



SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology



Year: B. Tech II (Semester IV)

Subject Name: Database Management Systems

Subject Code: BTCO13404

Type of course: Profession Core Course

Prerequisite (if any): -

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. Relational database tables, Entity-Relationship Models, and database design. Finally, the course describes SQL, PL/SQL and advanced concepts of DBMS.

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:

Sr. No.	Contents	Total Hours
1.	Introduction To Databases Purpose of Database System – Views of data –Data Abstraction- Instances and Schemas-Data Models – Database System Architecture –Types of Users, Role of DBA	02
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	06
3.	Relational Database Design Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-	06





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	valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form	
4.	Storage, File Structure And Query Processing RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing, Query Processing Overview-Query Optimization	07
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.	06
6.	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	10
7.	PI/Sql Concepts Cursors, Stored Procedures, Stored Function, Database Triggers	04
8.	Advanced Topics Distributed Databases: Architecture, - Information Retrieval: IR Concepts, Retrieval Models, Introduction to unstructured databases	04

Suggested Specification table with Marks (Theory): (For B. Tech only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	15	5	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (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.





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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	2011	6 th Edition
2	Fundamentals of Database Systems	R. Elmasri and S. Navathe	Prentice Hall	2016	7 th Edition
3	An introduction to Database Systems	C J Date	Pearson	2004	8 th Edition
4	SQL-PL/SQL	Ivan Bayross	BPB	2009	3rd Edition

Course Outcomes (CO):

Sr. No.	CO statements	Marks % weightage
CO-1	Understand 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.	20
CO-2	Illustrate Functional Dependency and practice various normal forms for good database design.	20
CO-3	Discuss File organization, Indexing and Hashing as well as query processing concepts.	15
CO-4	Interpret transaction management, concurrency management, recovery processes in database handling.	15
CO-5	Practice and execute SQL queries and PL/SQL functions, triggers.	20
CO-6	Demonstrate advanced database concepts along with introduction to unstructured databases	10

List of Open learning website:





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- Nptel free course on Database Management System
<https://nptel.ac.in/courses/106/105/106105175/>
- UdemY free course on Introduction to Databases and SQL Querying
<https://www.udemy.com/course/introduction-to-databases-and-sql-querying/>
- 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/>
- PL/SQL Tutorial <https://www.guru99.com/pl-sql-tutorials.html>
- <https://www.tutorialspoint.com/dbms/index.htm>
- <https://www.javatpoint.com/dbms-tutorial>
- <https://www.w3schools.com/sql/>
- <https://www.codecademy.com/learn/learn-sql>

List of Open Source Software:

- SQLite
- PostgreSQL
- MySQL
- Cubrid

List of Experiments:

Sr. No.	Practical
1	Introduction to SQL.
2	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', 'deptname'. c) Create another table 'Company' with attributes 'cname', 'ccity', 'empnumber' in the database 'Employee'.
3	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'.





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4	<p>To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:</p> <ol style="list-style-type: none"> Add an attribute named ' Designation' to the table 'Emp'. Modify the table 'Emp', Change the datatype of 'salary' attribute to float. Drop the attribute 'deptname' from the table 'emp'. Delete the entries from the table ' Company' where the number of employees are less than 500.
5	<p>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:</p> <ol style="list-style-type: none"> Find the names of all employees who live in ' Gurgaon' and whose salary is between Rs. 20,000 and Rs. 30,000. 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. Find the names of all companies that do not end with letter 'A'.
6	<p>To study the aggregate functions (sum, count, max, min, average) and execute the following queries using these commands:</p> <ol style="list-style-type: none"> Find the sum and average of salaries of all employees in the computer science department. Find the number of all employees who live in Delhi. Find the maximum and the minimum salary in the HR department.
7	<p>To study the grouping commands (group by, order by) and execute the following queries using these commands:</p> <ol style="list-style-type: none"> List all employee names in descending order. Find the number of employees in each department where the number of employees is greater than 5. List all the department names where the average salary of a department is Rs.10,000.
8	<p>To study the commands involving data constraints and execute the following queries using these commands:</p> <ol style="list-style-type: none"> Alter table 'Emp' and make 'enumber' as the primary key
9	<p>Alter table 'Company' and add the foreign key constraint.</p> <ol style="list-style-type: none"> Add a check constraint in the table 'Emp' such that salary has the value between 0 and Rs.1,00,000. Alter table 'Company' and add unique constraint to column cname. Add a default constraint to column ccity of table company with the value 'Delhi'.
10	<p>To study the commands for aliasing and renaming and execute the following queries using these commands:</p>



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	<ul style="list-style-type: none">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'.
11	<p>To study the commands for joins (cross join, inner join, outer join) and execute the following queries using these commands:</p> <ul style="list-style-type: none">a) Retrieve the complete record of an employee and its company from both the table using joins.
12	<p>List all the employees working in the company 'TCS'</p>
13	<p>To study the various set operations and execute the following queries using these commands:</p> <ul style="list-style-type: none">a) List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.b) List the enumber of all employees who live in Delhi but whose company is not in Gurgaon.
14	<p>To study the various scalar functions and string functions (power, square, substrng, reverse, upper, lower, concatenation) and execute the following queries using these commands:</p> <ul style="list-style-type: none">a) Reverse the names of all employees.b) Change the names of company cities to uppercase.c) Concatenate name and city of the employee.
15	<p>To study the commands for views and execute the following queries using these commands:</p> <ul style="list-style-type: none">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.
16	<p>To study the commands involving indexes and execute the following queries:</p> <ul style="list-style-type: none">a) Create an index with the attribute ename on the table employee.b) Create a composite index with attributes cname and ccity on table company.c) Drop all indexes created on table company.
17	<p>Introduction to PL-SQL.</p>
18	<p>To study the conditional controls and case statement in PL-SQL and execute the following queries:</p> <ul style="list-style-type: none">a) Calculate the average salary from table 'Emp' and print increase the salary if the average salary is less than 10,000.b) Print the deptno from the employee table using the case statement if the deptname is 'Technical' then deptno is 1, if the deptname is 'HR' then the deptno is 2 else deptno is 3.





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19	To study procedures and triggers in PL-SQL and execute the following queries: a) Create a procedure on table employees to display the details of employees to display the details of employees by providing them value of salaries during execution. b) Create a trigger on table company for deletion where the whole table is displayed when delete operation is performed.
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