Ref No:

SKIT, BANGALORE

COURSE PLAN

Academic Year 2019-20

Program:	B E – Information Science & Engineering
Semester :	5
Course Code:	17CS53
Course Title:	Database Management System
Credit / L-T-P:	4 / 4-0-0
Total Contact Hours:	50
Course Plan Author:	Veena M Naik

Academic Evaluation and Monitoring Cell

No. 29, Chimney hills, Hesaraghatta Road, Chikkabanavara
BANGALORE-5600990, KARNATAKA , INDIA
Phone / Fax :+91-08023721315/23721477
www.skit.org.in

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Note : Remove "Table of Content" before including in CP Book

      Each Course Plan shall be printed and made into a book with cover page

      Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

A. COURSE INFORMATION

1. Course Overview

Degree:	B.E	Program:	IS
Year / Semester :	3rd / V	Academic Year:	2019-20
Course Title:	Database Management System	Course Code:	17CS53
Credit / L-T-P:	4-0-0	SEE Duration:	180 Minutes
Total Contact Hours:	50	SEE Marks:	60 Marks
CIA Marks:	40	Assignment	1 / Module
Course Plan Author:	Veena M Naik	Sign	Dt:
Checked By:		Sign	Dt:
CO Targets	CIA target:60%	SEE Target:	72%

Note: Define CIA and SEE % targets based on previous performance.

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

Module	Content	Teaching Hours	Identified Module Concepts	Blooms Learning Levels
1	Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment.	5	Storage of data	L2 Understand
	Conceptual Data Modelling using Entities and Relationships: Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.	5	Entity relationship	L3 Apply
2	Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations. Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping	5	Relational Algebra	L3 Apply
	SQL:SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.	5	Query Language	L3 Apply
3	SQL:Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. Database Application Development: Accessing databases from applications,	5	SQL	L3 Apply
	An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop. Internet Applications:The three-Tier application architecture, The presentation layer, The Middle Tier	5	Data connectivity	L4 Analyze
4	Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional	5	Database design	L3 Apply

	Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms,Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form,Join Dependencies and Fifth NormalForm			
	Normalization Algorithms: Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs, Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms	5	Normalization	L4 Analyze
5	Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL.	5	Transaction process	L5 Evaluate
	Concurrency Control in Databases: Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques, Validation Concurrency control techniques, Granularity of Data items and Multiple Granularity Locking. Introduction to Database Recovery Protocols: Recovery Concepts, NO-UNDO/REDO recovery based on Deferred update, Recovery techniques based on immediate update, Shadow paging, Database backup and recovery from catastrophic failure.	5	Data transaction and recovery methods	L5 Evaluate
-	**Total**	50	-	-

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).
1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts ; 15 – 30 minutes
2. Design: Simulation and design tools used – software tools used ; Free / open source
3. Research: Recent developments on the concepts – publications in journals; conferences etc.

Modules	Details	Chapters in book	Availability
A	**Text books (Title, Authors, Edition, Publisher, Year.)**	-	-
1,2,4,5	Database systems Models, Languages, Design and Application Programming, RamezElmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.	1,2,3,4, 5, 7,8,14,15, 20,21,22	In Lib / In Dept
3	Database management systems, Ramakrishnan, and Gehrke, 3 rd Edition, 2014, McGraw Hill	6,7	
B	**Reference books (Title, Authors, Edition, Publisher, Year.)**	-	-
1,2,4,5	Silberschatz Korth and Sudharshan, Database System Concepts, 6 th Edition, Mc-GrawHill, 2013.	1,2,3	In Lib
3	Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.	7,8	In Lib
C	**Concept Videos or Simulation for Understanding**	-	-
1	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwie5peX457lAhWZ7HMBHaPLDiYQtwIwAXoECAsQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D6u2zsJOJ_GE&usg=AOvVaw1mGloytvVe1-tVBKm2otnE		
2	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwiMrord5J7lAhUl7HMBHTe4Bw0QtwIwAHoECAkQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv		

	%3D6uX_nXzeVDY&usg=AOvVaw2MTBMQT7AAv6rd8BaSvJls		
3	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjoy6So5p7lAhW6ILcAHb-jAb0QtwIwAHoECAkQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DgGGHjYbQMvw&usg=AOvVaw2hlC1m6LNwiWkGD8x0OdXj		
4	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwiNqPiz5p7lAhUymeYKHbVmDDgQwqsBMAB6BAgHEAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DHXV3zeQKqGY&usg=AOvVaw28qyHvdQya8x1gV53cnV7s		
5	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwjNs5DP5p7lAhVL6XMBHdHxBsAQtwIwAXoECAYQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DFIVDmEljBZA&usg=AOvVaw0dKswlo8R2TbpCzmz1lZmt		
6	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjoiPnr5p7lAhW273MBHScEC-MQtwIwAHoECAoQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D17jcw35uid0&usg=AOvVaw3iYdKx9i3lmDW0pLP6qjMB		
7	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=21&cad=rja&uact=8&ved=2ahUKEwjKuajq6J7lAhUHKY8KHULABqkQFjAUegQIBhAB&url=https%3A%2F%2Fnptel.ac.in%2Fcourses%2F106106093%2F&usg=AOvVaw3FDA_xn_nNeOq2a5-XfKYy		
8	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwi8vvWk6Z7lAhVLLo8KHfELDLUQtwIwAHoECAkQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DoylHRgBDfNc&usg=AOvVaw2QjqEcHlRFAZFqLVKE423u		
9	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwj4-ozJ6Z7lAhUEinAKHUTUAmMQtwIwAHoECAkQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D5ammL5KU4mo&usg=AOvVaw3a214t5HGHnuKO5pi83m2F		
10	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjV0-3q6Z7lAhXJP48KHa2tBa8QtwIwAHoECAkQAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3Di7LNUio7kvw&usg=AOvVaw1W5vlt4Hvxrbv-1m5vYlhU		
D	**Software Tools for Design**		
	Oracle 11g		
E	**Recent Developments for Research**	-	-
1	Data space and developments of data space environment		
2	Database systems: a practical approach to design, implementation, and management		
F	**Others (Web, Video, Simulation, Notes etc.)**	-	-
1	https://nptel.ac.in/courses/106105175/		
2	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=21&cad=rja&uact=8&ved=2ahUKEwjx3oiI6p7lAhVLMo8KHeFGBPYQFjAUegQIBRAB&url=https%3A%2F%2Fcosmolearning.org%2Fvideo-lectures%2Fintroduction-sql%2F&usg=AOvVaw0FDNdtIkJHfTTAI1z1w088		

4. Course Prerequisites

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

Students must have learnt the following Courses / Topics with described Content.

Modules	Course Code	Course Name	Topic / Description	Sem	Remarks	Blooms Level
1	17CS53	Database management System	Usage of Data Intensive application in real time	5	Topic discussed	L2
2	17CS53	Database management System	Analyzing Data, Data storage and data access requirement of any organization	5	Topic discussed	L2
3	17CS53	Database management System	Basic knowledge of any programming language	5	Studied in lower semesters	L2,L3
4	17CS53	Database management System	Logical understanding of requirements and representing it in programming	5	Developed through practice and example solving	L3
5	17CS53	Database management System	Knowledge of Transaction processing	5	Not yet discussed	L2

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.

Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

Modules	Topic / Description	Area	Remarks	Blooms Level
1	Object oriented database	Recent Developments	Industrial requirement analysis	L2
2	Visual Paradigm ERD Tools.	Software Tools	Can be used to design ER diagrams	L3
3	SQL server certification	Certificate Courses	Can help students for placements	L2

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

Modules	Course Code.#	Course Outcome At the end of the course, student should be able to . . .	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
1	17CS53.1	Understand the importance of Database management system in real time.	5	Storage of data	Discussion	Slip test	L2 Understand
	17CS53.2	Identify methodology of conceptual modeling through Entity relationship model	5	Entity relationship	Lecture	Q & A	L3 Apply
2	17CS53.3	Apply the relational model concepts and operations for optimizing queries in RDBMS.	5	Relational Algebra	Description	Assignment	L3 Apply
	17CS53.4	Apply the SQL commands for creating tables in database schema.	5	Query Language	Develope	Employee Problem set	L3 Apply
3	17CS53.5	Apply the triggers and views in database schema.	5	SQL	solve	Focused on analyzing	L3 Apply

							/compare	
	17CS53.6	Analyze the access methods to store the data through internet application	5	Data connectivity	Examine	Demonstrate	L4 Analyze	
4	17CS53.7	Apply the normalization techniques to normalize the database using mathematical modelling	5	Database design	Demonstration	Quiz	L3 Apply	
	17CS53.8	Analyze the different types of algorithm using database design theory for different applications	5	Normalization	Tutorial	Analyze	L4 Analyze	
5	17CS53.9	Demonstrate the transaction and query processing	5	Transaction process	Presentation	Seminar	L5 Evaluate	
	17CS53.10	Analyze and implement the concurrency control and database recovery protocols in database	5	Data transaction and recovery methods	Method / procedure	Student analyze / focuses	L5 Evaluate	
-	-	**Total**	**50**	-	-	-	**L2-L5**	

2. Course Applications

Write 1 or 2 applications per CO.
Students should be able to employ / apply the course learnings to . . .

Modules	Application Area Compiled from Module Applications.	CO	Level
1	Usage of database in different areas like banking , e-commerce , organization	CO1	L2
1	Understand and apply the concept of conceptual modelling to design a database	CO2	L3
2	Use relational model for optimizing queries	CO3	L3
2	Usage of Structured query language commands in creating database tables	CO4	L3
3	Creation of schema using triggers and views	CO5	L3
3	Accessing the database for various internet applications	CO6	L4
4	Using mathematical modelling techniques for normalization	CO7	L3
4	Understanding the normalization algorithms for database design	CO8	L4
5	Applying the characterizing schedules for transaction processing	CO9	L5
5	Understand the concurrency control techniques and database recovery protocols	CO10	L5

3. Mapping And Justification

CO – PO Mapping with mapping Level along with justification for each CO-PO pair.
To attain competency required (as defined in POs) in a specified area and the knowledge & ability required to accomplish it.

Modules	Mapping		Mapping Level	Justification for each CO-PO pair	Level
-	**CO**	**PO**	-	**'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'**	-
1	CO1	PO1	L5	Knowledge of using database management is required to use it in areas like banking , ecommerce etc.	L3,L5
1	CO1	PO2	L5	Understanding database systems is required to identify and analyze complex problems	L2 , L4, L5
1	CO1	PO3	L5	Learning of database systems is required to design and develop solution to complex problems	L4 , L5
1	CO1	PO4	L4	Investigation of complex problems of database management requires basic understanding of database systems	L3 , L4
1	CO1	PO5	L2	To develop appropriate techniques , tools , understanding of database management system is required	L2
1	CO1	PO10	L3	Applying the knowledge gained about using database in real time systems is required to communicate complex engineering activities	L2 , L3
1	CO2	PO1	L3	Knowledge of conceptual modelling through entity relationship model is required to design database simple to complex database problems	L3
1	CO2	PO2	L4	Analysing problems of database requires knowledge on conceptual	L3 ,

					L4
1	CO2	PO3	L5	To design solution to database problems requires learning of entity relationship model	L4 , L5
1	CO2	PO4	L5	Research based knowledge required to interpret data in design of ER diagram	L4 , L5
1	CO2	PO5	L3	Knowledge of ER modelling is required in design of modern tools like SQL	L3
1	CO2	PO9	L3	To develop ER diagrams specific to different databases individual students should have knowledge of ER modelling	L3
1	CO2	PO11	L4	To solve complex database problems and develop real time projects knowledge of conceptual modelling is required	L4
2	CO3	PO1	L3	Knowledge of relational model concepts is required for query optimization	L3
2	CO3	PO2	L4	To analyze query optimization knowledge of relational model concept is required	L4
2	CO3	PO3	L5	To design various RDBMS , understanding of relational model concept is required	L5
2	CO3	PO4	L4	Research based knowledge required to interpret data in process of optimization of queries	L4
2	CO3	PO5	L3	Knowledge of relational algebra is required in design of modern tools like SQL	L3
2	CO3	PO9	L3	To design queries specific to different databases retrievals individual students should have knowledge of relational algebra	L3
2	CO3	PO11	L5	To solve complex database problems and develop real time projects , knowledge of query optimization is required	L5
2	CO4	PO1	L3	Knowledge of basic SQL is required for creation of DB	L2,L 3
2	CO4	PO2	L4	Understanding the usage of SQL commands is required to analyze when complex tables been created	L2,L 3,L4
2	CO4	PO3	L4	Learning of basic SQL and its uswage is required to design and develop a complex database	L3, L4
2	CO4	PO5	L5	To create a DB appropriate techniques , tools are required in a database systems	L2, L3,L 4,L5
2	CO4	PO9	L3	To design queries specific to different databases retrievals individual students should have knowledge of query language	L3
2	CO4	PO11	L5	To solve complex database problems and develop real time projects , knowledge of query language is required	L5
3	CO5	PO1	L3	Knowledge of views and triggers is required to give solution to complex DB problems	L2,L 3
3	CO5	PO2	L5	Analyzing the DB schema for complex problems requires the knowledge of triggers and views	L3,L 4,L5
3	CO5	PO3	L4	To design the solution for a DB problems, understanding triggers and view is required.	L3,L 4,
3	CO5	PO4	L4	Research based knowledge required to analyze the data using views and triggers	L4
3	CO5	PO9	L5	To design queries specific to different databases retrievals , individual students should have knowledge of using views and triggers	L5
3	CO5	PO11	L5	To solve complex database problems and develop real time projects , knowledge of views and triggers is required	L5
3	CO6	PO1	L4	Knowledge of access methods is required to store data through internet applications	L2, L4
3	CO6	PO2	L4	Access methods knowledge is required to analyze data storage problems.	L2, L4
3	CO6	PO3	L3	To design and develop access methods to store the data knowledge of analyzing the access methods for different applications is required	L3
3	CO6	PO4	L4	Research based knowledge is required to model the different applications which use access methods to store the data	L4
3	CO6	PO5	L2	Knowledge of data connectivity is required in design of modern tools like	L2

				SQL	
3	CO6	PO9	L3	To develop different solutions specific to different databases individual students should have knowledge of data connectivity	L3
3	CO6	PO11	L4	To develop different database applications ,knowledge of data connectivity is required	L4
4	CO7	PO1	L2	Knowledge of normalization is required to give accurate solution to complex DB problems	L2
4	CO7	PO2	L4	Analysis of complex DB solution requires understanding of normalization	L2, L4
4	CO7	PO3	L4	Design the solution of DB problems requires normalization	L3, L4
4	CO7	PO5	L3	Knowledge of data normalization is required in design of modern tools like SQL	L3
4	CO7	PO9	L3	To design different databases individual students should have knowledge of data normalization	L3
4	CO7	PO11	L3	To develop different database applications ,knowledge of data normalization is required	L3
4	CO8	PO1	L3	Knowledge of normalization algorithm is required in designing of DB	L2,L3
4	CO8	PO2	L4	To review research solution to DB problems requires require knowledge of normalization algorithm	L2, L4
4	CO8	PO3	L5	Design solution to complex DB problems requires understanding of normalization algorithm	L4, L5
4	CO8	PO4	L2	Research based knowledge is required to analyze different types of algorithms using database design theory	L2
4	CO8	PO5	L3	Knowledge of algorithm analysis is required to develop modern tools like SQL	L3
4	CO8	PO9	L3	To design different databases individual students should have knowledge of algorithm analysis	L3
4	CO8	PO11	L4	To develop different database applications ,knowledge of algorithm analysis is required	L4
5	CO9	PO1	L2	Basics of transaction processing is required to demonstrate it	L2
5	CO9	PO2	L3	To analyze transaction properties knowledge of acid properties is required	L3
5	CO9	PO3	L4	To design and develop a database the knowledge of transaction processing is required	L4
5	CO9	PO4	L2	Research based knowledge is required to solve complex problems related to transaction processing	L2
5	CO9	PO5	L4	Knowledge of transaction processing is required to design modern tools like SQL	L4
5	CO9	PO12	L2	Knowledge of transaction processing is required to use different database applications	L2
5	CO10	PO1	L2	In case of transaction failures knowledge of recovery techniques is required	L2
5	CO10	PO2	L3	To analyze the issue of transaction failure the knowledge of concurrency control is in need	L3
5	CO10	PO3	L5	To develop a solution for the transaction failures the knowledge of recovery techniques is required	L5
5	CO10	PO4	L4	To overcome the transaction failures the investigation with some recovery techniques is in need	L4
5	CO10	PO9	L3	To recover from databases failures , individual students should have knowledge of implementing recovery protocols	L3
5	CO10	PO11	L4	To design solution to complex database problems knowledge of analyzing and implementing concurrency control is in need	L4

4. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

-		-	Course Outcomes	Program Outcomes	-

Modules	CO.#	At the end of the course student should be able to . . .	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	Level
1	15CS53.1	Understand the importance of Database management system in real time.	2.55	2.55	2.6	2.56	2.5	-	-	-	-	1	-	-				L2 Understand
1	15CS53.2	Identify methodology of conceptual modeling through Entity relationship model	2.55	2.55	2.6	2.56	2.5	-	-	-	2.56	-	2.56	-				L3 Apply
2	15CS53.3	Apply the relational model concepts and operations for optimizing queries in RDBMS.	2.55	2.55	2.6	2.56	2.5	-	-	-	2.56	-	2.56	-				L3 Apply
2	15CS53.4	Apply the SQL commands for creating tables in database schema.	2.55	2.55	2.6	-	2.5	-	-	-	2.56	-	2.56	-				L3 Apply
3	15CS53.5	Apply the triggers and views in database schema.	2.55	2.55	2.6	-	-	-	-	-	2.56	-	2.56	-				L3 Apply
3	15CS53.6	Analyze the access methods to store the data through internet application	2.55	2.55	2.6	2.56	2.5	-	-	-	2.56	-	2.56	-				L4 Analyze
4	15CS53.7	Apply the normalization techniques to normalize the database using mathematical modelling	2.55	2.55	2.6	-	2.5	-	-	-	2.56	-	2.56	-				L3 Apply
4	15CS53.8	Analyze the different types of algorithm using database design theory for different applications	2.55	2.55	2.6	2.56	2.5	-	-	-	2.56	-	2.56	-				L4 Analyze
5	15CS53.9	Demonstrate the transaction and query processing	2.55	2.55	2.6	2.56	2.5	-	-	-	-	-	-	2				L5 Evaluate
5	15CS53.10	Analyze and implement the concurrency control and database recovery protocols in database	2.55	2.55	2.6	2.56	-	-	-	-	2.56	-	2.56	-				L5 Evaluate
-	17CS53	Average attainment (1, 2, or 3)	2.55	2.55	2.6	2.56	2.5	-	-	-	2.56	1	2.56	2	-	-	-	-
-	PO, PSO	1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer and Society; 7.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design																

5. Curricular Gap and Content

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

Modules	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1	Usage of Data Intensive application in real time	Classroom discussion	1/8/19	Mrs.Veena M. Naik	PO1,PO2,PO5, PO11,PO12
2	Analyzing Data, Data storage and data access requirement of any organization	Classroom discussion	27/8/19	Mrs.Veena M. Naik	PO1,PO2,PO5, PO11,PO12

6. Content Beyond Syllabus

Topics & contents required (from A.5) not addressed, but help students for Placement, GATE, Higher Education, Entrepreneurship, etc.

17CS53/ A

Mod ules	Gap Topic	Area	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1	Usage of Data Intensive application in real time	Entrepreneurship	Classroom discussion	1/8/19	Mrs.Veena M. Naik	PO1,PO2,PO5,PO11,PO12
2	Analyzing Data, Data storage and data access requirement of any organization	Higher Education	Classroom discussion	27/8/19	Mrs.Veena M. Naik	PO1,PO2,PO5,PO11,PO12

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Mod ules	Title	Teach. Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Introduction to database	10	2	-	-	1	1	2	CO1, CO2	L2, L3
2	Relational model	10	2	-	-	1	1	2	CO3, CO4	L3, L3
3	SQL	10	-	2	-	1	1	2	CO5, CO6	L3, L4
4	Normalization	10	-	2	-	1	1	2	CO7, C08	L3, L4
5	Transaction processing	10	-	-	4	1	1	2	CO9, CO10	L5, L5
-	**Total**	**50**	**4**	**4**	**4**	**5**	**5**	**10**	**-**	**-**

2. Continuous Internal Assessment (CIA)

Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

Mod ules	Evaluation	Weightage in Marks	CO	Levels
1, 2	CIA Exam – 1	30	CO1, CO2, CO3, CO4	L2, l3, l3, l3
3, 4	CIA Exam – 2	30	CO5, CO6, CO7, C08	L3, L4, L3, L4
5	CIA Exam – 3	30	CO9, CO10	L5, L5
1, 2	Assignment - 1	10	CO1, CO2, CO3, CO4	L2, l3, l3, l3
3, 4	Assignment - 2	10	CO5, CO6, CO7, CO8	L3, L4, L3, L4
5	Assignment - 3	10	CO9, CO10	L5, L5
1, 2	Seminar - 1	00	-	-
3, 4	Seminar - 2	00	-	-
5	Seminar - 3	00	-	-
1 - 5	Other Activities – Mini Project	-	-	-
	Final CIA Marks	**40**	**-**	**-**

D1. TEACHING PLAN - 1

Module - 1

Title:	Introduction to database		Appr Time:	10 Hrs
a	***Course Outcomes***		-	**Blooms**
-	The student should be able to:		-	**Level**
1	Understand the importance of Database management system in real time.	CO1		L2
2	Identify methodology of conceptual modeling through Entity relationship model	CO2		L3

b	Course Schedule	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Introduction to Databases: Introduction,	C01	L2
2	Characteristics of database approach	C01	L2
3	Advantages of using the DBMS approach	C01	L2
4	History of database applications	C01	L2
5	Overview of Database Languages and Architectures: Data Models, Schemas, and Instances.	C01	L2
6	Three schema architecture and data independence, database languages, and interfaces	C01	L2
7	The Database System environment.	CO2	L3
8	Conceptual Data Modelling using Entities and Relationships: Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types	CO2	L2
9	,E R diagram	CO2	L3
10	examples, Specialization and Generalization.	CO2	L2
c	**Application Areas**	**CO**	**Level**
1	Usage of database in different areas like banking, e-commerce, organization	CO1	L2
2	Understand and apply the concept of conceptual modelling to design a database	CO2	L3
d	**Review Questions**	-	-
1	What is the difference between a database schema and a database state?	CO1	L2
2	What is the difference between logical data independence and physical data independence? Which one is harder to achieve and why?	CO1	L2
3	What is the role of precompiler in a DBMS environment?	CO1	L2
4	What is the difference between two tier and three tier client/server architectures?	CO1	L2
5	What do you understand by "degree of a relationship type"? Explain with example.	CO2	L3
6 U	Under what conditions can an attribute of a binary relationship type be migrated to become an attribute of the participating entity types?	CO2	L3
7	Discuss the naming conventions used for ER schema diagrams.	CO2	L3
e	**Experiences**	-	-
1			
2			
3			
4			
5			

Module – 2

Title:	Relational model	Appr Time:	10 Hrs
a	*Course Outcomes*	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Apply the relational model concepts and operations for optimizing queries in RDBMS.	CO3	L3
2	Apply the SQL commands for creating tables in database schema.	CO4	L3
b	*Course Schedule*	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations.	CO3	L3
2	Relational Algebra: Unary and Binary relational operations,	CO3	L3

3	additional relational operations (aggregate, grouping, etc.)	CO3	L3
4	Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design	CO3	L3
5	Relational Database Design using ER-to-Relational mapping.	CO3	L3
6	SQL: SQL data definition and data types	CO4	L2
7	specifying constraints in SQL,	CO4	L3
8	Additional features of SQL.	CO4	L3
9	retrieval queries in SQL	CO4	L3
10	INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.	CO4	L3
c	**Application Areas**	**CO**	**Level**
1	Use relational model for optimizing queries	CO3	L3
2	Usage of Structured query language commands in creating database tables	CO4	L3
d	**Review Questions**	-	-
12	Why are duplicate tuples not allowed in a relation?	CO3	L3
13	What is the difference between candidate key, primary key and unique key?	CO3	L3
14	Discuss the various reasons that lead to the occurrence of NULL values in relations?	CO3	L3
15	What are the rules that must be satisfied by the foreign key?	CO4	L3
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	17CS53	Sem:	5	Marks:	30	Time:	75 minutes		
Course:	Database Management System								
-	-	**Note: Answer any 2 questions, each carry equal marks. Module : 1, 2**					**Marks**	**CO**	**Level**
1	a	Describe the three schema architecture with neat diagram.					7	CO1	L2
	b	Explain the main phases of database design with a neat diagram.					8	CO2	L3
		OR							
2	a	Design an ER diagram for movie database. Considering the following requirements a. Each movie is identified by its tittle and year of release, it has length in minutes and can have zero or more quotes,languages. b. Production companies are identified by name and address and each production company can produce one or more movies. c. Actors are identified by name and dob,they can act in one or more movies and each actor has a role in movie d. Directors are identified by name and dob,so each director can direct one or more movies and each movie can be directed by one or more directors. e. Each movie belongs to any one category like horror,action,drama,etc					8	CO2	L3
	b	Discuss various components of DBMS and their interactions with diagram.					7	CO1	L2
3	a	Describe the characteristics of relations with suitable example for each.					7	CO3	L2
	b	Explain alter command and its options with an example.					8	CO4	L3
		OR							
4	a	Explain select and project operation in relational algebra with example					5	CO3	L2

| | b | Consider the following schema for a Library Database:
BOOK(Book_id, Title, Publisher_Name, Pub_Year)
BOOK_AUTHORS(Book_id, Author_Name)
PUBLISHER(Name, Address, Phone)
BOOK_COPIES(Book_id, Branch_id, No-of_Copies)
BOOK_LENDING(Book_id, Branch_id, Card_No, Date_Out, Due_Date)
LIBRARY_BRANCH(Branch_id, Branch_Name, Address)
Write SQL queries to
1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017.
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library. | 10 | CO4 | L3 |

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	17CS53	Sem:	5	Marks:	10	Time:	90 – 120 minutes
Course:	Database Management System			Module : 1, 2			

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		Define the following terms: *data model, database schema, database state,* internal schema, conceptual schema, external schema, data independence,DDL, DML, SDL, VDL, query language, host language, data sublanguage, *database utility, catalog, client/server architecture, three-tier architecture,* and n-*tier architecture*.	5	CO1	L2
2		Draw an ER diagram for a BANK database schema with at least five entity types. Also specify primary key and structural constraints.	5	CO2	L3
3		What is a weak entity type? Explain the role of partial key in design of weak entity type.		CO2	L3
4		Explain the typical components module of a DBMS, with a neat diagram.	5	CO1	L2
5		Discuss the main characteristics of database approach and how it differs from traditional file systems	5	CO1	L2
6		Describe the three schema architecture . Why do we need mappings among schema levels?	5	CO1	L2
7		Define an entity or attribute . Explain the different types of attributes that occur in a ER diagram model with example	5	CO2	L3
8		In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example.	5	CO4	L3
9		Explain the relational algebra operations from set theory with examples	5	CO3	L3
10		Consider the following RESORT database RESORT (resort no, resort name, resort type, resort addr, resort city, numsuite) SUITE(suit no, resort no, suite price) RESERVATION(reservation no, resort no, visitor no, check in, check out, totoal visitors, suite no) VISITOR(visitor no, firstname, lastname, visiter addr) 1) write the sql to list full details of all the resorts on los angeles	5	C04	L3

		2) write the sql list full details of all the resorts having number of suits more than 30) 3) write the sql to list visitor in ascending order by firstname.			

D2. TEACHING PLAN - 2
Module – 3

Title:	SQL			Appr Time:	10 Hrs
a	***Course Outcomes***			-	**Blooms**
-	The student should be able to:			-	**Level**
1	Apply the triggers and views in database schema.			CO5	L3
2	Analyze the access methods to store the data through internet application			CO6	L4
b	***Course Schedule***				
Class No	**Module Content Covered**			**CO**	**Level**
1	More complex SQL retrieval queries,			CO5	L3
2	Specifying constraints as assertions and action triggers			CO5	L3
3	Views in SQL			CO5	L3
4	Schema change statements in SQL.			CO5	L4
5	Schema change statements in SQL Continued			CO5	L4
6	Database Application Development:Accessing databases from applications			CO6	L4
7	An introduction to JDBC,JDBC classes ,Interfaces			CO6	L4
8	SQLJ, Stored procedures			CO6	L4
9	Case study: The internet Bookshop.			CO6	L4
10	Internet Applications: The three-Tier application architecture, The presentation layer, the middle tier			CO6	L4
c	**Application Areas**			**CO**	**Level**
1	Creation of schema using triggers and views			CO5	L3
2	Accessing the database for various Internet applications			CO6	L4
d	**Review Questions**			-	-
1	Describe the six clauses in the syntax of an SQL retrieval query. Show what type of constructs can be specified in each of the six clauses. Which of the six clauses are required and which are optional?			CO5	L3
2	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands.			CO5	L3
3	Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses			CO5	L3
4	What are the basic data types available for the attributes in SQL?			CO5	L3
5	Explain the three tier application architecture?			CO6	L4
e	**Experiences**			-	-
1					
2					
3					

4			
5			

Module – 4

Title:	Normalization	Appr Time:	10Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Apply the normalization techniques to normalize the database using mathematical modelling	CO7	L3
2	Analyze the different types of algorithm using database design theory for different applications	CO8	L4
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema	CO7	L3
2	Functional Dependencies, Normal Forms based on Primary Keys	CO7	L3
3	Second and Third Normal Forms	CO7	L3
4	Boyce-Codd Normal Form, Multivalued	CO7	L3
5	Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.	CO7	L3
6	Normalization Algorithms: Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions	CO8	L4
7	Algorithms for Relational Database Schema Design,	CO8	L4
8	Nulls, Dangling tuples, and alternate Relational Designs,	CO8	L4
9	Further discussion of Multivalued dependencies and 4NF	CO8	L4
10	, Other dependencies and Normal Forms	CO8	L4
c	**Application Areas**	**CO**	**Level**
1	Using mathematical modelling techniques for normalization	CO8	L3
2	Understanding the normalization algorithms for database design	CO7	L4
d	**Review Questions**	-	-
1	What is a functional dependency? What are the possible sources of the information that defines the functional dependencies that hold among the attributes of a relation schema?	CO7	L3
2	What undesirable dependencies are avoided when a relation is in 3NF?	CO7	L3
3	Why should NULL s in a relation be avoided as much as possible? Discuss the problem of spurious tuples and how we may prevent it.	CO8	L4
4	What is meant by the attribute preservation condition on a decomposition?	CO8	L4
5	Discuss the NULL value and dangling tuple problems.	CO8	L4
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	17CS53	Sem:	5	Marks:	30	Time:	75 minutes			
Course:	Database Management System									
-	-	**Note: Answer any 2 questions, each carry equal marks. Module : 3, 4**						**Marks**	**CO**	**Level**

1	a	How are triggers and assertions defined in SQL? Explain with example	7	CO5	L3
	b	Explain the three tier application architecture?	8	CO6	L3
		OR			
2	a	Explain how the GROUP BY clause works with an example. What is the difference between WHERE and HAVING clause.	7	CO5	L3
	b	Explain the single tier and client-server architecture with neat diagram	8	CO6	L2
3	a	Define 1NF , 2NF, 3NF with suitable example for each.	8	CO7	L3
	b	Define Minimal Cover .Write an algorithm for finding a minimal cover for a set of functional dependencies .	7	CO8	L2
		OR			
4	a	Explain insertion , deletion and modification anomalies. Illustrate with example.	8	CO7	L2
	b	Define non-additive joint property of a decomposition and write an algorithm of testing for non-additive joint property	7	CO8	L2

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	17cs53	Sem:	5	Marks:	10	Time:	90 – 120 minutes
Course:	Database Management System			Module : 3, 4			

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		Discuss how each of the following constructs is used in SQL and discuss the various options for each constructs: 1) Nested queries 2) Aggregate functions 3) Triggers 4) Views and their updatability 5) Schema change statements 6) Group by and having clause	5	CO5	L3
2		Draw and explain three tier architecture and technology relevant to each tier. write the advantages of three tier architecture	5	CO6	L4
3		What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?	5	CO6	L4
4		Define non-additive joint property of a decomposition and write an algorithm of testing for non-additive joint property	5	CO8	L4
5		Discuss insertion , deletion and modification anamolies. Why are they considered bad? Illustrate with examples	5	CO6	L4
6		Define an COMPANY database and Consider the following view, DEPT_SUMMARY , CREATE VIEWAS SELECT FROM GROUP BY DEPT_SUMMARY (D , C , Total_s , Average_s) Dno , COUNT (*), SUM (Salary), AVG (Salary) EMPLOYEE Dno ; State which of the following queries and updates would be allowed on the view. If a query or update would be allowed, show what the corresponding query or update on the base relations would look like, and give its result when applied to the database. a. SELECT FROM * DEPT_SUMMARY ; b. SELECT FROM WHERE D , C DEPT_SUMMARY TOTAL_S > 100000; c. SELECT FROM WHERE D , AVERAGE_S DEPT_SUMMARY	5	CO5	L3

		C > (SELECT C FROM DEPT_SUMMARY WHERE D =4); d. UPDATE SET WHERE DEPT_SUMMARY D =3 D =4; e. DELETE WHERE FROM DEPT_SUMMARY C > 4;			
7		Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?	5	CO7	L3
8		Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF?	5	CO7	L3
9		What is the dependency preservation property for a decomposition? Why is it important?	5	CO8	L4
10		Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F = { {A, B}→{C}, {A}→{D, E}, {B}→{F}, {F}→{G,H}, {D}→{I, J} }. What is the key for R? Decompose R into 2NF and then 3NF relations.	5	C07	L3

D3. TEACHING PLAN - 3

Module – 5

Title:	Agile Software Development,Agile Methods	Appr Time:	10 Hrs
a	*Course Outcomes*	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Demonstrate the transaction and query processing	CO9	L2
2	Analyze and implement the concurrency control and database recovery protocols in database	CO10	L2
b	*Course Schedule*		
Class No	**Module Content Covered**	**CO**	**Level**
1	Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions,	CO9	L2
2	Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, transaction support in SQL	CO9	L2
3	Concurrency Control in Databases: Two-phase locking techniques for Concurrency control	CO9	L2
4	Concurrency control based on Timestamp ordering,	CO9	L2
5	Multiversion Concurrency control techniques,	CO9	L2
6	Validation Concurrency control techniques	CO10	L2
7	Granularity of Data items and Multiple Granularity Locking. Introduction to Database Recovery Protocols: Recovery Concepts	CO10	L2
8	NO-UNDO/REDO recovery based on Deferred update	CO10	L2
9	Recovery techniques based on immediate update	CO10	L2
10	Shadow paging, Database backup and recovery from catastrophic failures		
c	**Application Areas**	**CO**	**Level**
1	Applying the characterizing schedules for transaction processing	CO10	L5
2	Understand the concurrency control techniques and database recovery protocols	CO9	L5
d	**Review Questions**	-	-
1	Draw a state diagram and discuss the typical states that a transaction goes through during execution.	CO9	L5
2	Discuss the atomicity, durability, isolation, and consistency preservation properties of a database transaction.	CO9	L5

3	Describe the four levels of isolation in SQL.	CO9	L5
4	What is a timestamp?	CO10	L5
5	What are UNDO -type log entries?	CO10	L5
6	What are REDO -type log entries?	CO10	L5
7	How does the system generate timestamps?	CO10	L5
8	Explain Shadow Paging	CO10	L5
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	17cs53	Sem:	5	Marks:	30	Time:	75 minutes			
Course:		Database Management System								
-	**-**	**Note: Answer any 2 questions, each carry equal marks. Module : 5**						**Marks**	**CO**	**Level**
1	a	Draw a state diagram and discuss the typical states that a transaction goes through during execution.						8	CO9	L5
	b	What are UNDO -type and REDO -type log entries?						7	CO10	L5
		OR								
2	a	Discuss ACID properties of a database transaction						7	CO9	L5
	b	Describe the wait-die and wound-wait protocols for deadlock prevention.						8	CO10	L5
3	a	Discuss the actions taken by the read_item and write_item operations on a database.						8	CO9	L5
	b	Describe the shadow paging recovery technique. Under what circumstances does it not require a log?						7	CO10	L5
		OR								
4	a	Explain transaction support in SQL						8	CO9	L5
	b	What is meant by transaction rollback? What is meant by cascading rollback?						7	CO10	L5

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions										
Crs Code:	17cs53	Sem:	5	Marks:	10	Time:	90 – 120 minutes			
Course:	Database Management System			Module : 5						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.										
SNo	**USN**	**Assignment Description**						**Marks**	**CO**	**Level**
1		Discuss ACID properties of a database transaction						5	CO9	L5
2		Explain transaction support in SQL						5	CO9	L5
3		Discuss the actions taken by the read_item and write_item operations on a database.							CO9	L5
4		What is a schedule (history)? Define the concepts of recoverable, cascadeless, and strict schedules, and compare them in terms of their recoverability.						5	CO9	L5
5		What is the two-phase locking protocol? How does it guarantee serializability?						5	CO9	L5
6		Describe the wait-die and wound-wait protocols for deadlock prevention.						5	CO10	L5
7		Discuss the timestamp ordering protocol for concurrency control. How does strict timestamp ordering differ from basic						5	CO9	L5

			Marks	CO	Level
		timestamp ordering?			
8		Discuss the UNDO and REDO operations and the recovery techniques that use each.	5	CO10	L5
9		Describe the shadow paging recovery technique. Under what circumstances does it not require a log?	5	CO10	L5
10		What do the terms steal/no-steal and force/no-force mean with regard to buffer management for transaction processing?	5	CO10	L5

F. EXAM PREPARATION

1. University Model Question Paper

Course:		Database Management System					Month / Year	May /2019	
Crs Code:	17CS53		Sem:	V	Marks:	100	Time:	180 minutes	
Module	**Note**	Answer all FIVE full questions. All questions carry equal marks.					**Marks**	**CO**	**Level**
1	a	Explain the typical components module of a DBMS, with a neat diagram.					10	CO1	L2
	b	Draw an ER diagram for a BANK database schema with at least five entity types. Also specify primary key and structural constraints.					10	CO2	L3
		OR							
	a	Describe the three schema architecture . Why do we need mappings among schema levels?					10	CO1	L2
	b	Define an entity or attribute . Explain the different types of attributes that occur in a ER diagram model with example					10	CO2	L2
2	a	Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course: STUDENT (Ssn,Name,Major,Bdate) COURSES(Course#,Cname,Dept) ENROLL(Ssn,Course#, Quarter, Grade) BOOK_ADOPTION(Course#,Querter,Book_isbn) TEXT(Book_isbn,Book_title,Publisher,Author) .create the above tables by properly specifying the primary keys And the foreign key. Ii. Enter atleast five tuples for each relation. Iii. Demonstrate how you add a new text book to the database and Make this book be adopted by some department. Iv. Produce a list of text books(include course #,book_isbn,book-Title) in the alphabetical order for courses offered by the cs Department that use more than 2 books. V. List any department that has all its adopted books published by Specific publisher.					10	CO3	L3
	b	In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example.					10	CO4	L3
		OR							
-	a	What is the difference between candidate key, primary key and unique key?					10	CO3	L2
	b	Explain how constraints are specified in SQL during table creation with suitable examples.					10	CO4	L3
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers.					10	CO5	L2

		e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands.			
	b	What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?	10	CO6	L2
		OR			
-	a	Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project. d) A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project with more than one employee working on it.	10	CO5	L3
	c	Discuss insertion, deletion and modification anamolies. Why are they considered bad? Illustrate with examples.	10	CO6	L3
4	a	Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF?	10	CO7	L2
	c	Define non-additive joint property of a decomposition and write an algorithm of testing for non-additive joint property	10	C08	L2
		OR			
-	a	What is meant by the attribute preservation condition on a decomposition ? Why should NULL s in a relation be avoided as much as possible?	10	CO7	L2
	b	Discuss the problem of spurious tuples and how we may prevent it.	10	CO8	L2
5	a	Draw a state diagram and discuss the typical states that a transaction goes through during execution.	10	CO9	L2
	b	Describe the shadow paging recovery technique. Under what circumstances does it not require a log?	10	CO10	L2
		OR			
	a	What is the two-phase locking protocol? How does it guarantee serializability?	8	CO9	L2
	b	What do the terms steal/no-steal and force/no-force mean with regard to buffer management for transaction processing?	12	C010	L2

2. SEE Important Questions

Course:	Database Management System					Month / Year	May /2019	
Crs Code:	17CS53	Sem:	5	Marks:	100	Time:	180 minutes	
Note	Answer all FIVE full questions. All questions carry equal marks.					-	-	
Mo dul e	Qno.	Important Question				**Marks**	**CO**	**Year**
1	1	Explain the typical components of a DBMS with a neat diagram.				8	CO1	2018
	2	Discuss the main Characteristics of the database approach. How does it differ from Traditional file systems?				4	CO1	2018
	3	Explain the three-schema architecture. What is the logical data independence and physical data independence?				4	CO1	2018
	4	Design an ER diagram for an insurance company. Assume suitable entity types like CUSTOMER,AGENT,BRANCH,POLICY,PAYMENT and the relation between them.				10	CO2	2015

	5	What are weak entity type? Explain the role of partial key in design of weak entity type?	5	CO2	2015
2	1	Discuss entity integrity and referential integrity constraint. Explain the importance of each of them	5	CO3	2015
	2	Discuss various types f join operations. Why is Theta join required.	5	CO3	2015
	3	Given the schema EMP (Fname, Lname, SSN, Bdate, Address, Sex, Salary, SuperSSN, Dno) DEP T(Dname, Dnumber, MgrSSN, MGrstartdate) DEPT-LOC (Dnumber, Dloc) PROJECT(Pname, Pnumber, Ploc,Dnum) WORKS-ON (ESSN,Pno,Hours) DEPENDENT(ESSN,Dep_name,Sex) Write the relational algebra query for the following. i)Retrieve the name of employee who works in the same department as that of "Ravi" ii)Retrieve the number of dependents for an employee named "Ravi" iii)Retrieve the name of managers working in location "DELHI" who has no female dependents.	10	CO4	2017
	4	Write a note on NULL and three valued logic	10	CO4	2014
	5	Consider the following RESORT database RESORT (resort no, resort name, resort type, resort addr, resort city, numsuite) SUITE(suit no, resort no, suite price) RESERVATION(reservation no, resort no, visitor no, check in, check out, totoal visitors, suite no) VISITOR(visitor no, firstname, lastname, visiter addr) 1) write the sql to list full details of all the resorts on los angeles 2) write the sql list full details of all the resorts having number of suits more than 30) 3) write the sql to list visitor in ascending order by firstname.	6	CO4	2018
3	1	Explain insert, delete and update statements in SQL with example.	9	CO5	2014
	2	Explain the following i)Embedded SQL ii)Stored Procedure	8	CO5	2015
	3	With program segment, explain retrieving of tuples with embedded SQL in C.	6	CO5	2019
	4	Differentiate i)Triggers and assertions ii)Embedded and Dynamic SQL iii)Outer join and Self join iv)Super key and Candidate key	8	CO5	2016
	5	What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?	4	CO6	2018
4	1	What do you mean by multivalued dependency. Explain the 4NF with example.	6	CO7	2016
	2	Explain the concept of BCNF	6	CO7	2018
	3	Discuss insertion, deletion, and modification anomalies. Why they are bad? Illustrate with example?	4	CO7	2018
	4	Define non-additive join property of a decomposition and write an algorithm f testing for non-additive join property.	4	CO8	2018
	5	What do you mean by closure of an attribute?Write an algorithm to find closure of an attribute.	6	CO8	2019
5	1	Explain transaction support in SQL		CO9	2016
	2	What is Serializibility?How can seriaizability be ensured?Justify your answer?	6	CO9	2018
	3	What is two Phase Locking? Describe with the help of an example	4	CO9	2019
	4	Discuss Time stamp ordering protocol for concurrency control.	6	CO10	2016

	5	Discuss the UNDO and REDO operations and recovery techniques that use each.	6	CO10	2018

G. Content to Course Outcomes

1. TLPA Parameters

Table 1: TLPA – Example Course

Module-#	Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Blooms' Level	Identified Action Verbs for Learning	Instruction Methods for Learning	Assessment Methods to Measure Learning
A	B	C	D	E	F	G	H
1	Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment.	5	L2	L2	Understand	Discussion	Slip test
1	Conceptual Data Modelling using Entities and Relationships: Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.	5	L2	L2	Identify	Lecture	Q & A
2	Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations. Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping	5	L2	L3	Apply	Description	Assignment
2	SQL:SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.	5	L2,L3	L3	Apply	Develope	Employee Problem set
3	SQL:Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. Database Application Development: Accessing databases from applications,	5	L3	L3	Apply	solve	Focused on analyzing / compare
3	An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop. Internet Applications:The three-Tier application architecture, The presentation layer, The Middle Tier	5	L2	L2	Analyze	Examine	Demonstrate
4	Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional	5	L2	L3	Apply	Demonstration	Quiz

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	Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms,Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form,Join Dependencies and Fifth Normal Form						
4	Normalization Algorithms: Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs, Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms	5	L2,L3	L3	Analyze	Tutorial	Analyze
5	Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL.	5	L2	L3	Demonstrate	Presentation	Seminar
5	Concurrency Control in Databases: Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques, Validation Concurrency control techniques, Granularity of Data items and Multiple Granularity Locking. Introduction to Database Recovery Protocols: Recovery Concepts, NO-UNDO/REDO recovery based on Deferred update, Recovery techniques based on immediate update, Shadow paging, Database backup and recovery from catastrophic failure.	5	L3,L4	L4	Analyze	Method/ procedure	Student analyze / focuses

2. Concepts and Outcomes:

Table 2: Concept to Outcome – Example Course

Module-#	Learning or Outcome from study of the Content or Syllabus	Identified Concepts from Content	Final Concept	Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short word for learning or outcome)	CO Components (1.Action Verb, 2.Knowledge, 3.Condition / Methodology, 4.Benchmark)	Course Outcome **Student Should be able to ...**
A	I	J	K	L	M	N
1	Characteristics of database approach, Advantages of using the DBMS approach	Storage of data	Real-time usage of database	importance of Database management system	Understand , importance of Database management system , real time.	Understand the importance of Database management system in real time.
1	Data Models, Schemas and Instances. Three schema architecture and data	Entity relationship	Conceptual modeling	Entity relationship model	Identify ,methodology of conceptual modeling ,Entity relationship model	Identify methodology of conceptual modeling through Entity relationship model

	independence, database languages, and interfaces					
2	Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations. Relational Algebra	Relational Algebra	Implementation database concepts using relational algebra	Relational model concepts	Apply ,the relational model concepts and operations , optimizing queries in RDBMS.	Apply the relational model concepts and operations for optimizing queries in RDBMS.
2	SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL	Structured query language	Database schema design	Database schema design	Apply, the SQL commands , creating tables in database schema.	Apply the SQL commands for creating tables in database schema.
3	Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL	SQL	Schema change statement using SQL	Schema change statement using SQL	Apply, the triggers and views , database schema.	Apply the triggers and views in database schema.
3	JDBC classes and interfaces, SQLJ, Stored procedures, Case study	Data connectivity	Internet application	Database application	Analyze ,the access methods to store the data , internet application	Analyze the access methods to store the data through internet application
4	Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation	Database design	Mathematical Modeling	Database design	Apply, the normalization techniques , using mathematical modeling	Apply the normalization techniques to normalize the database using mathematical modelling

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	schema, Functional Dependencies,Normal forms				
4	Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs	Normalization	Different types of normalization	database design theory	Analyze ,the different types of algorithm , database design theory	Analyze the different types of algorithm using database design theory for different applications
5	Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability ,Serializability	Transaction processing	Transaction processing	Transaction support in SQL	Demonstrate, transaction and query processing	Demonstrate the transaction and query processing
5	wo-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques, Database recovery methods	Data transaction and recovery methods	Concurrency control and database recovery protocols	Database recovery methods	Analyze and implement ,, concurrency control and database recovery protocols, database	Analyze and implement the concurrency control and database recovery protocols in database

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