

MongoDB



Zetlan Technologies

e-Learning Course

Learn Remotely!!



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COURSE MODULES

Module 1: Introduction to MongoDB

- What is MongoDB?
- NoSQL vs SQL Databases
- Features & Advantages of MongoDB
- Installation & Setup (Windows, macOS, Linux)
- MongoDB Ecosystem Overview (MongoDB Atlas, Compass, Shell, Drivers)

Module 2: MongoDB Basics

- Understanding Databases, Collections, and Documents
- JSON & BSON Data Format
- Basic CRUD Operations:
 - o Create (Insert Documents)
 - o Read (Find Documents)
 - o Update (Modify Documents)
 - o Delete (Remove Documents)
- Query Operators (\$eq, \$gt, \$lt, \$in, etc.)
- Indexing Basics

Module 3: Schema Design & Data Modeling

- Flexible Schema vs Fixed Schema
- Embedded Documents vs References
- Data Normalization vs Denormalization
- Best Practices for Schema Design
- Working with ObjectId and Timestamps

Module 4: Advanced Querying & Aggregation

- Query Optimization Techniques
- Projection (\$project)
- Aggregation Framework:
 - o \$match, \$group, \$sort, \$limit, \$lookup
 - o Pipelines & Stages
 - o Using \$unwind for Array Flattening
- Working with Geospatial Data

Module 5: Indexing & Performance Optimization

- **Types of Indexes:**
 - Single Field Index
 - Compound Index
 - Multi-key Index
 - TTL Index
 - Text Search Index
- **Explain Query Plan (.explain())**
- **Profiling & Performance Monitoring**
- **Query Caching & Optimization Strategies**

Module 6: MongoDB Transactions & ACID Properties

- **Understanding ACID Compliance in MongoDB**
- **Single vs Multi-Document Transactions**
- **Implementing Transactions with MongoDB**
- **Use Cases & Limitations of Transactions**

Module 7: MongoDB Security & Authentication

- **Role-Based Access Control (RBAC)**
- **Authentication Methods (SCRAM, x.509, LDAP, etc.)**
- **Data Encryption at Rest & in Transit**
- **Auditing & Logging**
- **Common Security Best Practices**

Module 8: Replication & High Availability

- **What is Replication?**
- **Setting up a Replica Set**
- **Primary & Secondary Nodes**
- **Failover Mechanism**
- **Read & Write Concern**

Module 9: Sharding & Scalability

- What is Sharding?
- Shard Keys & Partitioning Strategies
- Configuring a Sharded Cluster
- Balancing & Managing Shards
- Pros & Cons of Sharding

Module 10: MongoDB Deployment & Cloud Services

- MongoDB Atlas Overview
- Self-hosted vs Managed MongoDB
- Backup & Restore Strategies
- Monitoring Tools & Best Practices
- Deploying MongoDB with Docker & Kubernetes

Module 11: MongoDB with Programming Languages

- MongoDB with Node.js (Mongoose ORM)
- MongoDB with Python (PyMongo)
- MongoDB with Java
- MongoDB with C#/.NET
- Best Practices for Integration

Module 12: Case Studies & Real-World Applications

- E-commerce Platform
- Social Media Application
- IoT & Big Data Analytics
- Real-Time Chat System
- Logging & Event Tracking

