COURSE TITLE	**SQL DATA ANALYTICS WITH PYTHON**
COURSE CODE	**05FN0506**
COURSE CREDITS	**4**

Objective:

1. Apply SQL commands and Python programming techniques for efficient data handling, manipulation, and retrieval from structured datasets.
2. Analyze datasets using SQL queries and Python libraries (NumPy, Pandas) to identify patterns, relationships, and trends.
3. Evaluate different data processing and querying approaches by integrating SQL with Python for optimized data workflows.
4. Analyze and evaluate data insights through visualization techniques and case studies to support data-driven decision-making.

Course Outcomes: After completion of this course, student will be able to:

1. Apply SQL operations (DDL, DML, joins, subqueries) and Python data handling techniques to manage and process datasets effectively.
2. Analyze structured data using SQL and Python libraries to extract meaningful insights and perform statistical evaluation.
3. Evaluate integrated SQL-Python workflows for data extraction, transformation, and analysis in real-world scenarios.
4. Analyze data visualizations and case study outcomes to communicate insights and support business decisions.

Pre-requisite of course: Basic understanding of programming concepts. Familiarity with databases and Python syntax.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	0	30	20	50	50

Contents : Unit	Topics	Contact Hours
1	**SQL Basics for Data Analytics** Introduction to databases and SQL,Data types, DDL, DML, DCL commands,Filtering, sorting, and aggregating data,Joins and subquerie.	11
2	**Python Fundamentals for Data Handling** Python basics and data structures,File handling and working with CSV/Excel,NumPy and Pandas for data manipulation,Descriptive statistics using Python.	11

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Contents : Unit	Topics	Contact Hours
3	**Integration of SQL with Python** Connecting SQL database with Python using libraries,Executing SQL queries in Python,Fetching and transforming SQL results in Pandas,Case studies with combined SQL-Python workflows.	11
4	**Data Visualization and Case Studies** Data visualization using Matplotlib and Seaborn,Correlation and trend analysis,Real-world analytics project using SQL and Python,Report generation and storytelling with data.	12
Total Hours		**45**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**UNIT-1** Create tables and insert data using SQL commands, Write queries to filter and sort data, Perform aggregate functions with GROUP BY, Practice INNER, LEFT, RIGHT JOINs, Use subqueries to extract specific results, Read and manipulate CSV files using Pandas, Clean and transform datasets using Pandas functions, Perform statistical analysis using NumPy, Group and summarize data using Pandas, Merge and concatenate multiple dataframes.	15
2	**UNIT-2** Connect MySQL with Python using mysql-connector or SQLAlchemy, Write a Python script to run a SQL query and display results, Store SQL output in a Pandas dataframe, Clean SQL data in Python and visualize it, Perform a combined analysis on sales data using SQL + Python, Create bar and line charts using Matplotlib, Design heatmaps and pair plots using Seaborn, Visualize SQL data in Python, Build a dashboard-style report using Jupyter, Perform end-to-end analysis project and submit report.	15
Total Hours		**30**

Textbook :

1 Python for Data Analysis, Wes McKinney, O'Reilly Media, 2022

2 SQL for Data Scientists, Renee M. P. Teate, John Wiley & Sons, 2021

References:

1 Learning SQL (3rd Edition), Learning SQL (3rd Edition), Alan Beaulieu, O'Reilly Media, 2020

2 SQL Queries for Mere Mortals (4th Ed.), SQL Queries for Mere Mortals (4th Ed.), John L. Viescas, Michael J. Hernandez, Addison-Wesley, 2018

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	15.00	25.00	25.00	25.00	0.00

Instructional Method:

1 PPT, White Board, Practical

Supplementary Resources:

1 https://www.w3schools.com/sql/
2 https://docs.oracle.com/en/database/
3 https://leetcode.com/problemset/database/

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