



SYMBIOSIS INSTITUTE OF TECHNOLOGY, NAGPUR

Symbiosis International (Deemed University)

(Established under section 3 of the UGC Act, 1956)

Re-accredited by NAAC with 'A++' Grade | Awarded Category – I by UGC

Founder: Prof. Dr. S. B. Mujumdar, M. Sc., Ph. D. (Awarded Padma Bhushan and Padma Shri by President of India)

Course Name: JavaScript Lab
Course Code: 0705210508
Faculty: Computer Studies
Course Credit: 2
Course Level: 4
Sub-Committee (Specialization): Application Programming
Learning Objectives:

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The course is designed to teach Javascript as the most common client side web technology. The course will also serve as foundation for advanced web UI programming using JQuery.

Course Outcome (CO):

The student will be able to:

CO1: Understand the syntax, structure, and foundational concepts of JavaScript to implement client-side interactivity and validate user input using various control structures.

CO2: Apply ES6+ JavaScript features including arrow functions, template literals, and array/object destructuring to build efficient and modular web-based applications.

CO3: Manipulate the Document Object Model (DOM), handle events, and manage form validations to develop responsive and dynamic user interfaces.

CO4: Utilize browser storage (localStorage/sessionStorage), interact with JSON data, and simulate API calls to create real-world applications with persistent state and dynamic content loading.

Program Outcome (PO):

1. Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
5. Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
10. 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.
11. Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broad context of technological change.
12. 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 and receive clear instructions.

Program Specific Outcomes (PSO):

1. To apply the concepts of computer engineering and practical knowledge in analysis, design and development of computing systems and applications to multi-disciplinary problems.
2. To provide a concrete foundation to the students in the cutting edge areas of CSE and further help them in excelling in chosen areas of advanced computer science like Machine Learning, Algorithms, Data Science, Internet of Things, Computing and Data Security and Privacy.

Pre Requisites: HTML and CSS

Books Recommended:

Book Title	Author(s)	Publisher
Eloquent JavaScript: A Modern Introduction to Programming (3rd Edition)	Marijn Haverbeke	No Starch Press
JavaScript: The Definitive Guide (7th Edition)	David Flanagan	O'Reilly Media
You Don't Know JS Yet (Book Series)	Kyle Simpson	Independently Published (O'Reilly Support)
Professional JavaScript for Web Developers (4th Edition)	Matt Frisbie	Wrox / John Wiley & Sons

Course Outline:

Practical No.	Practical Title & Task Description	Mapped Syllabus Topic	Teaching Hours
1	JavaScript Setup and Developer Tools: Demonstrate use of inline, internal, and external JavaScript. Use console methods such as console.log(), console.error(), console.table(), and console.trace(). Create a simple webpage that logs user environment info and shows a welcome message.	Introduction to JavaScript	2
2	Variables, Data Types & ES6+ Features: Implement variable declarations using var, let, const. Demonstrate ES6 features such as template literals, destructuring, and default parameters. Create a billing calculator using user input and formatted output.	Data types, Variables	2
3	Conditionals, Loops & User Input: Use if-else, switch-case, and looping constructs like for, while, do-while. Accept input through forms and perform validation. Create a grading system that classifies grades based on marks entered by the user.	Data types, Variables	2
4	Functions, Scope & Error Handling: Create and invoke functions using declarations, expressions, and arrow syntax. Explore scope and closures. Include try-catch blocks to handle input errors. Write a function to reverse a number and check for palindrome.	Functions	4
5	Arrays & Objects with Higher-Order Functions: Use arrays and methods such as push, pop, map(), filter(), reduce(), forEach(). Handle object arrays (e.g., product list). Create a cart total calculator that applies discounts based on criteria.	Arrays and strings	3
6	String Methods & Regular Expressions: Work with string functions like split(), match(), replace(), indexOf(). Use regex to validate an email and extract information. Count vowels and reverse a given paragraph.	Arrays and strings	2
7	DOM Traversal and Manipulation: Use getElementById, querySelector, createElement, and appendChild to dynamically update webpage elements. Build a to-do list app where users can add, edit, and remove tasks.	Forms	3
8	Form Handling & Validation: Access and validate HTML form fields. Implement events such as onsubmit, onblur, onchange. Build a gym admission form with live validation of inputs like name, email, and age.	Forms	3
9	Web Storage and State Management: Use localStorage and sessionStorage to persist data across page reloads. Create a theme switcher or preference saver that remembers settings.	Building Applications	3
10	JSON Handling and Mini API Mock: Parse and display JSON data using fetch() or setTimeout(). Load student records or class schedule from a local JSON file and display them in a table dynamically.	Building Applications	3
11	Timers and Dynamic UI (Bonus): Use setInterval() and setTimeout() to build a countdown timer. Create a class scheduler that highlights active periods and shows alerts on start times.	Building Applications	1
Total			30

Evaluation: A. Continuous Assessment: Lab Assignments, Open Ended Problems, and Viva-Voce
B. End Semester Examination: Viva-Voce Lab Exam

Pedagogy: Hands on Session
Lectures
Class work discussion
Case studies
Github

CO-PO-Mapping:

The mapping is typically represented using a scale (1, 2, 3) where:

- 1: Low Contribution
- 2: Medium Contribution
- 3: High Contribution

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	2	1	-	-	2	-	2	2	3	2
CO2	3	2	2	2	3	1	-	-	2	-	2	2	3	3
CO3	3	2	3	2	3	1	-	1	3	2	2	3	3	2
CO4	3	2	3	2	3	2	1	1	2	2	3	3	3	3