

## A. Course Handout (Version 1.0) | Last updated on 01<sup>st</sup> 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	3 <sup>rd</sup> /2023
L-T-P (Per Week)	3-0-2	Course Credits	04
Course Coordinator	Dr. Gaganpreet Kaur		

### 1. Scope & 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 RDBMS and analyse 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
<b>CLO01</b>	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	<b>8</b>
<b>CLO02</b>	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	<b>14</b>
<b>CLO03</b>	To recognize and identify the use of normalization and functional dependency used in database design.	PO1,PO2,PO3,PO12	K3	Conceptual Procedural	<b>14</b>
<b>CLO04</b>	To apply and relate the concept of transaction, concurrency control, security and recovery in database.	PO3,PO5,PO12	K3	Conceptual Procedural	<b>12</b>
<b>CLO05</b>	To provide knowledge about the concepts of sequence, triggers, cursor, function, procedure, package.	PO1,PO2,PO3,PO10,PO11,PO12	K3	Conceptual Procedural	<b>12</b>

<b>Total Contact Hours</b>	<b>60</b>
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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.	<a href="https://dl.acm.org/doi/pdf/10.5555/77708">https://dl.acm.org/doi/pdf/10.5555/77708</a>
2.	<a href="https://link.springer.com/chapter/10.1007/978-1-349-11552-5_1">https://link.springer.com/chapter/10.1007/978-1-349-11552-5_1</a>
3.	<a href="https://www.sciencedirect.com/science/article/pii/B9780934613538500091">https://www.sciencedirect.com/science/article/pii/B9780934613538500091</a>
4.	<a href="https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.444.3426&amp;rep=rep1&amp;type=pdf">https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.444.3426&amp;rep=rep1&amp;type=pdf</a>
5.	<a href="https://www.db-book.com/db7/">https://www.db-book.com/db7/</a>
6.	<a href="http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf">http://index-of.es/Rdbms/McGraw.Hill.Osborne.Media.Oracle.Database.11g.The.Complete.Reference.Dec.2008.eBook-DDU.pdf</a>
7.	<a href="https://community.oracle.com/mosc/discussion/2956726/pl-sql-programming-language-of-oracle-by-ivan-bayross">https://community.oracle.com/mosc/discussion/2956726/pl-sql-programming-language-of-oracle-by-ivan-bayross</a>
8.	<a href="https://nptel.ac.in/courses/106/106/106106093/">https://nptel.ac.in/courses/106/106/106106093/</a>
9.	<a href="https://dl.acm.org/doi/abs/10.1145/7239.7266">https://dl.acm.org/doi/abs/10.1145/7239.7266</a>

## 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	<b>Introduction to Databases:</b> Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints	BO1 BO2 Link 6 Link 7	4
5-8	<b>Data Models:</b> Data Models, Relational Model, ER Model, ER Diagram, Relational Model	BO1 BO2 BO5	4
9-16	<b>Functional Dependencies and Normalization:</b> 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	<b>SQL Queries:</b> 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	<b>Database Security:</b> Database Security: Introduction, Threats, Counter Measures	BO1 BO6	2
27-36	<b>Control Structures:</b> 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	<b>Package, Procedures and Triggers:</b> 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	BO1 BO2 Link 8	12
49-54	<b>Transaction Management and Concurrency Control:</b> 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-I (Syllabus covered from 37-54 lectures)			
55-60	<b>Database Recovery:</b> 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.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a>
3	Overview of Database Languages and Architectures: Data Independence, DBA and Responsibilities of DBA, Schemas, Instances, Schema architecture	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106106220">https://nptel.ac.in/course/s/106106220</a>
4	Data Base System Architecture (Two-tier, Three Level ANSI-SPARC Architecture)	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106105175">https://nptel.ac.in/course/s/106105175</a>
5-6	Data Models: Relational Model, ER Model: Design, issues, Mapping constraints, ER diagram, Comparison of Models.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMpcOTuX3WRAFv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106106220">https://nptel.ac.in/course/s/106106220</a>

