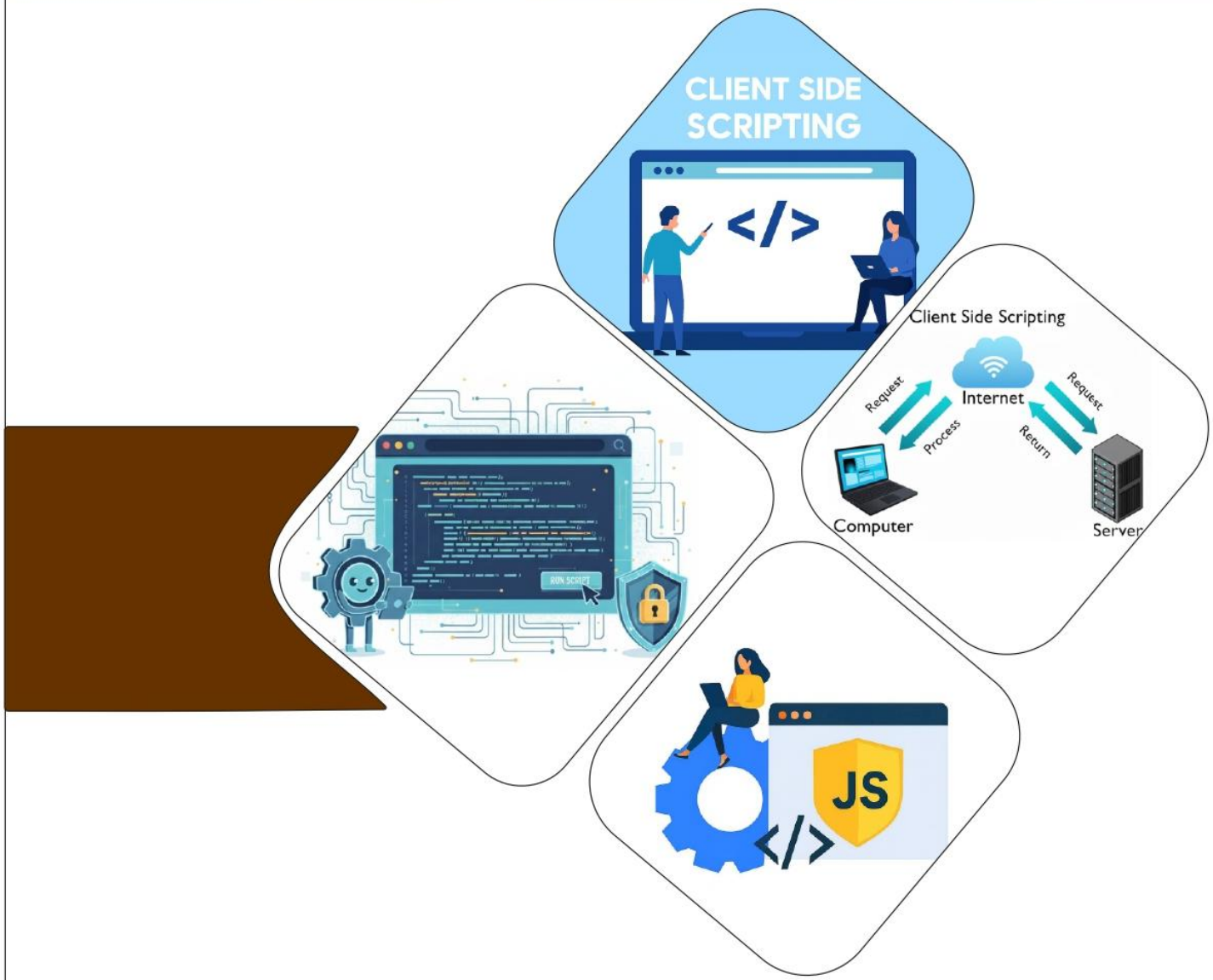
SCHEME :K

Name :_____
Roll No.:_____ Year : 20 ___ 20 __
Exam Seat No. :_____

LABORATORY MANUAL FOR

CLIENT SIDE SCRIPTING (316005)



COMPUTER ENGINEERING GROUP

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI
(Autonomous)(ISO21001:2018)(ISO/IEC27001:2013)

VISION

To ensure that the Diploma Level Technical Education constantly matches the latest requirements of Technology and industry and includes the all-round personal development of students including social concerns and to become globally competitive, technology led organization.

MISSION

To provide high quality technical and managerial manpower, information and consultancy services to the industry and community to enable the industry and community to face the challenging technological & environmental challenges.

Quality Policy

We, at MSBTE are committed to offer the best-in-class academic services to the students and institutes to enhance the delight of industry and society. This will be achieved through continual improvement in management practices adopted in the process of curriculum design, development, implementation, evaluation and monitoring system along with adequate faculty development programmes.

Core Values

MSBTE believes in the following:

- Skill development in line with industry requirements.
- Industry readiness and improved employability of Diploma holders.
- Synergistic relationship with industry.
- Collective and Cooperative development of all stake holders.
- Technological interventions in societal development.
- Access to uniform quality technical education.

A Laboratory Manual
for

Client Side Scripting (316005)

Semester– VI

"K-SCHEME"

(CM/ CO/ CW/ IF/ IH/ SE)

Maharashtra State

Board of Technical Education, Mumbai

(Autonomous) (ISO 21001:2018) (ISO/IEC 27001:2013)

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

(Autonomous)(ISO21001:2018)(ISO/IEC27001:2013)

Address: 4th floor, Govt. Polytechnic Building, 49,

Kherwadi, Bandra (E), Mumbai- 400 051

(Printed on : _____)

Maharashtra State
Board of Technical Education

Certificate

This is to certify that Mr. / Ms ……

Roll No……. of Sixth Semester of Diploma in …… of the Institute ……

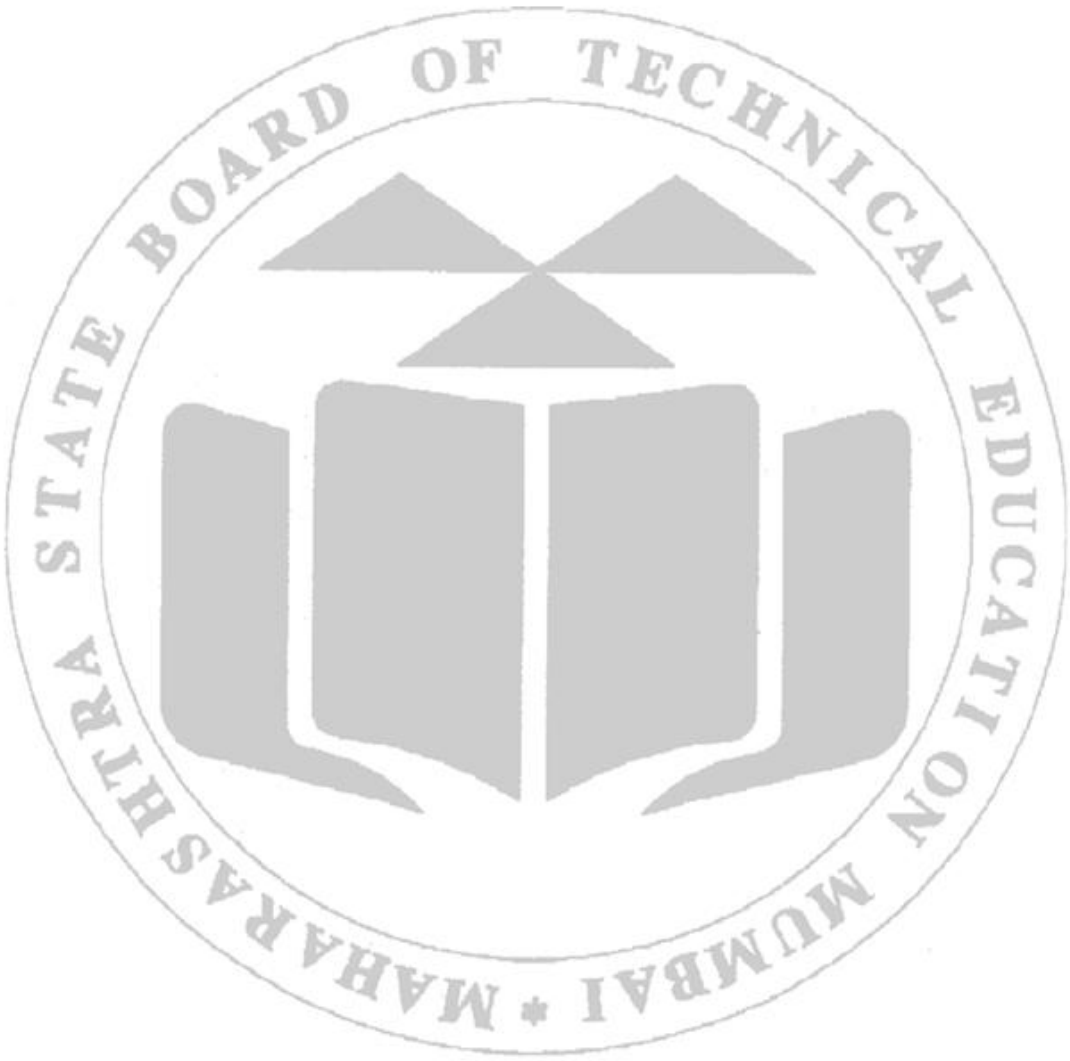
(Inst. Code……...) has completed the term work satisfactorily in course **Client Side Scripting (316005)** for the academic year 20…….to 20…..... as prescribed in the curriculum.

Place ……. Enrollment No……

Date…..... Exam Seat No. ……..

Course Teacher **Head of the Department** **Principal**

Institute Seal


MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION MUMBAI

Preface

The objective of all engineering laboratories or field experience in the technical education system is to help students acquire the critical competencies and skills that businesses demand. In light of this, MSBTE developed the cutting-edge "K" Scheme curriculum for engineering diploma programs, emphasizing outcome-based learning and the National Education Policy 2020 (NEP2020). As a result, a sizable portion of the program is dedicated to practical work. This demonstrates how crucial laboratory work is in helping teachers, instructors, and students understand that every minute of lab time must be used efficiently to create these outcomes rather than being spent on pointless tasks. Consequently, each practical has been created to operate as a "vehicle" to advance this industry in order to ensure the successful implementation of this outcome-based curriculum. It is challenging to teach practical skills using only the "chalk and duster" activity. Because of this, the "K" scheme laboratory manual creation team focused on the outcomes when designing the practical rather than following the long-standing custom of doing the practical to "verify the theory" (which may turn out to be a by-product along the way).

This lab manual is intended to support all parties involved, particularly the students, instructors, and teachers, in helping the students achieve the pre-established objectives. It is required of every student to read through the relevant practical process in its entirety and comprehend the bare minimum of theoretical background related to the practical at least one day in advance of the practical. As a crucial starting point for carrying out the practical, each exercise in this manual starts with establishing the competency, industry-relevant skills, course outcomes, and practical outcomes. The skills the students will acquire from the process outlined there, together with the necessary safety measures to be followed, will subsequently be made clear to them. These will enable them to apply the knowledge and abilities to solve real-world problems in their professional lives.

In today's interactive web environment, Client-Side Scripting plays a vital role in creating dynamic, responsive, and user-friendly web applications. Technologies such as JavaScript, along with frameworks like React, Angular, and Vue.js, empower developers to enhance user interfaces, validate input, and provide real-time interaction directly within the user's browser.

This practical exercise guides students in developing and implementing client-side scripts to improve website functionality and user experience. Through hands-on activities and real-world examples, learners gain a solid understanding of both theoretical concepts and practical implementation, preparing them to build efficient, interactive, and modern web applications.

The team responsible for developing the Practical manual would like to express its gratitude to MSBTE for taking the lead in developing and implementing the curriculum. Additionally, the team recognizes the valuable contributions made by individual course experts who have been directly or indirectly involved in the development of the "K" scheme curriculum and the laboratory manual. It is impossible to claim perfection in this laboratory manual, even though every effort has been made to verify it for errors, especially because this is the first edition. Any such mistakes and recommendations for enhancements are quite appreciated and can be brought to our attention.

Lab Manual Development Team

Program Outcomes (POs) to be achieved through Practical of this Course

Following POs are expected to be achieved through the practical's of the **Client Side Scripting** course.

PO 1. Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

PO 2. Problem analysis: Identify and analyze well-defined engineering problems using codified standard methods.

PO 3. Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO 4. Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO 5. Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO 6. Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities in diverse and multidisciplinary fields.

PO 7. Life-long learning: Ability to analyze individual needs and engage in updating in the context of technological changes.

List of Industry Relevant Skills:

By undertaking the practical exercises included in this Client-Side Scripting Laboratory Manual, the following industry-relevant skills are expected to be developed in the learner:

- Web Technologies and Frameworks
- DOM Manipulation and Event Handling
- Form Validation and User Interaction
- Asynchronous Programming (AJAX & Fetch API)
- Web Performance and Security

Practical- Course Outcome (CO) matrix

CO1 - Develop web page using client side scripting technology.
CO2 - Design dynamic web pages using AngularJS.
CO3 - Implement the built-in functions and objects in AngularJS.
CO4 - Develop web application using React.
CO5 - Apply event handling in React Framework.

Sr. No.	Title of the Practical	CO 1	CO 2	CO 3	CO 4	CO 5
1	* Write a program to display " Hello World" using: • Console.log() • document.write( ) • alert ()	√				
2	Write a program to display "Welcome " using Python script	√				
3	Create objects for the given problem with JSON	√				
4	1. Setup Angular development environment using: • Installation of Node.js and npm • Installation of Angular CLI 2. Write a program to display "Good Morning" Message on web page		√			
5	* Write AngularJS program to design form using various controls and apply validations on input		√			
6	* Write a program to display data model view and display data for given problem		√			
7	Write a program to display two - way databinding		√			
8	*Write a program to implement different filters in AngularJS		√			
9	* Write a program to implement different events in Angular JS		√			
10	Write a program displaying data in a table			√		

11	* Write a program to implement CSS to table data-odd and even rows			√		
12	* Write programs for implementation of different methods of AngularJS Controllers			√		
13	* Write programs to demonstrate use of controllers in external files			√		
14	* Write a program to handle data using React form				√	
15	Write a program to pass function argument into React component				√	
16	*Write a program to pass function argument into React program and implement the life cycle of React				√	
17	* Write a program to implement states of React Hooks				√	
18	Write a program to design real time form using react components					√
19	Write a program to apply validations for React form					√
20	* Write a program to manipulate List using key and without key in React					√
21	Write a program to render a list using map function in React					√
22	*Write a program to apply following approaches of css to a React web page Inline styling CSS stylesheets CSS Modules					√
23	* The microproject has to be web based realtime application suggested by teacher such as : Develop a web "Chat Application" having Chat window with send and receive the text,image etc. Develop a web "Music Player application "where user can get the Album with singer and play the music.	√	√	√	√	√

Guidelines to Teachers

1. There will be two sheets of blank pages after every practical for the student to report other matters (if any), which is not mentioned in the printed practical.
2. For difficult practical if required, the teacher could provide the demonstration of the practical emphasizing of the skills which the student should achieve.
3. Teachers should give students hands-on opportunities after the demonstration.
4. Assess the skill achievement of the students and COs of each unit.
5. One or two questions ought to be added in each practical for different batches. For this teacher can maintain various practical related question banks for each course.
6. For effective implementation and attainment of practical outcomes, teachers ought to ensure that in the beginning itself of each practical, students must read through the complete write-up of that practical sheet.
7. During practicals, ensure that each student gets a chance and takes an active part in taking observations/ readings and performing practicals.
8. Teachers ought to assess the performance of students continuously according to the MSBTE guidelines.

Instructions for Students

1. For incidental writing on the day of each practical session every student should maintain a dated log book for the whole semester, apart from this laboratory manual which s/he has to submit for assessment to the teacher in the next practical session.
2. For effective implementation and attainment of practical outcomes, in the beginning itself of each practical, students need to read through the complete write-up including the practical related questions and assessment scheme of that practical sheet.
3. Students ought to refer to the reference book, lab manuals etc. Students should not hesitate to ask about any difficulties they face during the conduct of practical's.

Content Page

List of Practical and Formative Assessment Sheet

Sr. No	Laboratory Practical Titles	Page No.	Date of performance	Date of submission	FA PR marks (25)	Dated sign. of teacher	Remarks (if any)
1	* Write a program to display " Hello World" using: • console.log() • document.write( ) • alert ()	1					
2	Write a program to display "Welcome " using Python script	6					
3	Create objects for the given problem with JSON	11					
4	1. Setup Angular development environment using: • Installation of Node.js and npm • Installation of Angular CLI 2. Write a program to display "Good Morning" Message on web page	16					
5	* Write AngularJS program to design form using various controls and apply validations on input	23					
6	* Write a program to display data model view and display data for given problem	30					
7	Write a program to display two - way databinding	35					
8	*Write a program to implement different filters in AngularJS	41					
9	* Write a program to implement different events in Angular JS	45					
10	Write a program displaying data in a table	51					
11	* Write a program to implement CSS to table data-odd and even rows	56					
12	*Write programs for implementation of different methods of AngularJS Controllers	61					
13	* Write programs to demonstrate use of controllers in external files	66					
14	* Write a program to handle data using React form	71					

Sr. No	Laboratory Practical Titles	Page No.	Date of performance	Date of submission	FA PR marks (25)	Dated sign. of teacher	Remarks (if any)
15	Write a program to pass function argument into React component	76					
16	*Write a program to pass function argument into React program and implement the life cycle of React	81					
17	* Write a program to implement states of React Hooks	85					
18	Write a program to design real time form using react components	89					
19	Write a program to apply validations for React form	94					
20	* Write a program to manipulate List using key and without key in React	99					
21	Write a program to render a list using map function in React	104					
22	*Write a program to apply following approaches of css to a React web page Inline styling CSS stylesheets CSS Modules	109					
23	* The microproject has to be web based realtime application suggested by teacher such as : Develop a web "Chat Application" having Chat window with send and receive the text,image etc. Develop a web "Music Player application "where user can get the Album with singer and play the music.	114					
Total							

Note: To be transferred to Proforma of CIAAN-2023.

