

Diploma in MEAN Stack Development

Duration: 6 Months

Course Overview

The **Diploma in MEAN Stack Development** is a career-oriented program that equips learners with the skills required to build modern, scalable, and dynamic full-stack web applications. The course focuses on **MongoDB (database)**, **Express.js (server-side framework)**, **Angular (front-end framework)**, and **Node.js (runtime environment)**, along with RESTful API development, authentication & security, and deployment. By the end of the course, students will be capable of developing, testing, and deploying complete MEAN stack applications.

Course Objectives

1. To provide strong foundations in **front-end development** using Angular.
 2. To train students in **server-side development** using Node.js and Express.js.
 3. To build proficiency in **NoSQL databases (MongoDB)** for data management.
 4. To develop skills in **RESTful API design and integration**.
 5. To introduce **authentication and security** mechanisms in web applications.
 6. To integrate **front-end and back-end systems** effectively.
 7. To provide practical knowledge of **project deployment on cloud platforms**.
 8. To prepare students for careers as **MEAN Stack Developers** through real-world projects.
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Course Outcomes

After completing this course, students will be able to:

- Design and develop **interactive user interfaces** using Angular.
- Build **scalable server-side applications** using Node.js and Express.js.
- Create and manage **NoSQL databases** with MongoDB.
- Develop and integrate **RESTful APIs**.
- Implement **authentication, authorization, and security best practices**.
- Deploy MEAN stack applications on **cloud hosting services**.

- Work as **Full Stack Developers, Backend Engineers, or Web Application Developers.**
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Course Syllabus

Module 1: Introduction to Full Stack & MEAN

- Overview of Full Stack Development
 - MEAN Stack Architecture (MongoDB, Express, Angular, Node.js)
 - Tools Setup: Node.js, npm, Angular CLI, MongoDB Compass/Atlas, VS Code, Git
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Module 2: Front-End Development with Angular

- Introduction to Angular Framework
 - Angular Project Setup & CLI Commands
 - Components, Templates, and Data Binding
 - Directives, Pipes, and Services
 - Angular Routing & Navigation
 - Forms: Template-driven & Reactive Forms
 - HTTPClient – Consuming REST APIs
 - Angular Project – Blog/To-do App
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Module 3: Server-Side Development with Node.js

- Introduction to Node.js & npm
 - Modules (Core & Custom)
 - File System & Streams
 - Event Loop & EventEmitter
 - Building a Simple HTTP Server
 - Express.js Introduction & Setup
 - Middleware & Routing in Express.js
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Module 4: Database Management with MongoDB

- Introduction to NoSQL & MongoDB
 - MongoDB Data Types & Structure
 - CRUD Operations (Create, Read, Update, Delete)
 - Indexing, Aggregation, and Query Optimization
 - MongoDB with Mongoose ODM
 - Database Relationships & Validation
 - Mini Project – Student Records Manager
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Module 5: RESTful API Development

- Introduction to RESTful Services
 - Creating REST APIs with Express.js & Node.js
 - CRUD APIs with MongoDB & Mongoose
 - Error Handling & Validation
 - Consuming APIs from Angular Front-End
 - Mini Project – Employee Management API
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Module 6: Authentication & Security

- Authentication vs Authorization
 - JSON Web Tokens (JWT)
 - Role-based Access Control (RBAC)
 - Securing REST APIs
 - Password Hashing with bcrypt
 - Handling CORS & HTTPS Basics
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Module 7: Front-End & Back-End Integration

- Connecting Angular Front-End with Node.js Back-End
- API Integration with Angular Services
- Real-Time Communication with Socket.io (optional)

- Mini Project – Full Stack CRUD App
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Module 8: Deployment & Version Control

- Git & GitHub Workflow
 - Environment Variables & Config Management
 - Deploying MEAN Apps on Heroku, Render, or AWS
 - MongoDB Atlas for Cloud Database
 - CI/CD Pipeline Basics
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Module 9: Final Project & Assessment

- Full MEAN Stack Project combining Angular, Node.js, Express, MongoDB
 - Example Projects: E-commerce App, Job Portal, Online Learning Platform
 - Final Testing, Debugging, and Deployment
 - Viva & Certification
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☒ This syllabus ensures learners gain **hands-on practical experience** in **front-end, back-end, database, security, API integration, and deployment**, making them **industry-ready MEAN Stack Developers**.