A. Course Handout (Version 1.0) | Last updated on 01st July 2023

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

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 dependencies used in database design.
CLO04	To apply and relate the concept of transaction, concurrency control, data security and data 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

Student should be able:

	Course Outcome	POs	CL	KC	Sessions
CLO01	To provide a comprehensive foundation for designing and implementing database system by using RDBMS and analyze its need for real life applications.	PO2, PO3, PO11, PO12	K2	Factual Conceptual	**8**
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	**14**
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	**12**
CLO05	To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package.	PO1, PO2, PO3, PO10, PO11, PO12	K3	Conceptual Procedural	**12**
Total Contact Hours					**60**

Revised Bloom's Taxonomy Terminology

*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: Introduction to SQL by Oracle Press.

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

B06: Database Management System, Raghu Ramkrishnan, Johannes Gehrke, McGraw-hill, Third Edition.

5. Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	https://dl.acm.org/doi/pdf/10.5555/77708
2.	https://link.springer.com/chapter/10.1007/978-1-349-11552-5_1
3.	https://www.sciencedirect.com/science/article/pii/B9780934613538500091
4.	https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.444.3426&rep=rep1&type=pdf
5.	https://www.db-book.com/db7/
6.	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf
7.	https://community.oracle.com/mosc/discussion/2956726/pl-sql-programming-language-of-oracle-by-ivan-bayross
8.	https://nptel.ac.in/courses/106/106/106106093/
9.	https://dl.acm.org/doi/abs/10.1145/7239.7266

6. Recommended Tools and Platforms

Oracle 11g Express Edition

7. Course Plan:

Session No.	Topic(s)	Recommended Book / Other reading material	Total Sessions
1-4	**Introduction to Databases:** Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints	BO1 BO2 Link 6 Link 7	4
5-8	**Data Models:** Data Models, Relational Model, ER Model, ER Diagram, Relational Model	BO1 BO2 BO5	4
9-16	**Functional Dependencies and Normalization:** Functional Dependencies, Normalization: Functional Dependencies, Decomposition Full Functional Dependency (FFD), Transitive Dependency, Normal Forms: 1NF, 2NF Normal Forms: 3NF, BCNF, De-Normalization	BO1 BO2 BO5 Link 5 Link 6 Link 9	8
17-24	**SQL Queries:** DDL statements Create, Alter, Drop, 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	BO1 BO2 BO5	8
25-26	**Database Security:** Database Security: Introduction, Threats, Counter Measures	BO1 B06	2
27-36	**Control Structures:** Control Structures: Introduction To Conditional statement, Iterative Control Sequential Control Statements, Cursors, Views	BO3 BO4 Link 8	10

ST-I (Syllabus covered from 1-36 lectures)			
37-48	**Package, Procedures and Triggers:** Procedures, Parts of Procedures, Parameter Modes, Advantages of Procedures Triggers: Syntax for Creating Trigger Types Of Triggers Package, Package Specification and Package Body Developing A Package, Bodiless Package, Advantages	BO1 BO2 Link 8	12
49-54	**Transaction Management and Concurrency Control:** Transaction Management, Concurrency Control: Introduction To Transaction, Properties Of Transactions Serializability And Recoverability, Need For Concurrency Control, Locking Techniques	BO1 BO2 Link 7 Link 9	6
ST-2 (Syllabus covered from 37-54 lectures)			
55-60	**Database Recovery:** Database Recovery Of Database: Introduction, Need For Recovery, Types Of Errors Recovery Techniques	BO1 BO2 BO6 Link 6 Link 7	6
ETE (Syllabus covered from 1-60 lectures)			

8. Delivery/Instructional Resources

Lecture No.	Topics	Web References	Audio-Video
1-2	Introduction to Databases: Database Concepts, Characteristics of Data Base approach, Advantages and Disadvantages of DBMS.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106104135
3	Overview of Database Languages and Architectures:Data Independence, DBA and Responsibilities of DBA, Schemas, Instances, Schema architecture	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106106220
4	Data Base System Architecture (Two-tier, Three Level ANSI-SPARC Architecture)	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106105175
5-6	Data Models: Relational Model, ER Model: Design, issues, Mapping constraints, ER diagram, Comparison of Models.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106106220
7-8	Conceptual Data Modelling using Entities and Relationships: Database design process, Entity Types, Entity sets, Attributes, keys And their types, Weak entity types, ER diagrams, naming convention and design issues.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106106220 https://nptel.ac.in/courses/106106220

9-10	Functional dependencies, Decomposition, Full Functional Dependency (FFD), Transitive Dependency (TD)	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106106220
11-16	Normalization: Normal Forms (1NF, 2NF) Normal Forms (3NF, BCNF)	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106104135 https://nptel.ac.in/courses/106104135 https://nptel.ac.in/courses/106104135
17-24	Introduction to PL/SQL: Introduction to PL/SQL basic, environment, Data Types, Variables, operators.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://www.c-sharpcorner.com/article/plsql-for-beginners/
25-26	Database Security, Threats, Counter Measures.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://www.digimat.in/nptel/courses/video/106105175/L01.html
27-36	Control Structures: Introduction to conditional control, Iterative control and sequential control statements.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://www.c-sharpcorner.com/article/plsql-for-beginners/
37-40	Introduction to Functions and Cursors	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://www.c-sharpcorner.com/article/plsql-for-beginners/
41-48	Procedure, Packages and Triggers: Parts of procedures, Parameter modes, Advantages of procedures, package specification and package body, developing a package, Advantages of packages.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://www.c-sharpcorner.com/article/plsql-for-beginners/
49-51	Introduction to Triggers, advantages of triggers, Syntax for creating triggers, Types of triggers.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://freevideolectures.com/course/3684/oracle-11g-12c/40
52	Transaction Management: Introduction to Transaction Processing, Properties of Transactions, Sates of transactions, Schedule.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
53-54	Serializability, Conflict schedule, View Serializability and Recoverability	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106104135

