

SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU

LECTURE PLAN FOR THE ACADEMIC YEAR 2025 – 2026

Teacher	Dr. Purohit Shrinivasacharya	Dept.	Information Science and Engineering
Class	VII (E Section)	Course	Full Stack Development (S7ISI01)

Course Objectives

The objectives of this course are:

1. To understand the essential javascript concepts for web development.
2. To style Web applications using bootstrap.
3. To utilize React JS to build front end User Interface.
4. To understand the usage of API's to create web applications using Express JS.
5. To store and model data in a noSQL database.

Course Code	Course Title	Teaching & Learning Scheme							
		Classroom Instruction (CI) (in hrs / sem)		Lab Instruction (LI) (in hrs / sem)	Self-Learning (SL) (in hrs / sem)	Term Work (TW) (in hrs / sem)	Assessment (hrs / sem)	Total no. of Hours per sem	Total Credits (C)* (Total Hours/30)
		L	T	P	SL	TW	A		
S7ISI01	Full Stack Development	42	-	28	14	27	7	118	4

Sl. No.	Date	Topic	Remarks
UNIT – 1			
1	01/09/2025	Basic JavaScript: Script, comments, variables: rules, Data types: numbers, strings.	
2	03/09/2025	Arrays: creating, values, Expressions: operators, arithmetic operators, string operators; Examples.	
3	04/09/2025	Functions: Basic, Declaring, Calling, Parameters, Returning, Variable scope.	
4	05/09/2025	Study Hour: Example programs	
5	08/09/2025	Objects: Creating, Accessing, Constructors, Updating, This keyword, Arrays objects.	

6	10/09/2025	Built in objectives: Browser object model, Document object model, Global objects.	
7	11/09/2025	Number objects, Math objects, Date object, Examples.	
8	12/09/2025	Study Hour: Example programs	
9	15/09/2025	Decisions and Loops: if.. else., Comparison operators, Logical operators, Switch.	
10	17/09/2025	Loops: for, while, do..while; Examples.	Assignment-I (2 Hrs)
UNIT - II			
11	18/09/2025	Document Object Model: DOM Tree, , Selecting Elements using ID attributes,	
12	19/09/2025	Working with DOM Selecting an element from a Nodes, Selecting Elements using Class attributes,	
13	20/09/2025	Study Hour: Example programs	
14	22/09/2025	Updating Element Content & Attributes, Events,	
15	22/09/2025	DOM Manipulation, Removing attributes.	
16	24/09/2025	Events: Different Types of Events.	
17	25/09/2025	How to Bind an Event to an Element: HTML event, traditional DOM event.	
18	26/09/2025	Study Hour: DOM Tree example programs	
19	29/09/2025	Event Listeners, Example programs.	
20	03/10/2025	Event Delegation, Example programs.	Assignment-II (2 Hrs)
UNIT – III			
21	06/10/2025	Form enhancement and validation. Introduction to MERN: MERN components, React, Node.js	13, 14, 15 Oct. 25 Test - I
22	08/10/2025	Server less Hello world: JSX, Project setup.	
23	09/10/2025	React Components: Issue Tracker	
24	10/10/2025	Study Hour: Example programs	
25	16/10/2025	React Classes, Examples.	
26	17/10/2025	Composing Components, Examples.	
27	23/10/2025	Passing Data Using Properties, Examples.	
28	24/10/2025	Passing Data Using Children, Examples	
29	27/10/2025	Dynamic Composition, Examples.	Assignment-III (2 Hrs)
30	29/10/2025	Study Hour: Example programs	
UNIT – IV			
31	30/10/2025	React State: Initial State, Async State Initialization	
32	31/10/2025	Updating State, Lifting State Up, Event Handling.	
33	03/11/2025	Stateless Components, Designing Components, State vs. Props.	
34	05/11/2025	Component Hierarchy, Communication, Stateless Components.	
35	06/11/2025	Express, REST API, GraphQL, Field Specification, Graph Based, Single Endpoint.	
36	07/11/2025	Study Hour: Example programs	
37	10/11/2025	Strongly Typed, Introspection, Libraries, The About API GraphQL Schema File.	
38	12/11/2025	The List API, List API Integration, Custom Scalar types.	
39	13/11/2025	The Create API, Create API Integration.	

40	14/11/2025	Query Variables, Input Validations, Displaying Errors.	27, 28, 29 Nov. 2025 Test - 2
41	17/11/2025	Study Hour: Example programs	
UNIT – V			
42	19/11/2025	MongoDB: Basics, Documents, Collections.	
43	20/11/2025	Databases, Query Language, Installation.	
44	21/11/2025	The Mongo Shell, MongoDB CRUD Operations, Create, Read, Projection.	
45	24/12/2026	Update, Delete, Aggregate, MongoDB Node.js Driver, Schema Initialization.	
46	26/12/2025	Study Hour: Example programs	
47	01/12/2025	Reading from MongoDB, Writing to MongoDB.	
48	03/12/2025	Modularization and Webpack ,Back-End Modules Front-End Modules and Webpack Transform and Bundle.	Assignment-IV (2 Hrs)
49	04/12/2025	Libraries Bundle ,Hot Module Replacement.	
50	05/12/2025	Study Hour: Example programs	
51	08/12/2025	Debugging DefinePlugin: Build Configuration.	
52	10/12/2025	Production Optimization.	
53	11/12/2025	Study Hour: Example programs	

Implementation Experiments:

Sl. No.	Programs on
1	Write a script that Logs "Hello, World!" to the console. Create a script that calculates the sum of two numbers and displays the result in an alert box.
	Create an array of 5 cities and perform the following operations: Log the total number of cities. Add a new city at the end. Remove the first city. Find and log the index of a specific city.
2	Read a string from the user, Find its length. Extract the word “JavaScript” using substring() or slice(). Replace one word with another word and log the new string. Write a function isPalindrome(str) that checks if a given string is a palindrome (reads the same backward).
3	Create an object student with properties: name (string), grade (number), subjects (array), displayInfo() (method to log the student's details). Write a script to dynamically add a passed property to the student object, with a value of true or false based on their grade. Create a loop to log all keys and values of the student object.
4	Create a button in your HTML with the text "Click Me". Add an event listener to log “Button clicked!” to the console when the button is clicked. Select an image and add a mouseover event listener to change its border color. Add an event listener to the document that logs the key pressed by the user.
5	Build a React application to track issues. Display a list of issues (use static data). Each issue should have a title, description, and status (e.g., Open/Closed). Render the list using a functional component.
6	Create a component Counter with A state variable count initialized to 0. Create Buttons to increment and decrement the count. Simulate fetching initial data for the Counter component using useEffect (functional component) or componentDidMount (class component). Extend the Counter component to Double the count value when a button is clicked. Reset the count to 0 using another button.

7	Install Express (npm install express). Set up a basic server that responds with “Hello, Express!” at the root endpoint (GET /). Create a REST API. Implement endpoints for a Product resource: GET: Returns a list of products. POST: Adds a new product. GET /:id: Returns details of a specific product. PUT /:id: Updates an existing product. DELETE /:id: Deletes a product. Add middleware to log requests to the console. Use express.json() to parse incoming JSON payloads.
8	Install the MongoDB driver for Node.js. Create a Node.js script to connect to the shop database. Implement insert, find, update, and delete operations using the Node.js MongoDB driver. Define a product schema using Mongoose. Insert data into the products collection using Mongoose. Create an Express API with a /products endpoint to fetch all products. Use fetch in React to call the /products endpoint and display the list of products. Add a POST /products endpoint in Express to insert a new product. Update the Product List, after adding a product, update the list of products displayed in React.

Important Dates to be remembered:

Sl No	Important Events	Date
1.	I – Test	13 th - 15 th October 2025
2.	Last date for dropping of course	21 st October 2025
3.	II – Test	27 th - 29 th November 2025
4.	Last date for withdrawal of course	1 st December 2025
5.	Last working day	13 th December 2025
6.	Preparation Holidays	14 th – 19 th December 2025
7.	Semester end examination	20 th Dec. 2025 – 05 th Jan. 2026
8.	Announcement of results	17 th January 2026

