

Comprehensive Web Application Development

Course Duration: 40 Hours

Course code: CWAD

1. Course Overview

This course provides a complete, end-to-end journey into modern web application development, covering both frontend and backend technologies. Learners will start with web fundamentals (HTML, CSS, JavaScript) and progress to advanced frameworks like React/Angular, Node.js/Express, and database integration. The course also covers RESTful APIs, authentication, deployment, and performance optimization. By the end of the course, participants will be capable of designing, developing, and deploying scalable, full-stack web applications using industry best practices.

2. What you'll learn?

By the end of this course, learners will be able to:

- Understand web development architecture and full-stack workflows.
- Build responsive, dynamic UIs using HTML5, CSS3, and JavaScript (ES6+).
- Work with modern frontend frameworks (React or Angular).
- Develop REST APIs with Node.js and Express.js.
- Integrate databases (SQL and NoSQL: MySQL/PostgreSQL & MongoDB).
- Implement authentication & authorization with JWT and OAuth.
- Manage state across client and server.
- Apply DevOps practices for building and deploying apps.
- Test and debug applications effectively.
- Deploy apps on cloud platforms (AWS, Azure, or Netlify/Vercel).

3. Target Audience

- Beginners and intermediate developers aiming to become full-stack web developers.

- Software engineers transitioning into web application development.
- Students and professionals preparing for software development roles.
- Teams seeking a comprehensive understanding of modern web development workflows.

4. Pre-Requisites

Familiarity with:

- Basic programming concepts (variables, loops, functions).
- Basic knowledge of HTML, CSS, and JavaScript.
- Willingness to work with frontend + backend technologies.

5. Course content

Module 1: Introduction to Web Application Development

- Course overview and setup
- Web development lifecycle and architecture
- Client-side vs server-side development

Module 2: Frontend Fundamentals

- HTML5 and semantic elements
- CSS3: Flexbox, Grid, and responsive design
- JavaScript (ES6+ features) refresher

Module 3: Modern Frontend Framework (React or Angular)

- Introduction to React/Angular framework
- Components, props, and state management
- Routing and navigation
- API integration with Axios/Fetch
- Styling strategies (CSS Modules, Tailwind, Material UI)

Module 4: Backend Development with Node.js & Express.js

- Introduction to Node.js runtime
- Building REST APIs with Express
- Middleware and routing concepts
- Error handling and logging

Module 5: Database Integration

- SQL Databases (MySQL/PostgreSQL): Schema, queries, joins
- NoSQL Databases (MongoDB): Collections, documents, aggregation
- Connecting databases with Node.js
- CRUD operations in real applications

Module 6: Authentication & Authorization

- User registration and login systems
- JWT-based authentication
- OAuth2 and third-party logins
- Role-based access control (RBAC)

Module 7: Advanced Frontend Development

- State management with Redux/Context API (for React)
- Angular Services and RxJS Observables (for Angular)
- Forms and validation
- Performance optimization (code splitting, memoization)

Module 8: Full-Stack Integration

- Connecting frontend to backend APIs
- Managing client-server communication
- Handling sessions and cookies
- Best practices for full-stack workflows

Module 9: Testing & Debugging

- Unit testing with Jest (React/Node.js)
- API testing with Postman
- Debugging techniques with DevTools

Module 10: Deployment & DevOps Basics

- Preparing app for production
- Deployment on Netlify, Vercel, AWS, or Azure
- CI/CD pipelines with GitHub Actions
- Containerization with Docker (intro)

Module 11: Security in Web Applications

- Common vulnerabilities (XSS, CSRF, SQL Injection)
- Secure coding practices
- HTTPS and SSL/TLS basics

Module 12: Capstone Project – Comprehensive Web App

- Build and deploy a full-stack web application
- Features: Authentication, API integration, database management, responsive UI
- Collaborative development with Git and version control
- Final presentation and deployment demo