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Course Overview

Course Details

Course Name: MongoDB: The Complete Developer's Guide to NoSQL

Instructor: Priya Sharma

Created On: 16 June, 2025

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Price: 4000 INR

Duration: 3 Weeks

Modules: 17

Language: English, Hindi

Level: Beginner, Expert

Certifications: Yes

Course Description

This course is the ultimate guide to mastering MongoDB and the document database paradigm. We take you on a journey from the absolute basics of NoSQL to the advanced, production-grade features that power modern applications. You will learn not just how to use MongoDB, but how to think in terms of documents, design efficient schemas, and optimize for performance at scale.

We begin by exploring the fundamentals of the document model, BSON, and performing core CRUD operations. You'll quickly move on to advanced querying, mastering the art of indexing for high-speed reads, and unlocking the power of the Aggregation Framework to perform

complex data analysis. The course includes dedicated modules on data modeling patterns, ensuring you design schemas that are both efficient and scalable.

For developers, we provide an in-depth look at using Mongoose to interact with MongoDB in a Node.js environment. We also cover critical operational topics like security, transactions, replication for high availability, and sharding for horizontal scaling. By the end, you will be proficient in developing and managing robust MongoDB databases.

What You'll Learn:

- Core concepts of NoSQL and the document data model.
- Mastering CRUD operations and advanced querying techniques.
- In-depth data modeling and schema design patterns.
- Performance tuning with indexing and query analysis.
- The Aggregation Framework for complex data processing.
- Using Mongoose in a Node.js application.
- Implementing transactions for data integrity.
- Ensuring high availability with Replica Sets.
- Scaling horizontally with Sharding.
- Security, backup, and restore best practices.
- Advanced features like Change Streams, Full-Text Search, and Geospatial Queries.

Who Is This Course For?

This course is designed for developers of all levels. It's perfect for backend developers wanting to master a modern database, front-end developers aiming to become full-stack, and database administrators looking to expand their skills into the NoSQL world. No prior database experience is required.

Prerequisites:

- **Basic Computer Literacy:** Familiarity with using a computer and navigating file systems.
- **Basic Understanding of Data:** General knowledge of what data is and how it might be organized.
- **A Computer/Laptop:** You'll need a working computer (Windows, macOS, or Linux) with an internet connection.
- **A Willingness to Learn:** Your enthusiasm to master NoSQL databases is the most important prerequisite!

Features hands-on labs, a complete project database schema, and a certificate of completion. Available in English and Hindi.

Course Curriculum Details

Module 1: Module 1: Introduction to NoSQL & MongoDB

4 Lessons

1. 1. What is NoSQL? (SQL vs NoSQL Databases) **20min**
2. 2. Introduction to MongoDB and the Document Model **25min**
3. 3. Understanding JSON and BSON (Binary JSON) **15min**
4. 4. Recap & Practical Task: Explore JSON Structures **20min**

Module 2: Module 2: Installation & Environment Setup

4 Lessons

1. 5. Installing MongoDB Locally (Windows, macOS, Linux) **25min**
2. 6. Getting Started with MongoDB Atlas (The Cloud Database Service) **20min**
3. 7. Exploring the Mongo Shell and MongoDB Compass GUI **30min**
4. 8. Recap & Practical Task: Connect to MongoDB Locally and on Atlas **30min**

Module 3: Module 3: CRUD Operations: The Basics

6 Lessons

1. 9. Understanding Databases, Collections, and Documents **15min**

2. 10. Create Operations: `insertOne()` and `insertMany()` **25min**

3. 11. Read Operations: `find()` (Basic Queries) and `findOne()` **30min**

4. 12. Update Operations: `updateOne()`, `updateMany()`, and Document Replacement (`replaceOne()`) **35min**

5. 13. Delete Operations: `deleteOne()` and `deleteMany()` **20min**

6. 14. Recap & Practical Task: Perform Basic CRUD on Sample Data **40min**

Module 4: Module 4: Advanced Querying

8 Lessons

1. 15. Querying with Comparison Operators (`$eq`, `$ne`, `$gt`, `$gte`, `$lt`, `$lte`, `$in`, `$nin`) **25min**

2. 16. Logical Operators (`$and`, `$or`, `$not`, `$nor`) **20min**

3. 17. Element Operators (`$exists`, `$type`) **15min**

4. 18. Querying on Embedded Documents and Arrays (`dot notation`, `$elemMatch`) **30min**

5. 19. Array Operators (`$all`, `$size`, `$push`, `$pop`, `$addToSet`) **30min**

6. 20. Controlling Projections to Shape Results (`include/exclude fields`) **20min**

7. 21. Regular Expression Queries (`$regex`) **15min**

8. 22. Recap & Practical Task: Write Complex Queries on a Nested Dataset **50min**

Module 5: Module 5: Indexing for Performance

7 Lessons

1. 23. What are Indexes? How They Work in MongoDB **20min**
2. 24. Creating Single Field and Compound Indexes **30min**
3. 25. Understanding Query Execution with `explain()` **25min**
4. 26. Specialized Indexes: Multikey, TTL (Time-To-Live), and Unique Indexes **30min**
5. 27. Text Indexes for Full-Text Search (Basic) **20min**
6. 28. Managing Indexes (Listing, Dropping) **15min**
7. 29. Recap & Practical Task: Create Indexes and Analyze Query Performance **50min**

Module 6: Module 6: The Aggregation Framework (Fundamentals)

