

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTERS IN COMPUTER APPLICATION (Integrated MCA)

Year – I (Semester – II) (W.E.F. JAN 2014)

Subject Name: Fundamentals of Database Management Systems (DBMS)

Subject Code: (4420603)

Learning Objectives:

This course is intended to give students basic fundamental knowledge about RDBMS. This will give conceptual insight about how database design and implementation takes place. Also, gives insight about relational operations and use of databases.

Pre-requisites: Basic knowledge of working with computers

Contents: [] indicates # of lectures

Sr. No.	Course Content	No. of Sessions
1	Introduction to Database System Data, Information, Data Management, File-based Data Management, database, Database Systems, Organization of a Database, Characteristics of Data in a Database, DBMS, Benefits of DBMS, Functions of DBMS, Components of DBMS, Data dictionary, Database Users, Database Architecture, Data abstraction, ANSI/SPARC Architecture, Logical and Physical data independence, Database languages, Database Design, Database constraints	[8 Lectures]
2	Data Models Conceptual, Physical and Logical Database Models, Database relationships, Hierarchical model, Network Model, Relational Model, E-R model	[2 Lectures]
3	Entity Relationship Modeling E-R Model, Components of an E-R Model, E-R conventions, Relationships, Composite entities, Entity list, E-R diagrams, E-R Modeling symbols, Super class, subclass entity types, attribute inheritance, specialization, generalization, specialization/generalization constraints, categorization	[12 Lectures]

	<u>E-R Diagram exercise:</u> Payroll Management System, Library Management System, Railway Reservation System, Hospital Management System, Student Management System	
4	Relational Database Design RDBMS terminology, Relational Data structure, Relational data manipulation, Codd's rules, Integrity constraints, Pitfalls of Relational database design, decomposition, functional dependencies, Normalization, Keys, Relationships, First Normal Form(1NF), Second Normal form(2NF), Third normal Form(3NF), Boyce-Codd Normal Form (BCNF), Fourth Normal Form (4NF), Fifth Normal Form (5NF), Lossless join dependency, Domain-Key Normal Form (DCNF), Denormalization	[10 Lectures]
5	Relational Algebra and Calculus Relational Algebra operations, aggregate functions, Update operations, Types of relational calculus, Domain relational calculus	[12 Lectures]
6	Group Projects a) Study of Contemporary Databases Each group should collectively identify most popular RDBMS (like ORACLE, MYSQL, etc.) and Prepare presentation of 10-15 minutes for class covering the following key topics: • Introduction of RDBMS • History • Key Features • Key Benefits / Advantages • Comparison of it with other (Key challenges) b) Database Design Projects Each group should collectively identifies area or system and to the extent perform database design. The key tasks are • To identify a business problem (Application) • Build Database design (using normalization) • Implements database design (Keys, Tables, Relationships) • List relational operations Prepare a 10-15 minute presentation for the last class meeting	[4 Lectures]

Main Reference Book:

Alexis Leon, Mathews Leon, “Essentials of Database Management Systems” (Second reprint 2009), Tata McGraw Hill Publication

Suggested Additional Reading:

1. C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems” 8th Edition (2006), Pearson Education
2. Ramakrishnan, Gehrke, “Database Management Systems” 3rd Edition, McGraw Hill
3. Peter Rob, Carlos Coronel, “Database Systems: Design, Implementation and Management”, 7th Edition (2007), Cengage Learning
4. S. K. Singh, “Database Systems: Concepts, Design and Applications”, Pearson Education
5. Silberschatz, Korth, Sudarshan, “Database System Concepts” 5th Edition, McGraw Hill

Chapter wise Coverage from the Text Book:

Unit	Topics
1	Chapter 1 & 2
2	Chapter 3 (Except 3.8,3.9,3.10)
3	Chapter 4 & 5
4	Chapter 6,7 & 8
5	Chapter 9 & 10

Major Tools for Lab Exercise (Suggestive):

1. My SQL Database
2. ORACLE Database
3. MS VISIO