React.Js Course Syllabus

Module 1: Introduction to React

1. **Introduction to Frontend Development**
   - Understanding the role of React in frontend development
   - The evolution of frontend frameworks
2. **What is React?**
   - Overview of React: A JavaScript library for building user interfaces
   - React's key features: Components, JSX, and Virtual DOM
3. **Setting Up the Development Environment**
   - Installing Node.js and npm
   - Setting up a React project using `create-react-app`
   - Understanding folder structure of a React project
4. **First React Application**
   - Creating your first React component
   - Introduction to JSX
   - Rendering a component to the DOM
   - Understanding `ReactDOM.render()` method

Module 2: Components and Props

1. **Components in React**
   - Functional components vs. Class components
   - How to create components using both methods
2. **Props in React**
   - Understanding props: Passing data to components
   - Destructuring props
   - Default props and prop types
   - Prop drilling and component composition

Module 3: State and Events

1. **State in React**
   - Understanding state in React components
   - `useState` hook for managing state in functional components
   - Class component state (`this.state`, `this.setState()`)
2. **Handling Events**
   - Event handling in React (onClick, onChange, etc.)
   - Synthetic events in React
   - Binding event handlers in class components
   - Using arrow functions in event handlers
3. **Conditional Rendering**

- Using `if`, ternary operator, and logical operators for conditional rendering
- Rendering lists of data with `.map()`

Module 4: React Hooks

1. **Introduction to React Hooks**
   - What are hooks?
   - Why hooks are important and how they simplify React code
2. **useState Hook**
   - Managing state with `useState` in functional components
   - Multiple state variables in a component
3. **useEffect Hook**
   - Understanding `useEffect` for side effects (data fetching, DOM manipulation)
   - Fetching data using `useEffect`
   - Cleanup function in `useEffect`
   - Dependency array in `useEffect`

Module 5: Handling Forms

1. **Handling Form Inputs**
   - Controlled components vs. uncontrolled components
   - Managing form inputs using `useState`
2. **Form Validation**
   - Basic form validation techniques
   - Handling form submission
3. **Multiple Forms**
   - Handling multiple forms with separate states
   - Handling dynamic form fields (adding/removing fields)

Module 6: Routing with React Router

1. **Introduction to React Router**
   - What is React Router? Why do we need it?
   - Installing and setting up `react-router-dom`
2. **Basic Routing**
   - Defining routes using `<Route />`
   - Creating links with `<Link />` and `<NavLink />`
   - Rendering components based on URL path
3. **Nested Routing and Route Params**
   - Nested routes (child routes)
   - Passing parameters to routes (URL parameters, query strings)
4. **Programmatic Navigation**
   - Navigating with `useNavigate()` hook

Module 7: Managing Application State

1. **Introduction to Context API**
    - Understanding the Context API: Share state globally
    - Creating a context provider and consumer
2. **useContext Hook**
    - Using `useContext` for easier access to global state
3. **Global State Management with Context API**
    - Managing global state using context (Example: Theme, User, etc.)

Module 8: Fetching Data

1. **Introduction to Fetch API**
    - Fetching data from external APIs
    - Using the Fetch API with React (GET requests)
2. **Handling Asynchronous Code**
    - `async/await` and `Promises`
    - Using `useEffect` for data fetching
3. **Displaying Data in Components**
    - Rendering data dynamically in JSX
    - Handling loading states and error states

Module 9: Error Boundaries and Debugging

1. **Error Boundaries**
    - What are error boundaries and why are they important?
    - Creating a custom error boundary component
2. **Debugging React Applications**
    - Debugging in the browser
    - Using React Developer Tools
    - Common React issues and how to troubleshoot them

Module 10: Performance Optimization

1. **React Rendering Behavior**
    - How React decides when to re-render components
2. **useMemo and useCallback Hooks**
    - Optimizing performance using `useMemo` and `useCallback`
3. **Lazy Loading and Code Splitting**
    - Code splitting using `React.lazy()` and `Suspense`
    - Dynamic imports for reducing initial bundle size

Module 11: Building and Deploying React Applications

1. **Building the React App for Production**
    - Understanding the build process (`npm run build`)
    - Optimizing performance for production
2. **Deploying React Apps**

- Deploying to services like Netlify, Vercel, and GitHub Pages
- Continuous deployment using GitHub Actions