React.js (03 Months)
Syllabus

01: Introduction to React

- ✓ What is React?
- ✓ History and evolution (React vs other frameworks)
- ✓ Advantages and use-cases of React
- ✓ Understanding SPA (Single Page Applications)
- ✓ ReactJS project setup using Vite and Create React App (CRA)
- ✓ Folder structure overview and file walkthrough
- ✓ JSX: JavaScript XML Explained
- ✓ Embedding expressions in JSX
- ✓ JSX rules and best practices

02: Components and Props

- ✓ Functional Components vs Class Components
- ✓ Creating and using components
- ✓ Props (properties) in React
- ✓ Passing data between components
- ✓ Default props and prop types validation using PropTypes
- ✓ Component reusability and composition
- ✓ Children props and fragment usage

03: State and Event Handling

- ✓ Understanding useState() hook
- ✓ Updating and managing component state
- ✓ Handling user input and events
- ✓ Form input handling
- ✓ Conditional rendering using if, ternary, and logical operators
- ✓ Controlled vs uncontrolled components

04: Lists and Keys

- ✓ Rendering lists in React using .map()
- ✓ Understanding key prop and why it's needed
- ✓ Dynamic list rendering
- ✓ Deleting and updating items in a list

05: Hooks (In-Depth)

- ✓ Introduction to React Hooks
- ✓ useState() – Managing state
- ✓ useEffect() – Side effects and lifecycle management
- ✓ useRef() – Accessing DOM elements & persistent values
- ✓ useContext() – Context API for state sharing
- ✓ useReducer() – Complex state management
- ✓ useMemo() and useCallback() – Performance optimization

06: React Router (Routing in React)

- ✓ Introduction to React Router DOM
- ✓ Setting up routes using <BrowserRouter>
- ✓ <Route>, <Switch>, <Link>, <NavLink>
- ✓ Dynamic routing and route parameters
- ✓ Nested routes and navigation
- ✓ Redirects and NotFound (404) pages

07: Forms and Validation

- ✓ Handling form inputs
- ✓ Managing multiple form fields with one handler
- ✓ Client-side validation techniques
- ✓ Using external libraries like **Formik** and **Yup** for validation
- ✓ Handling form submissions and errors

08: API Integration and Data Fetching

- ✓ Introduction to REST APIs and JSON
- ✓ Fetching data with fetch() and axios
- ✓ Displaying fetched data in components
- ✓ Error handling and loading states
- ✓ POST, PUT, DELETE requests
- ✓ Creating reusable API services

09: Styling in React

- ✓ Inline styles vs CSS files
- ✓ CSS Modules
- ✓ Using frameworks like Bootstrap, Tailwind, or Material UI with React
- ✓ Styled-components and emotion (CSS-in-JS)
- ✓ Responsive design in React apps

10: React Context API and State Management

- ✓ The problem with prop drilling
- ✓ Creating and using React Context
- ✓ Sharing state between components
- ✓ Global state management using Context
- ✓ Introduction to **Redux** (optional advanced section)
  - o createStore(), dispatch(), reducers
  - o Redux Toolkit basics (optional)

11: Code Splitting and Performance Optimization

- ✓ React app performance bottlenecks
- ✓ Lazy loading with React.lazy() and Suspense
- ✓ Memoization with React.memo()
- ✓ Profiling with React Developer Tools
- ✓ Bundling & optimization with Vite/Webpack

12: Testing React Applications

- ✓ Introduction to testing in React
- ✓ Unit testing with Jest
- ✓ Component testing with React Testing Library
- ✓ Writing test cases for events and API interactions
- ✓ Mocking data and APIs
- ✓ Test coverage and debugging

13: Deployment and Production Build

- ✓ Building the production version of React app
- ✓ Hosting React app on GitHub Pages, Netlify, or Vercel
- ✓ CI/CD basics with GitHub Actions (introductory)
- ✓ Environment variables in React (.env files)
- ✓ Version control best practices using Git

Capstone Projects

- ✓ To-Do List with Add/Edit/Delete Functionality
- ✓ Weather App using OpenWeatherMap API
- ✓ Blog App with Routing and Comments (with JSONPlaceholder API)
- ✓ User Dashboard with Protected Routes
- ✓ E-commerce Product Page UI
- ✓ Portfolio Website Using React

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