



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Information Technology

Subject Code: DI05016041

Subject Name: Web Development with Java Script

w. e. f. Academic Year:	2026-27
Semester:	5 th
Category of the Course:	PEC-III

Prerequisite :	HTML, CSS
Rationale:	JavaScript is the most widely used client-side scripting language and forms the foundation of modern interactive web development. In today's digital era, almost every website and web application rely on JavaScript for dynamic content, user interaction, and real-time processing. This course is designed to help diploma students build strong logical and problem-solving skills by introducing them to essential JavaScript concepts such as variables, conditions, loops, functions, arrays, and strings. The course further expands into practical, industry-relevant areas including DOM manipulation, event handling, JSON operations, ES6 features, asynchronous programming, Fetch API, and LocalStorage—skills that are highly demanded in front-end development.

Course Outcome:

After Completion of the Course, Student will be able to:

No	Course Outcomes	RBT Level
01	CO1: Demonstrate fundamental JavaScript concepts including variables, data types, operators, conditions, and loops.	Apply
02	CO2: Deploy Javascript functions, arrays, and string manipulation techniques to build structured and reusable JavaScript programs.	Apply
03	CO3: Implement Client-side interface using DOM manipulation and event handling.	Apply
04	CO4: Implement object handling, JSON operations, and modern ES6 features (template literals, destructuring, spread operator) in practical applications.	Apply
05	CO5: Develop small web applications using Fetch API, async/await, and LocalStorage to handle asynchronous operations and data persistence.	Apply

**Revised Bloom's Taxonomy (RBT)*



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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE(E)	PA(M)	PA(I)	ESE(V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	JavaScript Basics & Logic Building 1.1 Introduction to JavaScript Fundamental of JavaScript, Application of JavaScript, JS in browsers & JS engines 1.2 Output Methods console.log(), alert(), document.write() 1.3 Variables var, let, const Scope & best practices 1.4 Data Types Number, String, Boolean typeof operator 1.5 Operators Arithmetic, Comparison, Assignment and Logical operators 1.6 Javascript Popup Boxes Alert Box, Confirm Box and Prompt Box 1.7 Conditional Statements if, else, else-if and nested conditions 1.8 Looping Constructs for loop, while loop, break & continue	10	23



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	1.9 Javascript Errors try, catch and throw		
2.	Functions, Arrays & Strings 2.1 Functions - Defining functions, Parameters, return values and function calling 2.2 Arrow Functions - Introduction & syntax - Usage in small programs 2.3 Arrays - Creating arrays, Accessing values, Array properties & length 2.4 Array Methods - push(), pop(), shift(), unshift(),indexOf() & includes() 2.5 Strings - String length, Case conversion (toUpperCase(), toLowerCase()), includes() & trim()	08	17
3.	DOM Manipulation & Events 3.1 Introduction to DOM - DOM basics, Node structure & Document object 3.2 Selecting Elements - getElementById, getElementsByClassName & querySelector / querySelectorAll 3.3 Manipulating HTML & CSS - Changing text (innerHTML, textContent), Changing styles, Adding/removing classes 3.4 Handling Events - click, input, change, mouse events & Event properties 3.5 EventListener - Syntax & usage, Multiple events on same element 3.6 DOM Navigation and Nodes	9	20



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	3.7 Javascript Validation JS email Validation, JS Regular Expressions and JS Form Validation		
4.	Objects & Modern JavaScript (ES6) 4.1 JavaScript Objects - Key-value pair structure, Accessing and modifying object properties, Nested objects 4.2 JSON Basics - JSON format syntax, JSON.parse(), JSON.stringify() 4.3 Template Literals - Backtick syntax, String interpolation, Multi-line strings 4.4 Destructuring - Array destructuring, Object destructuring 4.5 Spread Operator - Copying arrays, Merging arrays, Expanding object properties	9	20
5.	Async JS & Storage 5.1 Asynchronous JavaScript - Synchronous vs Asynchronous - Callbacks (concept only) 5.2 Fetch API - Basic fetch request, Reading JSON data from API - Simple API handling 5.3 async/await - Writing async functions - Awaiting API results 5.4 LocalStorage - setItem(), getItem(), removeItem() - Storing simple text or objects	9	20
	Total	45	100