Note : Out of above suggestive LLOs -

- '*' Marked Practical's (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

Practical No. 1: * Write a program to display " Hello World" using:

- **console.log()**
- **document.write( )**
- **alert ()**

I. Practical Significance

Client-side scripting languages, primarily JavaScript, hold significant practical importance in modern web development due to their ability to enhance user experience and offload processing from servers

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO1 – Develop a Web Page using client side scripting technology.

IV. Laboratory Learning outcome(s)

LLO 1.1 Create a webpage using structure tags to display sample message.

V. Relevant Affective Domain related Outcome(s)

Helps developers understand the flow of the program without disrupting the user experience.

VI. Relevant Theoretical Background

In JavaScript, there are several ways to display messages to the user or for debugging purposes.

1. console.log():

The console.log() method in JavaScript is a powerful tool used to output messages, variables, or data to the browser's console. It is commonly used for debugging and testing purposes.
Syntax:
console.log(message);
Example:
console.log("Hello world!");

2.document.write():

The document.write() method in JavaScript is used to write content directly to the HTML document. It is generally used for simple tasks like debugging or dynamically inserting content during the initial page load.
Syntax:

document.write(content);

Example:

document.write("Hello World!");

3.alert():

The alert() method in JavaScript is used to display a simple alert box with a message and an "OK" button. It is often used to provide information or warnings to users.

Syntax:

alert(message);

Example:

alert("Hello! I am an alert box!!");

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Display the dialog box using alert to display mutliline text.
2. Display the text in document.write using HTML formatting tags.

XI. Exercise

1. Write steps or ways to observe the output of console.log.
2. State purpose of scripting language like javascript.
3. Write and explain syntax of script tag in html.

(Space for answers)

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.tutorialspoint.com/json/json_data_types.htm
2. https://www.w3schools.com/js/js_json_syntax.asp

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 2: Write a Program to display "Welcome" using python script

I. Practical Significance

PyScript provides a practical way to run Python code directly within an HTML document in a web browser, offering several significant advantages.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO1 – Develop a Web Page using client side scripting technology.

IV. Laboratory Learning outcome(s)

LLO 2.1 Create a python script to display sample message.

V. Relevant Affective Domain related Outcome(s)

Creating a dynamic, responsive, and engaging user interfaces, leading to a positive emotional response in user.

VI. Relevant Theoretical Background

The print() function prints the specified message to the screen, or other standard output device.

Syntax: print*(object(s)*, sep=*separator*, end=*end*, file=*file*, flush=*flush*)

object(s) -	Any object, and as many as you like. Will be converted to string before printed
sep='separator'	Optional. Specify how to separate the objects, if there is more than one. Default is ' '
end='end'	Optional. Specify what to print at the end. Default is '\n' (line feed)

File	Optional. An object with a write method. Default is sys.stdout
Flush	Optional. A Boolean, specifying if the output is flushed (True) or buffered (False). Default is False

Create an html file with following code in <head> tag.

<link rel="stylesheet" href="https://pyscript.net/releases/2025.8.1/core.css" />

<script type=”module” src="https://pyscript.net/releases/2025.8.1/core.js"></script>

And add following script tag in html file

<script type=”mpy” terminal>

Python code

</script>

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Print list of elements using for loop
2. Print your name using python script
3. Print array element using for in loop using py-script.

XI. Exercise

1. Write py-script to display todays date in browser.
2. How the python script is embedded in html.

(Space for answers)

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.freecodecamp.org/news/pyscript-python-front-end-framework/
2. https://www.oneclickitsolution.com/blog/run-python-in-html
3. https://www.geeksforgeeks.org/python/create-basic-webpage-with-pyscript

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			**Dated Sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 3: Create object for given problem with JSON.

I. Practical Significance

JSON (JavaScript Object Notation) is commonly used for data storage and transfer. JSON is a popular choice for applications that benefit from a simple and easy-to-use data format.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO1 – Develop a Web Page using client side scripting technology.

IV. Laboratory Learning outcome(s)

LLO 3.1 Write a program with JSON objects with properties and access the object using JSON.

V. Relevant Affective Domain related Outcome(s)

Creating a dynamic, responsive, and engaging user interfaces, leading to a positive emotional response in user.

VI. Relevant Theoretical Background

A JSON object is a fundamental data structure within JSON (JavaScript Object Notation), a lightweight data-interchange format. It represents a collection of unordered key-value pairs, also referred to as properties.

Structure of a JSON Object:

Enclosed in Curly Braces:

A JSON object begins with a left curly brace { and ends with a right curly brace }.
Key-Value Pairs:
Inside the curly braces, data is organized into key-value pairs.

Keys (Property Names):

Keys must be strings, enclosed in double quotes (e.g., "name"). They act as identifiers for the associated values.

Values:

Values can be various JSON data types:

- Strings (e.g., "John Doe")
- Numbers (integers or floating-point, e.g., 30, 1.75)
- Booleans (true or false)
- Arrays (ordered lists of values, e.g., ["reading", "hiking"])
- Other JSON objects (allowing for nested structures)

- null (representing the absence of a value)

Separation:

Key-value pairs within an object are separated by commas ,. A colon : separates each key from its corresponding value.

For Example:

```
const myObj ={  "name": "Alice",  "age": 28}
```

Accessing Object Values

You can access object values by using dot (.) notation:

For Example:

```
x = myObj.name
```

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Create JSON object Employee with name and age properties and display them
2. Create JSON Object Person with name, age and city with default values. Display them.
3. Create JSON object Student with rollno, name and marks. Assign values and display them.

XI. Exercise

1. What is full form of JSON?
2. How do you convert JSON object into javascript object?

(Space for answers)

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/js/js_json_objects.asp
2. https://www.geeksforgeeks.org/javascript/javascript-json-objects/

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 4: 1. Setup Angular development environment using i) Installation of Node.js and npm ii) Installation of Angular CLI 2. Write a program to display "Good Morning" message on Webpage.

I. Practical Significance

It is a comprehensive platform for building scalable, maintainable single-page web applications (SPAs).

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 – Design Dynamic Webpage using AngularJS.

IV. Laboratory Learning outcome(s)

LLO 4.1 Install Angular Software Application.

V. Relevant Affective Domain related Outcome(s)

The act of setting up and running a new app allowing you to focus on the application's business logic rather than the framework's mechanics.

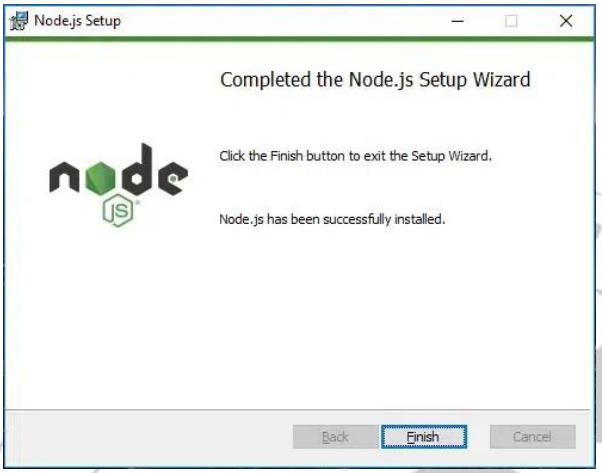
VI. Relevant Theoretical Background

To install Angular on your local system, you need the following:

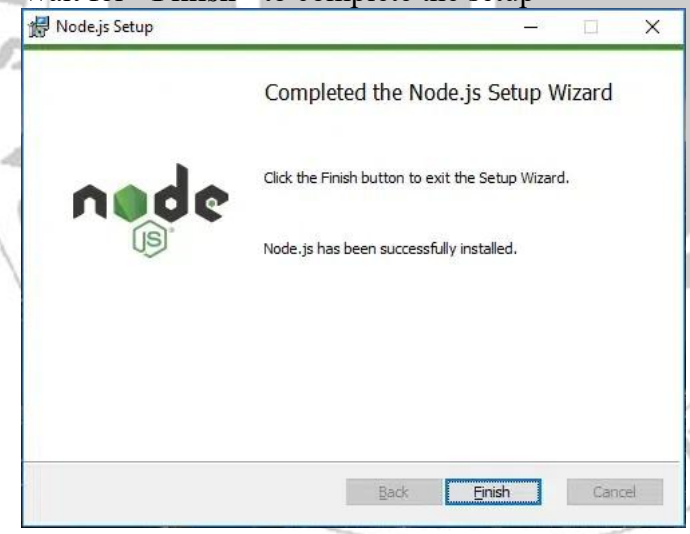
1. Node.js
2. Nmp package manager.

