



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

NOSQL DATA BASES (MONGODB)								
III Semester: CSE								
IV Semester: CSD / CSM								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
24X0597	Skill Development	L	T	P	C	CIA	SEE	Total
		0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 30			Total Classes:30			
Prerequisites: There are no prerequisites to take this course.								

Course Overview:

Programs can be implemented using the MongoDB Shell or with Python/Java/PHP for connectivity where appropriate.

Course Objectives:

1. Importing of data from various sources.
2. PowerBI Concepts
3. Mapping of Visual Layouts and Graphical Properties.
4. How to create Dashboard using PowerBI
5. Developing of charts using PowerBI.

Course Outcomes: After Completion of the Course, Students should be able to

1. Understand the fundamentals of NoSQL databases and explore the advantages of MongoDB over RDBMS.
2. Apply various MongoDB operators and commands to query, update, and manage data.
3. Perform CRUD operations and implement effective data modeling using collections and documents.
4. Analyze the usage of indexing, aggregation, geospatial queries, and advanced MongoDB features.
5. Develop and demonstrate connectivity with MongoDB using Java, Python, and PHP programming

List of Experiments:

Module I: Introduction & Data Modeling

1. Create and Explore a NoSQL Document Structure
 - o Insert sample JSON documents to show flexible schemas.
2. Compare RDBMS vs. MongoDB with a Practical Schema
 - o Model the same data (e.g., user accounts) in SQL and MongoDB.
3. Explore MongoDB Data Types
 - o Insert and query documents using types like String, NumberInt, Boolean, Array, Date, etc.
4. Basic MongoDB Data Modeling Example
 - o Design an embedded vs. referenced model for blog posts and comments.

Module II: Operators and Commands

1. Use Query and Projection Operators
 - o Demonstrate \$eq, \$gt, \$lt, \$in, \$and, \$or, \$exists, and projection { field: 1 }.
2. Update Operators and Aggregation Stages
 - o Use \$set, \$inc, \$push in update, and pipeline stages like \$match, \$group, \$sort.
3. Sorting, Limiting, and Modifying Queries
 - o Apply .limit(), .sort(), and modifiers like .explain(), .hint().
4. Geospatial Commands and User Management
 - o Insert geoJSON data and run \$geoWithin queries; create users and assign roles.

Module III: Database & Collection Management

1. Create and Drop a Database
 - o Use use dbName, db.dropDatabase().
2. Create and Drop Collections
 - o db.createCollection("students"), db.students.drop().
3. Explore Collection Indexes and Options
 - o Create indexes and check with db.collection.getIndexes().
4. Set Up Schema Validation Rules
 - o Use JSON schema validation to restrict document structure

Module IV: CRUD Operations & System Commands

1. CRUD: Insert, Query, Update, Delete Documents
 - o Full example of inserting, querying with filters, updating fields, and deleting.
2. Use of db.runCommand() and Server Info
 - o Run db.runCommand({ serverStatus: 1 }) and db.isMaster().
3. Bulk Operations and Upsert Example
 - o Demonstrate bulkWrite() with mixed inserts and updates.
4. Check Collection Stats and Perform Partial Updates
 - o db.collection.stats(), \$set with field targeting.

Module V: Shell, Methods, and Connectivity

1. Using MongoDB Shell: Collection and Cursor Methods
 - o Demonstrate .find(), .countDocuments(), .forEach(), .toArray().
2. Query Plan Cache and Role Management Commands
 - o db.collection.getPlanCache().clear() and role creation with db.createRole().
3. Python MongoDB CRUD App using PyMongo
 - o Connect to MongoDB Atlas/local, and perform CRUD using Python

ELECTRONIC RESOURCES:

1. <https://learn.mongodb.com>
2. <https://www.w3schools.com/mongodb/>
3. <https://www.tutorialspoint.com/mongodb/index.html>
4. <https://www.youtube.com/@MongoDB>
5. <https://www.geeksforgeeks.org/mongodb-tutorial/>
6. <https://www.geeksforgeeks.org/power-bi-tutorial/>

MATERIALS ONLINE:

1. Lab Manual
2. Open-ended experiments

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)