Devi Ahilya University, Indore, India Institute of Engineering & Technology				**III Year B.E. (Computer Engineering) (Full Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
5CERE1	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
Web Technology	**3**	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

Course Objectives

1. Understand the fundamental concepts, components, and protocols of web technology.
2. Master the core concepts and syntax of JavaScript to create interactive and dynamic web applications.
3. Gain proficiency in React.js library.
4. Acquire the skills to work with MongoDB, a NoSQL database, to store and manage data efficiently in web applications.
5. Learn how to utilize Express.js framework and Node.js runtime environment to develop server-side applications.

Course Outcome:

Students earned credits which will develop ability to fulfil following course objective: -

CO. No.	**CO.**	**PO.**
CO1.	Understand the fundamental concepts, components, and protocols of web technology, including HTML, CSS, and HTTP, to build a solid foundation for web development.	PO1, PO3, PO5, PO12
CO2.	Master the core concepts and syntax of JavaScript to create interactive and dynamic web applications, including variables, data types, control structures, functions, and events.	PO1, PO3, PO5, PO6, PO12
CO3.	Gain proficiency in React.js library, comprehend its component-based architecture, and learn to build reusable UI components for developing modern, efficient, and scalable web applications.	PO3, PO4, PO5, PO6, PO7, PO9, PO12
CO4	Acquire the skills to work with MongoDB, a NoSQL database, to store and manage data efficiently in web applications, including CRUD operations, indexing, aggregation, and schema design.	PO3, PO4, PO5, PO9, PO12
CO5	Learn how to utilize Express.js framework and Node.js runtime environment to develop server-side applications, handle HTTP requests and responses, implement middleware, and build RESTful APIs for web services.	PO3, PO6, PO7, PO8, PO12

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	3	2	3		3							3
CO2	2	3	3		3	3						3
CO3			3	2	3	3	2		3			3
CO4			3	3	3				3			3
CO5			3			2	2	3				3

1. * CO (rows) mention nil/very small/insignificant contribution to the PO (column)
2. 1→ relevant and small significance 2 → medium or moderate and 3 →strong

COURSE CONTENTS

UNIT-I

Introduction to Web Technology: Evolution of the World Wide Web, Client-server architecture, MVC architecture, Internet protocols (HTTP, HTTPS, TCP/IP), Web-Servers, Web-Containers, URL, HTTP Basics, HTTP Methods, Requests, Status Codes, Headers. Introduction to HTML5: Elements, Attributes, Hyperlinks, Forms, div, Tables, images. Designing effective navigation. Cascading Style Sheets (CSS).

UNIT-II

JavaScript Essentials: Variables, data types, operators. Understanding DOM, Control Flow, Functions: Conditional statements, Loops, Iterations. Arrays and Objects: Manipulating arrays, working with objects, JSON. Error handling. DOM Manipulation, Events. Modern JavaScript: Arrow functions, Classes, Modules, Webpack.

UNIT-III

React JS: Understand Reacts role in UI development, component-based architecture. JSX and Rendering: Rendering components into DOM with JSX syntax. Components, Props: Functional, class components, handling state, lifecycle methods. Event Handling, Forms, Controlled Components. React Router for client-side routing. Hooks: useState, useEffect for state, side effects. Component Composition, API Requests, Data Handling. Styling in React, Error Handling: Error boundaries, graceful error handling.

UNIT-IV

MongoDB: Understanding the need for Non-RDBMS and the Difference between NoSQL and RDBMS. Getting Started with MongoDB: Creating Database, Collection. Basic Operations: Inserting, Finding, Querying, Sorting, Deleting, Updating data. Advanced Operations: Dropping Collection, Limiting, and Joining data in MongoDB.

UNIT-V

Express JS and Node JS: Provide an overview of environment setup and core concepts including routing, HTTP methods, URL building, middleware, templating, static file handling, form data processing, database integration, cookies, sessions, authentication, RESTful API development, scaffolding, and error handling.

Node JS: Introduce Node.js fundamentals such as modules, HTTP module, file system operations, URL module, Node Package Manager (NPM), event handling, file uploading, and email communication.

Learning Outcomes:

After completion of the course students will be able to -

1. Describe the concepts of WWW including browser and HTTP protocol.

2. Develop the modern web pages using the HTML5 and CSS3 features with different layoutsas per the need of applications.

5. Use JavaScript to develop the dynamic web pages and validate data entered by usersthrough forms

6. Use MERN Stack to generate the web pages dynamically using the database connectivity.

7. Develop modern Web Applications using the client and server-side technologies and theweb design fundamentals.

Books Recommended:

1. Pro MERN Stack, 2nd Edition - Vasan Subramanian
2. Steven M. Schafer, "HTML, XHTML and CSS", Fourth Edition by, Wiley India Edition.
3. HTML 5, Black Book, Dreamtech Press
4. Web Technologies, Black Book, Dreamtech Press
5. Web Design, Joel Sklar, Cengage Learning
6. Web Technologies – Achyut S Godbole and Atul Kahate

List of Practical Assignments:

During the learning of course, students need to do assignments:

1. Design web pages using HTML5
2. Style web pages using CSS3 features
3. Accepting and validating user entered data using JavaScript.
4. Develop a Dice Roller Game using Animation and JavaScript.
5. Setup MERN Stack Environment and Create tic-tac-toe game.
6. Develop a Calculator App using React js.
7. Build a basic Forms using React js.
8. Create a blog app using React js.
9. Setup a Mock API Server and Fetch Data in Blog from an API.
10. Create API to fetch blogs from DB.
11. Add API Authentication to Blog App.
12. Build Chat App.