Activities to meet Teaching Learning Scheme

Sl. No	Activity Planned	Number of Hours
1.	Classroom Teaching	42
2.	Formative Assessment [Test (2 No.) + Quiz (2 No.) + Semester End Exam]	07
3.	Study Hours: Assignment writing on topics covered in the that week.	14
4.	Activity Based Learning: I. Case Study (21 Hours) – Build a Personal Profile Page. - Define the Problem: (2 Hours) Clearly outline the scenario or problem that requires solving Identify the core data that will be handled and how it interacts with the system. - Specify Requirements: (2 Hours) Identify user expectations (e.g., efficient lookups, fast retrieval, low latency). - Choose Appropriate Tools: (2 Hours) Review the available data structures. - Create a webpage that displays your name, photo, skills, and contact info. - Add a button to toggle between Light Mode and Dark Mode using JavaScript. - Create a To-Do List App (Frontend with React): (3 Hours)	21+6 = 27

	• Initialize React app. • Create Task component and TaskList component. • Use useState for managing tasks. • Store/retrieve tasks in localStorage. 5. REST API for To-Do App (Backend with Node.js + Express): (6 Hours) • Install express and set up a server. • Create routes with dummy JSON array. • Use Postman to test API calls. 6. Connect Tasks to MongoDB (Database Integration): (2 Hours) • Install MongoDB (or use MongoDB Atlas). • Create Task model with Mongoose. • Replace API logic with DB queries (Task.find(), Task.save()). • Test with Postman. 7. Integrate Frontend and Backend (Full Stack): (2 Hours) • Install Axios in React. • Fetch tasks in useEffect hook. • Update UI dynamically on API responses. • Handle CORS in Express (cors middleware). 8. Deploy the App (Deployment & DevOps): (2 Hours) • Push code to GitHub. • Connect Render → backend repo (configure env vars). • Connect Vercel → frontend repo. • Test live app with cloud DB. II. Online course of Learning Full Stack React (Infosys Springboard): (6 Hours)	
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Text Books:

1.	Jon Duckett	JavaScript & jQuery: Interactive Front-End Web Development , Wiley Publication, 2014.
2.	Vasan Subramanian	Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node , Apress Publication, 2019.

Reference Books:

1.	Vasan Subramanian	https://github.com/vasansr/pro-mern-stack
2.	Prof. Gaurav Raina, Tanmai Gopal	Introduction to Modern Application Development, IIT Madras
3.	IIT, Kharagpur	https://archive.nptel.ac.in/courses/106/105/106105084/

Course Outcomes:

Upon completion of this course the student will be able to:

CO1: Apply JavaScript to build dynamic and interactive Web projects.

CO2: Implement user interface components for JavaScript-based Web using React.JS.

CO3: Apply Express/Node to build web applications on the server side.

CO4: Develop data model/s in an open source nosql database.

CO5: Demonstrate modularization and packing of the front-end modules.

Mapping of Course Outcomes (COs) to Program Outcomes (POs) & Program Specific Outcomes (PSOs)

		POs											PSOs		
		1	2	3	4	5	6	7	8	9	10	11	1	2	3
COs	CO1	3													1
	CO2			2											1
	CO3	3													1
	CO4			2											1
	CO5			2											1
C203		3	-	2	--	--	--	--	--	--	--	--	--	--	1

Assessment Tools	COs				
Direct AT	CO1	CO2	CO3	CO4	CO5
CIE (Individual)	Tests	Tests	Tests	Tests	SEE
SEE (Individual)	Yes	Yes	Yes	Yes	Yes
Assignments (Individual/Group)		Yes	Yes	Yes	Yes
Micro Projects (Group)	-	-	-	-	-
Topic seminar (Individual)	-	-	-	-	-
Case studies (Individual/Group)	-	-	-	-	-
Online courses (Individual/Group)	-	-	-	-	-
Indirect AT					
Course end survey (Students)	Yes	Yes	Yes	Yes	Yes
Student profile (Faculty)	-	-	-	-	-

Course delivery methods, assessment tools and sample questions:

CO1	Apply JavaScript to build dynamic and interactive Web projects.
Delivery Methods	Classroom mode of Teaching, Demonstrations
Assessment Tools	Tests and SEE
Sample Questions	1. What are JavaScript data types? List at least five with examples. (L2, PO1, 6 Marks) 2. Write a program to find the sum and average of numbers stored in an array. (L2, PO1, 6 Marks) 3. What is a function in JavaScript? Why are functions used? Write the syntax for declaring and calling a function. (L2, PO1, 6 Marks) 4. Write a function that takes two numbers as input parameters and returns their GCD. (L3, PO1, 8 Marks)

