INSTITUTE	**FACULTY OF COMPUTER APPLICATIONS**
PROGRAM	**MASTER OF SCIENCE (DATA SCIENCE)**
SEMESTER	**1**
COURSE TITLE	**RELATIONAL AND NON-RELATIONAL DATABASES**
COURSE CODE	**05MD0104**
COURSE CREDITS	**2**

Objective:

1 To give brief insight on basic fundamental aspects of relational database system and non – relational database.
2 To implement and execute SQL queries.
3 To implement and execute interactive SQL queries.
4 To understand concept of NoSQL database and manage the data with MongoDB.
5 To implement CRUD operations using Cassandra and Redis.

Course Outcomes: After completion of this course, student will be able to:

1 Understand basic fundamental aspects of relational and non-relational databases.
2 Apply and execute concepts of basic SQL queries.
3 Implement and execute interactive SQL queries.
4 Implement CRUD operations and advanced queries using MongoDB.
5 Apply the CRUD operations on data using Cassandra and Redis.

Pre-requisite of course:NONE

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	4	0	0	0	25	25

Contents : Unit	Topics	Contact Hours
Total Hours		

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Introduction to Relational Database and NoSQL** Introduction of syllabus (theory and practical), Data, Database, Database Systems, Database Management Systems), Characteristics, actors on the stage, workers behind the scene, the benefits of using the DBMS approach., Clusters, File Systems and Distributed File Systems, Sharding, Replication,, CAP theorem, BASE, Introduction of NoSQL (What is it?, Where It is Used, Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL,NewSQL.	10
2	**SQL Essentials** SQL Fundamentals, DDL, DML, DCL, TCL, Database Related Commands, Table Related Commands, Insert Records, Read Records– simple select queries, Read Records– simple select queries, Read – simple select queries, Update records, Delete records, Defining Constraints: Primary Key, Foreign Key, Unique, Non-Null, Foreign Key Check, IN Operator, Aggregate Functions, Built-in Functions: Numeric Functions, Date, String, Set Operations, Subqueries , Join	10
3	**Interactive SQL** SQL Operators, Range Searching, Pattern Matching, Order By Clause, Group By and Having Clause, Dual Table, View, Index, Sequence, Synonym, Practical Test	10
4	**MongoDB** What is MongoDB? Why MongoDB? JSON, BSON, _id, database, collection, document, Support for dynamic queries, storing binary data, replication, sharding, updating information in-place, data types, terms used in RDBMS, Commands related to database Commands related to collection, CRUD operations Insertion Simple retrieving queries, Comparison operator and logical operator queries, Limit, skip and sort Count and distinct, Update and save, Arrays in MongoDB, aggregation, Indexes, dealing with null values, java script in MongoDB, Backup in MongoDB, import and export in MongoDB Cursors in MongoDB, Automatic generation of unique numbers for the _id field, Map Reduce in MongoDB	12
5	**Cassandra and Redis** Introduction to Cassandra, Features of Cassandra, CQL Data Types, CQLSH, Keyspaces, Create operation, Read operation, Update operation, Delete operation, Introduction, Environment and Configuration, Get and Set operations, LPUSH, RPUSH, LPOP, RPOP, RANGE, SADD, SMEMBERS, SCARD, SISMEMBER, SUNION, SINTER, SDEF, HASH commands	8
Total Hours		**50**

Textbook :

1 Database System Concepts, Silberschatz, Korth, Sudarshan, McGraw Hill Publication, 4

2 SQL, PL/SQL the programming Language of Oracle, Ivan Byross, BPB Publication, 4

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Textbook :

3 Big Data and Analytics, Seema Acharyas, Subhashini Chellappan, Wiley, 1

References:

1 Database Systems : Design, Implementation and Management, Database Systems : Design, Implementation and Management, Peter Rob, Carlos Coronel, Cengage Learning , 2007

2 An Introduction to Database Systems, An Introduction to Database Systems, C J Date, A Kannan, S Swaminathan, Pearson Education, 2006

3 Database Management Systems, Database Management Systems, Ramakrishnan, Gehrke, McGraw Hill, 3rdE

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
10.00	10.00	30.00	20.00	20.00	10.00

Instructional Method:

1 PPT

2 DEMO

3 Videos

Supplementary Resources:

1 https://www.tutorialspoint.com/sql/

2 http://www.mongodb.com

3 https://www.tutorialspoint.com/cassandra

4 https://www.tutorialspoint.com/redis

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