

<b>Programme : Diploma in Electronics Engineering (Sandwich Pattern)</b>													
<b>Course Code:</b>			<b>Course Title: Database Management Systems</b>										
<b>Compulsory / Optional: Compulsory</b>													
<b>Teaching Scheme and Credits</b>						<b>Examination Scheme</b>							
<b>CL</b>	<b>TL</b>	<b>LL</b>	<b>SLH</b>	<b>NLH</b>	<b>Credits</b>	<b>FA-TH</b>	<b>SA-TH (3Hrs.)</b>	<b>FA-PR</b>	<b>SA</b>		<b>SLA</b>	<b>Total</b>	
3	-	4				20	20	60	25	50#	-	25	200

**Total IKS Hrs. for course:**

**Abbreviations:** CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH- Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

**Legends:** @ Internal Assessment, # External Assessment, \*# On Line Examination, @\\$ Internal Online Examination

#### **Note:**

1. FA-TH represents an average of two class tests of 30 marks each conducted during the term.
2. SA-TH represents the end term examination.

#### **I. Rationale**

Database management system creates, stores, manages a large amount of data which can be used by different software application. In comparison to file processing systems, use of this system increases efficiency of business operations and reduces overall costs. For Developing and managing efficient and effective database applications it requires understanding the fundamentals of database management systems, techniques for the design of databases, and principles of database administration. The course focuses on the fundamentals of database management systems and the recent developments..

#### **Industry / Employer Expected Outcome**

Students should be able to develop application using Database Management System.

#### **II. Course Outcomes:** Students will be able to achieve & demonstrate the following COs on completion of course based learning

<b>CO1</b>	Describe fundamental concepts of database.
<b>CO2</b>	Create, manage Database using SQL commands, Apply different constraints on database
<b>CO3</b>	Develop databases using Entity Relationship modelling approach.
<b>CO4</b>	Apply data normalization and techniques on database
<b>CO5</b>	Maintain transaction processing in Database System.
<b>CO6</b>	Write PL/SQL code for database, create functions and procedures, apply triggers on database.

**Course Content Details:**

<b>Unit No.</b>	<b>Theory Learning Outcomes (TLO's)aligned to CO's</b>	<b>Topics / Sub-topics</b>
1	<p><b>TLO 1.1:</b> Introduce concepts like data, database, DBMS, Advantages and applications of DBMS.</p> <p><b>TLO 1.2:</b> Describe Data abstraction, Data dictionary, Instance and schema</p> <p><b>TLO 1.3:</b> Explain Logical and Physical Independence.</p> <p><b>TLO 1.4:</b> Explain DBMS architecture.</p> <p><b>TLO 1.5:</b> Explain database models.</p>	<p><b>Database System Concepts</b></p> <p>1.1 An Introduction to Database: Data, Database, Database Management Systems,advantages of DBMS over file processing system, Applications of DBMS</p> <p>1.2 Data abstraction, Data dictionary, Instance and schema,</p> <p>1.3 Data independence-Logical and Physical Independence</p> <p>1.4 Components of a DBMS and overall structure of a DBMS, Database Users, functions of Database Administrator.</p> <p>1.5 Data Modeling: Relational, Hierarchical, Network</p> <p><b>Course Outcome: CO1 Teaching Hours :6 hrs Marks: 10</b></p>
2	<p><b>TLO 2.1:</b> Explain basic concepts of relational model.</p> <p><b>TLO 2.2:</b> Describe Codd's 12 rules of RDBMS</p> <p><b>TLO 2.3:</b> Explain structured Query language with syntax and examples.</p> <p><b>TLO 2.4:</b> Describe syntax and examples of clauses in SQL.</p> <p><b>TLO 2.5:</b> Describe syntax and examples of functions in SQL</p> <p><b>TLO 2.6:</b> Describe concept of nested query.</p> <p><b>TLO 2.7:</b> Explain concept of join and its types</p> <p><b>TLO 2.8:</b> Describe syntax and examples of view.</p> <p><b>TLO 2.9:</b> Explain key concepts used in SQL</p> <p><b>TLO 2.10:</b> Explain integrity constraints with syntax and examples.</p> <p><b>TLO 2.11:</b> Describes fundamental relational algebra operations</p> <p><b>TLO 2.12:</b> Describe composition of relational operations.</p>	<p><b>Relational Data Model</b></p> <p>2.1 Basic Concepts of Relational Model- Domain, Attributes, Tuples and Relations</p> <p>2.2 Codd's rules of RDBMS</p> <p>2.3 Structured Query Language: Data types in SQL ,DDL, DML ,TCL,DCL.</p> <p>2.4 Clauses in SQL: Where, Having, Group by, Order by clauses</p> <p>2.5 Functions in SQL: Date functions, Time functions, String functions, Aggregate functions</p> <p>2.6 Concept of Nested Query</p> <p>2.7 Concept of Join: Equi, Non-equi, outer, self join</p> <p>2.8 Views Creating , updating , Dropping Views.</p> <p>2.9 Key Concepts-Super Key, Candidate Key, Primary Key, Foreign Key.</p> <p>2.10 Integrity Constraints- constraints on a single relation, not null constraint,unique constraint, check constraint, Primary key constraint, Foreign Key constraint.</p> <p>2.11 Fundamental Relational Algebra Operations: Select , Project</p> <p>2.12 Composition of Relational operations: Union ,Set Difference , CartesianProduct</p>

