Course Plan

A. Course Handout (Version 1.0)

Institute/School Name	Chitkara University Institute of Engineering and Technology
Department Name	Department of Computer Science & Engineering
Programme Name	Bachelor of Engineering (B.E.), Computer Science & Engineering
Course Name	Database Management System	Session	2024-2025
Course Code	22CS007	Semester/Batch	3rd /2023
L-T-P (Per Week)	3-0-2	Course Credits	04
Course Coordinator	Dr. Shikha		

CLO01	To provide a comprehensive foundation for designing and implementing database system by using RDBMS and analyse its need for real life applications.
CLO02	To enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expression from queries.
CLO03	To recognize and identify the use of normalization and functional dependency used in database design.
CLO04	To apply and relate the concept of transaction, concurrency control, security and recovery in database.
CLO05	To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package.

1. Objectives of the Course

The course provides a wide scope of learning & understanding of the subject and the main objectives of the course are:

- To provide a comprehensive foundation for designing and implementing database system by using relational database management systems and analyze its need for real life applications.
- To enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expression from queries.
- To recognize and identify the use of normalization and functional dependency used in database design.
- To apply and relate the concept of transaction, concurrency control, security, and recovery in database.
- To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package.

2. Course Learning Outcomes

After completion of the course, the student should be able to:

	Course Outcome	POs	CL	KC	Sessions
CLO01	To provide a comprehensive foundation for designing and implementing database system by using RDBMS and analyse its need for real life applications.	PO2, PO3, PO11, PO12	K2	Factual Conceptual	**16**
CLO02	To enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expression from queries.	PO2, PO3, PO4, PO12	K3	Procedural Conceptual	**20**

CLO03	To recognize and identify the use of normalization and functional dependency used in database design.	PO1, PO2, PO3, PO12	K3	Conceptual Procedural	**14**
CLO04	To apply and relate the concept of transaction, concurrency control, security and recovery in database.	PO3, PO5, PO12	K3	Conceptual Procedural	**14**
CLO05	To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package.	PO1, PO2, PO3, PO10, PO11, PO12	K3	Conceptual Procedural	**16**

Revised Bloom's Taxonomy Terminology
* PO's available at (shorturl.at/cryzF)
**Cognitive Level =CL
***Knowledge Categories = KC

Course Learning Outcomes	PO1	PO2	PO3	PO4		PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO01		M	H									H	M
CLO02		M	H	M									M
CLO03	M	M	M										M
CLO04			H			H							H
CLO05	M	M	H								H	H	M

H=High, M=Medium, L=Low

3. ERISE Grid Mapping

Feature Enablement	Level (1-5, 5 being highest)
Entrepreneurship	3
Research	4
Innovation	3
Skills	5
Employability	5

4. Recommended Books:

B01: Database System Concepts', Abraham Silberschatz, Henry F. Korth, Sudharsan, McGraw-Hill, Seventh Edition.

B02: 'An Introduction to Database Systems', C.J.Date , O'Reilly Media, Eighth Edition.

B03: 'Database Systems', Ramez.Z.Elmasri, Shamkant B.Navathe, Pearson Education, Seventh Edition.

B04: DBMS: A Simplified Approach by Parteek Bhatia

B05: Introduction to PL/SQL by Ivan Bayross, BPB Publications, Fourth Edition

B06: Oracle PL/SQL Programming, 4th Edition, by Steven Feuerstein, Bill Pribyl. Publisher: O'Reilly Media, Inc.

5. Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	https://www.javatpoint.com/dbms-tutorial
2.	https://link.springer.com/chapter/10.1007/978-1-349-11552-5_1
3.	https://nptel.ac.in/courses/106/106/106106093/
4.	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.e Book-DDU.pdf
5.	https://dl.acm.org/doi/pdf/10.5555/77708

