

GUJARAT TECHNOLOGICAL UNIVERSITY

INFORMATION TECHNOLOGY (23)

DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE: 2722318

SEMESTER: II

Type of course: Master of Engineering

Prerequisite:

- Fundamental knowledge about computers, operating system.
- Knowledge about programming language, corresponding to basic course on programming language.
- Knowledge about data, information, flowchart, algorithm.

Rationale:

A database management system (DBMS) is about managing and structuring the collections a large body of information. Purpose of a database system is to provide users with an abstract view of the data. Thereby, data can be stored in complex data structures that permit efficient retrieval, yet users see a simplified and easy-to-use view of the data. The lowest level of abstraction, the physical level, describes how the data are actually stored and details the data structures. The next-higher level of abstraction, the logical level, describes what data are stored, and what relationships exist among those data. The highest level of abstraction, the view level, describes parts of the database that are relevant to each user; application programs used to access a database form part of the view level.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2#	0	4	70	30	30	0	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	An overview of Database Management: Introduction and application of DBMS, Purpose of Database system, Data Independence, Database architecture, Mappings, Database users and Administrators.	2	5
2	Relational Databases: Structure, Database Schema, Keys, Relational Algebra operations, Queries in Relational Algebra	3	10
3	Database Design: Design Process, E-R Model, Design Constraints, E-R Diagram, Design Issues, Weak Entity Set, Extended E-R Features	4	10
4	Relational Database design:	5	15

	Functional Dependency, Closure of a Set of Dependency, Closure of a Set of Attributes, Irreducible set of Dependency, Normalization , Dependency Preservation.		
5	Transaction Management: Introduction to Transaction, Properties of Transaction, Recovery, 2 Phase Commit Protocol, Savepoints, Concurrency Problems, Locking, Deadlock, Serializability, 2 Phase Locking Protocol, Intent Locking	10	15
6	Query Processing and Optimization: Overview, Measures of Query Cost, Selection operation, Sorting, Join Operation, Evaluation of Expressions, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Evaluation plans, materialized views	4	20
7	Security: Introduction, Discretionary access control, Mandatory Access Control, Multi-level Security, Data Encryption	02	5
8	SQL Concepts : Introduction to SQL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All, view and its types.	12	20

Reference Books:

1. An introduction to Database Systems, C J Date, Addition-Wesley.
2. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill.
3. SQL- PL/SQL by Ivan bayross
4. Oracle – The complete reference – TMH /oracle press
5. Understanding SQL by Martin Gruber, BPB

Course Outcome:

Upon the successful completion of this course, students should be able to:

1. Evaluate business information problem and find the requirements of a problem in terms of data.
2. Describe fundamental elements of a relational database management system
3. Design entity-relationship diagrams to represent simple database application scenarios
4. Convert entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data
5. Develop professional attitude towards the development of database application.

List of Experiments:

1. To study following DDL and DML commands and create database.
 - a. Create
 - b. Select
 - c. Insert
 - d. Delete
 - e. Update

- f. Drop
 - g. Truncate, etc.
2. To perform queries using where clause, sorting, searching, pattern matching (LIKE predicate).
 3. To perform queries using aggregate functions (avg, count, max, min, sum), group by clause.
 4. To perform queries using single row functions (numeric, date, character functions)
 5. To perform queries using sub-queries.
 6. To perform queries using various types of joins (inner-join, outer join, cross join, self-join)
 7. To perform queries using various set operators (union, intersection, set0difference)
 8. To perform queries using various types of joins (inner-join, outer join, cross join, self-join)
 9. To perform queries using table level constraints, alter table.
 10. To study Transaction control commands.

Open Ended Problem:

- Develop an Online leave management system, Leave Management process includes defining the leave types, assigning entitlements and calculating carry over leaves, employees applying for leaves, managers approving or rejecting the leave requests, importing the leave data into payroll for calculations etc.
- Develop a Library management system, where indexing of book according to the author or alphabetical order can be done. Issuing of books to the student can be managed and searching of books.
- Develop Inventory control and procurements for school management systems. School does have regular purchase of chalk box, chairs, benches etc.

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.