Level 6 Advanced Diploma in Data Science & Business Analytics (952) 210 Credits

Unit: SQL for Data Analysis **Exam Paper No.:** 1	**Guided Learning Hours:** 300 **Number of Credits:** 30
Prerequisites: Basic SQL knowledge skills and ability to work on own initiative	**Corequisites:** Diploma in Data Analytics or equivalence.
Aim: Relational databases are everywhere. This is one of the tech skill that demands attention. SQL spans continents, countries, industries, and drive businesses and schools, hospitals and nonprofits, research and applications. Apart from working as database developer, but one can also find job postings as business analyst, data scientist, data engineer; including in financial industry which requires a solid foundation in SQL. In this course, learners will be using PostgreSQL as the database. The knowledge gained can easily be used in Microsoft SQL Server and Oracle; however, there are minor differences between.	
Required Materials: Recommended Learning Resources.	**Supplementary Materials:** Lecture notes and tutor extra reading recommendations.
Special Requirements: This is a hands-on unit, hence practical use of computers is essential. Requires intensive lab work outside of class time.	
Intended Learning Outcomes:	**Assessment Criteria:**
1. Understand why databases have many tables and how to identify relationships between them.	1.1 Define primary/foreign keys. 1.2 Describe the role of SQL in extracting, loading and transforming data. 1.3 Explain referential integrity in databases. 1.4 Describe Venn diagrams in relation to table joins. 1.5 Explain different types of SQL table joins. 1.6 Demonstrate implementation of SQL OUTER, INNER and CROSS joins.
2. Understand the purpose and implementation of functions in aggregating data; including the questions they answer/solve.	2.1 Demonstrate the use of SUM, AFG, MIN, MAX, TRUNC and ROUND. 2.2 Describe declarative programming. 2.3 Describe a sub-query. 2.4 Be able to use SQL sub-queries. 2.5 Identify operators used with sub-queries. 2.6 Be able to combine SQL statements using UNION and UNION ALL
3. Understand various data types supported in SQL and the differences between them.	3.1 Demonstrate how Booleans, text, numbers and dates are used in SQL. 3.2 Describe arrays. Define JavaScript Object Notation (JSON). 3.3 Describe Universally Unique Identifiers (UUIDs). 3.4 Be able to use date and time functions. 3.5 Describe SQL string manipulation functions. 3.6 Demonstrate the use of CASE statement.

4. Understand the use of CASE statement as a conditional logic to SQL queries and implementation of coalesce function.	4.1 Describe CASE statement syntax 4.2 Explore differences between CASE and IF/ELSE statement 4.3 Demonstrate using GROUP BY and CASE statements 4.4 Describe how to use coalesce function 4.5 Demonstrate using coalesce function in SQL 4.6 Describe what coalesce function does.
5. Understand what "*Analytic Functions*" are and how they perform calculations against a set of rows to return an aggregated value.	5.1 Describe cumulative value calculations. 5.2 Be able to calculate rank row. 5.3 Describe how to perform year/month/week calculations. 5.4 Explain RANK and ROW_NUMBER analytic functions. 5.5 Describe the use of LEAD and LAG functions. 5.6 Describe use of temporary tables. 5.7 Describe pivot and unpivot in SQL.
Methods of Evaluation: A 3-hour written examination paper with five essay questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake coursework/projects in **SQL for Data Analysis** with a weighting of 100%.	

Recommended Learning Resources: SQL for Data Analysis

Text Books	• Data Analysis Using SQL and Excel by Gordon S. Linoff. ISBN-13 : 978-1119021438 • PostgreSQL Query Optimization by Henrietta Dombrovskaya, Boris Novikov, Anna Bailliekova. ISBN-13 : 978-1484268841 • PostgreSQL Configuration by Baji Shaik. ISBN-13 : 978-1484256626
Study Manuals 	BCE produced study packs
CD ROM 	Power-point slides
Software 	Postgres