55-56	Concurrency Control: Need for Concurrency Control, Locking Techniques, Time Stamping Methods.	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106106220 https://nptel.ac.in/courses/106104135
57-60	Database Recovery of database: Introduction, Need for Recovery, Types of errors, Recovery Techniques	https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link	https://nptel.ac.in/courses/106104135

9. Lab Plan

Sr. No.	Lab Number	Experiments	Learning Resource
1	1-2	Implementing DDL commands (CREATE, ALTER, DROP, RENAME) for TABLES.	https://www.db-book.com/db7/slides-dir/PDF-dir/ch3.pdf
2	3-4	Implementing DML Commands (DELETE, INSERT, SELECT, UPDATE, etc)-Queries.	https://www.educba.com/sql-dml-commands/
3	5-6	Implementation of different types of operators in SQL • Arithmetic Operators • Logical Operators • Comparison Operator • Special Operator • Set Operation	https://www.w3schools.com/sql/sql_operators.asp https://www.edureka.co/blog/sql-operators/
4	7-8	Study and Implementation of • Group By & having clause • Order by clause	ps://www.dummies.com/article/technology/programming-web-design/sql/how-to-use-group-by-having-and-order-by-sql-clauses-160800/
5	9-10	Implementation of Nested Queries and Correlated queries	https://www.w3resource.com/sql-exercises/sql-subqueries-exercises.php
6	11-12	Study & Implementation of Database Backup & Recovery commands. Study & Implementation of Rollback, Commit, Savepoint.	https://www.studytonight.com/dbms/tcl-command.php
7	13-14	Creating Database /Table Space • Managing Users: Create User, Delete User • Managing roles:- Grant, Revoke.	https://www.sqlshack.com/grant-with-grant-revoke-and-deny-statements-in-sql-server-and-azure-sql-database/
8	15-16	Introduction and implementation of programs using control structures and Loops: If-else statements and case statement. For, while, Do-while.	https://docs.oracle.com/cd/B19306_01/appdev.102/b14261/controlstructures.htm

9	17-18	Introduction and implementation of programs using Cursors.	https://docs.oracle.com/cd/B14117_01/appdev.101/b10807/13_elems013.htm
10	19-20	Creating Procedures and Functions in PL/SQL	https://docs.oracle.com/cd/B10501_01/win.920/a97251/ch3.htm
11	21-22	Introduction and implementation of programs of Packages.	https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch14.htm
12	23-24	Introduction and implementation of programs of Triggers.	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf
13	25-26	Introduction to PL/SQL Concepts, its features and implementation of DML Statements like INSERT, UPDATE & DELETE on database tables using PL/SQL	http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf

10. Action plan for different types of learners

Slow Learners	Average Learners	Advanced Learners
• Remedial Class for slow learners. • Encouragement for improvement using peer tutoring. • Individual feedback to each slow learner.	• Doubt Class for average learners • Special Doubt session will be arranged for ST topics. • Doubts of individual student will be resolved.	• Academic Courses would be provided to fast learner. .

11. Evaluation Scheme & Components:

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 1	Sessional Tests (STs)	02*	40%	Online
Component 2	End Term Examination	01**	60%	Online
Total		**100%**		

* Out of 02 STs, the ERP system automatically picks the best 01 ST.

**As per Academic Guidelines minimum 85% attendance is required to become eligible for appearing in the End Semester Examination.

12. Syllabus of the Course:

SNo.	Topic	No. of Lectures	Weightage %
	Overview of Database, Database Management System (DBMS) DBMS Architecture, Data Independence, Integrity Constraints	4	13.4%

1	Data Models, Relational Model, ER Model ER Diagram, Relational Model	4	
2	Functional Dependencies, Normalization: Functional Dependencies, Decomposition Full Functional Dependency (FFD), Transitive Dependency, Normal Forms: 1NF, 2NF Normal Forms: 3NF, BCNF, De-Normalization	8	26.6%
	DDL statements Create, Alter, Drop, 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	8	
3	Database Security: Introduction, Threats, Counter Measures	2	20%
	Control Structures: Control Structures: Introduction to Conditional statement, Iterative Control Sequential Control Statements, Cursors, Views	10	
4	Package, Procedures and Triggers Procedures, Parts of Procedures, Parameter Modes, Advantages Of Procedures Triggers: Syntax for Creating Triggers, Types of Triggers, Package, Package Specification And Package Body, Developing A Package, Bodiless Package, Advantages	12	20%
5	Transaction Management and Concurrency Control: Transaction Management, Concurrency Control: Introduction to Transaction, Properties Of Transactions Serializability And Recoverability, Need For Concurrency Control, Locking Techniques	6	10%
6	Database Recovery: Database Recovery of Database: Introduction, Need for Recovery, Types Of Errors Recovery Techniques	6	10%

This Document is approved by:

Designation	**Name**	**Signature**
Course Coordinator	Dr. Ravneet Kaur	
Head-Academic Delivery	Dr. Vikas Khullar/ Dr Tanya Gera	
Dean	Dr. Rishu Chhabra	
Date (DD/MM/YYYY)	01/07/2023	