5 Lessons

1. 30. Introduction to the Aggregation Pipeline: Concepts and Structure **25min**
2. 31. Core Stages: `$match` and `$project` **35min**
3. 32. Core Stages: `$group` for Data Summarization **40min**
4. 33. Core Stages: `$sort`, `$limit`, and `$skip` **25min**
5. 34. Recap & Practical Task: Aggregate Sales Data with Core Stages **1hr**

Module 7: Module 7: Advanced Aggregation & Joins

7 Lessons

1. 35. Joining Collections with `$lookup` (Left Outer Join Equivalent) **35min**
2. 36. Working with Arrays in Aggregation: `$unwind` and `$addFields` **30min**

3. 37. Advanced Stages: `$facet` for Multi-Faceted Aggregation **35min**

4. 38. Advanced Stages: `$bucket` and `$bucketAuto` for Grouping Documents **30min**

5. 39. Advanced Stages: `$redact` for Document Access Control **25min**

6. 40. Aggregation Pipeline Optimization Techniques **20min**

7. 41. Recap & Practical Task: Build a Complex Aggregation Pipeline for Reporting **1hr 15min**

Module 8: Module 8: Data Modeling & Schema Design

6 Lessons

1. 42. Embedding vs. Referencing: Key Design Decision in NoSQL **30min**

2. 43. Modeling One-to-One and One-to-Many Relationships **35min**

3. 44. Modeling Many-to-Many Relationships **30min**

4. 45. Common Schema Design Patterns (e.g., Attribute Patterns, Subset Patterns) **30min**

5. 46. Handling Polymorphic Associations **20min**

6. 47. Recap & Practical Task: Design a Schema for a Social Media Application **1hr**

Module 9: Module 9: Transactions & Data Integrity

4 Lessons

1. 48. Understanding ACID Compliance in MongoDB (Document vs. Multi-Document) **20min**

2. 49. Implementing Multi-Document Transactions **35min**

3. 50. Transaction Retries and Error Handling **20min**

4. 51. Recap & Practical Task: Implement a Transaction for a Banking Transfer Scenario **45min**

Module 10: Module 10: Using MongoDB with Node.js (Mongoose)

4 Lessons

1. 52. Connecting a Node.js/Express App with Mongoose **25min**
2. 53. Creating Schemas and Models in Mongoose **30min**
3. 54. Performing CRUD Operations with Mongoose **35min**
4. 55. Recap & Practical Task: Build a Simple API with Node.js and Mongoose **1hr**

Module 11: Module 11: Advanced Mongoose & Driver Usage

5 Lessons

1. 56. Schema Validation and Virtual Properties **25min**
2. 57. Mongoose Middleware (Hooks) for Pre/Post Operations **20min**
3. 58. Populating Relationships Across Collections with Mongoose **30min**
4. 59. Using the Native MongoDB Node.js Driver (Beyond Mongoose) **25min**
5. 60. Recap & Practical Task: Add Advanced Features to Your Mongoose API **1hr**

Module 12: Module 12: Security

5 Lessons

1. 61. Authentication and Built-in Roles in MongoDB **25min**

2. 62. Role-Based Access Control (RBAC) Implementation **30min**

3. 63. Network Security: Encryption in Transit (TLS/SSL) **20min**

4. 64. User Management Best Practices **15min**

5. 65. Recap & Practical Task: Configure User Authentication and Roles **45min**

Module 13: Module 13: Replication for High Availability

5 Lessons

1. 66. What is a Replica Set? Concepts and Architecture **20min**

2. 67. Failover and Election Process in Replica Sets **25min**

3. 68. Read and Write Concerns: Balancing Consistency and Performance **30min**

4. 69. Practical Task: Set up a Local Replica Set (Conceptual Walkthrough) **40min**

5. 70. Recap & Practical Task: Understand Replica Set Behavior **30min**

Module 14: Module 14: Sharding for Horizontal Scaling

4 Lessons

1. 71. The Need for Sharding: Horizontal Scaling Explained **20min**

2. 72. Sharding Architecture and Components (Mongos, Config Servers, Shards) **30min**

3. 73. Choosing a Good Shard Key (Cardinality, Distribution, Frequency) **35min**

4. 74. Recap & Practical Task: Design a Shard Key Strategy for a High-Volume Application **45min**

Module 15: Module 15: Backup, Restore & Monitoring

4 Lessons

1. 75. Backup Strategies: `mongodump` and Cloud Backups (Atlas) 30min
2. 76. Restoring Data with `mongorestore` 25min
3. 77. Monitoring Database Performance (Atlas Monitoring, `mongostat`, `mongotop`) 30min
4. 78. Recap & Practical Task: Perform a Backup and Explore Monitoring Metrics 40min

Module 16: Module 16: Advanced Database Features

4 Lessons

1. 79. Real-time Updates with Change Streams 30min
2. 80. Full-Text Search Capabilities (`$text` operator and Atlas Search) 30min
3. 81. Geospatial Queries (`$geoWithin`, `$near`) 30min
4. 82. Recap & Practical Task: Implement a Geospatial Search Feature 50min

Module 17: Module 17: Final Project - E-commerce Database

5 Lessons

1. 83. Project Overview and Data Modeling for an E-commerce Platform 45min
2. 84. Building the Schemas and Relationships (Embedding vs. Referencing Decisions) 1hr
3. 85. Writing Complex Queries and Aggregations for the Application 1hr 30min

4. 86. Implementing Basic Security and Optimization **45min**

5. 87. Final Review, Project Submission & Course Conclusion **1hr**

This curriculum is subject to minor adjustments to ensure the most up-to-date and effective learning experience.