

MERN Stack Developer Course Outline

Duration: 80–100 Hours

Level: Beginner to Advanced

Delivery Mode: Online / Offline

Target Audience: Aspiring web developers, JavaScript enthusiasts, Students, IT professionals

Prerequisites: Basic knowledge of HTML, CSS, and JavaScript

Module 1: Introduction to Full Stack Development

- Overview of Web Development: Front-End vs. Back-End vs. Full Stack
 - What is the MERN Stack?
 - Overview of MongoDB, Express.js, React.js, Node.js
 - Setting Up Development Environment: Installing Node.js, MongoDB, and IDE
 - Introduction to Version Control: Git and GitHub for Collaboration
-

Module 2: Introduction to MongoDB (Database)

- Introduction to NoSQL and MongoDB
 - MongoDB Architecture: Database, Collections, and Documents
 - Basic MongoDB Commands: Create, Read, Update, Delete (CRUD) Operations
 - Data Modeling in MongoDB
 - MongoDB Query Language (MQL)
 - Introduction to MongoDB Atlas and Cloud Databases
 - MongoDB Aggregation Framework
-

Module 3: Express.js (Back-End Framework)

- Introduction to Express.js and its Role in MERN Stack
 - Setting Up Express.js and Building a Basic Server
 - Handling HTTP Requests: GET, POST, PUT, DELETE
 - Middleware in Express.js
 - Routing and URL Parameters
 - Creating RESTful APIs with Express.js
 - Error Handling and Debugging in Express.js
-

Module 4: Node.js (Back-End Runtime Environment)

- Introduction to Node.js and its Role in MERN Stack
 - Setting Up Node.js and NPM (Node Package Manager)
 - Understanding Node.js Event Loop and Asynchronous Programming
 - File System Operations and Modules in Node.js
 - Handling HTTP Requests and Responses in Node.js
 - Building APIs with Express.js and Node.js
 - Error Handling and Debugging in Node.js
-

Module 5: Introduction to React.js (Front-End Framework)

- Introduction to React.js and Component-Based Architecture
 - Setting Up React Environment with Create-React-App
 - JSX Syntax: Creating and Rendering Components
 - Props and State in React
 - Handling Events in React
 - Conditional Rendering and Lists in React
 - React Lifecycle Methods and useEffect Hook
 - Managing State with useState Hook
-

Module 6: Advanced React.js Concepts

- React Router for Navigation
 - Managing Form Inputs in React
 - React Hooks: useEffect, useContext, useReducer
 - Managing Global State with Context API
 - Introduction to Redux for State Management
 - Component Design and Best Practices
 - Error Boundaries in React
 - React Performance Optimization Techniques
-

Module 7: Building Full-Stack Applications with MERN

- Understanding Full-Stack Architecture and the Role of MERN Stack
- Connecting Front-End (React.js) to Back-End (Node.js/Express.js)
- Connecting Node.js with MongoDB using Mongoose
- CRUD Operations with MongoDB and React

- User Authentication with JWT (JSON Web Token)
 - File Upload and Storage in Full-Stack Applications
 - Building a Full-Stack To-Do List Application (Project)
-

Module 8: RESTful API Design and Development

- Understanding REST Architecture
 - Creating RESTful APIs with Express.js and Node.js
 - Working with HTTP Methods: GET, POST, PUT, DELETE
 - Sending and Receiving Data in JSON Format
 - API Testing with Postman
 - Authentication in RESTful APIs using JWT
 - Error Handling and Validation in API Requests
-

Module 9: MongoDB and Advanced Data Management

- MongoDB Data Modeling and Schema Design
 - Advanced Querying in MongoDB: Aggregation, Grouping, Sorting
 - Working with MongoDB Indexes
 - Optimizing Database Queries
 - Managing Relationships Between Documents in MongoDB
 - Data Validation and Schema Constraints in Mongoose
-

Module 10: Deployment and Cloud Services

- Introduction to Web Hosting and Cloud Platforms
 - Deploying Full-Stack MERN Applications on Heroku
 - Setting up MongoDB Atlas and Integrating with MERN
 - Deploying React Applications on Netlify
 - Continuous Deployment with GitHub and Jenkins
 - Setting Up CI/CD Pipeline for MERN Stack Projects
 - Configuring Domains, SSL, and Production Environment
-

Module 11: Testing MERN Applications

- Introduction to Testing in MERN Stack

- Unit Testing with Jest for React Components
 - End-to-End Testing with Cypress
 - Writing API Tests with Mocha and Chai
 - Mocking in Tests and Test Coverage
 - Continuous Integration and Testing for MERN Applications
-

Module 12: Final Project and Exam Preparation

- Building a Full-Stack MERN Application (Capstone Project)
- Code Review and Debugging
- Deployment of Final Project on Cloud
- Preparing for Job Interviews as Full-Stack Developer
- Best Practices for Full-Stack Web Development
- Mock Interviews and Career Tips