Uka Tarsadia University

B.Tech.

CSE / CSE (AI&ML) / CSE (CC) / CSE (CS) / CE / CE (SE) / IT

Semester IV

ADVANCED WEB DEVELOPMENT

IT4036

Effective From January-2025

Syllabus version: 1.00

Subject Code	Subject Title
IT4036	Advanced Web Development

Teaching Scheme				Examination Scheme			
Hours		Credits		Theory Marks		Practical Marks	Total Marks
Theory	Practical	Theory	Practical	Internal	External	CIE	
3	2	3	1	40	60	50	150

Objectives of the course:

- To provide knowledge of advanced JavaScript to develop interactive Web pages.
- To create dynamic Web pages using open source JavaScript frameworks.

Course Outcomes:

Upon completion of the course, the student will be able to,

CO1: Apply variables, decision making statements, collections, iterators and generators.

CO2: Understand OOP version of JavaScript and its usage to create dynamic Web pages.

CO3: Understand and apply functions and asynchronous JavaScript to create interactive Web pages.

CO4: Understand and apply interaction between JavaScript and browser.

CO5: Develop Web pages that can handle various events through JavaScript API.

CO6: Understand JavaScript framework to develop web pages.

Sr. No.	Topics	Hours
	Unit – I	
1	**Basics of JavaScript:** Introduction to JavaScript, Executing JavaScript, Syntax, Keywords, Reserved words, Data types, Operators, Statements, Primitive and reference values, Execution context and scope, RegExp type, Singleton built-in objects, Collection reference types, Iterators, Generators.	6
	Unit – II	
2	**OOP Concepts, Proxies and Reflect:** Understanding Objects, Object creation, Inheritance, Classes, Proxy fundamentals, Proxy traps and reflect methods, Proxy patterns.	8

Unit – III		
3	**Functions, Promises and Async Function:** Arrow functions, Function names, Understanding arguments, No overloading, Default parameter values, Spread arguments, Function expressions, Function as values, Function internals, Function properties and methods, Recursion, Closures, Asynchronous programming, Promises, Sync functions.	9
Unit – IV		
4	**The BOM and DOM:** The Browser object model (BOM) - Window object, Location object, Navigator object, Screen object, History object, Client detection - Capacity detection, User-agent detection, Software and hardware detection, The Document Object Model (DOM) - Hierarchy of nodes, Working with the DOM, Mutation observers.	8
Unit – V		
5	**Event Handling and JavaScript APIs:** Events - Event flow, Event handlers, Event object, Types, Memory and performance, Simulating events, Scripting forms - Form basics, Scripting text boxes, Scripting select boxes, Form serialisation, Rich text edition, JavaScript APIs - Atomics and SharedArrayBuffer, Cross-context messaging, Encoding API, Blob and file APIs, Media events, Native drag and drop, Notifications API, Page visibility API, Stream API, Timing APIs, Web components, Web cryptography API.	8
Unit – VI		
6	**Introduction to Framework and its Components:** Introduction to React, Components and its lifecycle, Styling in React, Properties, State, UI, Events, Accessing DOM elements, Handling external data.	6

Sr. No.	**Advanced Web Development (Practical)**	**Hours**
1	Write a JavaScript to demonstrate properties and methods of String reference Type.	1
2	Write a JavaScript to demonstrate properties and methods of Array Collection Reference Type.	1
3	Write a JavaScript to demonstrate properties and methods of Date reference Type.	1

