

MongoDB – Short Syllabus

1. Introduction to MongoDB

- What is MongoDB?
 - NoSQL vs SQL
 - MongoDB Architecture
 - Document, Collection, Database
 - BSON format
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2. CRUD Operations

- insertOne, insertMany
 - find, findOne
 - updateOne, updateMany
 - deleteOne, deleteMany
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3. Query Operators

- Comparison operators (\$gt, \$lt, \$eq, \$ne)
 - Logical operators (\$and, \$or, \$not)
 - \$in, \$nin
 - \$regex
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4. Mongoose (For Node.js Developers)

- Schema
- Models
- CRUD with Mongoose
- Middleware (pre/post hooks)
- Validation
- Virtual fields

5. Relationships

- One-to-One
 - One-to-Many
 - Many-to-Many
 - Population (populate())
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6. Aggregation Framework

- \$match
 - \$group
 - \$project
 - \$sort
 - \$limit
 - \$lookup (join)
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7. Indexing

- Create index
 - Unique index
 - Compound index
 - Index performance
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8. Data Modeling

- Embedding vs Referencing
 - Schema design patterns
 - When to normalize/denormalize
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9. MongoDB Atlas

- Cloud database setup

- Clusters
 - IP Whitelisting
 - Connecting to Node.js
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10. Performance & Security

- Sharding basics
- Replication basics
- Backup
- Role-based access control (RBAC)
- Environment variables for DB URI