KOENIG SOLUTIONS · COURSE OUTLINE

Advanced React: Redux, React Router & React Query

Learn to build React applications with routing, Redux state management, React Query data fetching, testing and performance optimisation.

2 Days	5	26	14
DURATION	MODULES	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers React Router for configuring routes, dynamic and nested routing, and protected routes, followed by state management with Redux including store, reducers, actions, middleware and react-redux integration. It then addresses data fetching and API integration using axios and React Query, along with pagination and infinite scrolling. The course also covers testing React components and Redux logic with Jest and React Testing Library, and concludes with performance optimisation techniques such as memoisation, lazy loading and code splitting.

WHO THIS COURSE IS FOR

- **React Developers**
- **Front-End Developers**
- **Web Developers**
- **JavaScript Developers**
- **QA Engineers**

PREREQUISITES

- Working Knowledge of React JS

LEARNING OBJECTIVES

- Configure routes and navigation with React Router
- Implement protected routes and authentication flow
- Apply Redux for global state management with actions and reducers
- Integrate middleware such as redux-thunk and redux-saga
- Fetch and manage server state using React Query and axios
- Handle loading, error, pagination and infinite scrolling states
- Write unit tests for components, actions and reducers
- Optimise re-renders and implement lazy loading and code splitting

COURSE SYLLABUS

5 Modules, 26 Topics

DAY 1 Core React Features and State Management

01

2 hours (1-hour lecture, 1-hour lab) | 3 Lab Activities

Session 1: React Routing and Navigation

TOPICS

- Introduction to React Router
- Configuring routes (BrowserRouter, Route, Switch, Routes)
- Dynamic routing and route parameters
- Nested routes and layouts
- Using Link, NavLink, and useNavigate for navigation
- Protected routes and authentication flow

02

2.5 hours (1.5-hour lecture, 1-hour lab) | 3 Lab Activities

Session 2: State Management with Redux

TOPICS

- **Introduction to Redux:** Store, Reducers, Actions
- Understanding the Redux data flow
- Middleware (redux-thunk and redux-saga)
- Integration with React using react-redux
- Using Redux DevTools for debugging

DAY 2 Data Handling, Testing, and Optimization

03

2.5 hours (1.5-hour lecture, 1-hour lab) | 3 Lab Activities

Session 1: Data Fetching and API Integration

TOPICS

- Fetching data using the Fetch API and axios
- Understanding React Query for server state management
- Handling loading and error states
- Pagination and infinite scrolling
- Integrating APIs into a Redux workflow

04

2 hours (1.5-hour lecture, 30-minute lab) | 3 Lab Activities

Session 2: Testing and Debugging

TOPICS

- **Introduction to testing frameworks:** Jest and React Testing Library
- Writing unit tests for React components
- Testing Redux actions and reducers
- Mocking API calls for testing
- **Debugging tools:** React DevTools and console debugging

05

2 hours (1-hour lecture, 1-hour lab) | 2 Lab Activities

Session 3: Performance Optimization and Best Practices

TOPICS

- Common performance issues in React applications
- Optimizing re-renders with React.memo and useMemo
- Lazy loading components using React.lazy and Suspense
- Code splitting and bundling with Webpack
- Best practices for folder structure, hooks, and component design

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
01	**Session 1: React Routing and Navigation**	**Build a multi-page application (e.g., a blog):** Home page, Blog list page, Single blog page (dynamic route) Add navigation between pages with NavLink Implement a protected route for creating a new blog post
02	**Session 2: State Management with Redux**	**Build a simple task management app:** Use Redux to manage a global state for tasks (add, update, delete tasks) Implement async actions using redux-thunk to simulate saving tasks to a server Debug the app using Redux DevTools
03	**Session 1: Data Fetching and API Integration**	**Enhance the task management app:** Fetch task data from a mock API using axios Add loading and error indicators Implement pagination for tasks using React Query

#	MODULE	ACTIVITY
04	**Session 2: Testing and Debugging**	■ **Write tests for the task management app:** Test the rendering of task components ■ Mock API calls to test data fetching logic ■ Debug issues using React DevTools and console logs
05	**Session 3: Performance Optimization and Best Practices**	■ **Optimize the task management app:** Identify and reduce unnecessary re-renders ■ Implement lazy loading for routes and components

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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