Programme: **Bachelor of Engineering (Information Technology)**

Semester: **VI**

Course Code: **102046701**

Course Title: **Advanced Web Development**

Course Group: **Professional Elective Course - II**

Course Objectives: On completion of the course, the students will become familiar with client-server architecture and able to develop web application using JavaScript based frameworks on client and server side both. Students will learn the advanced web programming concepts related to MEAN stack development.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
3	0	2	4	40 / 14	60 / 21	20 / 7	30 / 10	150 / 52

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction to CSS and Java Script:** CSS rule, selectors, where to add them, Responsive design, CSS frameworks; Java Script syntax, Java script inbuilt objects, Error handling, even handling, DOM, AJAX	04
2	**Introduction to AngularJS:** Introduction to AngularJS, MVC Architecture, Basic concepts, Simple application, Number and String expression, Object binding and expression, Working with Arrays, Data binding, Understanding Controllers, $scope object, Adding behavior to $scope object, Passing parameters to method, Arrays as member in controller scope, Nested controllers and scope inherited, Multiple Controllers and their scope	04

3	**AngularJS Filters, Services, Modules, Directives:**	**08**
	Filters: What is filter, Built-in Filters (Uppercase, Lowercase, Currency, Limit, OrderBy, Filter, Date, Number), Creating Custom Filters; Services: What is service, Built-in services ($http, $timeout, $interval), Creating Custom Services, Injecting Dependencies in Services, using service inside a filter; Modules: Why module, Module loading, Creating Custom Module; Directives: What is directive, Built-in Directives (ng-repeat, ng-options, ng-disabled, ng-show, ng-hide), Event Directives (ng-click, ng-change, ng-mouseover, ng-keyup etc.), ng-include directive, Creating custom directive	
4	**AngularJS - Forms, Validation and Routing**	**05**
	Using Simple form, working with different input elements, Validation of inputs, Form Events CSS Classes, Creating Custom Validation, Introduction to Single Page Application (SPA), HTML template creation, use of routing to make SPA, AJAX using AngularJS, AngularJS Animation	
5	**NodeJS:** Introduction to NodeJS, Advantages of NodeJS, Traditional Web Server Model, NodeJS Process Model, Modules in NodeJS, Creating Custom Modules, HTTP Module, Creating Web Server, Read the Query String, File System Module, URL Module, Buffer, Streams Node Package Manager (NPM), Installing packages locally and globally, Events in NodeJS, Events Module, Event Loop, File Upload, Nodemailer Module, Serving Static Files, Template Engine, Express.JS or Express, Configuring Routes in Express, Cookies, Session, Networking with NodeJS, NodeJS REST API	**07**
6	**MongoDB:** NoSQL Database, Advantages of NoSQL, Types of NoSQL Databases, what is MongoDB, Need of MongoDB, Advantages of MongoDB, RDBMS vs NoSQL, Installing MongoDB, Creating of Database, Collection, Document, Dropping of Database, Collection and Document, Inserting and Updating of Document, Querying of Document, Projection, Limiting Records, Sorting Records, Indexing, Aggregation	**05**
7	**NodeJS and MongoDB:** Connect NodeJS with MongoDB, Various operations on database of MongoDB like Insert, Find, Query, Sort, Delete, Update, Limit, Join and Drop using NodeJS.	**07**
	Total	**40**

List of Practicals / Tutorials:

1	Write HTML/Javascript code for the following:
	1. When name of the basic color is entered in the textbox and leave the textbox then it should take that color as background color.
	2. Until you enter the complete mobile number (means less than 10 digits) in the textbox, it should take red color as background and when it becomes complete then show the alert message.
	Write a Javascript code to create user defined object Car with carModelName, carColor, carPrice, carSpeed properties and with displaySpeed(s),increaseSpeed(s) and DescreaseSpeed(s) as methods.

2	Write HTML/Javacript code to change the background color of div element periodically. For example, at every 30 seconds it changes the background color. Hint: use SetInterval function. Write HTML/Javascript code to make an animation for displaying set of images. It takes frequency (in milliseconds) of image repetition as input from the user. Also, it shows button to start/stop (single button which toggles) the animation.
3	Write AJAX script to display the student details like Enrollment number and Name (in tabular form) from XML file stored on the same web server. After displaying student details, when enrolment number is clicked then it fetches city, address, pincode and other details for the student.
4	Design Order Form with a total price updated in real time, which contains name of five products and their prices. Create a bill amount for all the products and calculate GST on the billing amount and display total amount. Use AngularJS.
5	Write AngularJS filter to check whether the entered number in the textbox is prime or not.
6	Write AngularJS service which makes the square of the number when it is called.
7	Write AngularJS service which makes the addition/subtraction of two numbers entered in textboxes when Add/Sub button is clicked. Enter Number A: Enter Number B: **Add** **Sub** Result: ????
8	Write AngularJS script to read the JSON data (Student's enrolment number and name) from the server and populate the dropdown list with enrolment number.
9	Write AngularJS validation script to validate the password and confirm password. Password must contain at least four and maximum 10 characters and must start with number only. Content of password and confirm password box must be the same otherwise it should display the appropriate message.
10	Write AngularJS validation script to validate the registration form and submit button gets enabled if all the validations are passed successfully. The form contains fields like First name, last name, email address, mobile number, sex (radio button) and department (select box).
11	Write AngularJS script to implement single page web application. Make your own website which includes the pages like about you, education, hobbies, contact me etc.
12	Write AngularJS script to implement custom directive (reusable component) for calculator with operations like add, subtraction and multiplication.
13	Write NodeJS code to implement web server to serve the different content based on URL.
14	Write NodeJS code to provide the file upload facility to the user. It also imposes the restriction of file size to be uploaded.
15	Create a simple web application using AngularJS, NodeJS and MongoDB. For example, you may design Library Management System, Hospital Management System etc. with minimal functionalities.

Reference Books:

1	Angularjs in Action by Ruebbelke, Wiley Publication
2	Node.js in Action by Alex Young, Bradley Meck, Mike Cantelon, Tim Oxley, Marc Harter, T. J. Holowaychuk, Nathan Rajlich, Wiley Publication
3	Node.Js in Practice by Alex Young, Marc Harter, Ben Noordhuis Wiley Publication
4	MongoDB Basics, David HowsPeter MembreyEelco Plugge, Apress Publication

Supplementary learning material:

1	NPTEL - Swayam Courses
2	www.w3schools.com

Pedagogy:
- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	**U**	**A**	**N**	**E**	**C**	
15%	20%	25%	10%	10%	20%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	An ability to learn the concepts of client-side programming.	**10**
CO-2	Understand the concepts of AngularJS to extend basic HTML features	**30**
CO-3	Learn Node JS framework to build dynamic server-side applications	**30**
CO-4	Study the concept of NoSQL database and database connection with web application.	**20**
CO-5	Design and implement full featured web application using MEAN stack development tools.	**10**

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	June-2020
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025