

# React JS Syllabus

## Module 1: Introduction to React

1. **Understanding JavaScript ES6+**
  - Arrow functions
  - Let, Const, and Var
  - Destructuring
  - Spread and Rest operators
  - Promises and Async/Await
2. **What is React?**
  - Introduction and history of React
  - Why use React?
  - React vs. other front-end frameworks
3. **Setting Up the Development Environment**
  - Node.js and npm installation
  - Setting up a new React project using `Create React App`
  - Project structure overview
  - Introduction to JSX

## Module 2: Core Concepts

1. **Components**
  - Functional vs. Class Components
  - Component Structure and Syntax
  - JSX syntax and rules
  - Nesting and composing components
2. **State and Props**
  - Understanding component state
  - Using the `useState` hook
  - Passing data with props
  - Handling events and binding
3. **Component Lifecycle Methods (Class Components)**
  - `componentDidMount`
  - `componentDidUpdate`
  - `componentWillUnmount`
4. **Handling Forms and Input**

## Module 3: Hooks in React

1. **Introduction to Hooks**
  - Why use hooks?
  - Rules of hooks
2. **Built-in React Hooks**
  - `useState` – Managing State
  - `useEffect` – Handling Side Effects
  - `useContext` – Working with Context API
3. **Advanced React Hooks**
  - `useReducer` for complex state logic
  - `useRef` for accessing DOM elements

- `useMemo` and `useCallback` for performance optimization
- Custom hooks

## **Module 4: State Management**

- 1. Lifting State Up**
- 2. Context API**
  - Creating and consuming contexts
  - Context best practices
- 3. State Management Libraries**
  - Introduction to Redux
  - Actions, Reducers, and the Store
  - Integrating Redux into React
  - Using `Redux Toolkit`
  - Alternative state management options (MobX, Recoil)

## **Module 5: Routing in React**

- 1. React Router Basics**
  - Setting up React Router
  - Nested Routes
  - URL parameters
- 2. Navigation**
  - `Link` and `NavLink`
  - Redirects
- 3. Protected Routes and Authentication**

## **Module 6: Styling in React**

- 1. CSS Modules**
- 2. Styled Components**
- 3. Styled JSX**
- 4. Emotion and other CSS-in-JS libraries**

## **Module 7: Advanced Concepts**

- 1. Higher-Order Components (HOCs)**
- 2. Render Props**
- 3. Code Splitting and Lazy Loading**
  - React's `lazy` and `Suspense`
- 4. Error Boundaries**

## **Module 8: Building and Optimizing React Applications**

- 1. Debugging in React**
  - Using React Developer Tools
- 2. Optimizing Performance**
  - Using React Profiler
  - Avoiding unnecessary re-renders

### **3. Testing React Applications**

- Unit testing with Jest and React Testing Library
- Snapshot testing

### **4. Deploying React Applications**

- Using Vercel, Netlify, or Firebase

## **Module 9: Integrating with Backend**

### **1. Making HTTP Requests**

- Using `fetch` and `axios`

### **2. Managing Data Fetching**

- Handling asynchronous state changes
- Error handling and data loading indicators

### **3. Connecting with APIs**

## **Module 10: Project and Capstone**

### **1. Building a Real-World Application**

- CRUD operations
- Using external libraries (e.g., React Query, Formik, etc.)

### **2. Capstone Project**

- Create a fully-featured, deployable React application
- Integrating React with backend services