Program: B.Com (Economics and Analytics)	Semester: IV
Course: Database Management and SQL for Analytics AY:2024-25	Course Code:

Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Continuous Assessment (CA) (Marks - 30)	Semester End Examinations (SEE) (60 Marks - in Question Paper)
2 LABS	-	-	2		

Course Learning Objectives:

1. To understand the fundamental concepts of databases, including relational and non-relational model, to use SQL for data management and analysis
2. To develop essential SQL querying skills and techniques for accessing and modifying data from within databases
3. To become familiar with advanced SQL querying techniques for analyzing complex datasets and preparing and storing data for further processing

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Apply fundamental concepts of database management to design and create relational databases, populate them with relevant data and perform retrieval and manipulation

CO2: Utilize advanced querying techniques to perform complex data analysis tasks for further analytical processes

CO3: Analyze, evaluate, and optimize SQL queries for efficiency and performance to enhance the speed and resource utilization of database operations

Pedagogy:

Hands-On Learning, Computer Laboratory Based Learning

Outline of Syllabus: (per session plan)

Module	Description	No of Hours
1	Introduction to Database and Database Management	10
2	Learning SQL for Analytics	10
3	Advanced Querying	10
Total		**30**
Practicals		**-**

Unit	Topic	No. of Hours
Module 1	**Introduction to Database and Database Management** Introduction to Data and Database The world of data, Introduction to databases – Nonrelational database system, The relational model, SQL, NoSQL, Database Management Systems, Where can one write code for databases, Understanding relational databases and their components, Creating and populating a database Introduction to SQL What is SQL, SQL statement classes, SQL: A non-procedural languages, What is SQL, Benefits of SQL, SQL versus R or Python, SQL as part of data analysis workflow, Database types and how to work with them, A data model	10
Module 2	**Learning SQL for Analytics** Querying Basics SQL Terms, The SELECT clause, The FROM clause, The WHERE clause, The GROUPBY clause, The HAVING clause, The ORDER BY clause, The LIMIT clause, Data types, Operators and functions Creating, Updating, Deleting, and Retrieving Working with databases, Creating tables, Modifying tables, Indexes, Views, Transaction management, Retrieving records	10
Module 3	**Advanced Querying** Querying Multiple Tables and Queries What is a Subquery, What is a Join, Joining tables, Union operators, Case statements, Grouping and summarizing, Window functions, Pivoting and unpivoting, Sorting query results Preparing Data for Analysis Types of Data, Distribution, Data Quality, Data Cleaning, Shaping Data Aggregate Functions for Data Analysis Introduction, Aggregate functions, Aggregate functions with GROUPBY, Using aggregates to clean data and examine data quality	10

Reference Books:

[1]. Upom Malik, MattGoldwasses, Benjamin Johnston, “SQL for Data Analytics”, Packt, 2019

[2]. Allen G. Taylor, “SQL All-In-One for Dummies”, 3rd Edition, John Wiley & Sons, 2019

[3]. Alice Zhao, “SQL Pocket Guide”, 4th Edition, O’Reilly, 2021

[4]. Alan Beaulieu, “Learning SQL” 3rd Edition, O’Reilly, 2020

[5]. Anthony Molinaro, Robert de Graaf, “SQL Cookbook”, 2nd Edition, O’Reilly, 2020

[6]. Cathy Tanimura, “SQL for Data Analysis”, O’Reilly, 2021

EXAM PATTERN FOR THE COURSE

1. **Internal Class Test - 10 Marks Paper Pattern (Pen Paper Based)**

Question 1	Fill in the Blanks	4 Marks
Question 2	Descriptive Question	3 Marks
Question 3	Descriptive Question	3 Marks

2. **10 Marks Internal Assignments / Practical Study / Case Study / Mini Project**

3. **30 Marks Final Exam Paper Pattern**

   a. Examination shall be conducted in machine test form in Batches (Max. Batch Size – 30 Students) in the computer laboratory

   b. One external examiner must be present along with the internal examiner (subject faculty in-charge) for the conduct of examination

   c. Question paper should have maximum number of distinct sets, kept faced down on table, from which student will pick up one question paper

   d. Duration of the examination is 1.5 Hrs

   e. Marks distribution is as follows:

1	Practical Question (One question for 20 marks Or Two questions each for 10 marks)	20 Marks
2	Viva Voce	05 Marks
3	Coursework Journal	05 Marks

Evaluation shall be done by the examiners both internal and external on machine in the computer laboratory

Students must prepare answer book during the examination with the code and output in it, which further must be printed