Course Code	USA20401J	Course Name	DATABASE SYSTEMS	Course Category	C	Professional Core Course	L	T	P	C
							4	0	4	6

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Applications		Data Book / Codes/Standards	Nil	

		Learning			Program Learning Outcomes (PLO)														
Course Learning Rationale (CLR):	The purpose of learning this course is to:	1	2	3	1	2	3	4	5	6	7	8	9	100	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-1 :	Understand the fundamentals of Database Management Systems, Architecture and Languages																		
CLR-2 :	Conceive the database design process through ER Model and Relational Model																		
CLR-3:	Design Logical Database Schema and mapping it to implementation level schema through Database Language Features																		
CLR-4 :	Familiarize queries using Structure Query Language (SQL) and PL/SQL																		
CLR:5	Familiarize the Improvement of the database design using normalization criteria and optimize																		
CLR-6 :	Understand the practical problems of concurrency control and gain knowledge about failures and																		
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																		
CLO-1 :	Acquire the knowledge on DBMS Architecture and Languages	3	80	70	H	M	L	L	-	-	-	-	L	L	L	H	-	-	H
CLO-2 :	Apply the fundamentals of data models to model an application's data requirements using conceptual modeling tools like ER diagrams	3	85	75	H	H	H	H	H	-	-	-	H	H	H	H	-	-	H
CLO-3 :	Apply the method to convert the ER model to a database schemas based on the conceptual relational model	3	75	70	H	H	H	H	H	-	-	-	H	H	H	H	-	-	H
CLO-4 :	Apply the knowledge to create, store and retrieve data using Structure Query Language (SQL) and PL/SQL	3	85	80	H	H	H	H	H	-	-	-	H	H	H	H	-	-	H
CLO-5 :	Apply the knowledge to improve database design using various normalization criteria and optimize queries	3	85	75	H	H	L	M	L	-	-	-	M	M	M	L	-	-	H
CLO-6 :	Appreciate the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.	3	85	75	H	L	L	L	L	-	-	-	H	L	L	L	-	-	H

Duration (hour)		24	24	24	24	24
S-1	SLO-1	What is Database Management System	Data base models	Basics of SQL-DDL,DML,DCL,TCL	Decomposition using FD-dependency preservation,	Serializability, Recoverability, Transaction support in SQL
	SLO-2	Advantage of DBMS over File Processing System	Design process	Structure Creation, alternation		
S-2	SLO-1	Introduction and applications of DBMS	Entity Relation Model	Defining Constraints-Primary Key, Foreign Key, Unique, not null, check, IN operator	Codd Rules	Concurrent Executions
	SLO-2	Purpose of database system				Concurrency control
S-3	SLO-1	Views of data	ER diagram	Functions-aggregation functions	Normalization – 1Nf, 2NF, 3NF,	Concurrency Control : Lock based Protocols

	SLO-2		Case study for ER Diagram	Built-in Functions-numeric, date, string functions, string functions, Set operations,	BCNF, 4NF and 5NF	Two Phase Ccontrol Commit Protocol
S-4	SLO-1	SQL : Data Definition Commands	Design Issues in ER Model	SQL : Joins	PI/SQL Introduction	PL/SQL : Query Precessing and Stored Procedure
	SLO-2		SQL : Aggregate Functions		PL/SQL : variable declaration and icontrol structures	
S 5-8	SLO-1	Lab 1: SQL Data Definition Language Commands on sample exercise	Lab4 Inbuilt functions in SQL on sample Exercise.	Lab 7 : Join Queries on sample exercise. * Frame and execute the appropriate DDL,DML,DCL,TCL for the project	Lab 10: PL/SQL Conditional and Iterative Statements	Lab 13: PL/SQL Query Processing , stored procedure
	SLO-2					
S-9	SLO-1	Database system Architecture	Keys , Attributes and Constraints	Sub Queries,	Domain Constraints, Referential Integrity	Concurrency Control : Time Stamp based Validation based
	SLO-2				Secondary Storage Devices	
S-10	SLO-1	Overview of SQL	Mapping Cardinality	Correlated sub queries	Buffering of blocks File organization	MultiGranularity, Deadlocking, Deadlock Prevention protocol
	SLO-2					
S-11	SLO-1	*SQL : Data Manipulation Commands*	*Extended ER - Aggregation*	*Nested Queries, Views and its Types*	*Indexing Methods – Primary , Secondary , Multilevel Indices*	*Recovery Concepts, Deferred update technique, Immediate update technique, Shadow paging,*
	SLO-2		*Generalizaion and Specialization*			
S-12	SLO-1	*SQL : Set Operations*	*SQL : Views in SQL*	*Transaction Control Commands*	*ISAM, B-trees Introduction*	*PL/SQL : Exceptional Handling*
	SLO-2		*SQL Queries in SQL*	*Commit, Rollback, Save point*		*PL/SQL: Trigger*
S 13-16	SLO-1	*Lab 2: SQL Data Manipulation Language Commands * Identification of project Modules and functionality*	*Lab 5: Simple Queries in SQL*	*Lab 8: Sub Queries*	*Lab 11: PL/SQL Functions * Frame and execute the appropriate Set Operators & Views for the project*	*Lab 14: PL/SQL Trigger, Exceptional Handling * Frame and execute the appropriate PL/SQL Cursors and Exceptional Handling for the project*
	SLO-2					
S-17	SLO-1	*Data Independence*	*ER Diagram Issues*	*Relational Algebra – Fundamental Operators and syntax, relational algebra queries*	*Transaction Management Transaction Concept*	*Database security and Authorization Need forf Database security*
	SLO-2					
S-18	SLO-1	*The evolution of Data Models*	*Weak Entity*	*Pitfalls in Relational database*	*Transaction States*	*Mandatory Access control and Multilevel Security*
	SLO-2					
S-19	SLO-1	*Comparision of Data Models*	*Conversion of ER to Relational Table*	*Functional Dependency – definition,*	*ACID Properties*	*Database Users and DBA Statistical database security*
	SLO-2					

S-20	SLO-1	*SQL : Data Control Commads*	*SQL : Nested Queries*	*trivial and non-trivial FD*	*PL/SQL Cursor*	
	SLO-2	SQL:Transaction Control Commands			*PL/SQL : Functions and statements to handle Cursor,*	*PL/SQL : Application Programs*
S 21-24	SLO-1 SLO-2	*Lab 3: SQL Data Control Language Commands and Transaction control commands to the sample exercises* ** Identify the issues that can arise in a business perspective for the application*	*Lab 6: Nested Queries on sample exercise* ** Construction of Relational Table from the ER Diagram*	*Lab9: Correlated Subqueries*	*Lab 12: PL/SQL Cursors* ** Frame and execute the appropriate PL/SQL Conditional and Iterative Statements for the project*	*Lab 15 Student Progress report Generation* *Employee payslip generation*

Learning Resources	*1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, (2011),"Database System Concepts", Sixth Edition, Tata McGraw Hill* *2. RamezElmasri, Shamkant B. Navathe,(2011), "Fundamentals of Database Systems", Sixth Edition, Pearson Education* *3. CJ Date,AKannan,SSwamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education* *4. Rajesh Narang, (2011),"Database Management Systems",Second Edition, PHI*	*5. Martin Gruber, (1990), "Understanding SQL", Sybex* *6. SharadMaheshwari, (2016), "Introduction to SQLandPL/SQL", Second Edition, Laxmi Publications* *7. RaghuramaKrishnan,JohannesGehrke, (2003), Database Management Systems, Third Edition, McGrawHill Education*

Learning Assessment

Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, Conf. Paper etc.,

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr.G.Muruganandam, Group Project Manager, HCL Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1. Mrs.E.Aarthi, SRM IST
Mr.M. Hemachandar, Tech Lead, Wipro Limited, Chennai		2. Mrs.A.Pavithra, SRM IST