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Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	30	45	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	JavaScript™ Absolute Beginner's Guide, Third Edition	Kirupa Chinnathambi	Pearson Education, Inc., 2023, ISBN: 9780137959211
2	HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2nd Edition	DT Editorial Services	Dreamtech Press / Wiley India Pvt. Ltd, 2016, ISBN: 978-9351199076
3	JavaScript Bible, 7th Edition	Danny Goodman, Michael Morrison, Paul Novitski, Tia Gustaff Rayl	John Wiley & Sons Inc., 2010, ISBN: 978-0470526910
4	Eloquent JavaScript, 4th Edition	Marijn Haverbeke	No Starch Press, 2024, ISBN: 978-1718504103
5	JavaScript: The Definitive Guide, 7th Edition	David Flanagan	O'Reilly Media, 2020, 978-1491952023

(b) Open-source software and website:

1. <https://www.w3schools.com/js/default.asp>
2. <https://www.geeksforgeeks.org/javascript/javascript-tutorial/>
3. https://onlinecourses.swayam2.ac.in/e-learning/preview/nou24_cs09



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4. <https://www.tutorialspoint.com/javascript/index.htm>

Suggested Course Practical List:

The following practical outcomes (PrOs) are the subcomponents of the COs. These PrOs need to be attained to achieve the COs.

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Develop a “Hello World” program using JavaScript by linking an external JavaScript file (HELLO.JS) with an HTML file.	1	2
2	Use console.log() to display output messages and understand debugging basics.	1	2
3	Develop a simple arithmetic calculator using JavaScript operators and user input.	1	2
4	Generate multiplication tables using loops in JavaScript.	1	2
5	Store student marks in arrays and compute total and average using array operations.	2	2
6	Perform text processing using string methods (count characters, uppercase and lowercase).	2	2
7	Manipulate DOM elements to change background color using event handling.	3	2
8	Perform interactive operations like show/hide content and counters using button events.	3	2
9	Use DOM and events to dynamically update text based on user input.	3	2
10	Create and display a student object using key-value pairs.	4	2
11	Implement a program to parse JSON data into a JavaScript object and vice versa using built-in methods like JSON.parse() and JSON.stringify()	4	2
12	Use template literals and destructuring to format and display object data.	4	2
13	Develop a To-Do list app with LocalStorage to add, delete, and persist tasks.	5	2
14	Fetch and display API data using Fetch API and async/await.	5	4
	Total		30

Note :- More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.



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List of Laboratory/Learning Resources Required:

Sr. No.	Laboratory/Learning Resources/Equipment Name with Broad Specifications	PrO. No.
1	1. Desktop computers or laptops 2. Minimum configuration: • Processor: Dual Core or above, RAM: 4 GB or higher, Storage: 20 GB free space, Projector / Smartboard for demonstrations	All
2	Software Requirements 1. Web Browser (Latest Version): • Google Chrome , Mozilla Firefox, Microsoft Edge 2. Code Editor / IDE: • Visual Studio Code, Sublime Text, Notepad++	All

1. To-Do List Application (with LocalStorage)

- Add, delete, update tasks
- Store tasks permanently in browser
- Filter completed/pending tasks

2. Student Result Management System

- Enter student marks
- Calculate percentage, grade
- Store results in LocalStorage
- Display result cards

3. Notes Keeper App (Similar to Google Keep – Basic)

- Create notes with title & description
- Search notes
- LocalStorage data saving

4. Weather Info App (Using Fetch API)

- Fetch weather data from an open API
- Show temperature, humidity, conditions
- Search by city

5. E-Commerce Product Listing (Static + JS)

- Cards for products
- Search & filter products
- Add to cart (LocalStorage)

Sample Projects: (if required)



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Project Title: Student Attendance & Activity Tracker

Features:

- Add student names
- Mark Present/Absent
- Show daily summary
- Store attendance using LocalStorage
- Generate attendance percentage
- Color indicators (e.g., red for < 75%)

Concepts Used:

- DOM Manipulation
- Events
- Arrays & Objects
- LocalStorage
- Template literal output

Suggested Activities for Students: (if required)

1. Debug the Code Challenge

Teacher gives buggy code → students fix errors.

Boosts logical thinking & debugging ability.

2. Pair Programming Activity

One student writes logic, other writes GUI.

Helps in teamwork and concept sharing.

3. DOM Manipulation Race

Who can:

- Change colors
- Update text
- Create elements dynamically
...in the shortest time.

4. Mini-Hackathon (2 Hours)

Students build a micro-project using:

- DOM
- Events
- Arrays
- LocalStorage

5. Data Visualization Activity (Simple)

Students convert an object/array into:

- List view



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- Table view
- Cards layout

6. Create Your Own Calculator

Each student makes a calculator with different theme & extra functions.

7. Form Validation Competition

Best-designed validation + clean UI wins.

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