	5. Create an object Student with properties: name, age, and marks. Access and display these properties. (L3, PO1, 8 Marks) 6. What is the Browser Object Model (BOM)? List any three BOM objects. Write a script to display the browser name and version using BOM. (L3, PO1, 6 Marks)
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CO2	Implement user interface components for JavaScript-based Web using React.JS.
Delivery Methods	Classroom mode of Teaching, Demonstrations, NPTEL Video
Assessment Tools	Tests and SEE
Sample Questions	1. Explain the virtual DOM and how React uses it to update the UI efficiently. (L2, PO1, 8 Marks) 2. How do you implement lazy loading and code splitting in React? Explain with an example. (L3, PO1, PO3, 8 Marks) 3. How does React handle component lifecycle in functional components? (L2, PO1, 6 Marks) 4. Write a script that selects all elements with a given class name and changes their background color. (L3, PO3, 8 Marks) 5. Write a program to select the first <h1> element using <code>querySelector()</code> and change its color. (L3, PO3, 6 Marks) 6. Demonstrate the difference between assigning <code>onclick</code> directly and using <code>addEventListener()</code>. Write a program to display a message when the mouse pointer moves over an image. (L3, PO3, 8 Marks)

CO3	Apply Express/Node to build web applications on the server side.
Delivery Methods	Classroom mode of Teaching, Demonstrations
Assessment Tools	Tests and SEE
Sample Questions	1. What is MERN? List and explain its components. (L2, PO1, 6 Marks) 2. Write the basic folder structure of a MERN project. Also, set up a simple Node.js server that returns "Hello MERN". (L3, PO1, PO3, 8 Marks) 3. What is JSX in React? Why is it used? Write a program that renders a heading and a paragraph using JSX. (L3, PO1, PO3, 5 Marks) 4. Why are components considered reusable in React? Create a functional component called Issue that displays issue details (id, status, owner). (L3, PO1, 8 Marks) 5. What is the purpose of the <code>render()</code> method in class components? Build a class component that displays the current time and updates every second. (L3, PO3, 8 Marks) 6. What is dynamic composition in React? Implement a Tab component that dynamically switches content based on selected tab. (L3, PO3, 8 M)

CO4	Develop data model/s in an open source nosql database.
Delivery Methods	Classroom mode of Teaching, Demonstrations, Group activity
Assessment Tools	Tests, SEE and Assignments
Sample Questions	1. How do you define the initial state in a React component? Write a program that fetches data asynchronously on component load and updates the state. (L3, PO1, PO3, 8 Marks) 2. What is “lifting state up” in React? Differentiate between synthetic events and native browser events. (L2, PO1, 6 Marks) 3. Create a parent component that stores temperature and passes it to child components. Demonstrate “lifting state up” for conversion between Celsius and Fahrenheit. (L3, PO3, 8 Marks) 4. What is Express.js and why is it used? Write a GraphQL query to fetch id, name, and email fields of users. (L3, PO1, 5 Marks) 5. How are lists represented in GraphQL schemas? Write a GraphQL query that fetches multiple fields for a list of books. (L3, PO1, 5 Marks)

CO5	Demonstrate modularization and packing of the front-end modules.
Delivery Methods	Classroom mode of Teaching, Demonstrations and Power Point Presentation
Assessment Tools	SEE, Assignment
Sample Questions	1. What is MongoDB? How is it different from relational databases? (L2, PO1, 4 Marks) 2. Create a MongoDB collection of students with documents containing name, age, and course. (L3, PO3, 6 Marks) 3. What is MongoDB Query Language (MQL)? Create a collection employee in companyDB and insert sample documents. Run a query to find all employees with salary > 50000. (L3, PO3, 8 Marks) 4. Define CRUD operations in MongoDB. Demonstrate filtering examples with operators: \$gt, \$lt, \$eq. (L3, PO1, 10 Marks) 5. What is the syntax for deleting documents in MongoDB? Create a schema in Node.js using Mongoose for a Book model with title, author, price. (L3, PO1, 10 Marks) 6. Why is production optimization important in Webpack projects? Configure Webpack to split code into multiple chunks. Implement lazy loading for a React component with Webpack. (L3, PO1, 10 Marks)


Teacher


HOD


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