6. Recommended Tools and Platforms

Oracle 11g Express Edition

7. Course Plan:

Lecture Number	Topics	Text Book
1-2	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints	B01-Chpater-1
3-4	Data Models, ER (Entity Relationship) Diagram	B01-Chapter-6
5-6	Functional Dependencies, Introduction of Normalization and its Importance, Data Redundancy, and Update Anomalies	B01-Chapter-7 B02-Chapter-11
7-8	Normal Forms (1NF, 2NF, 3NF & BCNF), De-Normalization	B01-Chapter-7 B02-Chapter-12
9-10	Introduction to SQL, SQL Commands, Datatypes, and DDL statements (create, alter, drop, and truncate)	B01-Chapter-3 B04-Chapter-8
11-12	Implementing Constraints (primary key, foreign key, unique, not null, default, check)	B01-Chapter-2
13-14	DML Statements (insert, update, delete), Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions Joins,	B05-Chapter-5 B04-Chapter-8
15-16	Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS	B05-Chapter-6 B04-Chapter-8
17-18	DCL statement Grant, Revoke, Group by clause, having clause	B05-Chapter-7 B04-Chapter-8
19-20	Views, Benefits of views, creating views, alter views and drop views	B04-Chapter-8
21-22	Joins (inner join, outer join, cross join, self-join), write complex queries using joins	B04-Chapter-8
23-24	Introduction to PL/SQL, Advantages of PL/SQL, The Generic PL/SQL Block (Anonymous blocks & Named blocks)	B04-Chapter-8
25-26	Variables, Data types, create a anonymous block with simple PL/SQL program	B06-Chapter-1
27-28	Control Structure in PL/SQL (if-else, switch case)	B06-Chapter-4
29-30	Control Structure in PL/SQL (while loop, for loop)	B06-Chapter-5
31-32	Introduction to cursors, types of cursors, advantages and disadvantages of cursors	B06-Chapter-5
33-34	Introduction to procedure, creating procedure and calling procedure, parameter modes	B06-Chapter-5

35-36	Introduction to Triggers, types of triggers, Syntax for Creating Triggers.	B06-Chapter-19
37-38	Introduction to package, advantages of creating packages, package specification and package body,	B06-Chapter-18
39-40	Developing a package, Calling packages, bodiless	B06-Chapter-18
41-42	Transaction: introduction, TCL commands (commit, rollback, save point), ACID properties	B01-Chapter-17
43-44	Concurrent Transactions: Concurrency control, need for concurrency control, Locking Techniques	B01-Chapter-17 B01-Chapter-18
45-46	Database Recovery: Introduction, Need for Recovery, Types of Errors Recovery Techniques	B01-Chapter-19
47-48	Database security: introduction, threats, counter measures	B02-Chapter-17

8. Delivery/Instructional Resources

Lecture No.	Topics	Web References	Audio-Video
1-2	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints	https://parteekbhatia.com/wp-content/uploads/2021/02/Chapter-1-1.pdf	https://www.youtube.com/watch?v=DTN78zxMs-I&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=1&pp=iAQB
3-4	Data Models, ER (Entity Relationship) Diagram	https://www.javatpoint.com/dbms-er-model-concept	https://www.youtube.com/watch?v=LIKeqPQNCjo&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=19&pp=iAQB
5-6	Functional Dependencies, Introduction of Normalization and its Importance, Data Redundancy, and Update Anomalies	https://www.javatpoint.com/dbms-functional-dependency	https://www.youtube.com/watch?v=7YEP0z0v508&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=38&pp=iAQB
7-8	Normal Forms (1NF, 2NF, 3NF & BCNF), De-Normalization	https://www.javatpoint.com/dbms-normalization	https://www.youtube.com/watch?v=bSUiOqf7rtM&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=36&pp=iAQB
9-10	Introduction to SQL, SQL Commands, Datatypes, and DDL statements (create, alter, drop, and truncate)	https://www.geeksforgeeks.org/sql-tutorial/	https://www.youtube.com/watch?v=H4Kwa2083m4&list=PLVCEF4zOWjkhvC5xsSRiyS_VeOvw78eCJ&index=1&pp=iAQB
11-12	Implementing Constraints (primary key, foreign key, unique, not null, default, check)	https://www.javatpoint.com/dbms-keys	https://www.youtube.com/watch?v=IKeSsa3aGuY&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=35&pp=iAQB
13-14	DML Statements (insert, update, delete), Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions Joins,	https://www.javatpoint.com/sql-where	https://www.youtube.com/watch?v=vs04JXcRwkY