1. Install Node.js

a. Visit the official Node.js website to download the Node.js '.msi' installer
b. Locate the downloaded **.msi** file and double-click to run it.
c. Follow the prompts in the setup wizard, accept the license agreement, and use the default settings for installation.



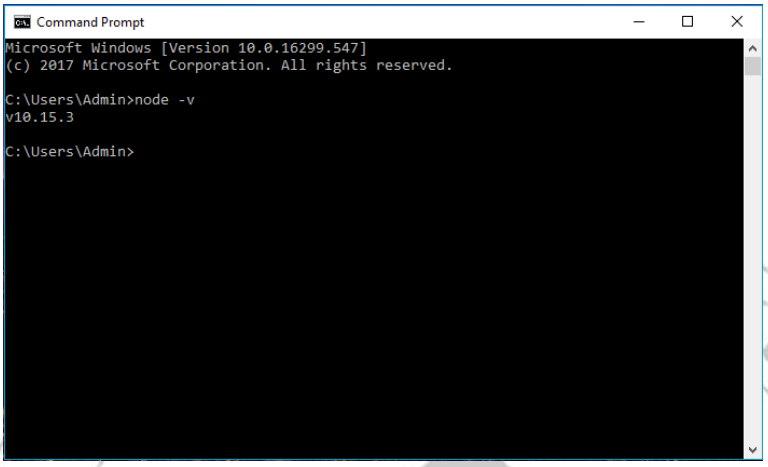
d. npm: to manage packages for Node.js applications
e. Native modules: for building native C++ modules
f. The installer may prompt you to "install tools for native modules". Select “Install” to complete the process.
g. Wait for **"Finish"** to complete the setup



h. **To Verify the Installation :**Open **Command Prompt** or PowerShell > Check the installed versions by running these commands:
Type **node -v** and press Enter to check the Node.js version.

Type **npm -v** and press Enter to check the npm version.

Both commands should return version numbers, confirming successful installation.

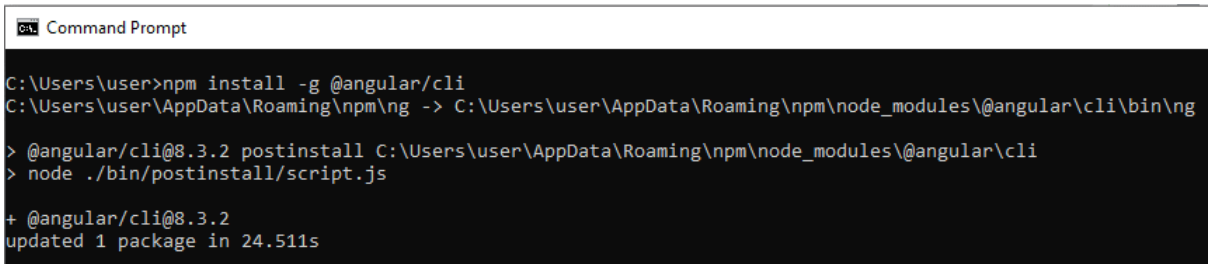


2. Node Version Manager or nvm-windows allows users to manage different versions of node.js

a. Download the latest NVM for Windows installer(.zip) from the GitHub page.
b. Now run the installer(nvm-setup.exe) and follow the setup instructions**.**

3. Install the Angular CLI

a. Open a terminal window and run the following command:
npm install –g @angular/cli



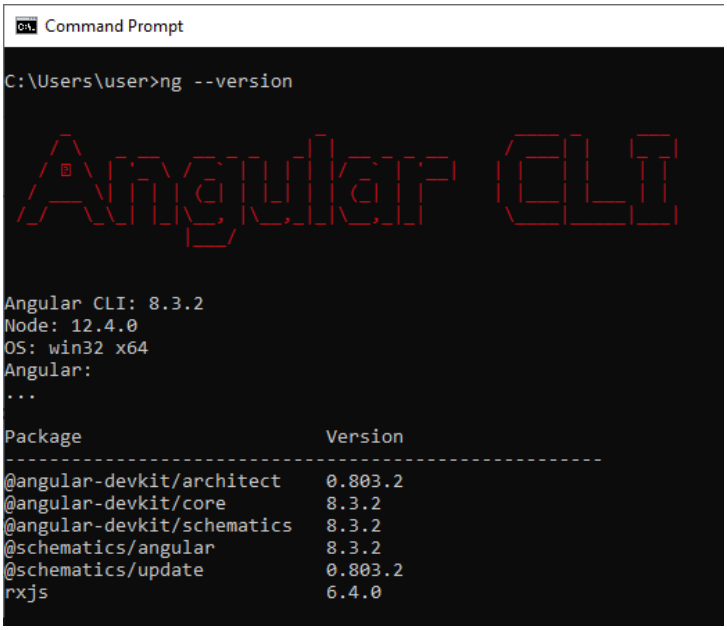
b. On completing installation type following command on the command prompt
ng version

This will display angular cli version

Node.js version

Npm version

And OS also on command prompt



c. Create your folder.
d. Open command prompt browse to your project directory and type command cd <folder name>
e. Type and run the command – npm install
f. Type the following command on command prompt to start server

ng serve

g. your local server is started at port 4200.
h. In the browser type

http://localhost:4200

This will run your base application and show “Hello <projectname>”. Default app output.

i. To edit the code open your directory/app.
j. Within the directory structure locate src->app->app.ts.
k. Open the file and change the template part to the text you want to get on the webpage.
l. Refresh the localhost:4200 page and you will get the output.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Develop app in AngularJs to display "Good Morning" Message in Browser
2. Create Angular App to display "Hello World" Message.

XI. Exercise

1. Give full form of npm and AngularJS CLI.
2. Which file in the file directory of AngularJS will contain the code for output.
3. List advantages of AngularJs.

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.freecodecamp.org/news/pyscript-python-front-end-framework/
2. https://www.oneclickitsolution.com/blog/run-python-in-html
3. https://www.geeksforgeeks.org/python/create-basic-webpage-with-pyscript

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 5: *Write AngularJs Program to design form using various controls and apply validations on inputs.

I. Practical Significance

AngularJS's declarative validation directives and form state tracking simplify the implementation of complex validation logic directly within the HTML

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 – Design Dynamic Webpage using AngularJS.

IV. Laboratory Learning outcome(s)

LLO 5.1 Use Forms Controls.

V. Relevant Affective Domain related Outcome(s)

It focuses on ensuring the form is user-friendly, intuitive, and provides a positive emotional response.

VI. Relevant Theoretical Background

Setting up Visual studio code for AngularJs

1. Create folder for your application
2. Open Visual Studio code->open folder you have created
3. Go to view menu and open terminal
4. Type command npm install –g @angular/cli. It will take time to install packages.
5. Type command
   ng new <new project-name>
6. Type command
   cd <project-name>
7. Type command
   ng serve
8. Go to browser
   http://localhost:4200
9. This will run your angularjs project in browser.
10. Edit index.html to have different form controls.

AngularJS monitors the state of the form and input fields and notify the user about the current state.

Form input fields have the following states:

- $untouched: It shows that field has not been touched yet.
- $touched: It shows that field has been touched.
- $pristine: It represents that the field has not been modified yet.
- $dirty: It illustrates that the field has been modified.
- $invalid: It specifies that the field content is not valid.
- $valid: It specifies that the field content is valid.
  These all are the properties of the input field which can be either true or false.

- $submitted: It specifies that the form is submitted.

AngularJS Directives:

Directives are markers in the Document Object Model(DOM). Directives can be used with any controller or HTML tag which will tell the compiler what exact operation or behavior is expected.

The following table lists the important built-in AngularJS directives with their brief description:

Directives	**Description**
ng-app	Start of AngularJS application.
ng-init	It is used to initialize a variable
ng-model	It is used to bind to the HTML controls
ng-controller	Attaches a controller to the view
ng-bind	Binds the value with an HTML element
ng-repeat	Repeats HTML template once per each item in the specified collection.