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.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106106220">https://nptel.ac.in/course/s/106106220</a>  <a href="https://nptel.ac.in/course/s/106106220">https://nptel.ac.in/course/s/106106220</a>
9-10	Functional dependencies, Decomposition, Full Functional Dependency (FFD), Transitive Dependency (TD)	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106106220">https://nptel.ac.in/course/s/106106220</a>
11-16	Normalization: Normal Forms (1NF, 2NF) Normal Forms (3NF, BCNF)	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a>  <a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a> <a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a>
17-24	Introduction to PL/SQL: Introduction to PL/SQL basic, environment, Data Types, Variables, operators.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://www.c-sharpcorner.com/article/plsql-for-beginners/">https://www.c-sharpcorner.com/article/plsql-for-beginners/</a>
25-26	Database Security, Threats, Counter Measures.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://www.digimat.in/nptel/courses/video/106105175/L01.html">https://www.digimat.in/nptel/courses/video/106105175/L01.html</a>
27-36	Control Structures: Introduction to conditional control, Iterative control and sequential control statements.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://www.c-sharpcorner.com/article/plsql-for-beginners/">https://www.c-sharpcorner.com/article/plsql-for-beginners/</a>
37-40	Introduction to Functions and Cursors	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://www.c-sharpcorner.com/article/plsql-for-beginners/">https://www.c-sharpcorner.com/article/plsql-for-beginners/</a>
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.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://www.c-sharpcorner.com/article/plsql-for-beginners/">https://www.c-sharpcorner.com/article/plsql-for-beginners/</a>
49-51	Introduction to Triggers, advantages of triggers, Syntax for creating triggers, Types of triggers.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://freevideolectures.com/course/3684/oracle-11g-12c/40">https://freevideolectures.com/course/3684/oracle-11g-12c/40</a>
52	Transaction Management: Introduction to Transaction Processing, Properties of Transactions, Sates of transactions, Schedule.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://onlinecourses.nptel.ac.in/noc21_cs04/preview">https://onlinecourses.nptel.ac.in/noc21_cs04/preview</a>

53-54	Serializability, Conflict schedule, View Serializability and Recoverability	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a>
55-56	Concurrency Control: Need for Concurrency Control, Locking Techniques, Time Stamping Methods.	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106106220">https://nptel.ac.in/course/s/106106220</a> <a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a>
57-60	Database Recovery of database: Introduction, Need for Recovery, Types of errors, Recovery Techniques	<a href="https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link">https://drive.google.com/drive/folders/15AHZkkEkPkMp cOTuX3WRAfv2twAa-A_b?usp=drive_link</a>	<a href="https://nptel.ac.in/course/s/106104135">https://nptel.ac.in/course/s/106104135</a>

## 9. Action plan for different types of learners

Slow Learners	Average Learners	Advanced Learners
<ul style="list-style-type: none"> <li>Remedial Class for slow learners.</li> <li>Encouragement for improvement using peer tutoring.</li> <li>Individual feedback to each slow learner.</li> </ul>	<ul style="list-style-type: none"> <li>Doubt Class for average learners</li> <li>Special Doubt session will be arranged for ST topics.</li> <li>Doubts of individual student will be resolved.</li> </ul>	<ul style="list-style-type: none"> <li>Academic Courses would be provided to fast learner.</li> </ul>

## 10. 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
<b>Total</b>		<b>100%</b>		

\* 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.

## 11. Syllabus of the Course:

SNo.	Topic	No. of Lectures	Weightage %
1	Overview of Database, Database Management System (DBMS) DBMS Architecture, Data Independence, Integrity Constraints	4	13.4%
	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,	8	

	Compound WHERE Clause with multiple AND & OR Conditions, Joins, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS, DCL statement Grant, Revoke		
<b>3</b>	Database Security: Introduction, Threats, Counter Measures	2	20%
	Control Structures: Control Structures: Introduction To Conditional statement, Iterative Control Sequential Control Statements, Cursors, Views	10	
<b>4</b>	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%
<b>5</b>	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%
<b>6</b>	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
<b>Course Coordinator</b>	Dr. Gaganpreet Kaur	
<b>Dean</b>	Dr. Raj Gaurang Tiwari	
<b>Date (DD/MM/YYYY)</b>	01/07/2023	