4	Write a JavaScript to create a cart contains items of categories like groceries, apparels, accessories and gadgets. Each category offers discounts 10%, 20%, 5% and 50% discounts. Apply discount on the times present in the cart and generate a final bill. [Hint: Use objects containing key-value pair]	2
5	Create a regular expression to find pattern from the given text as follow: 1) All the words starting with 'A'. 2) All the words starting with consonants. [Bonus Program: Upload a file using PHP and find above mentioned patters using JavaScript RE only from the text present in the file.]	2
6	Take input from user through prompt box and store it in an array. Print the fibonacci series till the indexed number in the array. [Hint: Use Iterative Methods of array]	2
7	Take input from user through prompt box and store it in an array. Calculate the Factorial of each number present in the array using iterative method of array and generate the resultant array of factorial values. [Bonus Program: Create the same program combining the iterative methods concept and recursion.]	2
8	a) Write a demonstrative JavaScript for i) Function methods, ii) Function internals b) Write a JavaScript to implement function overloading using function internals.	2
9	Write a demonstrative JavaScript for i) Map, wekamap and Set, ii) Function Closure, and iii) Typed array with ArrayBuffers.	1
10	a) Write a JavaScript to list the properties of an object using iterator and generator. b) Write a JavaScript to delete the name property and change the sclass property value from the following object. Also print the object before and after the said operations. [Hint: Use data properties of a JavaScript object.] c) Write a JavaScript to update the rollno property value based on the scalss value. Perform this using accessor property of a JavaScript object. [Hint: for sclass: VI, the rollno is 12. If the sclass: V, the rollno should be 13.] Sample object: let student = { name : "David Rayy", sclass : "VI", rollno : 12 };	2

11	a) Write a JavaScript to get the volume of a Cylinder with four decimal places using object classes. [Hint: Volume of a cylinder : V = πr2h, where r is the radius and h is the height of the cylinder.] b) Write a Bubble Sort algorithm in JavaScript using OOP concept. [Bonus: Create a php page which take names of students. List the name using the algorithm developed in this practical.]	2
12	Write a JavaScript to create a tip calculator that help determine how much to tip at restaurants or whenever the need arises.	1
13	Write a JavaScript to create election map. The code should have two candidates running for president and display the number of votes they received from each state, both in a table on the bottom right and when you hover mouse over a state. [Hint: BOM, DOM, Events] [Bonus: Created map should change the colour and pop the name of the state.]	2
14	Write a JavaScript to perform form validation using regular expression.	1
15	Write a demonstrative JavaScript for JavaScript APIs.	1
16	Write a React code to build a simple search filter functionality to display a filtered list based on the search query entered by the user.	1
17	Write a react code to create a simple counter which increments or decrements count dynamically on-screen as the user clicks on the button.	1
18	Write a react code to create an accordion that toggles text content on click of the accordion header.	1
19	Write a react code for simple login form where the user login by entering their username and password. The form inputs are validated to check if correct information is entered and the error messages are if the validation fails. The login form is hidden and the “Welcome, ${name}” message is shown when the user login is successful.	2
20	Write a react code to display a checklist with multiple options that can select and the selected options are dynamically displayed on the screen.	2

Text book:

1. Matt Frisbie - "Professional JavaScript for Web Developers", 2020, John Wiley& Sons, Inc.

Reference books:

1. Kirupa Chinnathambi - "Learning React ", 2017, Pearson Education, Inc.
2. Axel Rauschmayer - "Speaking JavaScript: An In-Depth Guide for Programmers", 2014, O'Reilly Media.
3. Nicholas C. Zakas - "Understanding ECMAScript 6: The Definitive Guide for JavaScript Developers", 2016, No Starch Press.
4. Vipul A M, Prathamesh Sonpatki - "ReactJS by Example - Building Modern Web Applications with React", 2016, Packt Publishing.

Course objectives and Course outcomes mapping:

- To provide knowledge of advanced JavaScript to develop interactive Web pages: CO1, CO2, CO3, CO4
- To create dynamic Web pages using open source JavaScript framework: CO5, CO6

Course units and Course outcome mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Basics of JavaScript	✓					
2	OOP Concepts, Proxies and Reflect		✓				
3	Functions, Promises and Async Function			✓			
4	The BOM and DOM				✓		
5	Event Handling and JavaScript APIs					✓	
6	Introduction to Framework and its Components						✓

Programme Outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and di- versity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-class room activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary set- tings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme Outcomes and Course Outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
PO1	✓	✓	✓	✓	✓	✓
PO2						
PO3				✓	✓	✓
PO4						
PO5					✓	✓
PO6						

PO7						
PO8						
PO9						
PO10						
PO11						
PO12						