

# MONGODB SYLLABUS

## Module 1: Introduction to MongoDB

- What is MongoDB and NoSQL
- Features of MongoDB
- SQL vs NoSQL databases
- Installing MongoDB & MongoDB Compass
- Understanding JSON & BSON
- MongoDB architecture overview

## Module 2: MongoDB Basics

- Databases, Collections, Documents
- Creating and dropping databases
- Creating collections
- Inserting documents
- Viewing and querying data

## Module 3: CRUD Operations

- Insert (insertOne, insertMany)
- Read (find, findOne)
- Update (updateOne, updateMany)
- Delete (deleteOne, deleteMany)
- Query operators (\$eq, \$gt, \$lt, \$in)

## Module 4: Data Modeling

- Schema design concepts
- Embedded vs referenced documents
- Designing efficient data models
- Handling relationships

## Module 5: Querying & Projection

- Filtering data
- Projection (fields selection)
- Sorting (sort)
- Limiting results (limit, skip)

## Module 6: Indexing

- What are indexes
- Types of indexes (single, compound, text)
- Creating and dropping indexes
- Performance optimization

## Module 7: Aggregation Framework

- Aggregation pipeline
- Stages (\$match, \$group, \$project, \$sort)
- Data transformation
- Real-world aggregation examples

## Module 8: Relationships & Lookup

- One-to-one, one-to-many relationships
- \$lookup for joins
- Referencing vs embedding

## Module 9: MongoDB with Node.js

- Connecting MongoDB with Node.js
- Using MongoDB driver
- CRUD operations with Node.js
- Using Mongoose ORM

## Module 10: Transactions

- Multi-document transactions
- ACID properties in MongoDB
- Using transactions

## Module 11: Security & User Management

- Authentication and authorization
- Creating users
- Roles and permissions
- Data security best practices

## Module 12: Backup & Restore

- Backup strategies
- mongodump and mongorestore
- Exporting and importing data

## Module 13: Performance & Optimization

- Query optimization
- Index optimization
- Monitoring performance
- Scaling techniques

## Module 14: MongoDB Atlas (Cloud)

- Introduction to MongoDB Atlas
- Creating cluster
- Connecting cloud database
- Cloud deployment

## Module 15: Real-World Projects

- Blog database system
- E-commerce database
- User authentication system
- API-based project