15-16	Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS	https://www.javatpoint.com/sql-subquery	https://www.youtube.com/watch?v=JksrTuEVEPk
17-18	DCL statement Grant, Revoke, Group by clause, having clause	https://www.javatpoint.com/dcl-commands-in-sql	https://www.youtube.com/watch?v=kx6m8ABU4ZE
19-20	Views, Benefits of views, creating views, alter views and drop views	https://www.javatpoint.com/sql-view	https://www.youtube.com/watch?v=SYGe92NgAQY
21-22	Joins (inner join, outer join, cross join, self-join), write complex queries using joins	https://www.javatpoint.com/sql-join	https://www.youtube.com/watch?v=xUJnewKRI_g&list=PLVCEF4zOWjkhvC5xsSRiyS_VeOvw78eCJ&index=14&pp=iAQB
23-24	Introduction to PL/SQL, Advantages of PL/SQL, The Generic PL/SQL Block (Anonymous blocks & Named blocks)	https://www.javatpoint.com/pl-sql-tutorial	https://www.c-sharpcorner.com/article/ plsql-for-beginners/
25-26	Variables, Data types, create a anonymous block with simple PL/SQL program	https://www.javatpoint.com/pl-sql-variables	https://www.c-sharpcorner.com/article/ plsql-for-beginners/
27-28	Control Structure in PL/SQL (if-else, switch case)	https://www.javatpoint.com/pl-sql-if	https://www.c-sharpcorner.com/article/ plsql-for-beginners/
29-30	Control Structure in PL/SQL (while loop, for loop)	https://docs.oracle.com/cd/B19306_01/appdev.102/b14261/controlstructures.htm	https://www.youtube.com/watch?v=trEF3DKcYB4
31-32	Introduction to cursors, types of cursors, advantages and disadvantages of cursors	https://www.javatpoint.com/pl-sql-cursor	https://www.c-sharpcorner.com/article/ plsql-for-beginners/
33-34	Introduction to procedure, creating procedure and calling procedure, parameter modes	https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch14.htm	https://www.c-sharpcorner.com/article/ plsql-for-beginners/
35-36	Introduction to Triggers, types of triggers, Syntax for Creating Triggers.	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf	https://freevideolectures.com/course/3684/oracle- 11g-12c/40
37-38	Introduction to package, advantages of creating packages, package specification and package body,	https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch14.htm	https://www.c-sharpcorner.com/article/ plsql-for-beginners/
39-40	Developing a package, Calling packages, bodiless	https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch14.htm	https://www.youtube.com/watch?v=skz4hITG_cY
41-42	Transaction: introduction, TCL commands (commit, rollback, save point), ACID properties	https://www.javatpoint.com/dbms-transaction-processing-concept	https://www.youtube.com/watch?v=971pR8iWjPM&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=47&pp=iAQB

	Concurrent Transactions: Concurrency control, need for	https://www.javatpoint.com	https://onlinecourses.npt
43-44	concurrency control, Locking Techniques	/dbms-concurrency-control	el.ac.in/noc21_cs04/previ ew
45-46	Database Recovery: Introduction, Need for Recovery, Types of Errors Recovery Techniques	https://www.javatpoint.com /dbms-log-based-recovery	https://nptel.ac.in/course s/106104135
47-48	Database security: introduction, threats, counter measures	https://www.javatpoint.com /database-security	https://www.digimat.in/n ptel/courses/video/1061 05175/L01.html

9. Lab Plan

Sr. No.	Lab Number	Experiments	Learning Resource
1	1-2	Lab 1 (Introduction to the software)	https://www.w3schools.com/mysql/mysqli nstall_windows.asp
2	3-4	Lab 2 (Installation of software for DBMS)	https://www.oracle.com/technetwork/tutori als/chapter2files-1903474.html
3	5-6	Lab 3 (Creating Tables, Alter the table and drop tables)	https://www.javatpoint.com/sql-tutorial https://www.javatpoint.com/sql-table
4	7-8	Lab 4 (Appy constraints on the new or existing table)	https://www.javatpoint.com/constraints-in-sql
5	9-10	Lab 5 (Perform DML operations on tables, select query to fetch records from tables)	https://www.javatpoint.com/ddl-commands-in-sql
6	11-12	Lab 6 (Implement Aggregate Function, Nested & Correlated Queries)	https://www.javatpoint.com/sql-aggregate-functions
7	13-14	Lab 7 (Write queries using views)	https://www.javatpoint.com/sql-view
8	15-16	Lab 8 (Write queries using joins)	https://www.javatpoint.com/sql-join
9	17-18	Lab 9 (Write a simple PL/SQL program using if-else statement)	https://www.javatpoint.com/conditional-statements-in-pl-sql
10	19-20	Lab 10 (Write a PL/SQL program using for and while loop)	https://www.javatpoint.com/conditional-statements-in-pl-sql
11	21-22	Lab 11 (Create a procedure using cursor)	https://www.javatpoint.com/pl-sql-procedure
12	23-24	Lab 12 (Perform operations using triggers)	https://www.javatpoint.com/pl-sql-trigger
13	25-26	Lab 13 (Create package which have procedures and functions)	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Medi a.Oracle.Database.11g.The.Complete.R eference.Dec.2008.eBook-DDU.pdf
14	27-28	Lab 14 (Create complex packages)	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Medi a.Oracle.Database.11g.The.Complete.R eference.Dec.2008.eBook-DDU.pdf
15	29-30	Lab 15 (Learn Locking Techniques)	https://www.javatpoint.com/dbms-lock-based-protocol
16	31-32	Lab 16 (Learn to recover database)	https://www.studytonight.com/dbms/t cl-command.php

10. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
• Remedial Classes on Saturdays • Encouragement for improvement using Peer Tutoring • Use of Audio and Visual Materials • Use of Real-Life Examples	• Workshops • Formative Exercises used to highlight concepts and notions • E-notes and E-exercises to read ahead of the pedagogic material.	• Engaging students to hold hands of slow learners by creating a Peer Tutoring Group • Design solutions for complex problems • Design solutions for complex problems • Presentation on topics beyond those covered in CHO

11. Evaluation Scheme & Components:

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 2	Sessional Test	03*	40%	Online
Component 3	End Term Examinations	01**	60%	Online
Total			**100%**	

  * Students will have to appear in all Sessional Tests.

    Makeup Examination will compensate for either ST-1 or ST-2 (Only for genuine cases, based on the Dean's approval).

  **As per Academic Guidelines, a minimum of 75% attendance is required to become eligible for appearing in the End Semester Examination.

12. Syllabus of the Course:

S.No.	Topic (s)	No. of Sessions	Weightage %
1	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints, Data Models, ER (Entity Relationship) Diagram, Functional Dependencies, Introduction of Normalization and its Importance, Data Redundancy, and Update Anomalies Lab 1 (Introduction to the software) Lab 2 (Installation of software for DBMS), Normal Forms (1NF, 2NF, 3NF & BCNF), De-Normalization, Introduction to SQL, SQL Commands, Datatypes, and DDL statements (create, alter, drop, and truncate) Implementing Constraints (primary key, foreign key, unique, not null, default, check) Lab 3 (Creating Tables, Alter the table and drop tables) Lab 4 (Appy constraints on the new or existing table), DML Statements (insert, update, delete), Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions Joins, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS	24	30%
	Sessional Test-1		
2	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints, Data Models, ER (Entity Relationship) Diagram, Functional Dependencies, Introduction of Normalization and its Importance, Data Redundancy, and Update Anomalies Lab 1 (Introduction to the software)	48	60%

	Lab 2 (Installation of software for DBMS), Normal Forms (1NF, 2NF, 3NF & BCNF), De-Normalization, Introduction to SQL, SQL Commands, Datatypes, and DDL statements (create, alter, drop, and truncate) Implementing Constraints (primary key, foreign key, unique, not null, default, check) Lab 3 (Creating Tables, Alter the table and drop tables) Lab 4 (Apply constraints on the new or existing table), DML Statements (insert, update, delete), Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions Joins, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS DCL statement Grant, Revoke, Group by clause, having clause Lab 5 (Perform DML operations on tables, select query to fetch records from tables) Lab 6 (Implement Aggregate Function, Nested & Correlated Queries), Views, Benefits of views, creating views, alter views and drop views, Joins (inner join, outer join, cross join, self-join), write complex queries using joins, Introduction to PL/SQL, Advantages of PL/SQL, The Generic PL/SQL Block (Anonymous blocks & Named blocks) Lab 7 (Write queries using views) Lab 8 (Write queries using joins), Variables, Data types, create an anonymous block with simple PL/SQL program, Control Structure in PL/SQL (if-else, switch case), Control Structure in PL/SQL (while loop, for loop) Lab 9 (Write a simple PL/SQL program using if-else statement)		
	Sessional Test -2 (ST1 syllabus also included)		
3	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints, Data Models, ER (Entity Relationship) Diagram, Functional Dependencies, Introduction of Normalization and its Importance, Data Redundancy, and Update Anomalies Lab 1 (Introduction to the software) Lab 2 (Installation of software for DBMS), Normal Forms (1NF, 2NF, 3NF & BCNF), De-Normalization, Introduction to SQL, SQL Commands, Datatypes, and DDL statements (create, alter, drop, and truncate) Implementing Constraints (primary key, foreign key, unique, not null, default, check) Lab 3 (Creating Tables, Alter the table and drop tables) Lab 4 (Apply constraints on the new or existing table), DML Statements (insert, update, delete), Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions Joins, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS DCL statement Grant, Revoke, Group by clause, having clause Lab 5 (Perform DML operations on tables, select query to fetch records from tables) Lab 6 (Implement Aggregate Function, Nested & Correlated Queries), Views, Benefits of views, creating views, alter views and drop views, Joins (inner join, outer join, cross join, self-join), write complex queries using joins, Introduction to PL/SQL, Advantages of PL/SQL, The Generic PL/SQL Block (Anonymous blocks & Named blocks) Lab 7 (Write queries using views) Lab 8 (Write queries using joins), Variables, Data types, create an anonymous block with simple PL/SQL program, Control Structure in PL/SQL (if-else, switch case), Control Structure in PL/SQL (while loop, for loop) Lab 9 (Write a simple PL/SQL program using if-else statement) Lab 10 (Write a PL/SQL program using for and while loop) Introduction to cursors, types of cursors, advantages and disadvantages of cursors, Introduction to procedure, creating procedure and calling procedure,	**64**	**80%**

	parameter modes, Introduction to Triggers, types of triggers, Syntax for Creating Triggers. Lab 11 (Create a procedure using cursor) Lab 12 (Perform operations using triggers) Introduction to package, advantages of creating packages, package specification and package body, Developing a package, Calling packages, bodiless		
Sessional Test-3 (ST1 and ST2 syllabus also include)			
4	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints, Data Models, ER (Entity Relationship) Diagram, Functional Dependencies, Introduction of Normalization and its Importance, Data Redundancy, and Update Anomalies Lab 1 (Introduction to the software) Lab 2 (Installation of software for DBMS), Normal Forms (1NF, 2NF, 3NF & BCNF), De-Normalization, Introduction to SQL, SQL Commands, Datatypes, and DDL statements (create, alter, drop, and truncate) Implementing Constraints (primary key, foreign key, unique, not null, default, check) Lab 3 (Creating Tables, Alter the table and drop tables) Lab 4 (Appy constraints on the new or existing table), DML Statements (insert, update, delete), Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions Joins, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS DCL statement Grant, Revoke, Group by clause, having clause Lab 5 (Perform DML operations on tables, select query to fetch records from tables) Lab 6 (Implement Aggregate Function, Nested & Correlated Queries), Views, Benefits of views, creating views, alter views and drop views, Joins (inner join, outer join, cross join, self-join), write complex queries using joins, Introduction to PL/SQL, Advantages of PL/SQL, The Generic PL/SQL Block (Anonymous blocks & Named blocks) Lab 7 (Write queries using views) Lab 8 (Write queries using joins), Variables, Data types, create an anonymous block with simple PL/SQL program, Control Structure in PL/SQL (if-else, switch case), Control Structure in PL/SQL (while loop, for loop) Lab 9 (Write a simple PL/SQL program using if-else statement) Lab 10 (Write a PL/SQL program using for and while loop) Introduction to cursors, types of cursors, advantages and disadvantages of cursors, Introduction to procedure, creating procedure and calling procedure, parameter modes, Introduction to Triggers, types of triggers, Syntax for Creating Triggers. Lab 11 (Create a procedure using cursor) Lab 12 (Perform operations using triggers) Introduction to package, advantages of creating packages, package specification and package body, Developing a package, Calling packages, bodiless Transaction: Introduction, TCL commands (commit, rollback, save point), ACID properties Lab 13 (Create package which have procedures and functions) Lab 14 (Create complex packages) Concurrent Transactions: Concurrency control, need for concurrency control, Locking Techniques, Database Recovery: Introduction, Need for Recovery, Types of Errors Recovery Techniques, Database security: introduction, threats, counter measures Lab 15 (Learn Locking Techniques) Lab 16 (Learn to recover database)	**80**	**100%**
End Term Examination (ETE-Complete Syllabus)			

This Document is approved by:

Designation	Name	Signature
Course Coordinator	Dr. Shikha	
Head-Academic Delivery	Dr. Mrinal Paliwal	
Dean	Dr. Rishu Chhabra	
Dean Academics	Dr. Monit Kapoor	
Date	26.06.2024	