

## Week 1: Foundations of HTML and CSS

### Session 1: Fundamentals of HTML

- Introduction to HTML
- Basic structure of an HTML document
- Common tags (headings, paragraphs, links, images, lists)
- Form elements and attributes
- Input types and validation
- Semantic HTML tags (header, nav, section, article, footer)
- **Project: First landing page with HTML**

### Session 2: Getting Started with CSS & github

- Inline, internal, and external CSS
- Basic selectors and properties (color, background, font, text alignment)
- Box model (margin, border, padding, content)
- Positioning (static, relative, absolute, fixed)
- Flexbox basics
- Introduction to git & github and its setup
- **Project: Creating a simple layout with CSS**

## **Week 2: JavaScript Essentials and Advanced Techniques**

### **Session 3: JavaScript Essentials**

- Variables, data types, and operators
- Basic syntax and control structures (if statements, loops)
- Introduction to functions
- Let var and const
- Hoisting and scopes
- Closure
- Introduction to HOF
- DOM manipulation (getElementById, querySelector)
- Event handling (click, hover, etc.)
- Event bubbling and capturing

### **Session 4: Advanced Concepts of JavaScript**

- Arrow functions
- Destructuring arrays and objects
- Working with arrays (methods like push, pop, map, filter)
- Objects and their properties
- Working with asynchronous javascript (callbacks, promises, async/await)

## Week 3: Introduction to React and Component Basics

### Session 5: Introduction to React and JSX

- What is React and why use it
- Setting up a React environment (using Create React App)
- Installing bundlers
- React.createElement and render method
- Introduction to JSX
- Tailwind CSS

### Session 6: Components, Props, and State

- Creating and rendering components
- Creating different components
- Understanding props
- Creating cards with props
- React reconciliation and React fibers
- Understanding keys in React
- Understanding the useState hook
- **Project: Creating a simple React project**

## **Week 4: React Advanced Features and Routing**

### **Session 7: Advanced Hooks and State Management**

- Understanding the useEffect hook
- Clean-up function of useEffect
- Custom hooks
- State lifting
- Context API

### **Session 8: UI Functionalities and React-Routing**

- Introduction to React Router DOM
- Creating different paths
- Creating an error page using useRouteError hook
- Creating children routes
- Understanding types of routing (SSR vs CSR)
- Single Page Application and dynamic routing
- Using useParams hook
- Applying event handlers

## **Week 5: CSS Frameworks and Advanced React Concepts**

### **Session 9: Getting Started with Frameworks**

- Introduction to Bootstrap / Tailwind
- Setting up Bootstrap/Tailwind
- Grid system and responsive design
- Commonly used classes (buttons, cards, alerts)

### **Session 10: Advanced React Concepts**

- Higher-order components
- Lazy loading (on-demand loading)
- Controlled vs uncontrolled components

## **Week 6: React lifecycle and performance optimization**

### **Session 11: Class Components**

- Creating class-based components
- States in class components
- Lifecycle methods of React

### **Session 12: Performance optimization**

- Error boundaries
- Fragments and StrictMode
- Performance optimization with React.memo and useCallback

## **Week 7: State management with Redux**

### **Session 13: Introduction to Redux**

- What is Redux and why use it
- Setting up Redux
- Actions, reducers, and the store
- Connecting Redux with React components

### **Session 14: Advanced Redux**

- Advanced Redux concepts (middleware, async actions)
- Combining reducers
- Project work: Integrating Redux into the Recipe app

## **Week 8: Project Implementation**

### **Session 15: Setting Up the E-commerce Website**

- Planning the project structure
- Setting up the environment with Create React App
- Installing necessary dependencies (React Router, Redux, Tailwind CSS, etc.)
- Creating the basic layout (header, footer, product listing)

### **Session 16: Implementing Functionality and deployment**

- Adding product data and displaying products
- Implementing product details page
- Adding a shopping cart with Redux
- Deployment of react front end on hosting platforms

## **Week 9: Introduction to Node.js and Express**

### **Session 17: Node.js Basics and Modules**

- Introduction to Node.js and its architecture
- Setting up Node.js and creating a basic server
- Understanding the Node.js event loop and asynchronous programming
- Core modules and third-party packages
- Working with NPM for package management
- Creating and managing custom modules

### **Session 18: Basics of Express.js and RESTful APIs**

- Setting up an Express application
- Understanding routing and middleware in Express
- Creating a basic RESTful API
- CRUD operations and data handling
- Implementing error handling and validation

## **Week 10: Advanced Express and API Design**

### **Session 19: Advanced Express Features**

- Authentication and authorization (JWT, OAuth)
- Advanced routing techniques and error handling
- Integrating third-party services (e.g., payment gateways)

### **Session 20: API Design and Documentation**

- Designing scalable and maintainable APIs
- Documenting APIs using tools like Swagger
- Testing APIs with Postman or similar tools

## **Week 11: Introduction to MongoDB**

### **Session 21: MongoDB Basics**

- Introduction to NoSQL and MongoDB
- Setting up MongoDB and using MongoDB Atlas
- Basic CRUD operations and data modeling

### **Session 22: Advanced MongoDB**

- Schema design and data relationships
- Aggregation framework and indexing
- Performance optimization and data validation



## **Week 12: Authentication and CI/CD Pipelines**

### **Session 23: Authentication and Authorization**

- Implementing user authentication (e.g., JWT, Passport.js)
- Managing user roles and permissions
- Securing APIs and handling sessions

### **Session 24: CI/CD Pipelines**

- Introduction to Continuous Integration and Continuous Deployment
- Setting up CI/CD pipelines using GitHub Actions or similar tools
- Deploying applications (backend and frontend) to cloud platforms

## **Week 13: Major Project Frontend Setup**

### **Session 25: Setting Up the E-commerce Website**

- Planning and organizing the project structure
- Setting up the frontend environment with Create React App
- Installing and configuring dependencies (React Router, Redux, Tailwind CSS, etc.)
- Building the basic layout (header, footer, product listing)

### **Session 26: Implementing Functionality**

- Adding and displaying product data
- Implementing product details and shopping cart functionality with Redux

## **Week 14: Finalizing and Deployment**

### **Session 27: Backend Integration and Checkout Functionality**

- Developing checkout functionality and integrating with the backend

### **Session 28: Deployment and Final Touches**

- Deploying Node.js/Express backend to cloud platforms (Heroku, AWS, etc.)
- Hosting the React frontend on platforms like Netlify or Vercel
- Configuring domain names, SSL certificates, and final deployment checks
- Conducting final testing and performance optimization