Directives	Description
ng-show	Shows or hides the associated HTML element
ng-hide	Conditionally hides an HTML element based on the truthiness of an expression.
ng-readonly	Makes HTML element read-only
ng-disabled	Use to disable or enable a button dynamically
ng-if	Removes or recreates HTML element
ng-click	Custom step on click
ng-class	Conditionally applies CSS classes to an element based on the evaluation of expressions.
ng-submit	Binds a function to the submit event of an HTML form, allowing execution of custom behavior on form submission.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.

3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Develop New Employee registration form with different form controls and validate it with ng-show.
2. Develop Student exam registration form and validate it with ng-controller directive
3. Develop a form with different controls and validate it onclick of submit button using ng-click

XI. Exercise

1. State the use of ng-model and name attributes of Input field in AngularJS Form
2. Which directive will be used to display error messages.
3. List various validation states of input fields.

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.tutlane.com/tutorial/angularjs/angularjs-form-validations-with-examples
2. https://www.youtube.com/watch?v=ICl7_i2mtZA
3. https://www.w3schools.com/angularjs/angularjs_validation.asp

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 6: *Write a program to display data model view and display the data for given problem.

I. Practical Significance

The Model-View-Controller (MVC) pattern in AngularJS makes clear separation of concerns. This makes applications easier to manage, test, and maintain by dividing them into three interconnected parts: the Model (data), the View (presentation), and the Controller (logic).

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences:
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 – Design Dynamic Webpage using AngularJS.

IV. Laboratory Learning outcome(s)

LLO 6.1 Implement data binding in AngularJS.

V. Relevant Affective Domain related Outcome(s)

Simplifies development process. Easy to maintain and test the application.

VI. Relevant Theoretical Background

AngularJS utilizes data binding to automatically synchronize data between the model (your application's data) and the view (the HTML presented to the user). This synchronization can be one-way or two-way:
One-Way Data Binding:
From Model to View: Changes in the model are reflected in the view. This is achieved using expressions like {{ expression }} or directives like ng-bind.
From View to Model: Changes in the view (e.g., user input) are reflected in the model. This is typically done using event directives like ng-change or ng-click to trigger functions that update the model.

Implementing Data Binding in a Visual Studio Project:

1. Interpolation

It is used to one way binding data from a component to your view
Normally Interpolation is denoted as double curly braces (Example: { { } })
Imagine you want to show a name on your site. With interpolation, you can put your code directly into the web page using double curly braces shown in the following example:

Write following Code in app.html file

<h1> welcome {{name}}</h1>

Write following code in app.ts file

```
import { Component } from '@angular/core';
@Component({
 selector: 'app-root',
 templateUrl: './app.html',
 styleUrl: './app.css'
})
export class App {
 name = "Angular"
}
```

Output is reflected into Browser window.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Display Hello <name>.Set the name as your name
2. Set the first name and last name in separate property and display full name.

XI. Exercise

1. How do you display a value from your controller using one-way binding?
2. What is interpolation in data binding?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.freecodecamp.org/news/pyscript-python-front-end-framework/
2. https://www.oneclickitsolution.com/blog/run-python-in-html
3. https://www.geeksforgeeks.org/python/create-basic-webpage-with-pyscript

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.7: Write a program to display two-way data binding.

I. Practical Significance

Two-way data binding in AngularJS is a powerful feature that ensures synchronization between the model (data) and the view (UI). It simplifies the development process and enhancing user experience.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences:
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 – Design Dynamic Webpage using AngularJS.

IV. Laboratory Learning outcome(s)

LLO 7.1 Implement data binding synchronization between model and view.

V. Relevant Affective Domain related Outcome(s)

Two-way binding in AngularJS simplifies synchronization between model and view. This makes developer stress free as they don't need to write the extra code of synchronization.

VI. Relevant Theoretical Background

In Two-way data binding, the flow of data is bidirectional i.e. when the data in the model changes, the changes are reflected in the view and when the data in the view changes it is reflected in the model. Two-way data binding is achieved by using the ng-model directive. The ng-model directive transfers data from the view to the model and from the model to the view.
In Two-way data binding, view (UI part) updates automatically when data model changed.
We can achieve this two-way data binding using ng-model directive. If we use ng-model directive in html control it will update value automatically whenever data got changed in input control.
This directive is typically applied to input elements (like <input>, <textarea>, and <select>) and creates a two-way binding between the input's value and a property on the $scope object in the controller.
How it works:
View to Model: When a user interacts with an input element bound with ng-model (e.g., typing text into an input field), AngularJS detects this change and automatically updates the corresponding property in the $scope object.
Model to View: When the value of a property in the $scope object changes (e.g., updated by a function in the controller), AngularJS's digest cycle detects this change and automatically updates the associated element in the view to reflect the new value.
For Example:

```
<div ng-app="myApp" ng-controller="myCtrl">
  <label>Name:</label>
  <input type="text" ng-model="userName">
  <p>Hello, {{userName}}!</p>
</div>

<script>
  var app = angular.module('myApp', []);
  app.controller('myCtrl', function($scope) {
    $scope.userName = "Guest"; // Initial value in the model
  });
</script>.
```

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Accept name in text field in the form and display it.
2. Created a registration form. The user fills in the details and clicks on the submit button. On clicking on the submit button the details filled by the user are displayed

XI. Exercise

1. Differentiate one way and two-way binding.
2. Which are common directives used for data binding?
3. Explain $scope is in AngularJS?

(Space for answers)

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XII. References/Suggestions for further Reading Assessment Scheme

1. hthttps://www.youtube.com/watch?v=OCXfjTdDgOk
2. https://www.tutlane.com/tutorial/angularjs/angularjs-data-bindings-one-way-two-way-with-examples

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 8: *Write a program to implement different filters in AngularJS.

I. Practical Significance

AnngularJS filters provides an efficient way to transform and format the data for display in view. Filters allow the presentation of data in a user-friendly and consistent format without altering the underlying data model.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 – Design Dynamic Webpage using AngularJS..

IV. Laboratory Learning outcome(s)

LLO 8.1 Use filters in AngularJS.

V. Relevant Affective Domain related Outcome(s)

For end-users, AngularJS filters enhance the application's user interface (UI) by formatting and presenting data in a more digestible, engaging, and relevant way. This make a web page feel more professional and reliable.

VI. Relevant Theoretical Background

Filters are used to modify the data. They can be clubbed in expression or directives using pipe (|) character. The following list shows the commonly used filters.

Syntax:

{{expression | filterName:parameter }}

Sr. No.	Name	Description	Syntax
1	uppercase	converts a text to upper case text.	{{expression| uppercase }}
2	lowercase	converts a text to lower case text.	{{expression|lowercase}}
3	currency	formats text in a currency format.	{{ currency_expression | currency : symbol : fractionSize}}

4	filter	filter the array to a subset of it based on provided criteria	{{ expression | filter : filter_criteria }}
5	orderby	orders the array based on provided criteria.	{{ orderBy_expression | orderBy : expression : reverse }}

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Take input from user as first name and last name and display fullname in capital letter.
2. Accept amount from user and display it in currency format.
3. Display date in MM/DD/YYYY format.

XI. Exercise

1. Can we apply multiple filters to same expression? How?
2. Explain how to apply filter to directive.

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.geeksforgeeks.org/angular-js/what-are-filters-in-angularjs/
2. https://www.tutorialspoint.com/angularjs/angularjs_filters.htm

XIII. Assessment Scheme

	Performance Indicators	Weightage
	Process related (15 Marks)	**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
	Product related (10 Marks)	**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 9: *Write a program to implement events in AngularJS.

I. Practical Significance

AngularJS event handling is the ability to enable rich, interactive, and responsive web applications by bridging user actions in the view with logic in the controller.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 – Design Dynamic Webpage using AngularJS.

IV. Laboratory Learning outcome(s)

LLO 9.1 Implement various keys and mouse events.

V. Relevant Affective Domain related Outcome(s)

For end-users, AngularJS filters enhance the application's user interface (UI) by formatting and presenting data in a more digestible, engaging, and relevant way. This make a web page feel more professional and reliable

VI. Relevant Theoretical Background

Events in AngularJS can be used to perform particular tasks, based on the action taken.
AngularJS provides directives for handling various DOM events directly within the HTML, allowing for declarative event binding. These directives typically start with ng- and are followed by the event name. When the specified event occurs on the element, the expression assigned to the directive is evaluated within the current scope.

Following are directives used for **mouse event handling**:

1. ngMousedown

The ngMouseDown directive allows us to specify the behavior of element(s) on mousedown events. This directive has the highest priority.
Syntax

```
<ANY ELEMENT ng-mousedown="expression">
  ...
</ANY ELEMENT>
```

2. ngMouseenter

The ngMouseenter directive allows us to specify the behavior of element(s) on mouse enter event. This directive has highest priority.

