MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2024 Admission Onwards

SYLLABUS						
SIGNATURE COURSE						
Name of the College	B.C.M. College, Kottayam					
Faculty/ Discipline	Mathematics					
Programme	BSc (Hons) Mathematics					
Course Coordinator	Jintumol K.U					
Contributors	Dr. Liju Alex,Ms. Ann Johns, Dr. Anu Varghese					
Course Name	Introduction to Data Analysis using SQL					
Type of Course	SEC					
Specialization title	This Signature Course does not have a specialization.					
Course Code	MG5SECMATA01					
Course Level	300					
Course Summary	This course introduces students to the fundamentals of data analysis through structured query language (SQL), using the first nine chapters of Practical SQL by Anthony DeBarros. Designed for beginners, the course provides a hands-on, project-driven approach to understanding how to manage, explore, and analyze data using a relational database system, specifically PostgreSQL. Students will begin by learning to install and configure PostgreSQL, create databases and tables, and understand core SQL syntax including SELECT, WHERE, and ORDER BY. As the course progresses, learners will explore SQL data types, import external data files, and apply arithmetic operations and aggregate functions such as SUM(), AVG(), and COUNT() to extract insights. In the final module, students will learn to combine data from multiple tables using joins and to group and summarize data using GROUP BY and HAVING.						
Semester	5	**Credits**			3	**Total Hours**
Course Details	**Learning Approach**	Lecture	Tutorial	Practical	Others	
		3	0	0	0	45
Pre-requisites, if any	Basic knowledge in Mathematics and Statistics					

Course Outcomes (CO)

Number of COs		**4**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Install, configure, and use a relational database management system (PostgreSQL) to create and manage databases and tables.	A	PO1, PO2, PO3, PO4, PO9, PO10
2	Write SQL queries using SELECT, WHERE, ORDER BY, and expressions to retrieve and filter data effectively.	A	PO1, PO2, PO3, PO4, PO9, PO10
3	Apply SQL functions such as aggregation (SUM(), AVG(), COUNT()) and grouping (GROUP BY, HAVING) to analyze datasets and summarize insights.	A	PO1, PO2, PO3, PO4, PO9, PO10

Number of COs		4	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
4	Perform data integration and transformation using table joins and data cleaning techniques to prepare data for analysis.	A	PO1, PO2, PO3, PO4, PO9, PO10

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	2	1	-	-	-	-	1	2
CO 2	3	3	2	1	-	-	-	-	1	2
CO 3	3	3	2	1	-	-	-	-	1	2
CO 4	3	3	2	1	-	-	-	-	1	2

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Relational Databases and SQL			
	1.1	Introduction to PostgreSQL	2	["1"]
	1.2	Creating Databases and Tables	4	["1"]
	1.3	Basic SELECT Statements	3	["2"]
	1.4	Data Types in SQL	3	["2"]
	1.5	Importing and Exporting Data	3	["2"]
2	Querying and Modifying Data			
	2.1	Filtering Data	3	["2"]
	2.2	Aggregate Functions	3	["3"]
	2.3	Arithmetic in Queries	3	["3"]
	2.4	Modifying Data	3	["3"]
	2.5	Handling Nulls & Cleaning Data	3	["4"]
3	Intermediate SQL for Data Insights			
	3.1	Joining Tables	3	["4"]
	3.2	Joining Multiple Tables	3	["4"]
	3.3	Grouping Data	3	["3"]
	3.4	Filtering Grouped Data	3	["3"]
	3.5	Practical Use Cases	3	["4"]

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** This course will follow a structured, hands-on approach combining short lectures, live demonstrations, guided practice, and individual assignments. Each session begins with a brief review of previously covered content, followed by a lecture introducing new concepts . Lectures are paired with real-time SQL demonstrations using PostgreSQL and pgAdmin, allowing students to observe practical applications of the theory.

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Theory **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 25 Marks** Quizzes, Assignments, Module test, Class Participation **B. End Semester Evaluation (ESE)** **• Theory – 50 Marks** Assessment Methods – Examination Duration of Examination – 1.50 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B Answer Type: ∘ PART - A ∘ MCQ - (10 out of 15) – 10 × 2 = 20 ∘ PART - B ∘ One word - (6 out of 9) – 6 × 5 = 30

References

- 1. Title: Practical SQL: A Beginner’s Guide to Storytelling with Data ,Anthony DeBarros, No Starch Press, 2022 (2nd Edition)

Suggested Readings

- 1. Learning SQL, Alan Beaulieu, O’Reilly Media, 2020 (3rd Edition) 2. SQL for Data Analytics, Upom Malik, Matt Goldwasser, Benjamin Johnston, Packt Publishing, 2021 (2nd Edition) 3.Head First SQL, Lynn Beighley O’Reilly Media, 2007 4. The Art of SQL, Stéphane Faroult, Peter Robson, O’Reilly Media, 2006

Affidavit

- We, B.C.M. College, Kottayam and Jintumol K.U, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.
- We, B.C.M. College, Kottayam, agree to appoint a new course coordinator for the proposed Introduction to Data Analysis using SQL in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the signature course, for as long as the college offers this programme.
- We, B.C.M. College, Kottayam and Jintumol K.U, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.