# Course Outline

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| Course Name | Advance Web Technologies |
| Credit Hours | 3 |
| Instructor | M Abo Bakar Aslam<br>muhammad.abobbakar@uog.edu.pk |
| Course Objectives | In a course focused on front-end, backend web development using both React and NextJS, the primary goals are to equip students with a strong understanding of web technologies and React/NextJS/VeuJS fundamentals. They should become proficient in creating component-based user interfaces, implementing client-side routing with React/NextJS, managing state effectively, integrating with external APIs, and optimizing performance. Students will also learn to design responsive and accessible user interfaces and practice testing and debugging techniques. Practical project development is emphasized, and they should gain experience in version control, deployment, and building a professional portfolio. Collaboration and soft skills development are encouraged, preparing students for successful careers in web development. |
| Reference Materials | https://react.dev/learn<br>https://nextjs.org/<br>https://vuejs.org/<br>https://www.w3schools.com/react/default.asp<br>https://javascript.info/<br>https://sass-lang.com/documentation/<br>https://tailwindcss.com/docs<br>https://getbootstrap.com/docs/ |
| **Solutions for given tasks in each lecture will be available on** https://coursecs.wordpress.com/courses/web-development/ | |

# Lectures and their Contents

| Lecture | Contents and Practical Tasks |
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| 1 | **Introduction about Course**<br>• Motivation about Web application development<br>• Introduction about different frameworks/techniques for web application development<br>• Motivation about JavaScript and React based web application development<br>• Introduction about tools used for JavaScript and React based web application development |
| 2 | **Setting up Environment for Implementation of JavaScript Code**<br>• Install any code editor. In this course, we recommend Visual Studio (VS) Code. Download this tool by using https://code.visualstudio.com/download and install it. Moreover, install necessary extension in VS code.<br>• Install "React Developer Tool" extension for your browser<br>• Download and install node.js. Download it by using https://nodejs.org/en/download/current |
| 3 | React, Expression in JSX<br>• Motivation about React based web application development<br>• Introduction about tools used for React based web application development<br>• Setting up environment for React based web application development |
| 4 | • React components<br>• React router<br>• Props<br>• States |

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| 5 | • Fetching API<br>• Displaying fetched data on front end page<br>• Introducing map() function for above task |
| 6 | • Adding previous, next buttons to populate fetched data from built-in API<br>• Use useEffect() for fetched data |
| 7 | • Adding infinite scrolling for fetched data from built-in API<br>• Introducing .env file for storing local data |
| 8 | • Introducing MERN stack and installing environment for MERN stack<br>• Connect and get URI for MongoDB<br>• Creating database and insert some data in mongoDB |
| 9 | • Create custom API<br>• Storing data into database using Mongoose Model<br>• Adding data validation |
| 10 | • Hashing data before moving data intot database<br>• Create a registration system |
| 11 | Create complete login and registration system |
| 12 | • Saving some data into database w.r.t user's login and link data using primary and foreign key<br>• Fetching linked data from the database |
| 13 | Complete CRUD operations and display using frontend |
| 14 | • Use useContext Hook<br>• Use useState with useContext<br>• Update useContext data with useState and useEffect |
| 15 | • Use useLocation hook<br>• Context API |
| 16 | • Introducing NextJS<br>• Advantage for usage of NextJS over just react<br>• Setting environment for NextJS application |
| 17 | • Link component<br>• File based routing<br>• Simple route<br>• Nested route<br>• Dynamic route |
| 18 | • Image component<br>• API routes |
| 19 | • Server side rendering<br>• Static side generation |
| 20 | Data Form in NextJS |

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| 21 | Custom API in NextJS |
| 22 | CRUD operations using NextJS |
| 23 | • Overview of Vue.js framework<br>• Advantages of using Vue.js for web development<br>• Setting up a Vue.js development environment<br>• Hello World with Vue.js: Creating and rendering a simple Vue instance |
| 24 | • Understanding Vue.js instance lifecycle<br>• Data binding in Vue.js: One-way and Two-way binding<br>• Interpolation and directives in Vue.js<br>• Hands-on: Creating dynamic data bindings in Vue.js templates |
| 25 | • Deep dive into Vue.js directives: v-bind, v-model, v-if, v-for, etc.<br>• Handling user events with v-on directive<br>• Vue.js event modifiers for event handling<br>• Practical examples: Building interactive UI components with directives and events |
| 26 | • Introduction to Vue.js components<br>• Creating and registering global and local components<br>• Passing data to child components using props<br>• Emitting custom events from child components<br>• Hands-on: Building a simple application using Vue.js components |
| 27 | • Communication between sibling components using event bus<br>• Props drilling vs. Vuex for state management<br>• Introduction to Vuex for centralized state management<br>• Practical examples: Implementing component communication patterns |
| 28 | • Introduction to Vue Router for client-side routing<br>• Setting up routes and route parameters<br>• Navigation guards for authentication and authorization<br>• Nested routes and route transition effects<br>• Hands-on: Building a single-page application with Vue Router |
| 29 | Semester project on base of NextJS and VueJS. |
| 30 | • Understanding the Vuex architecture: State, Getters, Mutations, Actions<br>• Setting up Vuex store and modules<br>• Mutation and Action creators for state management<br>• Integrating Vuex with Vue.js components<br>• Hands-on: Implementing state management in a Vue.js application using Vuex |
| 31 | Presentation for project |
| 32 | Presentation for project |