

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
LOK NAYAK JAI PRAKASH INSTITUTE OF TECHNOLOGY, CHAPRA
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
LECTURE PLAN, ACADEMIC SESSION 2020-21 (ODD)
DATABASE SYSTEMS (CS 1509)

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Name of the Subject Allotted: Database Systems (CS 1509)

Academic Session / Semester: 2020-21 / 5th semester

Branch / Year: CSE/ THIRD YEAR

Course Description: Database management system has evolved from a specialized computer application to a central component of a modern computing environment, and, as result, knowledge about database systems has become an essential part of an education in computer science.” The fundamental concepts of database management include aspects of database design, database languages and database system implementation.

Course Objective:

The objectives of this course are:

- To provide a good understanding of the principles and practices of database management system.
- To provide an opportunity to apply the concepts of the various techniques and methods for database management system.
- To understand the different issues involved in the design and implementation of a database system.
- To develop an understanding of essential DBMS concepts such as: transaction processing, integrity, concurrency, and recovery in databases.

Course Outcomes:

Upon completing the course, the student will able to:

- Understand the basics of data base and database design.
- State various types of DBMS, query and transaction concept.
- Demonstrate an understanding of the relational data model.
- Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
- Formulate, using SQL & relational algebra, solutions to a broad range of query problems.

Course Plan (Tentative):

Lecture No.	Topics to be Covered
<i>Unit I – Introduction & Data Modeling using Entity Relationship Model</i>	

1	Basic Concepts and Conceptual Database Design, Characteristics of DBMS
2	File System Vs DBMS, Role of DBA
3	Database System concept and architecture
4	Data model, Schema and Instances, Data independence
5	Database language and interfaces, DDL & DML
6	Database Structure and its components
7	ER model concepts, notation for ER diagram, Mapping constraints
8	Keys, Concepts of Super Key, Candidate key, Primary key, Foreign Key
9	Candidate key, Primary key, Foreign Key Examples
10	Extended ER model- Generalization, Aggregation
11	Reduction of an ER diagrams to tables, Relationship of higher degree
<i>UNIT-II: Relational Data Model and SQL</i>	
12	Relational data model concepts, integrity constraints, entity integrity
13	Referential integrity, Keys constraints, Domain constraints
14	Relational algebra, Relational calculus, Tuple and Domain calculus
15	Characteristics of SQL, advantage of SQL. SQL data type and literals
16	Types of SQL commands. SQL operators and their procedure
17	Tables, Views and Indexes, Queries and sub queries
18	Queries and sub queries Examples
19	Aggregate functions, Insert, Update and Delete operations
20	Joins, Unions, Intersection, Minus, Cursors
21	Triggers, Procedures in SQL/PL SQL
<i>UNIT-III: Data Base Design & Normalization</i>	
22	Informal Design Guidelines for Relation Schemas
23	Functional dependencies, Normal forms, 1NF
24	Keys & Attributes participating in Keys
25	1NF ,2NF,
26	3NF, BCNF
27	Inclusion dependence, Loss less join decompositions
28	Loss less join decompositions
29	Normalization using FD

30	Normalization using FD
31	MVD, and JDs
<i>UNIT-IV: Transaction Processing Concept & Distributed Database</i>	
32	Introduction of Transaction system, ACID Properties
33	Testing of Serializability, Serializability of schedules
34	Conflict & View Serializable schedule
35	Recoverability, Recovery from transaction failures
36	Log based recovery, Checkpoints
37	Deadlock handling
38	Distributed data storage
39	Concurrency control, Directory system
<i>UNIT-V: Concurrency Control Techniques</i>	
40	Concurrency control, Locking Techniques for concurrency control
41	Time stamping protocols for concurrency control
42	Validation based protocol
43	Multiple granularity
44	Multi version schemes
45	Recovery with concurrent transaction
46	Case study of Oracle.

Students Performance Evaluation Scheme:

- **External Semester Examination : 70 Marks**
- **Internal Performance Assessment : 30 Marks**
 - 2 Sessional Tests : 20 marks
 - Attendance + Assessment : 10 marks

(Based on Assignments, Seminars, Group Discussions & Class Participation)

Readings:

I. Texts:

T1: Korth, Silberschatz, "Database System Concepts", 5th Ed., TMH, 2006.

T2: Elmsari and Navathe, "Fundamentals of Database Systems", 5th Ed., Pearson Edu., 2009.

II. References:

R1: Date C.J., "An Introduction to Database Systems" Ed. Addison-Wesley, 2000.

R2: Bipin C. Desai, "An Introduction to Database Systems", Gagotia Publications.

III. Websites:

- <http://www.w3schools.com/sql/default.asp>
- http://en.wikipedia.org/wiki/Database_normalization
- <http://www.sql-tutorial.net>