

COURSE TITLE	ADVANCED DATABASE
COURSE CODE	01CT0725
COURSE CREDITS	4

Objective:

- 1 The objective of this course is to provide the understanding of advanced concepts of database management system and its applications. Students will be able to create advance data mode and learn to optimize the query language.
- 2 The objective of this course is giving the understanding the advanced concepts of database management system and its applications, data modelling, database design, and query languages and query optimizations.

Course Outcomes: After completion of this course, student will be able to:

- 1 Understand the application of different data modelling methods in requirement analysis, design, and implementation of database system.
- 2 Explain the working and application of PL/SQL, Trigger and Procedures.
- 3 Apply the normal forms for efficient designing of relational database.
- 4 Use appropriate storage and access structures.
- 5 Use techniques for transaction management, concurrency control, and recovery.

Pre-requisite of course:Basic knowledge of database management, SQL, Normalization and Concurrency Control.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	RDBMS Entity –Relationship model – Relational Model , Relational constraints- Relational algebra, Tuples and Domain Relational calculus, Database Administrator, Introduction to SQL, Data Definition Language, Data Manipulation Language, Data Control Language, Queries, Join, Functions, Operators, Invoking SQL *Plus, Commit, Rollback, Normal forms, ER Diagram, mapping.	8
2	PL/SQL Introduction to PL/SQL, Control Statements, View, Indexes, Sequences, PL/SQL, Cursor, Database Trigger, Function, Procedure	6

Contents : Unit	Topics	Contact Hours
3	Query Optimization Query processing and optimization, Transactions-Properties of Transactions-Concurrency Control, , Recovery, Security and Authorization, Storage-Indexing and Hashing, B+ Trees, Trees-X Trees, Dynamic Hashing. Distributed Databases-Principles , Design-Queries Translation of queries optimization Access Strategies, , Management of Distributed Transactions actions-concurrency Control-Reliability.	8
4	Database System Architecture Centralized and Client-Server Systems, Parallel Databases, Distributed Databases, , Heterogeneous and Homogeneous Databases, Concurrency Control in Distributed Databases, Distributed Query Processing.	6
5	Object Oriented Concepts Data Object Models, Object Based Databases –Object Oriented Databases, Relational Databases, Object Definition Languages, Object Query Languages-SQL3, Concurrency in OODBs, Storage and Access , Data Access.	8
6	Databases Tools MongoDB, Improvado, Microsoft SQL Server, Postgre SQL, Oracle RDBMS, IBM DB2.	6
Total Hours		42

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment-1 Write a program to implement all DDL queries.	2
2	Experiment-2 Write a program to implement all DML queries.	2
3	Experiment-3 Write a program to implement all DCL queries.	2
4	Experiment-4 Write a program to implement all constraints.	2
5	Experiment-5 Write a program to implement all aggregate functions.	2
6	Experiment-6 Write a program to implement all inbuilt functions of SQL.	2
7	Experiment-7 Write a program to implement Triggers in SQL.	2
8	Experiment-8 Write a program to implement Procedures in SQL	2
9	Experiment-9 Write a program to implement View in SQL	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
10	Experiment-10 Write a program to implement database connectivity in various database softwares.	2
11	Experiment-11 Write a program to create database in various database softwares like MongoDB, PostgreSQL etc.	2
12	Experiment-12 Write a program to implement Nested Queries.	2
13	Experiment-13 Write a program to implement PL/SQL Block structure.	2
14	Experiment-14 Create Extended Entity Relationship diagram	2
15	Experiment-15 Write a program to implement Cursors	2
Total Hours		30

Textbook :

- 1 Modern Database Management, Fred R. McFadden, Jeffery A. Hoffer, Mary B, Wesley, 2000
- 2 Fundamentals Of Database Systems, Elmasri, Navathe, Wesley, 2000
- 3 Database System Concepts , Abraham Silberchartz, Henry F. Korth, S. Sudarshan, McGraw-Hill, 2020

References:

- 1 A First Course in Database Systems, A First Course in Database Systems, Jefry D. Ullman , Jenifer Widom , Pearson Education Asia, 2001
- 2 Distributed Databases Principles & Systems, Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, , McGraw-Hill , 1985
- 3 Object Oriented Interfaces & Databases, Object Oriented Interfaces & Databases, Rajesh Narang, Prentice Hall Of India, 2002

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	30.00	15.00	15.00	10.00

Instructional Method:

- 1 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 2 Practical examination will be conducted at the end of the semester for evaluation of performance of students in laboratory
- 3 Students may use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory, etc

Supplementary Resources:

- 1 <https://www.coursera.org/specializations/oracle-sql-databases>
- 2 <https://nptel.ac.in/courses/106105175>
- 3 <https://www.udemy.com/course/mysql-bootcamp/>