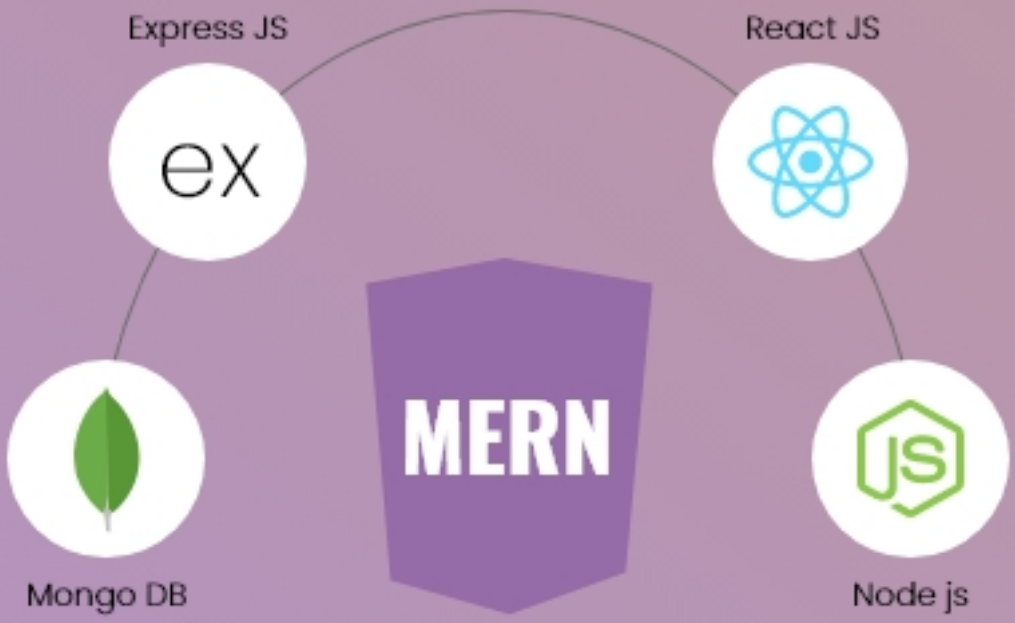
GeeksforGeeks

MERN

Full Stack Development



Detailed
Course Syllabus

CONTENTS

Week 1

Session 1: Understanding Web Development Basics

- Introduction to web development and its significance.
- Overview of front-end vs. back-end development.
- The role of HTML, CSS, and JavaScript in web development.

Session 2: Introduction to HTML - Structure and Basic Tags

- Understanding HTML as the structure of a web page.
- Basic HTML document structure (<!DOCTYPE>, <html>, <head>, <body>).
- Introduction to common HTML tags (e.g., <h1>, <p>, <a>, <img>).
- Practical exercise: Creating a simple HTML page.

Session 3: Setting up a Git Repository and Committing Changes

- Introduction to version control and Git.
- Installing Git and configuring user settings.
- Creating a local Git repository and making initial commits.
- Pushing changes to a remote repository (e.g., GitHub).

Week 2

Session 4: HTML Tags and Attributes

- In-depth exploration of HTML tags and attributes.
- Semantic HTML elements (e.g., <header>, <nav>, <article>).
- Common attributes (e.g., href, src, alt).
- Best practices for HTML coding.

Session 5: CSS Styling Basics

- Introduction to CSS as the presentation layer.
- CSS syntax, selectors, and properties.
- Applying styles to HTML elements.
- Cascading and specificity in CSS.

CONTENTS

Session 6: CSS Advanced Techniques (Flexbox, Grid)

- Introduction to CSS layout models.
- Mastering Flexbox for flexible and responsive layouts.
- Exploring Grid layout for complex page structures.
- Hands-on exercises for layout design..

Week 3

Session 7: Advanced HTML Topics (Forms, Semantic Elements)

- Creating forms in HTML (e.g., <form>, <input>, <button>).
- Semantic HTML elements for better structure.
- Accessibility considerations in HTML.

Session 8: Advanced CSS Techniques (Transitions, Animations)

- Advanced CSS properties for animations and transitions.
- CSS keyframes for creating animations.
- Best practices for creating smooth transitions.

Session 9: Introduction to JavaScript - Variables, Data Types, and Operators

- Introduction to JavaScript as a programming language.
- Variables, data types (string, number, boolean), and operators.
- Writing and running JavaScript in the browser console..

Week 4

Session 10: Control Flow (If-Else, For, While Loops)

- Understanding conditional statements (if, else if, else).
- Loop structures (for, while) for repetitive tasks.
- Practical exercises to create logic in JavaScript.