		Rename .  <b>Course Outcome: CO2 Teaching Hours :12 hrs Marks: 14</b>
3	<b>TLO 3.1:</b> Understand data modeling with basic concepts of E-R model.  <b>TLO 3.2:</b> Understand the concept of Enhanced ER Model.  3.1 <b>TLO 3.3:</b> Design ER and EER models for Bank, library, education, organization, hotel management, hospital management.	<b>Database Design Using E-R Model</b>  3.2 Data Modeling Using the E-R Model: Entity, Entity Sets-Weak Strong Entity Set, Relationship sets, Attributes, Types of attributes, Mapping Cardinalities, Shortcomings of ER Model. 3.3 Enhanced ER (EER) model: Subclass, super class, Specialization and Generalization 3.4 Case studies: Bank, library, education, organization, hotel management, hospital management.  <b>Course Outcome: CO3 Teaching Hours :5hrs Marks: 06</b>
4	<b>TLO 4.1:</b> Describe Normalization, Data redundancy and updating anomalies.  <b>TLO 4.2:</b> Explain Normalization based on Functional dependencies and Multi-valued Dependencies  <b>TLO 4.3:</b> Explain 1NF, 2NF, 3NF,BCNF normal forms.	<b>Normalization</b>  4.1 Normalization , Data redundancy and updating anomalies 4.2 Normalization based on Functional dependencies and Multi-valuedDependencies. 4.3 Normal Forms : 1NF, 2NF, 3NF,BCNF  <b>Course Outcome: CO4 Teaching Hours :6 hrs Marks: 10</b>
5	<b>TLO 5.1:</b> Explain ACID properties and transaction states.  <b>TLO 5.2:</b> Explain Concurrent Execution of Transactions  <b>TLO 5.3:</b> Describe Serial, Concurrent, Cascade less Schedule.  <b>TLO 5.4:</b> Understand Locks, Granting of locks, Lock Based Protocol	<b>Transaction Processing</b>  5.1 Transaction concept: Transaction properties (ACID), Transaction states 5.2 Concurrent Execution of Transactions. 5.3 Schedule: Serial, Concurrent, Cascade less Schedule. 5.4 Lock based protocols- Locks, Granting of locks, Lock Based Protocol  <b>Course Outcome: CO5 Teaching Hours : 8hrs Marks: 10</b>

		<b>PL/SQL Programming</b>
6	<p><b>TLO 6.1:</b> Describe block structure of PL/SQL, datatypes, variables and constants in PL/SQL.</p> <p><b>TLO 6.2:</b> Explain control structures in PL/SQL</p> <p><b>TLO 6.3:</b> Describe Exception Handling in PL/SQL.</p> <p><b>TLO 6.4:</b> Explain cursor, types of cursor in PL/SQL</p> <p><b>TLO 6.5:</b> Describe functions in PL/SQL</p> <p><b>TLO 6.6:</b> Describe procedures in PL/SQL</p> <p><b>TLO 6.7:</b> Explain database triggers syntax, its types .</p>	<p>6.1 Introduction of PL/SQL, Advantages of PL/SQL, The PL/SQL Block Structure, PL/SQL execution environment, PL/SQL data types, Variables, Constants.</p> <p>6.2 Control Structure: Conditional Control, Iterative Control, Sequential Control.</p> <p>6.3 Exception Handling: Predefined Exception, User Defined Exception.</p> <p>6.4 Cursor: Implicit and Explicit Cursors, Declaring, Opening and Closing a Cursor, Fetching a record from Cursor, Cursor for loops, parameterized Cursor.</p> <p>6.5 Functions: Advantage, Creating, Executing and Deleting a Functions.</p> <p>6.6 Stored Procedures: Advantage, Creating, Executing and Deleting a Stored Procedures.</p> <p>6.7 Database Triggers: Use Of Database Triggers, How to apply database Triggers, Types of Triggers, Syntax for creating Trigger, Deleting Trigger.</p> <p><b>Course Outcome: CO6 Teaching Hours :8 hrs Marks: 10</b></p>

### III. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Sr No	Practical / Tutorial / Laboratory Learning Outcome (LLO)	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant Cos
1	LLO: Able to install any open source database Product	Install any open source database Product like MySQL.	4	CO1
2	LLO: Able to write query to Create table, Alter the table, RenameTable, Drop the table	Create a New Database And Perform Following operations on that Database.a)Create table b)Alter the table c)Rename Table d)Drop the table.	4	CO2
3	LLO: Able to write query to Create a table, Insert values in that table, Update, Delete the contents of the table	Create a New Database And Perform Following operations on that Database a)Create a table b)Insert values in that table c)Update the table d)Delete the contents of the table.	4	CO2
4	LLO: Able to write query to create table and apply where, having, group by and order by clause on it.	Create a table and apply following clauses on it:Where,	4	CO2

		Having, Group by, Order by clauses.		
5	<b>LLO:</b> Able to implement date, time, string and aggregate functions in SQL	Implement the following Functions in SQL a) Date functions b) Time functions c) String functions d) Aggregate functions.	4	CO2
6	<b>LLO:</b> Able to write SQL code for creating of View, Perform Insert, Modify, Delete records through view, Delete the View. Able to write Nested -Query	Write SQL code for creating of View Perform Insert ,Modify, Delete records through view, Delete the View. Working with Nested -Query.	4	CO2
7	<b>LLO:</b> Able to implement all types of join in SQL	Implementation of all types of Joins.	4	CO2
8	<b>LLO:</b> Able to implement DCL and TCL commands.	Implementation of DCL commands: Grant, Revoke Implementation of TCL commands: Commit, Rollback, Savepoint.	4	CO2
9	<b>LLO:</b> Able to write query to apply constraints on the table.	Create table and Apply constraints such as NOT NULL, UNIQUE, Check, Default, Primary key ,Foreign key, on the table	4	CO1
10	<b>LLO:</b> Able to write PL/SQL programs using if then else, for, while, nested loop.	Write a PL/SQL programs using if then else, for, while, nested loop.	4	CO6
11	<b>LLO:</b> Able to write a PL/SQL code to implement implicit and explicit cursors.	Write a PL/SQL code to implement implicit and explicit cursors.	4	CO6
12	<b>LLO:</b> Able to write a PL/SQL programs based on Exception Handling	Write a PL/SQL programs based on Exception Handling (Predefinedand User-defined Exceptions).	4	CO6
13	<b>LLO:</b> Able to Write a PL/SQL code create Procedures and Functions	Write a PL/SQL code create Procedures and Functions	4	CO6
14	<b>LLO:</b> Able to write a PL/SQL programs to create triggers on given database.	Write a PL/SQL programs to create triggers on given database.	4	CO6
15	<b>LLO:</b> Design ER and EER models for Bank, library, education organization, hotel management, hospital management etc.	Case Study on ER Model And EER Model	4	CO3
		<b>Total</b>	60	

**IV. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):**

1. Prepare journal of practical.
2. Write assignment on the questions given by faculty.

**V. Specification Table:**

<b>Unit No</b>	<b>Topic Title</b>	<b>Distribution of Theory Marks</b>			
		<b>R Level</b>	<b>U Level</b>	<b>A Level</b>	<b>Total Marks</b>
1	<b>Database System Concepts</b>	2	2	6	10
2	<b>Relational Data Model</b>	4	6	4	14
3	<b>Database Design Using E-R Model</b>	2	2	2	6
4	<b>Normalization</b>	4	2	4	10
5	<b>Transaction Processing</b>	2	4	4	10
6	<b>PL/SQL Programming</b>	4	2	4	10
		<b>Total</b>	<b>18</b>	<b>18</b>	<b>60</b>

**VI. Assessment**

**Methodologies/Tools**

**Formative assessment (Assessment for Learning)**

- ♦ Rubrics for continuous assessment based on process and product related performance indicators (\_ 25 marks)

**Summative Assessment (Assessment of Learning)**

End term examination, Viva-voce, Workshop performance (\_ marks)

◆ VII. COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CO1	1	2	3	3	2	3	3	2	3	3
CO2	2	2	3	3	1	3	2		3	2
CO3	2	3		2	2	2	2	2	2	
CO4		3	2	3	2			2	3	3
CO5	1	2	3		2	3	3	2		3
CO6	2	2	3	3	2	3	3	2	3	3

Legends: - High:03, Medium:02, Low:01, No Mapping: --

**VIII. Suggested Learning Materials / Books**

Sr. No	Author/ Publisher	Title	ISBN
1	Abraham Silberschatz, Henry Korth& S. Sudarshan, Tata McGrawHill International	Database System concepts	9789332901384
2	Elmasri and Navathe Pearson Education	Fundamentals of Database Systems"	9780136086208 .
3	Gupta G. K. McGraw Hill Education, New Delhi 2013,	Database Management Systems	978-07-107273-1
4	Ivan Bayross BPB publication	PL/SQL	9788176566919

**IX. Learning Websites & Portals**

Sr.No	Link / Portal
1	<a href="https://www.w3schools.com/">https://www.w3schools.com/</a>
2	<a href="https://www.youtube.com/watch?v=IoL9Ve2SRwQ&amp;list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMIf4Ebh">https://www.youtube.com/watch?v=IoL9Ve2SRwQ&amp;list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMIf4Ebh</a>
3	<a href="https://www.javatpoint.com/dbms-tutorial">https://www.javatpoint.com/dbms-tutorial</a>

**X. Academic Consultation Committee/Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organization
1	Swapna Chavan	Visiting Lecturer	Government Polytechnic Mumbai
2	Dipali Gosavi	Lecturer	Government Polytechnic Mumbai
3	Vaibhav Wankhade	Software Engineer	Canada

Coordinator,  
Curriculum Development,  
Department of \_\_\_\_\_ Engineering

Head of Department  
Department of \_\_\_\_\_ Engineering

I/C, Curriculum Development Cell

Principal