Syntax

```
<ANY ELEMENT ng-mouseenter="expression">
  ...
</ANY ELEMENT>
```

3. ngMouseleave

The ngMouseleave directive allows us to specify the behavior of element(s) on mouse leave event. This directive has highest priority.

4. ngMousemove

The ngMousemove directive allows us to specify the behavior of element(s) on mouse move event. This directive has highest priority.

5. ngMouseover

The ngMouseover directive allows us to specify the behavior of element(s) on mouse over event. This directive has highest priority.

6. ngMouseup

The ngMouseup directive allows us to specify the behavior of element(s) on mouse up event. This directive has highest priority.

Following are the key directives in AngularJS:

1.ng-keydown - executes when key is starting to press (this executes first and then keypress event executes)

2.ng-keypress - executes when key is pressed

3.ng-keyup - executes when key is left after pressing

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Change the button color after clicking it.
2. Show count of key press in the text box.
3. Try to display x and y coordinates in different mouse events.

XI. Exercise

1. Does AngularJS override the element's original onmousedown event.? Justify.
2. Specify order of mouse click.(Mouse click, Mouse Up and Mouse down).

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/angularjs/ng_ng-keypress.asp
2. https://www.geeksforgeeks.org/angular-js/how-to-change-the-button-color-after-clicking-it-using-angularjs

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 10: Write a program to display the data in the table

I. Practical Significance

Presenting data in a table with rows and columns inherently makes complex or related information easier for a user to understand at a glance

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO3 – Implement built in functions and objects in AngularJS.

IV. Laboratory Learning outcome(s)

LLO 10.1 Create a web page to implement a table.

V. Relevant Affective Domain related Outcome(s)

Displaying the data in the table in presentable design can keep user engaged. Various functionalities that can be performed on the table can encourage the user to use it to present the updated data.

VI. Relevant Theoretical Background

The data in tables are basically repeatable, so you can use ng-repeat directives to create tables easily.

Syntax:

<element ng-repeat="expression">Content..<element>

Ng-repeat

The ng-repeat directive repeats a set of HTML, a given number of times. The set of HTML will be repeated once per item in a collection. The collection must be an array or an object.

Here, to create tables follow given steps.

- Set up an angularJs application.
- Define the data for the table.
- Using ng-repeat directive, iterate the data to display.
- Display the data as a table
- Style the data to look better.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Display 10 students data in the table format.
2. Display employee data of company in the table format
3. Display the list of different countries.

XI. Exercise

1. List various contextual variables available in AngularJS.
2. Which contextual variable from above list can be used to display serial no in the table for the record.

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.c-sharpcorner.com/blogs/display-data-in-table-using-angularjs
2. https://www.tutorialspoint.com/how-to-display-tables-using-angularjs

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 11: *Write a program to implement CSS to table data –odd and even rows.

I. Practical Significance

Presenting data in a table with rows and columns inherently makes complex or related information easier for a user to understand at a glance.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO3 – Implement built in functions and objects in AngularJS.

IV. Laboratory Learning outcome(s)

LLO 11.1 Implement table operation using filters.

V. Relevant Affective Domain related Outcome(s)

Displaying the data in the table in presentable design can keep user engaged. Various functionalities that can be performed on the table can encourage the user to use it to present the updated data..

VI. Relevant Theoretical Background

The data in tables are basically repeatable, so you can use ng-repeat directives to create tables easily.
Syntax:
<element ng-repeat="expression">Content..<element>
Ng-repeat
The ng-repeat directive repeats a set of HTML, a given number of times. The set of HTML will be repeated once per item in a collection. The collection must be an array or an object.
Here, to create tables follow given steps.

- Set up an angularJs application.
- Define the data for the table.
- Using ng-repeat directive, iterate the data to display.
- Display the data as a table
- Style the data to look better.

To implement CSS styling for odd and even rows in an AngularJS table, you can leverage the ng-class-odd and ng-class-even directives in conjunction with ng-repeat.
Syntax:

```
<element ng-class-odd="expression">
   Contents...
</element>
<element ng-class-even="expression">
   Contents...
</element>
```

Example:

```
<tr ng-repeat="person in people" ng-class-odd="'odd-row'" ng-class-even="'even-row'">
        <td>{{ person.name }}</td>
        <td>{{ person.age }}</td>
        <td>{{ person.city }}</td>
    </tr>
```

In this example odd-row and even-row are class defined in css file with different formatting

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Display 10 students data in the table format with different styles for odd and even rows.
2. Display data for 10 employees and display odd rows with light green color
3. Display staff details for 10 staff and display even rows with light green color.

XI. Exercise

1. Which pseudo-class in CSS class is used to apply different style to Odd or even rows of table.
2. Give different ways to format even and odd rows in the table in AngularJS

(Space for answers)

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/angularjs/angularjs_tables.asp
2. https://www.tutorialspoint.com/how-to-display-tables-using-angularjs

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 12: * Write programs for implementation of different methods of AngularJS Controllers

I. Practical Significance

Implementing different AngularJS Controller methods helps manage data and behavior in views to build dynamic and maintainable web applications.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO3 – Implement the built-in functions and objects in AngularJS.

IV. Laboratory Learning outcome(s)

LLO 12.1 Develop Angular JS applications using controllers.

V. Relevant Affective Domain related Outcome(s)

Helps students appreciate modular coding, apply filters effectively, follow best practices, and explore AngularJS controllers.

VI. Relevant Theoretical Background

A controller is a JavaScript function that manages the data (model) and behavior (logic) of a view in AngularJS. It acts as a bridge between the HTML view and the JavaScript model, allowing dynamic interaction between the user and the application.

Methods of AngularJS Controller:

1. **Basic Controller** :
   - Initializes $scope variable and simple functions:

```
$scope.message = "Hello!";
$scope.greet = function()
{ alert("Welcome!"); };
```

2. **Nested Controllers:**
   - A controller inside another controller.
   - Child controller inherits the parent scope, allowing modular design.

```
<div ng-controller="ParentCtrl">
   <div ng-controller="ChildCtrl">{{parentData}}</div>
</div>
```

3. **External Controllers:**
   - Controllers defined in separate JavaScript files for modularity.

   <script src="controller.js"></script>

4. **Filters in Controllers:**
   - Controllers can use AngularJS filters in the view or programmatically.

Example filters: uppercase, orderBy, currency

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a program to display student details (name, roll no, marks) using a controller.
2. Write a program where one controller is nested inside another (Parent–Child).

XI. Exercise

1. What is the role of the $scope object in a controller?
2. How do you attach variables and functions to the $scope object?

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XII. References/Suggestions for further Reading Assessment Scheme

1. http://training.trainingtrains.com/angularjs-controllers.html
2. https://www.w3schools.com/angularjs/angularjs_controllers.asp

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 13: * Write programs to demonstrate use of controllers in external files

I. Practical Significance

An AngularJS controller in an external file keeps the JavaScript logic separate from HTML, making the code modular, organized, and reusable.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO3 – Implement the built-in functions and objects in AngularJS.

IV. Laboratory Learning outcome(s)

LLO 13.1 Use concept of controller's external files.

V. Relevant Affective Domain related Outcome(s)

Helps students appreciate modular coding, apply filters effectively, follow best practices, and explore AngularJS controllers.

VI. Relevant Theoretical Background

Controllers can be defined in separate JavaScript files instead of writing them inside the HTML file. This helps to keep the code modular, organized, and easier to maintain. You just include the external JS file in your HTML using the <script> tag.

Example:

1. External JS File (controller.js)

```
// Define AngularJS module and controller
angular.module('myApp', [])
.controller('SimpleController', function($scope) {
$scope.message = "Hello from External Controller!";
});
```

2. HTML File (index.html)

```
<script src="controller.js"></script> <!-- Include external controller -->
```

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a program to display a message using an external controller.
2. Write a program to create a table of students and apply orderBy filter to sort names.
3. Write a program to display text in uppercase and lowercase using filters.

XI. Exercise

1. What is the difference between an internal and an external controller?

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XII. References/Suggestions for further Reading Assessment Scheme

1. http://training.trainingtrains.com/angularjs-controllers.html
2. https://www.w3schools.com/angularjs/angularjs_controllers.asp

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 14: * Write a program to handle data using React form

I. Practical Significance

A Simple React program that demonstrates how to handle form data — including reading input, updating state, and displaying the submitted data

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO4 – Develop web application using React..

IV. Laboratory Learning outcome(s)

LLO 14.1 Execute after writing program to handle data using React form.

V. Relevant Affective Domain related Outcome(s)

React provides a way to manage form data through component state, leading to what are known as "controlled components."

VI. Relevant Theoretical Background

1. **Forms in ReactJS**

Forms are used to collect user input and manage data entry in web applications. In React, form elements are handled differently because React controls the data flow through state and props.

