



Full Stack Web Development Training Program (MERN Stack)

Training Objectives


- Master back-end and front-end web development using the MERN stack (MongoDB, Express.js, React.js, Node.js).
- Build scalable, secure, and high-performance web applications using industry best practices.
- Develop practical skills in database management, API integration, and cloud deployment.
- Collaborate effectively in Agile environments using modern development workflows and DevOps tools.
- Prepare for career opportunities as Full Stack developers with hands-on experience in the latest technologies.

Program Structure

Module 1: Foundations of Web Development (10 hours)

- 1. Introduction to Web Technologies**
 - Internet vs Web : Key differences
 - Client-server architecture and HTTP/HTTPS protocols
 - RESTful principles vs GraphQL
 - Modern development environments (VS Code, GitHub)
- 2. Understanding Front-End and Back-End Technologies**
 - Overview of front-end technologies: HTML, CSS, JavaScript
 - Introduction to frameworks and libraries (React, Vue.js, Angular)
 - Overview of back-end technologies: Node.js, Python, PHP
 - API development and integration concepts
- 3. Version Control Systems**
 - Git fundamentals: repositories, commits, branches
 - Collaboration with GitHub: pull requests, issues, workflows

Hands-on Activity: Analyze a web request lifecycle and set up a collaborative GitHub project.

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Module 2: Back-End Development with Node.js & Express.js (85 hours)

1. **Node.js & Express.js Fundamentals (35 hours)**
 - Setting up a Node.js environment
 - Building RESTful APIs with Express.js
 - Middleware, authentication, and security best practices
2. **MongoDB and Database Design (30 hours)**
 - Introduction to NoSQL databases and MongoDB
 - CRUD operations, indexing, and schema design
 - Transaction management and data validation
3. **Advanced API Development (20 hours)**
 - Handling authentication (JWT, OAuth)
 - Building scalable microservices architectures
 - Real-time data with WebSockets

Hands-on Activity: Develop a user authentication API and integrate it with MongoDB.

Module 3: Front-End Development with React.js (85 hours)

1. **HTML, CSS & UI Frameworks (20 hours)**
 - Semantic HTML and accessibility best practices
 - Modern CSS (Flexbox, Grid, Tailwind CSS)
 - UI design with Material-UI and Mantine
2. **React.js Fundamentals (35 hours)**
 - JSX, components, and Virtual DOM
 - State management with hooks (useState, useEffect)
 - Advanced state management with Context API and Redux Toolkit
3. **Advanced React Development (30 hours)**
 - Asynchronous programming with Promises and async/await
 - Routing and navigation with React Router
 - Testing with Jest and React Testing Library

Hands-on Activity: Build an interactive React dashboard with API integration.

Module 4: Full Stack Integration (30 hours)


1. **Connecting React with Node.js (15 hours)**
 - API consumption using Axios
 - State synchronization and data fetching strategies
2. **Real-Time Applications (15 hours)**
 - WebSockets with Socket.io for real-time updates

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- Implementing chat and live notifications

Hands-on Activity: Develop a full-stack application integrating front-end and back-end.

Module 5: DevOps & Deployment (15 hours)

1. **Deployment Strategies (10 hours)**
 - Hosting applications using Vercel, Netlify, and Heroku
 - CI/CD pipelines with GitHub Actions
2. **Monitoring and Optimization (5 hours)**
 - Performance monitoring tools (Google Lighthouse, Postman)
 - Security best practices for web applications

Hands-on Activity: Deploy and monitor a full-stack MERN application.

Module 6: Capstone Project (15 hours)

- Develop a fully functional MERN stack application.
 - Implement authentication and authorization.
 - Integrate third-party APIs and deploy the final product.
 - Present the project with code review and performance analysis.
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Teaching Methodology

- **Hands-on Training:** Real-world projects with live coding sessions.
 - **Agile Approach:** Sprint-based execution with Scrum methodology.
 - **Continuous Assessment:** Weekly coding challenges and feedback.
 - **Collaboration:** Team projects, mentorship, and peer reviews.
 - **Industry Exposure:** Case studies and expert guest lectures.
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Training Duration

- **240 hours**, available in :
 - 20 weeks

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Expected Outcomes

- Proficiency in Full Stack development using the MERN stack.
- Ability to design and deploy scalable web applications.
- Experience in cloud deployment and DevOps practices.
- Readiness for enterprise and freelance job opportunities.

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