Session 11: Functions, Scope, and Closures in JavaScript

- Defining and using functions in JavaScript.
- Understanding variable scope (local vs. global).
- Introduction to closures and their applications.

CONTENTS

Session 12: Working with Arrays and Objects

- Creating, manipulating, and iterating through arrays.
- Working with objects and their properties.
- Common array and object methods.

Week 5

Session 13: Manipulating the DOM with JavaScript

- Introduction to the Document Object Model (DOM).
- Selecting and modifying DOM elements.
- Creating and removing HTML elements dynamically.

Session 14: Handling Events and User Interactions with JavaScript

- Adding event listeners to respond to user interactions.
- Event object properties and methods.
- Practical exercises for creating interactive web pages.

Session 15: Debugging and Troubleshooting JavaScript

- Common debugging techniques in the browser.
- Using the console for debugging.
- Identifying and fixing common JavaScript errors.

Week 6

Session 16: Introduction to React and JSX

- Understanding the role of React in web development.
- Introduction to JSX and its benefits.
- Setting up a React development environment.

Session 17: Creating React Components

- Creating functional components.
- Using props to pass data between components.
- Rendering components within a React application.

Session 18: State Management in React

- Introduction to state and its importance in React.
- Managing state with the useState hook.
- Updating and re-rendering components based on state changes.

Week 7

Session 19: Conditional Rendering and Event Handling in React

- Implementing conditional rendering in React components.
- Handling user events with event handlers.
- Practical exercises for interactive components.

Session 20: Introduction to React Hooks

- Introduction to React Hooks (e.g., useEffect).
- Using the useState and useEffect hooks in React.
- Managing component lifecycles with hooks.

Session 21: Practical Projects and Exercises with React

- Working on practical projects to apply React concepts.
- Developing and refining React components.
- Debugging and testing React applications.

Week 8

Session 22: Introduction to Node.js and Its Features

- Understanding Node.js as a JavaScript runtime environment.
- Event-driven, non-blocking I/O in Node.js.
- Setting up a Node.js development environment.

Session 23: Building Simple Web Servers with Node.js

- Creating a basic web server with Node.js.
- Handling HTTP requests and responses.
- Building RESTful APIs with Node.js.

Session 24: Working with Node Modules and Asynchronous Programming

- Introduction to Node modules (e.g., fs, http).
- Asynchronous programming in Node.js using callbacks.
- Error handling and debugging in Node.js.

Week 9

Session 25: Asynchronous JavaScript in Node.js

- Asynchronous patterns in Node.js (e.g., promises, async/await).
- Converting callback-based code to promise-based.
- Handling errors and exceptions in asynchronous code.

Session 26: Building RESTful APIs with Express.js

- Introduction to Express.js as a web application framework.
- Routing, middleware, and request handling in Express.
- Building RESTful endpoints for web services.

Session 27: Authentication and Security in Node.js

- Implementing user authentication and authorization.
- Security best practices for web applications.
- Practical exercises for securing Node.js applications.

Week 10

Session 28: Introduction to MongoDB and Mongoose

- Understanding NoSQL databases and the role of MongoDB.
- Setting up a MongoDB development environment.
- Defining database schemas and models using Mongoose.

Session 29: MongoDB Indexing and Aggregation

- Exploring MongoDB indexing for improved query performance.
- Using aggregation pipelines to process data.
- Query optimization and best practices in MongoDB.

Session 30: Building RESTful APIs with Node and Express

- Recap of RESTful API principles.
- Building CRUD operations with Express.js.
- Implementing middleware for authentication, validation, and more.

Week 11

Session 31: Introduction to State Management with Redux

- Understanding the need for state management in complex applications.
- Introduction to Redux principles and the Redux store.
- Setting up Redux in a React application..

Session 32: Creating Redux Actions and Reducers

- Defining Redux actions and action creators.
- Creating reducers to manage application state.
- Dispatching actions and connecting React components.

Session 33: Advanced Redux Concepts and Practical Projects

- Using Redux middleware for asynchronous actions.
- Managing application state with Redux.
- Practical projects to apply Redux concepts.

Week 12

Session 34: Building a Major Project (An E-Com App)

- Applying the knowledge gained throughout the course.
- Developing a significant web application (e.g., a portfolio, e-commerce site, or social network).
- Project development, testing, and debugging.

Session 35: Deployment Strategies (CI/CD pipelines, hosting)

- Introduction to Continuous Integration (CI) and Continuous Deployment (CD).
- Deploying React applications using hosting services (e.g., Netlify, Vercel).
- Deploying Node.js applications with server configurations.

Session 36: Project Presentation and Review

- Presenting and demonstrating the final project.
- Reviewing project code, architecture, and deployment.
- Feedback and discussion on project achievements and improvements.