Lesson Plan

Branch: Computer

Semester:IV Year: 2022-23

Course Title: Database Management System	SEE: 3 Hours – Theory & Oral Examination
Total Contact Hours: 36 Hours	Duration of SEE: 3 Hrs
SEE Marks: 80 (Theory) + 20 (IA)	
Lesson Plan Author:Dr Sujata Deshmukh,Prof.Jagruti Nagaonkar	Date: 20.1.23
Checked By:	Date:23.1.23

Syllabus:

Course Code:	Course Title	Credit
CSC403	Database Management System	3

Prerequisite: Data Structures	
Course Objectives:	
1	Develop entity relationship data model and its mapping to relational model
2	Learn relational algebra and Formulate SQL queries
3	Apply normalization techniques to normalize the database
4	Understand concept of transaction, concurrency control and recovery techniques.
Course Outcomes:	
1	Recognize the need of database management system
2	Design ER and EER diagram for real life applications
3	Construct relational model and write relational algebra queries.
4	Formulate SQL queries
5	Apply the concept of normalization to relational database design.
6	Describe the concept of transaction, concurrency and recovery.

Module		Content	Hrs
1		**Introduction Database Concepts**	3
	1.1	Introduction, Characteristics of databases, File system v/s Database system, Data abstraction and data Independence, DBMS system architecture, Database Administrator	
2		**Entity–Relationship Data Model**	6
	2.1	The Entity-Relationship (ER) Model: Entity types: Weak and strong entity sets, Entity sets, Types of Attributes, Keys, Relationship constraints: Cardinality and Participation, Extended Entity-Relationship (EER) Model: Generalization, Specialization and Aggregation	
3		**Relational Model and relational Algebra**	8
	3.1	Introduction to the Relational Model, relational schema and concept of keys. Mapping the ER and EER Model to the Relational Model, Relational Algebra-operators, Relational Algebra Queries.	
4		**Structured Query Language (SQL)**	6
	4.1	Overview of SQL, Data Definition Commands, Integrity constraints: key constraints, Domain Constraints, Referential integrity , check constraints, Data Manipulation commands, Data Control commands, Set and string operations, aggregate function-group by, having, Views in SQL, joins, Nested and complex queries, Triggers	
5		**Relational-Database Design**	6
	5.1	Pitfalls in Relational-Database designs, Concept of normalization, Function Dependencies, First Normal Form, 2NF, 3NF, BCNF.	
6		**Transactions Management and Concurrency and Recovery**	10
	6.1	Transaction concept, Transaction states, ACID properties, Transaction Control Commands, Concurrent Executions, Serializability-Conflict and View, Concurrency Control: Lock-based, Timestamp-based protocols, Recovery System: Log based recovery, Deadlock handling	

Textbooks:	
1	Korth, Slberchatz, Sudarshan, Database System Concepts, 6th Edition, McGraw Hill
2	Elmasri and Navathe, Fundamentals of Database Systems, 5th Edition, Pearson Education
3	Raghu Ramkrishnan and Johannes Gehrke, Database Management Systems, TMH
References:	
1	Peter Rob and Carlos Coronel, Database Systems Design, Implementation and Managementl, Thomson Learning, 5th Edition.
2	Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g, Black Book, Dreamtech Press.
3	G. K. Gupta, Database Management Systems, McGraw Hill, 2012

Assessment:	
Internal Assessment:	
Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed. Duration of each test shall be one hour.	
End Semester Theory Examination:	
1	Question paper will comprise of total six questions.
2	All question carries equal marks
3	Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4	Only Four question need to be solved.
5	In question paper weightage of each module will be proportional to number of respective lecture hours as mention in the syllabus.

Useful Links	
1	https://nptel.ac.in/courses/106/105/106105175/
2	https://swayam.gov.in/nd1_noc19_cs46/preview
3	https://www.classcentral.com/course/swayam-database-management-system-9904
4	https://www.mooc-list.com/tags/dbms

Course Outcomes:

CO-PO Mapping: (BL – Blooms Taxonomy, C – Competency, PI – Performance Indicator)

CO	BL	C	PI	PO	Mapping
CSC 403.1 Recognize the need of Database management system	L1,L2	1.4	1.4.1	PO1	3
CSC 403.2 Design and draw ER and EER diagram for the real life problem and Construct relational model	L5	1.4	1.4.1	PO1	3
		2.1.	2.1.2	PO2	3
		3.2.	3.2.1	PO3	3
		9.3	9.3.1	PO9	2
		10.1	10.1.1 10.1.2	PO10	2
		11.3	11.3.1	PO11	1
		12.2	12.2.1	PO12	2
CSC 403.3 Write relational algebra queries.	L4,L5	1.4	1.4.1	PO1	3
		2.1.	2.1.2	PO2	3
		9.2	9.2.3	PO9	2
		10.1.	10.1.1	PO10	1
		11.3	11.3.1	PO11	1
		12.2	12.2.1	PO12	2

CSC 403.4 Formulate SQL queries	L4,L5	1.4	1.4.1	PO1	3
		2.1.	2.1.2	PO2	3
		3.3	3.3.1	PO3	3
		4.1.	4.1.2	PO4	2
		5.5	5.2.2	PO5	3
		9.2	9.2.3	PO9	2
		10.1.	10.1.1	PO10	2
		11.3	11.3.1	PO11	1
		12.2	12.2.1	PO12	2
CSC 403.5 Analyze and apply concepts of normalization to relational database design.	L3,L4	1.4	1.4.1	PO1	3
		2.1.	2.1.2	PO2	3
		3.3	3.3.1	PO3	3
		9.2	9.2.3	PO4	2
		10.1.	10.1.1	PO10	2
		11.3	11.3.1	PO11	1
		12.2	12.2.1	PO12	2
CSC 403.6 Describe and apply the concept of transaction, concurrency and recovery	L1,L2,L4	1.4	1.4.1	PO1	3
		2.1.	2.1.2	PO2	3
		3.3	3.3.1	PO3	3
		4.1	4.1.1	PO4	2

		5.2	5.2.2	PO5	2
		9.2	9.2.3	PO9	2
		10.1	10.1.1	PO10	1
		11.3	11.3.1	PO11	1
		12.2	12.2.1	PO12	1

Mapping of CO and PO/PSO

Relationship of course outcomes with program outcomes: Indicate 1 (low importance), 2 (Moderate Importance) or 3 (High Importance) in respective mapping cell.

	PO1 (Engg Know)	PO2 (Ana)	PO3 (De sign)	PO4 (inve stiga)	PO5 (tools)	PO6 (engg Soci)	PO7 (Env)	PO8 (Eth)	PO9 (ind/ Team)	PO10 (comm.)	PO11 (PM)	PO12 (Life Long)
CSC403.1	3											2
CSC403.2	3	3	3						2	2	1	2
CSC403.3	3	3							2	1	1	2
CSC403.4	3	3	3	2	3				2	2	1	2
CSC403.5	3	3	3						2	2	1	2
CSC403.6	3	3	3	2	2				2	2	1	2
Course To PO	3	3	3		3				2	2	1	1
PO ATTAINMENT												

CO	PSO1(Develop AIML)	PSO2(Apply CS to protect IS assets)
CSC402.1	1	
CSC402.2	1	1
CSC402.3	1	1
CSC402.4	2	1
CSC402.5	1	1
CSC402.6	1	2
Course to PSO		

CO Assessment Tools:

Method	Direct(80%)				Indirect(20%)
	Internal (40%)			External(60%)	
Co	Test	Assignment	Quizzes	End Sem Exam	Course Exit Survey
CSC403.1	0.2*UT1	0.1*A1	0.1*Q1	0.6	1
CSC403.2	0.2*UT1	0.1*A1	0.1*Q1	0.6	1
CSC403.3	0.2*UT1	0.1*A1	0.1*Q1	0.6	1
CSC403.4	0.2*UT1	0.1*A1	0.1*Q1	0.6	1
CSC403.5	0.2*UT2	0.2*A2	0.1*Q2	0.6	1
CSC403.6	0.2*UT2	0.1*A2	0.1*Q2	0.6	1

Attainment:

CO CSC403.1:

Direct Method

$$A_{\text{CSC403.1}D} = 0.2 * Test1 + 0.1 * Assignment + 0.1 * Quizzes + 0.6 * SEE\_Theory$$

Final Attainment:

$$A_{\text{CSC403.1}} = 0.8 * A_{\text{CSC403.1}D} + 0.2 * A_{\text{CSC403.1}I}$$

CO CSC403.2:

Direct Method

$$A_{\text{CSC403.2}D} = 0.2 * Test1 + 0.1 * Assignment + 0.1 * Quizzes + 0.6 * SEE\_Theory$$

Final Attainment:

$$A_{\text{CSC403.2}} = 0.8 * A_{\text{CSC403.2}D} + 0.2 * A_{\text{CSC403.2}I}$$

CO CSC403.3:

Direct Method

$$A_{\text{CSC403.3}D} = 0.2 * Test1 + 0.1 * Assignment + 0.1 * Quizzes + 0.6 * SEE\_Theory$$

Final Attainment:

$$A_{\text{CSC403.3}} = 0.8 * A_{\text{CSC403.3}D} + 0.2 * A_{\text{CSC403.3}I}$$

CO CSC403.4:

Direct Method

$$A_{CSC403.4D} = 0.2 * Test2 + 0.1 * Assignment + 0.1 * Quizzes + 0.6 * SEE\_Theory$$

Final Attainment:

$$A_{CSC403.4} = 0.8 * A_{CSC403.4D} + 0.2 * A_{CSC403.4I}$$

CO CSC403.5:

Direct Method

$$A_{CSC403.5D} = 0.2 * Test2 + 0.1 * Assignment + 0.1 * Quizzes + 0.6 * SEE\_Theory$$

Final Attainment:

$$A_{CSC403.5} = 0.8 * A_{CSC403.5D} + 0.2 * A_{CSC403.5I}$$

CO CSC403.6:

Direct Method

$$A_{CSC403.6D} = 0.2 * Test2 + 0.1 * Assignment + 0.1 * Quizzes + 0.6 * SEE\_Theory$$

Final Attainment:

$$A_{CSC403.6} = 0.8 * A_{CSC403.6D} + 0.2 * A_{CSC403.6I}$$

Content Beyond Syllabus:

Database System Architectures -Distributed Database

Curriculum Gap:

Distributed Database system is not included in this revised syllabus of 2019. It is important from the perspective of Data mining and warehouse where system need to integrate heterogeneous / homogenous databases from different locations. Mapped with PO12 AND PSO1

FR. Conceicao Rodrigues College Of Engineering

Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50

Department of Computer Engineering
(2022-2023)
Lesson Plan

CLASS-SEM: S.E.- V **Credits-4**
SUBJECT: *Database Management Systems* (DBMS) **SUBJECT CODE- CSC403**

Professor: Prof.Jagruti Nagaonkar

Modes of Content Delivery:

i	Online Teaching	v	Self Learning Online Resources	Ix	Industry Visit/Technical Paper presentation in class
ii	Tutorial	vi	Slides, PPT	X	Group Discussion
iii	Remedial Coaching	vii	Simulations/Demonstrations	xi	Seminar
iv	Lab Experiment	viii	Expert Lecture	xii	Case Study

Lect. No.	Chap.no	Portion to be covered	Planned date	Actual date	Content Delivery Method/ Learning Activities
	Introduction Database concept				
1	1	Introduction, File system V/s Database system, adv and disadv., Characteristics of databases, Users of Database system, Roles of Database Administrator	10.1.2023	10.1.2023	PPT
2		Data Independence , Architecture	11.1.2023	11.1.2023	PPT
3		Schema, instance, Data Independence, levels of abstraction	12.1.2023	12.1.2023	PPT
	Entity Relationship Data model				
4	2	ER Diagrams basics, Problem statement for ER diagram	18.1.2023	18.1.2023	PPT
5		EER Diagrams, Explanation plus problem statement, Specialization & Generalization	19.1.2023	19.1.2023	PPT
6		Convert Problem statements into ER Diagram	19.1.2023	19.1.2023	PPT, Open Discussion with Students

Relational Model and relational algebra					
7	3.1	Introduction to the Relational Model, relational schema and concept of keys	15.2.2023	15.2.2023	PPT
8	3.2	Mapping the ER and EER Model to the Relational Model	16.2.2023	16.2.2023	PPT
9	3.3	Relational Algebra – unary and set operations, Relational Algebra Queries.	21.2.2023	21.2.2023	PPT
10	3.4	Problems based on Relational Algebra	22.2.2023	21.2.2023	PPT
Structured Query Language					
11	4	Structured Query Language (DDL), Structured Query Language (DML) Select ,Insert,Update,Delete	24.1.2023	22.2.2023	PPT, demonstration of experiment
12		Structured Query language(DDL) Alter,Drop,Truncate, Distinct,Order By	25.1.2023	24.1.2023	PPT, demonstration of experiment
13		Structured Query language(DML) Aggregate Functions, Simple Sub Query ,GroupBy ,Having	31.1.2023	25.1.2023	PPT
14		Sql SET Operations(IN,ANY,ALL), BETWEEN and NOT BETWEEN,IS NULL and IS NOT NULL	1.2.2023	31.1.2023	PPT
15		SQL JOINS (INNER ,OUTER(LEFT | RIGHT | FULL)	2.2.2023	1.2.2023	PPT
16		Nested and complex queries with examples, Views in SQL	7.2.2023	2.2.2023	PPT
17		Integrity constraints :- key constraints, Domain Constraints, Referential, integrity , check constraints	8.2.2023	7.2.2023	PPT
18		Different Keys in DBMS with example	9.2.2023	8.2.2023	PPT
19		Triggers	14.2.2023	9.2.2023	PPT
Relational Database Design					
20	5	Relational–Database Design	23.2.2023	14.2.2023	UT1 : 28 Feb,2-3 march 2023

		Design guidelines for relational schema, Function dependencies,			PPT
21		Function dependencies, Identifying candidate keys from given FD's	2.3.2023	23.2.2023	PPT
22		Need of normalization, Lossless join and Functional dependency preserving property	8.3.2023	2.3.2023	PPT
23		Normal Forms- 1NF, 2 NF, 3NF	9.3.2023	8.3.2023	PPT
24		Examples on 1NF,2NF,3NF,BCNF and Finding Candidate keys	14.3.2023	9.3.2023	Open Discussion with Students
Transaction management and concurrency and recovery					
25	6	Transaction concept, Transaction states, ACID properties,	15.3.2023	14.3.2023	PPT
26		Concurrent Executions, Recoverability, Serializability	16.3.2023	15.3.2023	PPT
27		Concurrency Control: Lock based protocols	21.3.2023	16.3.2023	PPT
28		Concurrency Control: Timestamp-based protocols	23.3.2023	21.3.2023	PPT
29		Log based recovery	28.3.2023	23.3.2023	PPT
30		Deadlock handling	29.3.2023	28.3.2023	PPT
31		University problems on conflict and view Serializability	5.4.2023	29.3.2023	PPT
32		Content Beyond Syllabus	6.4.2023	5.4.2023	Discussion withstudents ,PPT
33		Innovative Activity – crossword	16.2.2023	6.4.2023	Concept revision and Activity of Crossword
34		Remedial and Revision (M1,M2)	11.4.2023	16.2.2023	Discussion with students ,PPT
35		Remedial and Revision(M3 , M4)	12.4.2023	11.4.2023	Discussion with students ,PPT
36		Remedial and Revision(M5-M6)	13.4.2023	12.4.2023	Discussion with students ,PPT

Text Books/ Reference Books:

Te x t B o o k s :

1. G. K. Gupta :"Database Management Systems", McGraw – Hill.
2. **Korth, Slberchatz,Sudarshan, :"Database System Concepts", 6th Edition, McGraw – Hill**
3. Elmasri and Navathe, " Fundamentals of Database Systems", 5thEdition, PEARSON Education.
4. Peter Rob and Carlos Coronel, " Database Systems Design, Implementation and Management", Thomson Learning, 5th Edition.

Reference Books:

1. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g,Black Book, Dreamtech Press
2. Mark L. Gillenson, Paulraj Ponniah, " Introduction to Database Management", Wiley
3. Sharaman Shah ,"Oracle for Professional", SPD.
4. Raghu Ramkrishnan and Johannes Gehrke, "Database Management Systems", TMH
5. Debabrata Sahoo "Database Management Systems" Tata McGraw Hill, Schaum's Outline

Online Resources :

1) https://www.db-book.com/db6/slide-dir/index.html- **Korth, Slberchatz,Sudarshan, 6th Edition**
2) http://www.tutorialspoint.com/sql/ **(Weak students)**
3) https://www.w3schools.com/sql/default.asp
4) http://www.mysqltutorial.org/ or https://www.tutorialspoint.com/postgresql/
5) https://academy.vertabelo.com/course/standard-sql-functions# **(Strong students)**
6) **www.postgresqltutorial.com/postgresql-grouping-sets/ (Strong students)**
7) **www.postgresqltutorial.com**
8) https://www.freeprojectz.com/entity-relationship-diagram
9) https://www.w3schools.com/sql/sql_any_all.asp
10) https://www.geeksforgeeks.org/sql-all-and-any/
11) Data Base Management System - Course (nptel.ac.in)

1. Students should focus on following points to Learn **SQL online**

- Basic SQL commands to manipulate data stored in relational databases
- The most commonly used SQL commands to query a table in a database
- Using SQL to perform calculations during a query
- Querying multiple tables using joins
- Explore more about Triggers and functions and procedures

Evaluation Scheme

CIE Scheme

Internal Assessment: 20 (Average of two tests)

Internal Assessment Scheme

Module		Lecture Hours	No. of questions in		No. of questions in SEE
			Test 1	Test 2	
1	**Introduction Database concept**	03	01 (5 marks)	--	
2	**Entity Relationship Data model**	06	01 (5 marks)	--	
3	**Relational Model and relational algebra**	08	01 (5 Marks)	01 (5 Marks)	
4	**Structured Query Language**	06	01 (5 marks)		
5	**Relational Database Design**	06	--	02 (5 Marks Each)	
6	**Transaction management and concurrency and recovery**	10	--	02 (5 Marks Each)	

Note: Four to six questions will be set in the Test paper

Verified by:

Programme Coordinator Subject Expert