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## Course: CockroachDB Training

Duration: 30 Hrs (Changeable) | Fees: Individual / Batch

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Syllabus on the Next Page ..



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## CockroachDB Detailed Syllabus

### Module 1: Introduction to CockroachDB


- \* Overview of CockroachDB
- \* What is CockroachDB?
- \* Features and Benefits
- \* Comparison with Traditional Databases (MySQL, PostgreSQL)
- \* Use Cases and Industries
- \* Architecture and Design Principles
- \* Distributed SQL Database
- \* Shared-Nothing Architecture
- \* Multi-Active Availability
- \* Automatic Sharding and Replication


### Module 2: Installation and Setup

- \* Installing CockroachDB
- \* System Requirements
- \* Installing on Local Machine
- \* Running in Docker
- \* Deploying on Kubernetes
- \* Configuring CockroachDB
- \* Cluster Configuration
- \* Networking and Connectivity
- \* Security Considerations

### Module 3: CockroachDB Cluster Management

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- \* Creating a CockroachDB Cluster
- \* Single-Node Cluster
- \* Multi-Node Cluster Setup
- \* Scaling the Cluster
- \* Cluster Health Monitoring
- \* CockroachDB Admin UI
- \* Performance Metrics and Monitoring Tools
- \* Handling Failures and Recovery
- \* Managing Nodes and Replication
- \* Adding and Removing Nodes
- \* Data Distribution and Load Balancing
- \* Replication Factor and Consistency

### **Module 4: SQL and Querying in CockroachDB**

- \* SQL Compatibility
- \* PostgreSQL Compatibility
- \* SQL Features Supported
- \* Schema Design
- \* Tables, Indexes, and Constraints
- \* Partitioning and Data Locality
- \* Best Practices for Schema Optimization
- \* Writing Queries
- \* CRUD Operations

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- \* Joins, Aggregations, and Transactions
- \* Using JSON and Arrays
- \* Query Performance Optimization
- \* Query Planning and Execution
- \* Indexing Strategies
- \* EXPLAIN and Query Profiling


### **Module 5: Transactions and Consistency**


- \* Transaction Model in CockroachDB
- \* ACID Transactions
- \* Serializable Isolation Level
- \* Optimistic Concurrency Control
- \* Savepoints and Rollbacks
- \* Managing Distributed Transactions
- \* Handling Deadlocks and Performance Tuning

### **Module 6: Backup, Restore, and Disaster Recovery**

- \* Backup Strategies
- \* Full and Incremental Backups
- \* Cloud Storage Integration
- \* Restoring Data
- \* Point-in-Time Recovery
- \* Restoring Partial Data
- \* High Availability and Disaster Recovery

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- \* Failover Handling
- \* Handling Node and Region Failures

### **Module 7: Security and Access Control**


- \* Authentication and Authorization
- \* User Management
- \* Role-Based Access Control (RBAC)
- \* Managing SQL Privileges
- \* Data Encryption
- \* Encryption at Rest and in Transit
- \* TLS Configuration
- \* Auditing and Compliance
- \* Logging and Auditing Queries
- \* Compliance with GDPR, HIPAA, etc.


### **Module 8: CockroachDB in Cloud and Hybrid Environments**

- \* Deploying CockroachDB on Cloud Platforms
- \* AWS, GCP, and Azure Deployments
- \* CockroachDB Dedicated vs Self-Managed
- \* Multi-Region Deployment
- \* Latency Considerations
- \* Geo-Partitioning Data
- \* Hybrid Cloud and On-Premises Setup


### **Module 9: Advanced Topics**

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- \* Workload Management
- \* Performance Tuning and Scaling
- \* Query Caching and Optimization
- \* Observability and Logging
- \* Using Prometheus and Grafana for Monitoring
- \* Query Debugging with Logs
- \* Custom Functions and Extensions

### Module 10: Hands-on Projects

- \* Setting up a Production-Ready CockroachDB Cluster
- \* Developing a Scalable Web Application with CockroachDB
- \* Implementing Multi-Region Data Replication
- \* Performance Benchmarking and Optimization

(Click on Course for more details)

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**- Thank You -**

N.B: This syllabus is not final and can be customized as per requirements / updates.

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