



# Modern Web Application Development with React and Node RED Course

**Course Duration: 40 Hours    Course Code: REACT NODERED-301**

## 1. Course Overview

The **Modern Web Application Development with React and Node-RED Course** is designed to equip learners with the skills to build full-stack web applications using **React** for the frontend and **Node-RED** for the backend workflow automation. This course blends modern UI development with low-code backend integration, enabling learners to quickly create scalable, event-driven, and API-integrated applications. Participants will gain hands-on experience in building interactive React interfaces, connecting them with Node-RED flows, and deploying applications in real-world scenarios.

## 2. What You'll Learn

- Fundamentals of **React.js** and building dynamic UIs
- Introduction to **Node-RED** and flow-based programming
- Connecting **React frontends with Node-RED backends**
- Designing APIs and integrating with third-party services
- State management in React (Context API / Redux)
- Building **real-time applications** with WebSockets and MQTT in Node-RED
- Handling authentication and secure API communication
- Deploying full-stack apps on **cloud and edge platforms**

- Best practices for **modern web application development**

### 3. Target Audience

- Web developers who want to integrate **low-code backends** with modern frontends
- Frontend developers interested in **full-stack development** with Node-RED
- IoT developers building **dashboards and web apps**
- Professionals who want to create **rapid prototypes** of modern web apps
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### 4. Pre-Requisites

- Basic knowledge of **JavaScript and ES6+**
- Familiarity with **HTML, CSS, and React basics**
- Understanding of **APIs and JSON**
- Optional: Awareness of IoT or event-driven systems

### 5. Course Content

- **Module 1: Introduction to Modern Web Development**
- Overview of React.js and Node-RED
- Use cases for combining React + Node-RED
- Setting up development environments
  
- **Module 2: React Fundamentals**
- Components, Props, and State

- Event handling and lifecycle methods
- Using hooks (useState, useEffect, useContext)
- Routing with React Router
  
- **Module 3: Node-RED Basics**
- Introduction to flow-based programming
- Setting up Node-RED environment
- Creating and deploying flows
- Working with nodes: input, output, function, and API nodes
  
- **Module 4: Connecting React and Node-RED**
- Building REST APIs with Node-RED
- Consuming APIs in React applications
- Handling real-time data with WebSockets and MQTT
- Case study: Building a live data dashboard
  
- **Module 5: State Management and Data Flow**
- Managing global state in React with Context API / Redux
- Synchronizing state between React and Node-RED
- Error handling and data validation
  
- **Module 6: Authentication & Security**
- Securing APIs with tokens
- Implementing authentication in React frontends
- Best practices for protecting Node-RED flows



- **Module 7: Advanced Integrations**
  - Integrating third-party APIs (AI, IoT, Cloud services)
  - Automating workflows with Node-RED
  - Building real-time notifications and alerts
- **Module 8: Deployment & Scaling**
  - Preparing full-stack applications for production
  - Deploying React apps (Netlify, Vercel)
  - Deploying Node-RED flows (Docker, Cloud platforms)
  - Scaling applications for performance
- **Module 9: Capstone Project**
  - Build a complete **modern web application** with React + Node-RED
  - Example projects:
    - IoT device monitoring dashboard
    - AI-powered chatbot web app
    - Real-time stock/crypto tracker
    - Workflow automation tool