

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Industry Certified Value Added Course on

“React Framework for Web development”

14-07-2025 to 19-07-2025 (2025 – 2026 ODD)

COURSE OBJECTIVES

- To understand the fundamental concepts, architecture, and use cases of React.js in building modern web applications.
- To learn component-based development using Functional Components, Props, and Hooks in React.
- To implement forms, manage application state effectively, and integrate RESTful APIs.
- To utilize advanced React Hooks such as useContext, useMemo, and useCallback for optimizing performance and reusability.
- To build scalable multi-page applications using React Router and manage global state using Redux Toolkit.
- To design, develop, and deploy a complete React-based application using GitHub and hosting platforms like Vercel or Netlify.

UNIT 1: INTRODUCTION TO REACT AND ENVIRONMENT SETUP

(9 hours)

Understand what React.js is and why it is popular for building modern web applications. Learn the differences between Single Page Applications (SPA) and Multi-Page Applications (MPA), and explore the concept of the Virtual DOM. Get introduced to JSX and its advantages over plain HTML. Set up the development environment by installing Node.js and using Vite to create a React project. Explore the folder structure, run a Hello World app, and inspect component behavior using React DevTools.

UNIT 2: COMPONENTS, PROPS, AND EVENTS

(9 hours)

Dive into functional components and learn how to pass data using props. Understand and implement event handling in React to handle user interactions. Create reusable components like cards and lists. Learn how to render dynamic content using `.map()` with proper usage of keys. Implement conditional rendering techniques and toggle UI elements based on user actions. Apply best practices in building modular and maintainable components.

UNIT 3: FORMS, STATE MANAGEMENT, AND API CALLS (9 hours)

Learn how to create and manage forms with validation in React using controlled components. Handle input changes and form submissions with useState. Integrate external APIs using the fetch method and display the data in the UI. Understand the concept of lifting state up to manage shared data between components. Build a simple feedback or login form with API interaction, including real-time form validations and user input error handling.

UNIT 4: ADVANCED HOOKS AND PERFORMANCE OPTIMIZATION (9 hours)

Explore advanced React Hooks such as useContext, useMemo, and useCallback for improved state and performance management. Learn how to share global state using Context API and optimize component re-renders with memoization techniques. Create custom hooks to encapsulate logic for reuse across components. Build a theme switcher using useContext and practice performance optimization in rendering dynamic lists using useMemo.

UNIT 5: ROUTING, REDUX, AND PROJECT DEPLOYMENT (9 hours)

Implement routing in React using React Router v6, including nested routes and URL parameters. Understand the principles of Redux Toolkit, create slices, dispatch actions, and access global state using useSelector. Develop a multi-page app, such as a blog or task manager, with login/auth state managed by Redux—practice component communication patterns like prop drilling and context usage. Finalize the app and deploy it to GitHub, Vercel, or Netlify, following best practices in hosting and version control.

Total: 45Hours

COURSE OUTCOMES

After successful completion of the course, the students will be able to

| CO. No. | Course Outcome | Knowledge Level |
|---------|---|-------------------|
| CO1 | Apply core concepts of React such as JSX, Virtual DOM, and SPA architecture to build interactive user interfaces. | K3 - Apply |
| CO2 | Develop responsive UI components using Bootstrap and React's functional component model with props and events. | K3 - Apply |
| CO3 | Build state-driven applications using React hooks like useState/useEffect, form handling, and API integration. | K3 - Apply |
| CO4 | Implement advanced React features (useContext, useMemo, useCallback) and optimize performance using custom hooks. | K3 - Apply |
| CO5 | Construct and deploy full-stack applications using PHP with architecture, React routing, Redux, and Git tools. | MVC K3 - Apply |

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1:

Professional Skills: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2:

Problem - Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

CO - PO MAPPING

| Course Name | CO. No. | POs | | | | | | | | | | | PSOs | |
|-------------------------------------|---------|-----|---|---|---|---|---|---|---|---|----|----|------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 1 | 2 |
| React framework for Web Development | CO1 | H | H | H | M | M | L | - | - | L | L | M | H | M |
| | CO2 | H | H | H | M | M | L | - | - | L | L | M | H | M |
| | CO3 | H | H | H | M | M | L | - | - | L | L | M | H | M |
| | CO4 | H | H | H | M | M | L | - | - | L | L | M | H | M |
| | CO5 | H | H | H | M | M | L | - | - | L | L | M | H | M |

H - High, M - Moderate, L - Low

SDG MAPPING

| React Framework for web Development | SDGs | | | | | | | | | | | | | | | | |
|-------------------------------------|------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
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HOD - CSE

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