### **React Training**

### [**https://docs.google.com/document/d/1OWAWeZOBg7krdHuY6TB\_muxXEo5oIpc-fobr713mqtI/edit?usp=sharing**](https://docs.google.com/document/d/1OWAWeZOBg7krdHuY6TB_muxXEo5oIpc-fobr713mqtI/edit?usp=sharing)

### **Module 1: (3-4 Weeks) 1. JavaScript Refresher -**

* **ES6+ Features**
  + Let, Const, and Var
  + Arrow Functions
  + Template Literals
  + Destructuring & Spread Operator
  + Map, Filter, and Reduce – Learn how to efficiently transform and manipulate arrays using these high-order functions.
  + Deep Copy vs. Shallow Copy – Understand how object references work and how to avoid state mutation issues in React.
* **Asynchronous JavaScript**
  + Callbacks, Promises, and Async/Await
  + Fetch API & Error Handling
* **JavaScript Core Concepts**
  + Closures & Scope
  + Higher-Order Functions
  + Event Loop & Execution Context

### **2. React Basics -**

* **Introduction to React**
  + What is React?
  + Setting up a React Project (Vite/Create React App)
* **JSX & Components**
  + Functional vs Class Components
  + Props & State
  + Conditional Rendering
* **Event Handling in React**
  + Handling Clicks and Form Submissions
  + Synthetic Events vs Native Events
* **Lists and Keys**
  + Rendering Lists in React
  + The Importance of Keys
* **Fragments (<> </>) –** Use React Fragments to avoid unnecessary DOM elements.
* **React DevTools –** Debug and inspect React components, state, and props efficiently.
* **Uncontrolled Components with Refs –** Learn how to handle form inputs without controlled state.
* **Error Boundaries –** Catch and handle errors in component trees to prevent breaking the UI.

### **3.Styling in React**

* **CSS in React**
  + Inline Styles
  + CSS Modules
  + Styled Components
* **Integrating Bootstrap**
  + Installing and Using Bootstrap in React
  + Using React-Bootstrap Components
  + Customizing Bootstrap with SCSS
* **Integrating Tailwind CSS**
  + Setting Up Tailwind in a React Project
  + Using Utility Classes for Styling
  + Creating Custom Themes in Tailwind

### **4. React - A Deeper Dive**

* **State Management**
  + useState Hook
  + Lifting State Up
  + Context API
* **React Lifecycle & Effects**
  + useEffect Hook and Dependencies
  + Cleanup in useEffect
* **React Router**
  + Setting up React Router
  + Nested Routes & Dynamic Parameters
* **Optimizing Performance**
  + React.memo & useCallback
  + Lazy Loading with React Suspense

**Module 1 Assignments:**

* **Check assignments here:** <https://docs.google.com/document/d/1Jdd0Habc5JpZn0JfXLAv8KHDLKSOdv-HIJBCGvh11I8/edit?usp=sharing>
* **Modular Tic Tac Toe with Move Logs** – Develop a Tic Tac Toe game using reusable components for each functionality, ensuring a well-structured codebase. Include a move log to track and display past moves in the UI. for reference check:
  + <https://tictactoe-pearl-rho.vercel.app/>
  + <https://github.com/saurabhdhakne-extentia/tictactoe>

### **Module 2: (1-2 Weeks )**

### **5. Forms & Validation in React**

* Controlled vs Uncontrolled Components
* Handling Form Inputs with useState
* Form Validation without Libraries (Custom Validation)
* Form Validation with Libraries (Formik, Yup, React Hook Form)
* Handling File Uploads – Implement file input fields and process uploads using FormData and APIs.

### **6. Working with REST APIs in React**

* Fetching Data using Fetch API & Axios
* Handling API Errors & Loading States
* Implementing Pagination and Infinite Scrolling
* Sending Data (POST, PUT, DELETE Requests)
* Using React Query for API State Management

### **7. Integrating Graph & Chart Libraries in React**

* Popular Chart Libraries (Recharts, Chart.js, ApexCharts)
* Rendering Static Data in Graphs
* Fetching API Data for Dynamic Charts
* Customizing Graph Styles and Themes
* Handling Real-time Data Updates in Charts

**Module 2 Assignments:**

* **Check assignments here:**   
  <https://docs.google.com/document/d/10rW3cXFXm5-jORe4exrpJli3igghnnAApZsmbXop-TQ/edit?usp=sharing>

### **Module 3: (.5 - 1 week week)**

### **8. Deploying a React App**

* Generating a Production Build (npm run build)
* Deploying on Vercel (Setup & Configuration)
* Deploying on Netlify (Connecting Git & Deploying)
* Hosting on AWS S3, EC2
* Setting up for Automatic Deployments Heroku

**Module 3 Assignments: Deploy Your Projects on Vercel or Netlify**

### **9. Assignments (2-3 week)**

* **Analytical Dashboard with Graphs and Charts in React**
  + Create a dashboard displaying analytics using charts
  + Integrate REST API data for dynamic updates
  + Implement filters and sorting for better insights
* **Creating a Chatbot in React** 
  + Design a simple chatbot UI with message history
  + Implement basic bot responses using state and API calls
  + Add user input handling and response suggestions
* **Documentation Creator React App**
  + Build a markdown-based documentation editor
  + Support real-time preview of formatted content
  + Add export functionality to PDF or Markdown