NITK –Surathkal
Department of Computer Science & Engineering
Course Plan

Name of the Course: Database System	Course No: CS251	No. of Credits (L-T-P): 4(3-1-0)
Year : 2020 Semester: V Section: S1 &S2	Course Type: Program Core(PC)	Academic Session: Even

Prerequisites (if any):None

Name and Contact Details of Course Instructor:

Dr.M.Venkatesan, venkisakthi77@gmail.com;venksakthi@nitk.edu.in

Evaluation Scheme: Quiz -1&2 :20%, Tutorials:10%, Mid Sem: 30%, Final Exam: 40%.

Course Objectives:

1. Understand the role of a database management system in an organization.
2. Learn the basic concepts and operation of the relational data model.
3. Construct simple and moderately advanced database queries using Structured Query Language (SQL).
4. Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
5. Understand the concept of a database transaction and related database facilities, including concurrency control, backup and recovery, and security
6. Learn recent NoSQL Database concepts for unstructured data

Course (Learning) Outcomes (COs):

CO1 – Able to know the basic structure of database and its related operations.
CO2 – Recognise and use various types SQL queries for database applications.
CO3 – Design database using ER Model and various types of normalization techniques.
CO4 – Know the transaction processing algorithms, concurrency control techniques and security Methods.

Mapping of COs with POs:
(Strength of correlation: S-Strong, M-Medium, W-Weak)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	S	M	S	M	M	W	W	S	S	S
CO2	S	S	S	S	S	W	W	W	W	M	S	S
CO3	S	S	S	S	S	S	M	M	M	S	M	S
CO4	S	S	S	S	S	M	S	M	S	M	S	S

1. Teaching Learning Interaction:

Module – Title		Content	L-T-P hours
M1	Introduction to Database	Difference between file system and database , Characteristics of database approach, Three schema architecture, Data Models, Database concepts, Database Languages and Interfaces.	6-0-0
M2	E-R Model	Entity, Attributes, Type of Attributes, Relationship Types, Relationship Sets, Roles, and Structural Constraints, ER Diagram Notations, Naming Conventions and Design Issues, ER-to-Relational Mapping Algorithm.	7-2-0
M3	Relational Data Model ,	Relational Data Model Concepts and Integrity Constraints	6-1-0
M4	Relational Algebra and Relational Calculus SQL	Relational Algebra :Unary Relational Operations: Select and Project, Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Relational Calculus- Tuple Relational Calculus and Domain Relational Calculus , SQL Query , DDL, DML, Subquery, and Joins,	6-2-0
M5	Normalization	Functional Dependency, Normal Forms-First, Second, Third and Boyce-Codd normal form.	5-1-0
M6	File Handling	File Structures, Indexing, and Hashing.	6-1-0
M7	Query Optimization, Transaction Processing,	Heuristics Query Optimization, Transaction Processing Concepts, Desirable Properties of Transactions, Serial, Non serial, and Conflict-Serializable Schedules,	5-2-0
M8	Concurrency Control & Backup &Recovery	Concurrency Control Techniques-Two-Phase Locking Techniques-Timestamp Ordering-Basic of database recovery and security.	5-1-0
M9	No SQL Database	MongoDB	2-0-0
	Topics beyond syllabus/Advanced Topics (if any): No SQL Database-MongoDB		
	Gaps in the Syllabus (if any)		

2. List of Text Books & Reference Books, On-line Course Resources:

a. Ramez Elmasri and Shamkant B.Navathe, Fundamentals of Database Systems, Pearson Education,7th edition, 2016.
b. Raghu Rama Krishnan, Database Management Systems, Tata Mcgraw Hill,6th Edition,2010.
c. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, Database System Concepts, Tata McGraw Hill, 6th edition, 2011.
d. J.O. Ullman, "Principles of Database systems", Galgotia Publishers

2.1 NPTEL Courses (http://www.nptel.ac.in):

a. Database Management System -Prof. Partha Pratim Das -IIT Kharagpur (Jul- Sep 2019)

b. Database Design / Database Management System -Prof. D. Janakiram -IIT Madras

c. Fundamentals of Database Systems- Prof. Arnab Bhattacharya -IIT Kanpur

d. Database Management System -Partha Pratim Das -IIT Kharagpur

2.2 Coursera course:

a. Database Management Essentials -Michael Mannino-University of Colorado Denver-https://www.coursera.org/learn/database-management

3 Suggested list of Assignments / home works /problems/ ANY OTHER :

a. Designing ER Diagram for any web based application(University database)
b. Mapping the ER diagram to relation schema
c. Applying various normalization techniques on relation schema.
d. Writing complex queries to resolve real time database applications using sql, relational algebra and relational calculus.
e. Problems related to transaction processing and concurrency control.

4. Laboratory Instructions (if any) :

Develop an application and implement a database system for any real time applications area in which you have an interest. Use back end as MySQL and front end environments of your choice to develop your system. You are required to consider the following stages to complete your task:

Stage1: Choose your real time application and explore suitable framework to develop your application and submit one page abstract about your project.

Stage 2: Design an ER diagram of your proposed database application using any one of the ER tools like ER win, ER studio, etc

Stage 3: Map the ER diagram to Relation Schema and Apply integrity constraints.

Stage 4: Develop your backend using MySql database and learn sql operations, sub query and join.

Stage 5: Develop an application(front end environment) based on your choice

Stage 6: Demonstrate the DB system with a written report and justify you're system meets the minimum requirements of the lab.

5. Assessment Pattern (Use Bloom's Taxonomy to design rubrics for evaluating student performance)

Level No.	**Knowledge Level**	**Evaluation Component**					**Assessment (%)**
		Quizzes (10%)	Tutorials (10%)	Assignments (10%)	Mid Sem (30%)	Final Exam (40%)	
K1	Remember	10%	0%	0%	10%	10%	8
K2	Understand	20%	20%	20%	20%	15%	18
K3	Apply	20%	20%	10%	25%	25%	22.5
K4	Analyse	20%	20%	10%	20%	25%	21
K5	Evaluate	20%	20%	10%	15%	15%	15.5
K6	Create	10%	20%	50%	10%	10%	15
							100%

Name and Signature of Course Instructor:

M.Venkatesan

HOD signature: