a CHECK constraint |
| | | 9.5 | Create a NOT NULL constraint, using the ALTER TABLE…MODIFY command |
| | | 9.6 | Include constraints during table creation |
| | | 9.7 | Use DISABLE and ENABLE commands |
| | | 9.8 | Use the DROP command |
| 10 | Use substitution variables with an UPDATE command. Issue the transaction control statements COMMIT and ROLLBACK. Differentiate between DDL, DML, and transaction control commands. Differentiate between a shared lock and an exclusive lock | 10.1 | Add a record to an existing table |
| | | 10.2 | Add a record containing a NULL value to an existing table |
| | | 10.3 | Use a subquery to copy records from an existing table |
| | | 10.4 | Modify the existing rows within a table |
| | | 10.5 | Delete records |
| | | 10.6 | Use the SELECT…FOR UPDATE command to create a shared lock |
| 11 | Explain the effect of the WITH READ ONLY option. Explain the implication of an expression in a view for DML operations. Explain inline views and the use of ROWNUM to perform a "TOP-N" analysis. Identify problems associated with adding records to a complex view. Identify the key-preserved table underlying a | 11.1 | Create a view, using CREATE VIEW command or the CREATE OR REPLACE VIEW command |
| | | 11.2 | Employ the FORCE and NO FORCE options |
| | | 11.3 | State the purpose of the WITH CHECK OPTION constraint |

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| complex view | 11.4 | Update a record in a simple view |
| | 11.5 | Re-create a view |
| | 11.6 | Update a record in a complex view |
| | 11.7 | Drop a view |
| 12      Define the purpose of a sequence and state how it can be used by an organisation. Explain why gaps may appear in the integers generated by a sequence. Correctly use the CREATE SEQUENCE command to create a sequence.  Identify which options cannot be changed by the ALTER SEQUENCE command. Identify the contents of different versions of views used to access the data dictionary, based on the prefix of the view. | 12.1 | Use NEXTVAL and CURRVAL in an INSERT command |
| | 12.2 | Explain when Oracle will automatically create an index |
| | 12.3 | Create an index, using the CREATE INDEX command |
| | 12.4 | Delete an index, using the DELETE INDEX command |
| | 12.5 | Create a PUBLIC synonym |
| | 12.6 | Delete a PUBLIC synonym |
| 13      Explain the concept of authentication. Create a new user account.  Grant a user the CREATE SESSION privilege. | 13.1 | Make a password expire |
| | 13.2 | Change the password of an existing account |
| | 13.3 | Create a role; grant privileges to a role |
| | 13.4 | Assign a user to a role |
| | 13.5 | Revoke privileges from a user and a role |
| | 13.6 | Drop a user |
| 14      Understand how to add a column heading with a line break to a report. Format the appearance of numeric data in a column.  Specify the width of a column.  Substitute a text string for a NULL value in a report. | 14.1 | Add a multiple-line header to a report |
| | 14.2 | Display a page number in a report |
| | 14.3 | Add a footer to a report |
| | 14.4 | Change the setting of an environment variable |
| | 14.5 | Suppress duplicate report data |
| | 14.6 | Clear changes made by the COLUMN and BREAK commands |
| | 14.7 | Perform calculations in a report |

## Recommended Learning Resources:  Oracle SQL

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| **Text Books** | • Mastering Oracle SQL by Sanjay Mishra * Alan Beaulieu.  ISBN-10: 0596006322<br>• Mastering Oracle SQL and SQL*Plus (Oaktable Press) by Lex de Haan.  ISBN-10: 1590594487<br>• Oracle SQL Interactive Workbook (Interactive Workbook (Prentice Hall)) by Alex Morrison & Alice Rischert.  ISBN-10: 0130157457 |
| **Study Manuals** | BCE produced study packs |
| **CD ROM** | Power-point slides |
| **Software** | Oracle Database |