

KOENIG SOLUTIONS · COURSE OUTLINE

Career Enabler Program with React JS

Learn to build React applications using JavaScript, TypeScript, SQL and testing tools, from core syntax to performance optimisation.

14 Days

DURATION

13

MODULES

55

TOPICS

43

HANDS-ON ACTIVITIES

COURSE OVERVIEW

This programme begins with JavaScript and TypeScript fundamentals, covering variables, control structures, functions, ES6+ features, type annotations, interfaces and classes. It then moves into SQL, covering database and table creation, queries, joins, subqueries, aggregation, string and date functions, window functions, and query optimisation through indexing, execution plans and profiling tools. The focus then shifts to React, covering components, props, state, hooks, routing, state management with Context API and Redux, performance optimisation with memoization and code splitting, and testing with Jest, React Testing Library and Cypress. The programme concludes with a project applying React development, SQL optimisation and testing together.

WHO THIS COURSE IS FOR

Front-End Developers

Back-End Developers

Database Developers

Software Engineers

QA Engineers

LEARNING OBJECTIVES

- Apply JavaScript fundamentals such as functions, arrays and ES6+ features
- Implement TypeScript interfaces, classes and modules
- Write SQL queries using joins, subqueries and set operations
- Apply aggregation, string, date and window functions in SQL
- Analyse query performance using indexing and execution plans
- Build React components using props, state and hooks
- Implement routing and state management with Redux and Context API
- Develop tests for React components using Jest and Cypress

13 Modules, 55 Topics

01

3 Lab Sessions

Day 1: JavaScript Basics

LECTURE TOPICS

- **Introduction to JavaScript:** History, Uses, and Applications
- Variables, Data Types, and Operators
- **Control Structures:** Loops and Conditional Statements
- Functions and Scope
- Arrays and Objects
- **ES6+ Features:** Arrow Functions, Template Literals, Destructuring, Spread Operator

02

4 Lab Sessions

Day 2: TypeScript Basics

LECTURE TOPICS

- **Introduction to TypeScript:** Why TypeScript?
- Type Annotations and Interfaces
- Classes and Object-Oriented Programming in TypeScript
- Modules and Namespaces
- TypeScript Compiler and Configurations
- Introduction to TypeScript with JavaScript Libraries

03

3 Lab Sessions

Day 3: SQL Basics

LECTURE TOPICS

- Introduction to Databases and SQL
- Creating Databases and Tables
- **Basic SQL Queries:** SELECT, INSERT, UPDATE, DELETE
- Data Types in SQL
- **Filtering Data:** WHERE, ORDER BY, GROUP BY

04**3 Lab Sessions**

Day 4: Joins and Subqueries

LECTURE TOPICS

- **Understanding Joins:** INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN
- Using Subqueries in SQL
- **Set Operations:** UNION, INTERSECT, EXCEPT

05**3 Lab Sessions**

Day 5: Advanced SQL Functions

LECTURE TOPICS

- **Aggregation Functions:** COUNT, SUM, AVG, MIN, MAX
- **String Functions:** CONCAT, SUBSTRING, REPLACE, LENGTH
- Date and Time Functions
- **Window Functions:** ROW_NUMBER, RANK, PARTITION BY

06**3 Lab Sessions**

Day 6: Query Optimization - Part 1

LECTURE TOPICS

- Introduction to Query Optimization
- **Indexing:** Types and Best Practices
- Understanding Query Execution Plans
- Importance of Proper Table Design (Normalization vs Denormalization)

07**3 Lab Sessions**

Day 7: Query Optimization - Part 2

LECTURE TOPICS

- **Query Optimization Techniques:** Caching, Indexes, Partitioning
- **Avoiding Costly Operations:** SELECT *, Unnecessary Joins
- SQL Profiling and Query Tuning Tools
- Understanding Database Locks and Deadlocks

08

3 Lab Sessions

Day 8: React Basics

LECTURE TOPICS

- **Introduction to React:** Components, JSX, and Virtual DOM
- Functional Components vs Class Components
- Props and State in React
- Event Handling in React

09

3 Lab Sessions

Day 9: Advanced React Concepts

LECTURE TOPICS

- Lifecycle Methods in Class Components
- **Hooks in Functional Components:** useState, useEffect, useContext
- Component Composition and Reusability
- Lifting State Up

10

3 Lab Sessions

Day 10: Routing and State Management

LECTURE TOPICS

- **React Router:** Single Page Applications (SPA) and Routing
- Dynamic Routing and URL Parameters
- **Introduction to State Management in React:** Context API and Redux

11

3 Lab Sessions

Day 11: Performance Optimization in React

LECTURE TOPICS

- React Performance Bottlenecks
- Code Splitting and Lazy Loading
- Memoization with React.memo and useMemo
- Optimizing Re-rendering with useCallback and shouldComponentUpdate

12

3 Lab Sessions

Day 12: Testing in React

LECTURE TOPICS

- Introduction to Testing in React: Jest and React Testing Library
- Unit Testing React Components
- Testing Props, State, and Events
- Snapshot Testing in React

13

3 Lab Sessions

Day 13: End-to-End (E2E) Testing

LECTURE TOPICS

- Introduction to E2E Testing with Cypress
- Setting Up Cypress for React Applications
- Writing E2E Tests: Navigation, Forms, and UI Interactions
- Best Practices for E2E Testing

Day 14: Project and Wrap-Up

3 Project Works

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
01	Day 1: JavaScript Basics	LAB SESSION
		■ Practice with loops and conditional statements
		■ Write a function to manipulate arrays and objects
		■ Implement a simple calculator using functions and operators
02	Day 2: TypeScript Basics	LAB SESSION
		■ TypeScript setup and configuration
		■ Convert a small JavaScript project into TypeScript
		■ Use interfaces and types in functions and classes
03	Day 3: SQL Basics	LAB SESSION
		■ Create a database and tables
		■ Perform basic CRUD operations
		■ Write queries with filtering and sorting options

#	MODULE	ACTIVITY
04	Day 4: Joins and Subqueries	LAB SESSION - Write queries involving multiple tables using joins - Practice using subqueries within SELECT, FROM, and WHERE clauses - Perform set operations on multiple datasets
05	Day 5: Advanced SQL Functions	LAB SESSION - Write queries with aggregation functions - Use string and date manipulation functions in SQL queries - Apply window functions for ranking and partitioning data
06	Day 6: Query Optimization - Part 1	LAB SESSION - Analyze query performance using execution plans - Create indexes and observe performance improvements - Optimize queries with better table design and indexing
07	Day 7: Query Optimization - Part 2	LAB SESSION - Optimize poorly written queries - Use database profiling tools to analyze performance bottlenecks - Experiment with avoiding locks and reducing deadlock potential
08	Day 8: React Basics	LAB SESSION - Set up a simple React app using create-react-app - Create functional and class components - Build a form component and handle user inputs
09	Day 9: Advanced React Concepts	LAB SESSION - Build an app with components utilizing state and hooks - Refactor a class component to use hooks - Practice state lifting with multiple components
10	Day 10: Routing and State Management	LAB SESSION - Implement routing in a multi-page React application - Create a simple global state using Context API - Manage component state using Redux
11	Day 11: Performance Optimization in React	LAB SESSION - Identify performance bottlenecks in a React app - Implement code splitting using React.lazy and Suspense - Use React.memo and useMemo to improve performance
12	Day 12: Testing in React	LAB SESSION - Set up Jest and React Testing Library in a React project - Write unit tests for components and hooks - Implement snapshot testing for component rendering
13	Day 13: End-to-End (E2E) Testing	LAB SESSION - Set up Cypress in a React project - Write E2E tests for a multi-page React app - Perform automated tests for form submission, routing, and component interaction

#	MODULE	ACTIVITY
	Day 14: Project and Wrap-Up	PROJECT WORK ■ Build a fully functional React application with optimized performance and routing ■ Implement SQL query optimizations for a backend database ■ Include proper testing for React components and E2E tests

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.

FLEXIBLE DELIVERY

Learn the Way That Suits You

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Live Online Classes (ILO)

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Flexi (Self-Paced)

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