2. Controlled Components

A controlled component is a form element whose value is controlled by React state.
The input field value is set using the component's state.
Every change triggers an onChange() event that updates the state

3. Uncontrolled Components

Uncontrolled components store their own data in the DOM instead of React state.Accessed using Refs (useRef hook).Used when form handling does not require React to manage every keystroke

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Create a registration form that collects name, email, and password, and clears inputs after submission.
2. Demonstrate how to handle form data dynamically using an object to store multiple input fields

XI. Exercise

1. How do you handle form data using React Hooks like useState and useEffect
2. Demonstrate how to handle form data dynamically using an object to store multiple input fields.

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.tpointtech.com/react-forms
2. https://www.w3schools.com/react/react_forms.asp
3. https://react.dev/reference/react-dom/components/form

XIII. Assessment Scheme

	Performance Indicators	Weightage
	Process related (15 Marks)	**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
	Product related (10 Marks)	**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 15: Write a program to pass function argument into React component

I. Practical Significance

Passing function arguments into React components helps in data sharing and communication between components. It allows developers to reuse logic, control component behavior dynamically, and handle user interactions efficiently

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO4 – Develop web application using React

IV. Laboratory Learning outcome(s)

LLO 15.1 Execute after writing program passing function argument into React component.

V. Relevant Affective Domain related Outcome(s)

It helps developers manage communication between components and handle user interactions efficiently.

VI. Relevant Theoretical Background

- **React Components**
  - Components are reusable blocks of code that define how part of the UI looks and behaves.They can be written as functions that return JSX (HTML-like code)
- **Props (Properties)**
  - Props are used to pass **data or functions** from one component (parent) to another (child).They make components **dynamic** and **reusable**.
- **Passing Function as a Prop**
  - A parent component can send a **function** as a prop to a child.The child component can then **call (invoke)** that function, possibly with arguments.
- **Example** :

```
// Parent Component
function Parent() {
  // Function defined in parent
  function showMessage(name) {
    alert("Hello, " + name + "!");
  }

  // Passing function as prop to child
```

```
  return <Child greet={showMessage} />;
}

// Child Component
function Child(props) {
  return (
    <div>
      <h2>Welcome to React Example</h2>
      <button onClick={() => props.greet("User Name ")}>
        Click to Greet
      </button>
    </div>
  );
}
```

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a ReactJS program to demonstrate how multiple arguments can be passed through a function prop from a parent to a child component. Display both arguments in an alert message.

2. Write a ReactJS program where the child component triggers a parent's function to update a counter value on button click. Display the updated count on the screen.

XI. Exercise

1. Can we call the same function with different arguments from the child component?
2. How does this concept help in real-world React applications?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.geeksforgeeks.org/reactjs/reactjs-functional-components/
2. https://www.youtube.com/watch?v=yH5Z-lSeV9Y
3. https://react.dev/reference/react-dom/components/form

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 16: * Write a program to pass function argument into React program and Implement the life cycle of React

I. Practical Significance

This helps developers manage interaction and communication between components effectively and control component behavior at different stages for efficient and optimized app performance.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO4 – Develop web application using React.

IV. Laboratory Learning outcome(s)

LLO 16.1 Implement the concept of React life cycle.

V. Relevant Affective Domain related Outcome(s)

Understanding lifecycle methods helps control a component's behavior during creation, update, and deletion for efficient React app performance.

VI. Relevant Theoretical Background

- **React Component Lifecycle:**
  The lifecycle defines how components are created, updated, and destroyed during their existence in the DOM.

- **Phases of Lifecycle:**

  Mounting: Component creation (constructor(), componentDidMount())

  Updating: When state or props change (componentDidUpdate())

  Unmounting: Component removal (componentWillUnmount())

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a program to pass function argument into React component
2. Implement the Life Cycle of React

XI. Exercise

1. Why is an arrow function used inside the onClick event?
2. What is the difference between Mounting and Updating phases?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/react/react_lifecycle.asp
2. https://www.freecodecamp.org/news/react-lifecycle-methods-and-hooks-for-beginners/
3. https://www.youtube.com/watch?v=m_mtV4YaI8c

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 17: * Write a program to implement states of React Hooks

I. Practical Significance

Implementing states using React Hooks helps developers manage and update dynamic data in functional components without using class components. It allows components to remember values, respond to user actions, and update the UI automatically when data changes.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO4 – Develop web application using React.

IV. Laboratory Learning outcome(s)

LLO 17.1 Implement states of React Hooks.

V. Relevant Affective Domain related Outcome(s)

Helps developers handle and update dynamic data in functional components efficiently using Hooks.

VI. Relevant Theoretical Background

- React Hooks are special functions that let you use state and other React features in functional components (without using classes).
- The useState() hook is used to create and manage state variables inside a functional component.
- Syntax:
  const [stateVariable, setStateFunction] = useState(initialValue);
  stateVariable → holds the current value of the state
  setStateFunction → updates the state
  initialValue → sets the starting value of the state
- When the state is updated using setStateFunction, the component re-renders automatically to show the new value.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a React program to change the background color of a div when a button is clicked using the useState hook.
2. Write a React program to manage user input using the useState hook.

XI. Exercise

1. What is the purpose of the useState() hook in React?
2. Why do we use a setter function like setCount in React Hooks?.

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/react/react_usestate.asp
2. https://react.dev/reference/react/hooks
3. https://youtu.be/IQjB-U9X68

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 18: Write a program to design real time form using react components

I. Practical Significance

Using React components to design real-time forms helps developers build interactive, dynamic, and user-friendly interfaces where data updates instantly as users type.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO5 - Apply event handling in React Framework..

IV. Laboratory Learning outcome(s)

LLO 18.1 Use React components to design real time form.

V. Relevant Affective Domain related Outcome(s)

Helps developers create dynamic and responsive forms that update and validate user input in real time using React components.

VI. Relevant Theoretical Background

- React Components:
  React applications are built using components — reusable blocks of code that define specific parts of the user interface (UI).A form in React can be created as a functional component, which contains all form elements like input boxes, labels, and buttons.
- JSX (JavaScript XML):
  React uses JSX syntax to design UI elements.It allows developers to write HTML-like code inside JavaScript, making it easier to design and structure form layouts.
- Form Elements in React:
  Standard HTML elements like <form>, <input>, <label>, <select>, and <button> are inside React components. These elements help collect user data in a structured way.
- Controlled Components:
  In React, form inputs are usually controlled components, meaning their values are managed by React's state.This provides better control over user input and validation.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a React program to design a simple form using React components that accepts user details such as name and email, and displays them after form submission.
2. Write a React program to design a feedback form that accepts user name, email, and feedback message, and displays a thank-you message after submission.

XI. Exercise

1. What is a React component, and why is it used to design forms?
2. What is the role of JSX in designing forms using React?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/react/react_forms.asp
2. https://www.telerik.com/blogs/react-basics-react-forms-examples
3. https://www.tutorialspoint.com/reactjs/reactjs_forms.htm

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 19: Write a program to apply validations for React form

I. Practical Significance

Applying validations in React forms ensures that user inputs are correct, complete, and in the expected format before submission. It helps developers maintain data accuracy, improve user experience, and prevent invalid or incomplete data from being processed by the system.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences:
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO5 - Apply event handling in React Framework.

IV. Laboratory Learning outcome(s)

LLO 19.1 Apply validations for React form

V. Relevant Affective Domain related Outcome(s)

Helps developers ensure accuracy and completeness of user input by validating form data before submission in React applications.

VI. Relevant Theoretical Background

Event Handling (onChange, onSubmit):

- onChange is used to monitor user input and update state in real time.
- onSubmit is used to check and validate all input fields before form submission.

Types of Validation:

- **Required Field Validation:** Ensures no field is left empty.
- **Pattern Validation:** Checks specific formats (e.g., email or mobile number).
- **Length Validation:** Ensures data is within a specified range (e.g., password length).
- **Custom Validation:** User-defined rules for specific conditions.

ErrorHandling:

React forms often display **error messages** next to input fields when validation fails. These are controlled using conditional rendering and state variables (e.g., setError).

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a React program to design a student enrollment form that accepts name, age, and course name.Validate that: The name is not empty,The age is a number between 18 and 30,The course name is selected from a dropdown list.
2. Write a React program to design and validate a job application form that accepts applicant name, email, phone number, and experience.Validate each field and show appropriate error messages for missing or incorrect data.

XI. Exercise

1. How does React re-render components when validation errors or success messages are updated?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://algodaily.com/lessons/react-forms-and-validation-62093a9d
2. https://www.freecodecamp.org/news/how-to-validate-forms-in-react/#heading-how-to-implement-input-validation-in-react

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 20: * Write a program to manipulate List using key and without key in React

I. Practical Significance

It demonstrates how the use of unique keys improves performance, stability, and maintainability of dynamic lists by preventing unnecessary re-rendering or incorrect UI updates.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :

Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO5 - Apply event handling in React Framework.

IV. Laboratory Learning outcome(s)

LLO 20.1 Use concept of List using React.

V. Relevant Affective Domain related Outcome(s)

Helps developers efficiently manage dynamic lists in React by using keys to identify elements uniquely and avoid rendering issues during list updates.

VI. Relevant Theoretical Background

- In React, lists are used to render multiple elements dynamically. When displaying a list, each element should have a unique key. Keys help React identify which items have changed, added, or removed.
- If keys are not used, React may re-render elements inefficiently, causing unexpected behavior. Using conditional rendering and state variables (e.g., setError).
- **Example :**

```
import React from "react";
function StudentList() {
  const students = ["Amit", "Riya", "Neha", "Karan"];
  return (
    <div>
      <h2>List Without Key</h2>
      <ul>
        {students.map((name) => (
          <li>{name}</li>   {/* No key used here */}
        ))}
      </ul>
      <h2>List With Key</h2>
```

```
      <ul>
        {students.map((name, index) => (
          <li key={index}>{name}</li>   {/* Key added for unique identification */}
        ))}
      </ul>
    </div>
  );
} export default StudentList;
```

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a React program to display a list of student names without using keys and using unique keys.
2. Write a React program to delete and update an item from a list using a key.

XI. Exercise

1. Why is using an index as a key sometimes discouraged in dynamic lists?
2. Predict the output when two list items have the same key value — what issue may occur?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.naukri.com/code360/library/react-lists-and-keys
2. https://www.w3schools.com/react/react_lists.asp
3. https://www.geeksforgeeks.org/reactjs/reactjs-keys/

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 21: Write a program to render a list using map function in React

I. Practical Significance

map() function allows developers to render lists of data dynamically and efficiently. Instead of writing repetitive code for each element, the map() function simplifies the process by generating multiple components or elements directly from an array.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO5 - Apply event handling in React Framework.

IV. Laboratory Learning outcome(s)

LLO 21.1 Create a page to use map function in React.

V. Relevant Affective Domain related Outcome(s)

Using map() enhances flexibility, reusability, and efficiency in building dynamic, data-driven interfaces

VI. Relevant Theoretical Background

- In React, the map() function (a built-in JavaScript method) is commonly used to iterate over arrays and render UI elements dynamically.
- Syntax:

```
array.map((item, index) => {
return <Element key={index}>{item}</Element>;
});
```

- Example :

```
import React from "react";

function NameList() {
  const names = ["Aarav", "Priya", "Rohan", "Sneha", "Karan"];

  return (
    <div>
      <h2>Student Name List</h2>
      <ul>
        {names.map((name, index) => (
          <li key={index}>{name}</li>
```

```
        ))}
      </ul>
    </div>
  );
}

export default NameList;
```

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Display a list of subjects along with their index numbers (e.g., "1. English") using the map() function.
2. Use map() to display names from an array but show only those starting with the letter "A".

XI. Exercise

1. How can you modify the program to display both the index and value of each list item?
2. How would you handle dynamic addition or removal of list items using the map() function?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.geeksforgeeks.org/reactjs/how-to-use-map-to-create-lists-in-reactjs/
2. https://www.w3schools.com/react/react_lists.asp
3. https://www.geeksforgeeks.org/reactjs/reactjs-keys/

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 22: * Write a program to apply following approaches of CSS to a React web Page Inline styling, CSS stylesheets, CSS Modules

I. Practical Significance

Applying different CSS styling approaches allow developers to build visually appealing, maintainable, and scalable React applications, balancing both efficiency and design consistency.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences :
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO5 - Apply event handling in React Framework.

IV. Laboratory Learning outcome(s)

LLO 22.1 Implement different approaches for styling a React web page.

V. Relevant Affective Domain related Outcome(s)

Helps learners appreciate the importance of styling in creating user-friendly and visually appealing React applications

VI. Relevant Theoretical Background

In React, CSS (Cascading Style Sheets) is used to control the appearance and layout of components. React supports multiple ways to apply styles to components, allowing developers to choose the method that best fits their project's structure, scalability, and reusability needs.

- **Inline Styling**
  - Inline styling means applying styles **directly to an element** using the style attribute. In React, the style attribute accepts a **JavaScript object**
  - Example :
    <h2 style={{ color: "blue", backgroundColor: "lightgray" }}>Inline Style</h2>
- **CSS Stylesheets**
  - External CSS files are used to define styles and then imported into components.
  - Example :
    import "./App.css";
    <h2 className="heading">Stylesheet Style</h2>
- **CSS Modules**
  - CSS Modules allow styles to be scoped locally to a component to avoid conflicts.Each class name in a module is automatically unique to that component.Imported using a syntax like import styles from './App.module.css'.
  - Example :
    import styles from "./App.module.css";
    <h2 className={styles.title}>CSS Module Style</h2>

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		
2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below are a few sample questions for reference. Teachers must design more such questions to ensure the achievement of the identified CO.

1. Write a React program that demonstrates all three CSS approaches — Inline, Stylesheet, and CSS Modules.
2. Write a program that uses an external CSS file (App.css) to style a heading, paragraph, and button with different colors and padding.

XI. Exercise

1. What is the main difference between CSS Stylesheets and CSS Modules in React?
2. In what type of projects would you prefer CSS Modules over regular Stylesheets?
3. How can you apply the same CSS class from a stylesheet to multiple React components?

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.w3schools.com/react/react_css.asp
2. https://create-react-app.dev/docs/adding-a-css-modules-stylesheet/
3. https://css-tricks.com/different-ways-to-write-css-in-react/

XIII. Assessment Scheme

	Performance Indicators	Weightage
	Process related (15 Marks)	**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
	Product related (10 Marks)	**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No. 23: * Development of a Web-Based Real-Time Application as Suggested by the Teacher

I. Practical Significance

This microproject aims to develop a web-based real-time application using modern web technologies (AngularJS, ReactJS, JavaScript) that demonstrates dynamic data handling and interactive UI behavior.

II. Industry / Employer Expected outcome(s)

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences:
Develop web application using AngularJS and React Framework

III. Course Level Learning outcome(s)

CO2 - Design dynamic web pages using AngularJS.
CO3 - Implement the built-in functions and objects in AngularJS.
CO4 - Develop web application using React.
CO5 - Apply event handling in React Framework.

IV. Laboratory Learning outcome(s)

LLO 23.1 Carry out a microproject on the given problem statement.

V. Relevant Affective Domain related Outcome(s)

Through this project, students gain practical experience in building interactive UIs, integrating APIs, managing state, and handling dynamic content updates.

VI. Relevant Theoretical Background

- Knowledge of HTML for creating the basic structure of the web application.
- Use of CSS to style the interface and make it responsive across devices.
- Understanding JavaScript for interactivity, event handling, and dynamic updates.
- Concepts of ReactJS such as components, JSX, props, state, and hooks for building modular and real-time UI.
- Basics of API integration and handling JSON data for fetching live or dynamic information.
- Awareness of UI/UX principles to design a clean and user-friendly application.

VII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks (If any)
1.	Visual Studio IDE	Visual Studio 2022 – 64-bit application		

2.	Any browser	Google Chrome, Mozilla		

VIII. Precautions to be followed

1. Use correct syntax
2. Follow naming conventions.
3. Follow ethical practices.

IX. Conclusion

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X. Practical Related Questions

Note: Below given are few sample Microproject titles for reference. Teachers must design more such Microprojects titles to ensure the achievement of identified CO also assign separate Microproject to each student.

1. Develop a web "Chat Application" having Chat window with send and receive the text, image etc.
2. Develop a web "Music Player application "where user can get the Album with singer and play the music.

XI. Exercise

1. Prepare a complete microproject report that may include an Introduction, a Flowchart or Architecture/Block Diagram, the Source Code of the selected project, the Output, a Conclusion, and References, or any other points suggested by the teacher

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XII. References/Suggestions for further Reading Assessment Scheme

1. https://www.theknowledgeacademy.com/blog/react-js-projects/
2. https://skillcrush.com/blog/projects-you-can-do-with-javascript/
3. https://www.geeksforgeeks.org/reactjs/reactjs-projects/
4. https://www.wscubetech.com/blog/javascript-projects/

XIII. Assessment Scheme

Performance Indicators		Weightage
Process related (15 Marks)		**60%**
1	Logic formation	30%
2	Debugging ability	20%
3	Follow ethical practices	10%
Product related (10 Marks)		**40%**
4	Expected output	10%
5	Timely Submission	15%
6	Answer to sample questions	15%
	Total: 25 Marks	**100%**

Marks obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	