**React Syllabus (Beginner to Advanced)**

**🔹 1. Introduction to React**

* What is React?
* Features of React
* Advantages of React over other frameworks
* React vs. Angular vs. Vue
* Setting up a React development environment
* Understanding **JSX** (JavaScript XML)

**🔹 2. React Basics**

* Components in React (Functional vs. Class Components)
* Props and State
* Handling Events in React
* React Lifecycle Methods (Class Components)
* Conditional Rendering
* Lists & Keys in React

**🔹 3. React Hooks (Functional Components)**

* Introduction to Hooks
* **useState()** – Managing State
* **useEffect()** – Handling Side Effects
* **useContext()** – Context API for global state
* **useRef()** – Handling DOM references
* **useReducer()** – Alternative to useState
* **useMemo()** & **useCallback()** – Performance Optimization
* Custom Hooks

**🔹 4. React Routing**

* Introduction to React Router
* Installing React Router
* Setting up Routing in React
* Route Parameters & Query Strings
* Redirects & Navigation
* Nested Routes
* Protected Routes (Authentication)

**🔹 5. React Forms & Handling User Input**

* Controlled vs. Uncontrolled Components
* Handling Input Fields
* Form Validation in React
* Using Third-Party Form Libraries (Formik, React Hook Form)

**🔹 6. Managing State in React**

* Local State vs. Global State
* Context API for State Management
* Redux:
  + Introduction to Redux
  + Redux Store, Actions, and Reducers
  + Using Redux with React
  + Middleware (Redux Thunk, Redux Saga)
* Recoil & Zustand (Modern State Management)

**🔹 7. React UI & Styling**

* CSS Modules
* Styled Components
* Tailwind CSS with React
* Material UI & ShadCN/UI
* Framer Motion for Animations

**🔹 8. API Integration & Data Fetching**

* Fetch API & Axios
* Handling Promises & Async/Await
* Using useEffect() for API calls
* Error Handling & Loading States
* Infinite Scrolling & Pagination

**🔹 9. Performance Optimization**

* Virtual DOM & Reconciliation
* React Memoization (React.memo, useMemo, useCallback)
* Code Splitting & Lazy Loading (React.lazy & Suspense)
* Optimizing Re-Renders

**🔹 10. Advanced React Concepts**

* Higher-Order Components (HOCs)
* Render Props Pattern
* Portals in React
* Error Boundaries
* Server-Side Rendering (SSR) with Next.js
* Static Site Generation (SSG)

**🔹 11. React Testing**

* Introduction to Testing in React
* Unit Testing with Jest
* React Testing Library (RTL)
* Mocking API Calls in Tests

**🔹 12. React with TypeScript**

* Introduction to TypeScript
* Typing Props, State, and Hooks
* Using TypeScript with React Components

**🔹 13. React and Backend Integration**

* Connecting React with Node.js/Express
* Authentication with JWT
* Real-Time Data with WebSockets & Firebase

**🔹 14. React Deployment & Build Optimization**

* Creating Production Build
* Deploying React Apps on Vercel, Netlify, or Firebase
* CI/CD for React Projects
* Progressive Web Apps (PWAs) in React

**🎯 Final Projects & Hands-on Practice**

* Todo App
* E-commerce App
* Dashboard with Charts
* Social Media Clone
* Chat Application