

<b>Course Code</b>	<b>040110103</b>			
<b>Category</b>	<b>Core Subject</b>			
<b>Course Title</b>	<b>Relational Database Management System (RDBMS)</b>			
<b>Scheme and Credits</b>	<b>Theory</b>	<b>Tutorial</b>	<b>Lab</b>	<b>Credits</b>
	<b>3</b>	<b>1</b>	<b>4</b>	<b>6</b>
<b>Pre-requisites (if any)</b>	Basic knowledge of data storing and retrieving mechanism in computer and types of software and applications using different types of data to be stored and retrieve as per the need. Proficiency in any programming language. The course teaching language is English, so students have to have communication, reading and apprehension skills of English.			

**1. Course Objective:**

1	To understand the fundamental concepts of Database Management Systems and working knowledge about RDBMS
2	To learn the concepts necessary for designing, using and implementing database management systems and applications
3	To learn ER- Diagram, a pictorial representation for creating a good database.
4	To learn the Structured Query Language - DDL, DML and DCL.
5	To be able to understand the concepts of PL/SQL

**2. Course contents:**

<b>Unit</b>	<b>Course Content</b>	<b>Weightage</b>
<b>Unit I</b>	<b>Introduction to Database System</b>  Data, Information, File-based Data Management, Differentiate between Database and Database Management System Characteristics of Data in a Database, Data dictionary  <b>Database:</b> Users, Data Models, Data abstraction, ANSI/SPARC Architecture, Logical and Physical data independence, Database Languages and interface  <b>DBMS:</b> Functions of DBMS, Components of DBMS, Examples of	<b>10%</b>

	<p>DBMS, Classifications of Database Management Systems – Relational and Non-Relational Database</p> <p><b>RDBMS:</b> Benefits of using RDBMS, Elements of RDBMS, Difference between DBMS and RDBMS, Example and comparison of RDBMS</p>	
<b>UnitII</b>	<p><b>Entity Relationship Modelling</b></p> <p><b>Components of an E-R Model:</b> Entity, Entity Sets, Attributes and keys – Super Key, Primary Key, Candidate Key, Alternate Key, Relationship Types, Composite entities, Weak entity, Subclass, Super class with Attribute inheritance, Generalization and Specialization.</p> <p>Relational Database design by ER and EER to Relational Mapping, Mapping EER model construct to Relations</p> <p><b>Examples for ER Diagram:</b> College Management System, Project Management System, Railway Reservation System, Hospital Management System, Library Management System, e-Business Management System (can take any eBusiness example like online shopping, online food ordering etc....)</p>	<b>10%</b>
<b>UnitIII</b>	<p><b>Relational Database Design</b></p> <p>Design process steps for Relational Schema, Codd's Rules, Database Relationships and Constraints – Primary Key, Foreign Key, Null, Not Null, Unique</p> <p><b>Design Guidelines for Relational Schema:</b> Database design anomalies, Functional Dependencies, Normalization process – understanding Normal Forms based on Primary keys and converting database tables to 1NF, 2NF and 3NF, General Definitions with one example for Boyce-Codd Normal Forms (BCNF), Multi-valued Dependency, Joint Dependency (loss-less join)</p>	<b>20%</b>
<b>UnitIV</b>	<p><b>Structured Query Language (SQL)</b></p> <p>Introduction to SQL, features of SQL, Rules for SQL, SQL Components (DDL, DML, DCL), Data Types, Data Constraints</p> <p><b>Basic queries of SQL:</b> Creating table, inserting table data, Viewing Table data (All, rows and all columns, Selected columns and all rows, Selected columns and selected rows), Sorting data in a table, creating table from another table, deleting data (All rows, Specific rows), Updating data (All rows and conditionally), Renaming tables, truncating table, drop tables, Creating and dropping synonym. View and its types.</p> <p><b>Advanced queries of SQL:</b> Group by and Having Clause, Joins – Equi join, non equi join, left outer join, right outer join, Sub Query, IN</p>	<b>40%</b>

	Operator, Exist and Not Exist Operator, Set Operators: Union, Intersect and Minus, Indexing	
<b>UnitV</b>	<b>Database transactions and PLSQL</b>  <b>Transaction Concepts:</b> Introducing Transactions - Processing a transaction and State of transaction, ACID property of a transaction, Characterizing Schedules based on recoverability and Serializability  <b>Introduction to PLSQL:</b> Generic PLSQL Block, Execution Environment, PLSQL Character Set and Data Types, Anonymous and named PLSQL block, Control Structures. Transaction control commands – Commit, Rollback, Savepoint  <b>PLSQL Transactions:</b> Understanding Cursor, Cursor FOR loops, Parameterized Cursor, Cursor within Cursor, Creating Procedure with IN, OUT and INOUT parameters, Creating Functions, Triggers	<b>20%</b>

**Desirable:**
**2. Text Books:**

- a. C. J. Date, A. Kannan, S. Swaminathan – “An Introduction to Database Systems”, Pearson Edition, 8th Edition
- b. Ramez Elmasari and Shamkant B. Navathe – “Fundamentals of Database Systems”, Pearson Edition, 7th Edition
- c. S.K. Singh – “Database Systems – Concepts, Design and Applications”, Pearson Edition
- d. Abraham Silberschatz, Henry F. Korth and S. Sudarshan – “Database System Concepts”, McGraw Hill International Edition, 5th Edition
- e. Ivan Byross – “SQL PL/SQL The Programming Language of Oracle”, BPB Publications
- f. Ms. Anjali Jivani and Ms. Amisha Shingala – “Practice book on SQL and PL/SQL with examples”, Nirav and Roopal Publications, Third Edition.

**4. Webilography :**

1. <https://docs.oracle.com>
2. <https://www.tutorialspoint.com>
3. <https://www.educba.com/>

**5. Accomplishment of the student after completing the course:**

After completion of the course students should become capable of designing a relational database needed for any software development. They can write structured queries, procedures and triggers for retrieving data and generating reports in any software system.