

# Industry-Oriented MERN Stack Development Training Program

Duration: 28 Days | 5 Hours/Day

## Objective:

To train participants in building full-stack web applications using the MERN stack (MongoDB, Express.js, React, Node.js), preparing them for industry roles as full-stack JavaScript developers.

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## Program Overview

- **Target Audience:** Beginners to intermediate learners, IT professionals, or students aiming to become full-stack developers.
- **Prerequisites:** Basic programming knowledge (e.g., variables, loops, functions); familiarity with JavaScript is a plus.
- **Mode:** Instructor-led (online/offline), hands-on coding, and project-based learning.
- **Tools:** Node.js, MongoDB, Express.js, React, Git, VS Code, Postman, MongoDB Compass.

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## Training Schedule

### Week 1: JavaScript Foundations and Backend Basics

#### Day 1: Introduction to JavaScript and MERN Stack

- Overview of JavaScript and MERN Stack
- Setting up the Environment (Node.js, npm, VS Code)
- Writing and Running Your First JavaScript Program
- Hands-On: Simple Console Apps
- Practice: JavaScript Basics Exercises

#### Day 2: JavaScript Essentials

- Variables, Data Types, and Operators
- Control Structures (if-else, loops)
- Functions, Scope, and Closures
- Hands-On: Build a Simple Calculator
- Practice: Solve Coding Challenges

#### Day 3: JavaScript Advanced

- Arrays, Objects, and Destructuring
- ES6 Features: Arrow Functions, Promises, Async/Await
- Working with JSON
- Hands-On: Process Data with Array Methods
- Practice: Fetch Data with Promises

## Day 4: Node.js Basics

- Introduction to Node.js and Event-Driven Architecture
- Modules and npm (Package Management)
- File System Operations
- Hands-On: Build a File Reader App
- Practice: Create Custom Modules

## Day 5: Express.js Fundamentals

- Setting up Express.js
- Routing, Middleware, and HTTP Methods
- Serving Static Files
- Hands-On: Create a Simple Express Server
- Practice: Add Routes for a Mock API

## Day 6: MongoDB Basics

- Introduction to NoSQL and MongoDB
- Setting up MongoDB (Local/Atlas)
- CRUD Operations with MongoDB Shell
- Hands-On: Build a MongoDB Database
- Practice: Query and Update Data

## Day 7: Weekly Review and Mini Project

- Recap of Week 1 Concepts
- Debugging JavaScript and Node.js
- Mini Project: Build a REST API with Express.js and MongoDB
- Q&A and Peer Review

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# Week 2: Backend Development and API Integration

## Day 8: Connecting MongoDB with Node.js

- Using Mongoose for MongoDB Integration
- Defining Schemas and Models
- Performing CRUD Operations
- Hands-On: Build a User Database
- Practice: Add Validation

## Day 9: Advanced Express.js

- Error Handling and Validation
- Environment Variables and Configuration
- RESTful API Design Principles
- Hands-On: Enhance an API with Middleware
- Practice: Secure Routes

## Day 10: Authentication with JWT

- Introduction to Authentication and JWT

- User Registration and Login
- Protecting Routes with JWT
- Hands-On: Add Authentication to an API
- Practice: Test with Postman

### **Day 11: HTML and CSS Basics**

- HTML5 Structure and Semantics
- CSS: Flexbox, Grid, and Responsive Design
- Styling Best Practices
- Hands-On: Build a Static Landing Page
- Practice: Make it Responsive

### **Day 12: JavaScript in the Browser**

- DOM Manipulation and Events
- Fetch API for HTTP Requests
- Error Handling in Frontend
- Hands-On: Create an Interactive Form
- Practice: Fetch Data from an API

### **Day 13: Introduction to React**

- What is React? (Components, JSX)
- Setting up a React Project with Create React App
- Building Functional Components
- Hands-On: Create a Simple React App
- Practice: Add Multiple Components

### **Day 14: Weekly Review and Mini Project**

- Recap of Week 2
- Troubleshooting Backend-API Issues
- Mini Project: Build a User Management API with Authentication

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## **Week 3: Frontend Development with React**

### **Day 15: React State and Props**

- Managing State with useState
- Passing Data with Props
- Conditional Rendering
- Hands-On: Build a To-Do List App
- Practice: Add Delete Functionality

### **Day 16: React Hooks**

- useEffect for Side Effects
- Custom Hooks
- Handling Forms with React
- Hands-On: Fetch Data with useEffect
- Practice: Create a Custom Hook

## **Day 17: React Routing**

- Introduction to React Router
- Setting up Routes and Navigation
- Dynamic Routing with Parameters
- Hands-On: Build a Multi-Page App
- Practice: Add Protected Routes

## **Day 18: State Management with Context**

- Context API Basics
- Managing Global State
- Avoiding Prop Drilling
- Hands-On: Share State Across Components
- Practice: Add User Authentication State

## **Day 19: Connecting React with Backend**

- Consuming REST APIs in React
- Axios for HTTP Requests
- Displaying Data Dynamically
- Hands-On: Connect React to an Express API
- Practice: Add CRUD Functionality

## **Day 20: Styling in React**

- CSS Modules and Styled-Components
- Using Bootstrap or Tailwind with React
- Responsive Design in React
- Hands-On: Style a React App
- Practice: Add Animations

## **Day 21: Weekly Review and Mini Project**

- Recap of Week 3
- Debugging Frontend-Backend Integration
- Mini Project: Build a Task Manager App with MERN Stack

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# **Week 4: Full-Stack Integration and Deployment**

## **Day 22: Version Control with Git**

- Git Basics (commit, push, pull, branch)
- GitHub Workflows and Collaboration
- Resolving Merge Conflicts
- Hands-On: Push a Project to GitHub
- Practice: Collaborate on a Repo

## **Day 23: Full-Stack Project – Part 1**

- Planning a MERN Stack Application
- Backend: Express.js with MongoDB

- Setting up API Endpoints
- Hands-On: Build the Backend Structure
- Practice: Test with Postman

## **Day 24: Full-Stack Project – Part 2**

- Frontend: React with Routing and State
- Integrating Frontend with Backend APIs
- Real-Time Updates with React
- Hands-On: Connect and Style the Frontend
- Practice: Add User Interactions

## **Day 25: Testing and Debugging**

- Unit Testing with Jest (React)
- Testing APIs with Postman
- Debugging Tools and Techniques
- Hands-On: Test a MERN App
- Practice: Fix Bugs

## **Day 26: Deployment Basics**

- Preparing a MERN App for Deployment
- Deploying Backend to Heroku
- Deploying Frontend to Netlify
- Hands-On: Deploy a Sample App
- Practice: Configure Environment Variables

## **Day 27: Final Project Work**

- Completing the MERN Stack Application
- Code Review, Optimization, and Documentation
- End-to-End Testing
- Hands-On: Finalize and Polish Project

## **Day 28: Program Wrap-Up**

- Presentation of Final Projects
- Peer Feedback and Q&A Session
- Certification and Career Guidance

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# **Learning Outcomes**

By the end of this program, participants will be able to:

1. Write modern JavaScript code with ES6+ features.
2. Build RESTful APIs with Node.js, Express.js, and MongoDB.
3. Develop dynamic, responsive frontends with React.
4. Integrate frontend and backend in a full-stack MERN application.
5. Deploy MERN applications to production environments.

