SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Engineering
Instrumentation and Control

B Tech III Semester-V
Program: Honors -Industry 4.0

Subject Name: Database Systems **Subject Code: BTIC19521**

Type of course: Honors

Prerequisite (if any): Data Structure, Programming language c or python

List of Courses where this course will be prerequisite: Algorithm for Data Science

Rationale:
This course emphasizes the importance of database design, use, and management. The course begins with a general description of databases and database management systems, including the relationships that exist among a database, a DBMS, and an application.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	2	4	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

BSC: basic science course /ESC: Engineering Science Course /HSM: Humanities and management /PCC: Professional Core course /PEC: professional Elective course /OEC: Open Elective course/ MD: mandatory noncredit course

Sr. No.	Content	Total Hrs	
1	**Introduction** Database concepts, Benefits of Database Management Systems,Relational Database Management System,Applications of DBMS. .	6	13%
2	**Data Models Introduction To Relational Model** Keys-Schema /Diagram – Relational Algebra Entity-Relationship Model – E-R Diagrams – Enhanced- Er Model –Specialization Generalization- Aggregation- Er-To-Relational Mapping	9	20%
3	**Relational Database Design Functional Dependencies** Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form	9	20%
4	**SQL Concepts** Basics of SQL, DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated subqueries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. transaction control commands – Commit, Rollback, Savepoint	15	35%
5	**Transactions Transaction Concepts** ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels.	6	12%

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Suggested Specification table with Marks (Theory): (For BTech only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30%	**30%**	**30%**	**10 %**		

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr no	**Title of book /article**	**Author(s)**	**Publisher and details like ISBN**	**Year of publication**	**Publication Edition**
1	Database System Concepts	Silberschatz, Henry F. Korth, S. Sudarshan	McGraw-Hill ISBN: 978-9332901384	2011	6th Edition
2	Fundamentals of Database Systems	R. Elmasri and S. Navathe	Pearson, ISBN: 978-0133970777	2016	7th Edition
3	An introduction to Database Systems	C J Date	Pearson ISBN: 978-0201385908	2004	7th Edition
4	SQL-PL/SQL	Ivan Bayross	BPB Publication. ISBN: 978-8176569644	2009	3rd Edition

Course Outcomes:

After learning the course, Students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	define the basic concepts of DBMS, identify the purpose of DBMS and architecture of DBMS and demonstrate the Relational Database model along with the Entity relationship model.	25%
CO-2	illustrate Functional Dependency and practice various normal forms for good database design.	25%
CO-3	practice and execute SQL queries	10%
CO-4	interpret transaction management, concurrency management, recovery processes in database handling.	10%

Major Equipment Needed:

	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PSO 3
CO1				**3**							**3**	**2**			**3**
CO2				**3**							**3**	**2**			**3**
CO3				**3**							**3**	**2**			**3**
CO4				**3**							**3**	**2**			**3**

List of Open learning website:

1. Nptel free course on Database Management System https://nptel.ac.in/courses/106/105/106105175/
2. Udemy free course on Introduction to Databases and SQL Querying https://www.udemy.com/course/introduction-to-databases-and-sql-querying/
3. Udemy free course on Oracle SQL: An Introduction to the most popular database https://www.udemy.com/course/oracle-sql-an-introduction-to-the-most-popular-database/
4. SQL Tutorials
5. https://www.tutorialspoint.com/dbms/index.htm
6. https://www.javatpoint.com/dbms-tutorial
7. https://www.w3schools.com/sql/
8. https://www.codecademy.com/learn/learn-sql

List of Open Source Software:

MySQL
SQLite
PostgreSQL

FOR LAB SESSIONS:

List of Experiments:

1 To study Basic SQL commands (create database, create table, use , drop, insert) and execute the following queries using these commands:
a) Create a database named ' Employee'.
b) Use the database 'Employee' and create a table 'Emp' with attributes 'ename', 'ecity', 'salary','enumber','eaddress','depttname'.
c) Create another table 'Company' with attributes 'cname', ccity','empnumber' in th database'Employee'.

2 To study the viewing commands (select , update) and execute the following queries using these commands:
a) Find the names of all employees who live in Delhi.
b) Increase the salary of all employees by Rs. 5,000.
c) Find the company names where the number of employees is greater than 10,000.
d) Change the Company City to Gurgaon where the Company name is 'TCS'.

3 To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:
a) Add an attribute named ' Designation' to the table 'Emp'.
b) Modify the table 'Emp', Change the datatype of 'salary' attribute to float.
c) Drop the attribute 'depttname' from the table 'emp'.
d) Delete the entries from the table ' Company' where the number of employees are less than 500.

4 To study the commands that involve compound conditions (and, or, in , not in, between , not between , like , not like) and execute the following queries using these commands:
a) Find the names of all employees who live in ' Gurgaon' and whose salary is between Rs. 20,000 and Rs. 30,000.
b) Find the names of all employees whose names begin with either letter 'A' or 'B'. Find the

company names where the company city is 'Delhi' and the number of employees is not between 5000 and 10,000.
c) Find the names of all companies that do not end with letter 'A'

5 To study the aggregate functions (sum, count, max, min, average) and execute the following queries using these commands:
a) Find the sum and average of salaries of all employees in the computer science department.
b) Find the number of all employees who live in Delhi.
c) Find the maximum and the minimum salary in the HR department.

6 To study the commands involving data constraints and execute the following queries using these commands:
a) Alter table 'Emp' and make 'enumber' as the primary key

7 Alter table 'Company' and add the foreign key constraint.
a) Add a check constraint in the table 'Emp' such that salary has the value between 0 and Rs.1,00,000.
b) Alter table 'Company' and add unique constraint to column cname.
c) Add a default constraint to column ccity of table company with the value 'Delhi'.

8 To study the commands for aliasing and renaming and execute the following queries using these commands:
a) Rename the name of the database to 'Employee1'.
b) Rename the name of table 'Emp' to 'Emp1'.
c) Change the name of the attribute 'ename' to 'empname'.

9 List all the employees working in the company 'TCS'

10 To study the commands for views and execute the following queries using these commands:
a) Create a view having ename and ecity.
b) In the above view change the ecity to 'Delhi' where ename is 'John'.
c) Create a view having attributes from both the tables.
d) Update the above view and increase the salary of all employees of IT department by Rs.1000.

Major Equipment Needed: PC