Course Description

CAP2761C | Intermediate Analytics | 4.00 credits

This course offers an introduction to the SQL language and how it can be used by data analysts to query databases and gain valuable insights. Students will also gain extensive hands-on experience with Microsoft SQL Server, Azure, and GitHub. Prerequisite: CAP1788 and CGS1540C.

Course Competencies:

Competency 1: The student will demonstrate an understanding of SQL Server, SQL Server Management Studio and Azure Data Studio by:

1. Installing SQL Server, SQL Server Management Studio and Azure Data Studio
2. Enabling different Azure Data Studio Extensions
3. Connecting to SQL Server and Azure SQL Database
4. Exploring the SQL Server Management Studio and Azure Data Studio interfaces
5. Loading a relational database into SQL Server

Competency 2: The student will demonstrate an understanding of the world of data by:

1. Describing data and various data types
2. Classifying data based on its characteristics
3. Identifying fundamental database components such as tables, columns, and rows
4. Exploring a database and identifying outliers

Competency 3: The student will demonstrate an understanding of the fundamentals of SQL Server and the SQL language by:

1. Describing the purpose of SQL and T- SQL
2. Explaining how SQL can be used in an analytics workflow
3. Writing queries using the SELECT statement and its various clauses and keywords
4. Using various types of operators and basic functions
5. Performing operations to create, read, update, and delete a table
6. Describing the difference between a temporary table and persistent table
7. Combining multiple tables and queries together into a dataset by using various types of joins and unions
8. Configuring keys, constraints, and indexes
9. Creating subqueries and nested subqueries
10. Creating database objects such as views and stored procedures

Competency 4: The student will demonstrate an understanding of aggregate functions in SQL by:

1. Describing the conceptual logic of aggregation
2. Creating queries using common SQL aggregate functions such as SUM, AVERAGE, and COUNT
3. Using the GROUP BY clause to aggregate and combine groups of data
4. Using the HAVING clause to filter aggregates
5. Identifying basic univariate statistics about data
6. Using bivariate analysis to understand the relationship between two variables

Competency 5: The student will demonstrate an understanding of window functions by:

1. Describing the nature and purpose of window functions
2. Write basic window functions
3. Use common window functions to calculate statistics
4. Analyze data using window functions and a window frame

Competency 6: The student will demonstrate an understanding of complex data types by:
1. Performing descriptive analytics on time series data
2. Using geospatial data
3. Using complex data types (arrays, JSON, and JSONB)

Competency 7: The student will demonstrate an understanding of visualizing and exporting queries by:
1. Creating quick visualizations using the Sand Dance extension
2. Creating a story with an SQL Notebook in Azure Data Studio
3. Exporting SQL queries via a notebook

Competency 8: The student will demonstrate an understanding of GitHub by:
1. Creating a data repository
2. Managing file changes using Git
3. Publishing an Azure Data Studio repository to GitHub

Learning Outcomes:
- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively