Fr. Conceicao Rodrigues College Of Engineering

Department of Artificial Intelligence and Data Science Engineering

S.E. (AI DS) (semester IV) (2022-2023)
Course Outcomes & Assessment Plan

Subject: Database Management System (DBMS-CSC403)
Credits-3

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 concepts of transaction, concurrency control and recovery techniques

Teaching Scheme

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical/Oral	Tut	Credits
CSC403	Database Management System	03	--	--	03	--	---	03
CSL403	Database Management System	--	02	--	--	01	--	02

Examination Scheme

Course Code	Course Name	Theory Marks				Term Work	Practical & Oral	Total
		Internal Assessment			End Sem Exam			
		Test1	Test2	Avg				
CSC603	Database Management System	20	20	20	80 (3hr)	---	---	100

CSL603	Database Management System					25	25	50

Syllabus: **Prerequisite**: Data Structures

1 Introduction Database Concepts (3)

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)

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)

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)

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)

Pitfalls in Relational-Database designs, Concept of normalization, Function Dependencies, First Normal Form, 2NF, 3NF, BCNF.

6. Transactions Management and Concurrency and Recovery (10)

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

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.

Lecture Plan : SEM IV-DBMS-CSC403

Modes of Content Delivery:

i	Class Room Teaching	v	Self-Learning Online Resources	ix	Industry Visit
ii	Tutorial	vi	Slides	x	Group Discussion
iii	Remedial Coaching	vii	Simulations/Demonstrations	xi	Seminar
iv	Lab Experiment	viii	Expert Lecture	xii	Case Study

Term : 09th Jan – 22 Apr 2023 (UT1 : 27 Feb - 2 Mar) (UT2 : 17Apr -20 Apr)

No.	Portion to be covered	Planned date	Actual date	Content Delivery - Reference /Assessment Method
1	Introduction, File system V/s Database system, adv and disadv.	9/1/23		PPT, **UT1**
2	Characteristics of databases, Users ofDatabase system, Roles of Database Administrator	10/1/23		PPT, **UT1**
3	Data Independence and data abstraction , DBMS Architecture ,Schema, Instance.	12/1/23		PPT, **UT1**
4	ER Diagrams basics: Entity, Attribute, Relationship etc.	**16**/1/23		PPT, **UT1,Assgn**
5	Entity types: Weak and strong entity sets, Entity sets, Types ofAttributes, Keys. Examples of each.	**17**/1/23		PPT, **UT1,Assgn**
6	Relationship constraints: Cardinality and Participation, Problem statement for ER diagram.	**19**/1/23		PPT, **UT1,Assgn**
7	Solved University problems based on ER model	**23**/1/23		PPT, **UT1,Assgn**
8	EER : Specialization & Generalization ConvertProblem statements into ER Diagram	24/1/23		PPT, **UT1,Assgn**
9	Introduction to the Relational Model,relational schema and concept of keys	25/1/23		PPT, **UT1,Assgn**
10	Mapping the ER and EER Model to the Relational Model	30/1/23		PPT, **UT1,Assgn**
11	Relational Algebra – unary and setoperations, Relational Algebra Queries.	31/1/23		PPT, **UT1,Assgn**
12	Problems based on Relational Algebra	**1/2/23**		PPT, **UT1,Assgn**

13	Overview of SQL, DDL commands: CREATE, DROP, ALTER , TRUNCATE, RENAME	4/2/23		PPT, **UT1,Assgn**
14	DML commands – SELECT, UPDATE, INSERT, DELETE	6/2/23		PPT, **UT1,Assgn**
15	Integrity constraints: key constraints, Domain Constraints,Referential integrity , check constraints,	7/2/23		PPT, **UT1,Assgn**
16	DML- Aggregate Functions, Simple Sub queries, GroupBy , order byHaving	8/2/23		PPT, **UT1,Assgn**
17	String operations, Sql SET Operations . Sql Queries with IN,ANY,ALL,BETWEEN, NOTBETWEEN,IS NULL, IS NOT NULL.	13/2/23		PPT, **UT1,Assgn**
18	SQL JOINS (INNER ,OUTER(LEFT | RIGHT |FULL), NATURAL, CROSS)	14/2/23		PPT, **UT1,Assgn**
19	Simple Nested and complex queries, Nested sub queries with SOME, ANY, ALL, EXISTS, NOT EXISTS	15/2/23		PPT, **UT1,Assgn**
20	Nested and complex queriesexamples, Views in SQL,	20/2/23		PPT, **UT1,Assgn**
21	Complete Hands Practice on University Database with all types ofqueries	21/2/23		PPT, **UT1,Assgn**
22	PL/SQL	22/2/23		PPT, **UT2,Assgn**
23	Triggers	4/3/23		PPT, **UT2,Assgn**
24	Pitfalls in relational Database designs , Concept of Normalization	6/3/23		PPT, **UT2,Assgn**
25	Function dependencies, Identifyingcandidate keys from given FD's	8/3/23		PPT, **UT2,Assgn**
26	Need of normalization, Lossless join and Functional dependency preserving property.	13/3/23		PPT, **UT2,Assgn**
27	Normal Forms- 1NF, 2 NF,3NF	14/3/23		PPT, **UT2,Assgn**
28	BCNF, Examples on 1NF,2NF,3NF,BCNF and FindingCandidate keys.	15/3/23		PPT, **UT2,Assgn**
29	More problems on Normalization	18/3/23		PPT, **UT2,Assgn**
30	Transaction concept, Transaction states, ACID properties.	20/3/23		PPT, **UT2,Assgn**
31	Transaction Control Commands, Concurrent Executions,	21/3/23		PPT, **UT2,Assgn**
32	Serializability-Conflict and View	27/3/23		PPT, **UT2,Assgn**
33	Problems solved on serializability	28/3/23		PPT, **UT2,Assgn**
34	Concurrency Control: Lock basedprotocols	29/3/23		PPT, **UT2,Assgn**
35	Concurrency Control: Timestamp-based protocols	1/4/23		PPT, **UT2,Assgn**

36	Problems solved on Timestamp based protocol	**3**/4/23		PPT, **UT2,Assgn**
37	Recovery System: FailureClassification	**5**/4/23		PPT, **UT2,Assgn**
38	Log based recovery	10/4/23		PPT, **UT2,Assgn**
39	Deadlock handling	11/4/23		PPT, **UT2,Assgn**
40	Revision	12/4/23		

Total Lectures : 40

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

Reference Books:

1. Peter Rob and Carlos Coronel, Database Systems Design, Implementation andManagement‖, Thomson Learning, 5thEdition.
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

Online Resources:

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-9914
4. https://www.mooc-list.com/tags/dbms

Other useful Resources:

1) https://www.db-book.com/db6/slide-dir/index.html- **Korth, Slberchatz,Sudarshan, 6thEdition**
2) http://www.tutorialspoint.com/sql/ **(Weak students)**
3) https://www.w3schools.com/sql/default.asp **(Average students)**
4) http://www.mysqltutorial.org/ or https://www.tutorialspoint.com/postgresql/MySql
5) https://academy.vertabelo.com/course/standard-sql-functions# **(Strong students)**
6) **www.postgresqltutorial.com**
7) https://www.freeprojectz.com/entity-relationship-diagram
8) https://www.w3schools.com/sql/sql_any_all.asp

9) https://www.geeksforgeeks.org/sql-all-and-any/

Videos

1. ER Diagram Mapping- https://www.youtube.com/watch?v=WSNqcYqByFk(NPTEL)
2. Functional dependency and Normal Form - https://www.youtube.com/watch?v=YD8dhOmuVnY(NPTEL
3. SQL Joins Tutorial for Beginners - Inner Join, Left Join, Right Join, Full Outer Join: https://www.youtube.com/watch?v=2HVMiPPuPIM (Youtube Video)

Course Outcomes: [Target 2.5]

After successful completion of the course students will be able to:

CSC403.1 : Recognize the need of database management system

CSC403.2 : Design ER and EER diagram for real life applications

CSC403.3 : Construct relational model and write relational algebra queries.

CSC403.4 : Formulate SQL queries

CSC403.5 : Apply the concept of normalization to relational database design.

CSC403.6 : Describe the concepts of transaction, concurrency and recovery. After successful completion of the course students will be able to:

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	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		PSO1
CSC603.1	3													3
CSC603.2	3	3	3						3	2	2	2		3
CSC603.3	3	3	3		3				3	2	2	2		3
CSC603.4	3	3	3						2	3	3	2		3
CSC603.5	3	3	3						2	2	2			3
CSC603.6	3													3
TOTAL	18	12	12		03				10	09	09	06		18
CO-PO MATRIX	**3**	**3**	**3**		**3**				**2.5**	**2.25**	**2.25**	**2**		**3**

CO ASSESSMENT TOOLS

Course Outcome			***Direct Method***						***Indirect Method (20%)***
	UT		Assignment			Quiz		End sem Exam	
ECC305.1	30%	--	--	--		40%		30%	100%
ECC305.2	30%	--	--	30%		--		40%	100%
ECC305.3	15%	15%	20%	20%		--		30%	100%
ECC305.4	--	30%	30%	--		--		40%	100%

ECC305.5	--	40%	--	--	30%			30%	100%
ECC305.6	--	40%			30%			30%	100%

CO calculation= (0.8 *Direct method + 0.2*Indirect method)

Rubrics for assessing Course Outcome with each assessment tool:

Curriculum Gap/Content Beyond Syllabus:

Sr. No.	Gap/Content Beyond Syllabus	Activity	Topic
1	Unstructured data management	Guest lecture	Mongo DB
2			

Rubrics for Assignments

Class : S.E. AI & DS **Semester : IV**

Assignment No:	
Title:	
Date of Performance:	
Roll No:	
Name of the Student:	

Indicator	Poor	Average	Good
Timeliness • Maintains assignment deadline (2)	Assignment not done (0)	One or More than One week late (1)	Maintains deadline (2)
Completeness and neatness • Complete all parts of assignment(3)	N/A	< 80% complete (1-2)	100% complete (3)
Originality • Extent of plagiarism(2)	Copied it from someone else(0)	Atleast few questions have been done without copying(1)	Assignment has been solved completely without copying (2)
Knowledge • In depth knowledge of the assignment(3)	Unable to answer all questions(0)	Unable to answer some questions (1 or 2)	Able to answer all questions (3)