



MERN STACK Training

MERN STACK Content

Module 1: Foundations - Web Development Essentials

- **Introduction to Web Development:**
 - Understanding the client-server architecture.
 - Overview of frontend, backend, and databases.
 - Introduction to different web technologies and stacks.
 - The role of JavaScript in modern web development.
- **HTML (HyperText Markup Language):**
 - Basic HTML structure and tags.
 - Creating forms, tables, and lists.
 - Semantic HTML and accessibility.
 - HTML5 new features and elements.
- **CSS (Cascading Style Sheets):**
 - CSS syntax, selectors, and properties.
 - Box model, layout techniques (Flexbox, Grid).
 - Responsive design principles and media queries.
 - CSS preprocessors (Sass, Less) - Introduction.
- **JavaScript Fundamentals:**
 - Data types, variables, operators.
 - Control flow (conditionals, loops).
 - Functions, scope, and closures.

- DOM (Document Object Model) manipulation.
- Events and event handling.
- ES6+ features (arrow functions, destructuring, etc.).
- **Version Control with Git:**
 - Introduction to Git and version control concepts.
 - Basic Git commands (clone, add, commit, push, pull).
 - Branching and merging strategies.
 - Working with remote repositories (GitHub, GitLab).

Module 2: Frontend with React.js

- **Introduction to React.js:**
 - Understanding React's core concepts.
 - Component-based architecture.
 - JSX (JavaScript XML) syntax.
 - Setting up a React development environment (Create React App).
- **Components and Props:**
 - Functional components.
 - Passing data down with props.
- **State and Lifecycle:**
 - Managing component state using useState.
 - Understanding useEffect hook.
 - Updating state and triggering re-renders.
- **Event Handling:**
 - Handling user interactions in React.
 - Passing event handlers as props.
- **Conditional Rendering and Lists:**
 - Dynamically rendering content based on conditions.
 - Rendering lists of data using map().
 - The importance of keys in lists.
- **Forms in React:**

- Controlled and uncontrolled components.
- Handling form submissions.
- Form validation.
- **React Hooks:**
 - In-depth look at common hooks (useState, useEffect, useContext, useReducer, useRef, etc.).
- **Routing with React Router:**
 - Setting up client-side routing.
 - Defining routes and components.
 - Navigation between pages.
 - Route parameters.
- **Styling in React:**
 - Inline styles.
 - CSS modules.
 - Styled components.
 - Using CSS frameworks (e.g., Bootstrap, Material-UI) - Introduction.
- **State Management (Introduction):**
 - Understanding the need for state management.
 - Context API for simpler state management.
- **Making API Calls:**
 - Using fetch or libraries like Axios to communicate with the backend.
 - Handling asynchronous operations.
 - Displaying data from the API.

Module 3: Backend with Node.js and Express.js

- **Introduction to Node.js:**
 - Understanding Node.js runtime environment.
 - Node.js architecture and event loop.
 - NPM (Node Package Manager) and managing dependencies.

- Working with modules and require().
- **Building Web Servers with Node.js:**
 - HTTP module and request/response cycle.
 - Creating a basic web server.
 - Handling different HTTP methods (GET, POST, etc.).
- **Introduction to Express.js:**
 - Express.js framework and its features.
 - Setting up an Express.js application.
 - Routing: handling different URL paths.
- **RESTful API Development:**
 - Understanding REST principles.
 - Designing and building RESTful APIs with Express.js.
 - Handling request parameters and body data.
 - Sending JSON responses.
 - API testing with tools like Postman.
- **Error Handling and Logging:**
 - Implementing error handling in Express.js.
 - Using logging middleware.

Module 4: Database with MongoDB

- **Introduction to NoSQL and MongoDB:**
 - Understanding NoSQL database concepts.
 - Introduction to MongoDB and its features.
 - Document structure and collections.
 - Installing and setting up MongoDB.
 - MongoDB Compass for GUI management.
- **CRUD Operations in MongoDB:**
 - Create, Read, Update, Delete operations.
 - Inserting, querying, updating, and deleting documents.
 - Using MongoDB shell and Node.js driver (Mongoose).

- **Data Modeling with MongoDB:**
 - Designing effective MongoDB schemas.
 - Understanding relationships between collections (embedding, referencing).
 - Indexing for performance optimization.
- **Mongoose ODM (Object Data Modeling):**
 - Introduction to Mongoose.
 - Defining schemas and models.
 - Performing CRUD operations with Mongoose.
 - Data validation and sanitization.

Module 5: MERN Stack Integration and Deployment

- **Connecting Frontend and Backend:**
 - Making API requests from React to Express.js.
 - Handling data flow between the client and server.
- **Authentication and Authorization:**
 - Implementing user registration and login.
 - Using JWT (JSON Web Tokens) for authentication.
- **File Uploads:**
 - Handling file uploads from React to Node.js/Express.js.
 - Storing files.

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