4 . FULL STACK DEVELOPMENT Track

Course Code	Course name	L	T	P	C
CSFS2004P	Frontend Development	4	0	1	5
Total Units to be Covered: 05		Total Contact Hours: 90			
Prerequisite(s):		Syllabus version: 1.0			

Course Objectives

1. Understand the fundamentals of web development and front-end technologies.
2. Design and develop responsive web pages using HTML and CSS.
3. Build interactive web applications using JavaScript.
4. Utilize front-end frameworks and libraries to streamline development processes.
5. Implement best practices for accessibility and usability in web design.
6. Optimize web performance and user experience.
7. Collaborate effectively with backend developers and designers.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand Web Development Fundamentals

CO2: Create and build web pages and applications.

CO3: Utilize front-end frameworks and optimize web performance.

CO4: Apply security best practices and conduct testing.

CO5: Demonstrate project development skills.

CO-PO Mapping

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	-	-	-	3	-	-	-	1	-	-	-	-	-	-
CO 2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-

CO 3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	2	-	-	-	2	-	-	2	-	-	-
Average	-	-	0.4	-	2	-	-	-	0.6	-	-	0.4	-	-	-

1 – Weakly Mapped (Low) **2 – Moderately Mapped (Medium)**

3 – Strongly Mapped (High) **"_" means there is no correlation**

Syllabus

Unit I: Introduction to Frontend Development, Web Design **12 Lecture Hours**

Overview of web development and frontend technologies, Introduction to development environments (IDEs, text editors, browser developer tools), HTML5 essentials: tags, attributes, semantic markup, CSS fundamentals: selectors, box model, layout techniques, Introduction to responsive web design principles, CSS media queries and viewport settings, Flexbox and CSS Grid for flexible layouts, Introduction to Bootstrap or other CSS frameworks

Unit II: JavaScript and Web Optimization **12 Lecture Hours**

Introduction to JavaScript: variables, data types, control flow, Functions and scope, DOM manipulation and event handling, Introduction to jQuery or other JavaScript libraries, Working with arrays and objects, Asynchronous programming and AJAX, Introduction to ES6+ features (arrow functions, modules, etc.), Introduction to modern JavaScript frameworks (React, Vue.js, Angular), Understanding web performance metrics, Techniques for optimizing CSS and JavaScript, Asset optimization (images, fonts, etc.), Introduction to caching and CDNs

Unit III: Frontend: Building and Testing **12 Lecture Hours**

Introduction to task runners (Gulp, Grunt) or bundlers (Webpack, Parcel), CSS preprocessors (Sass, Less) for enhanced styling, Introduction to version control systems (Git), Accessibility and Usability, Principles of web accessibility, Techniques for creating accessible web content, Usability best practices and user-centered design principles, Introduction to frontend testing frameworks (Jest, Mocha), Unit testing and integration testing, Testing user interfaces and interactions.

Unit IV: JSX and Redux **12 Lecture Hours**

Why JSX, Embedding JavaScript, Expression in JSX, JSX as an Expression, Nested elements in JSX, JSX, Attributes, JSX Comments, JSX Styling and representation as object, The State of the Component, Defining State, Changing the State, Props, Validation, Validators, Elements, Rendering Element, About render (), Creating React Element, Updating Element, components, Introducing Components, Types of Components, Functional Component, Functional Components as Stateless, Using Functional Component, Redux Concepts, Redux Principles, Data Flow, Actions, Functions, Reduces, Testing , Dev-Tools, React & Redux Integrate.

Unit V: Web Security **12 Lecture Hours**

Introduction to web security principles, SPA frameworks, authentication and authorization systems, API analysis, detecting frameworks and libraries, Common Security Issues (eg. Cross-Site Scripting, CSRF, XXE, Injection), Common Countermeasures (e.g., Authentication, Authorization, HTTPS), securing web applications, reviewing code for security, vulnerability discovery and management, Web Application Firewalls.

Total lecture Hours 60

References*

Textbooks	1. Stefan Baumgartner, “Front End Tooling with Gulp”, Manning Publication. 2. “HTML5 Black Book”, Dreamtech Publications, 2016. 3. Ben Frain, “Responsive Web Design with HTML5 and CSS”, 4th Edition, Packt Publication, 2022.
Reference books	
Web Resources	
Journals	
MOOCs, online courses	

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination etc.

Examination Scheme

Components	IA	MID SEM	End Sem	Total
Weightage (%)	50	20	30	100

Frontend Development Lab

List of Experiments

Experiment-1: Write a program to create a simple webpage using HTML.

Experiment-2: Write a program to create a website using HTML CSS and JavaScript

Experiment-3: Write a program to build a Chat module using HTML CSS and JavaScript

Experiment-4: Write a program to create a simple calculator Application using React JS

Experiment-5: Write a program to create a voting application using React JS

Experiment-6: Write a program to create and Build a Password Strength Check using Jquery

Experiment-7: Write a program to create and Build a star rating system using Jquery

Experiment-8: Create a Simple Login form using React JS

Experiment-9: Using the CMS users must be able to design a web page using the drag and drop method

Experiment-10: Create a project on Grocery delivery application

Experiment-11: Connecting our TODO React js Project with Firebase

Total Lab hours 30

References*

Textbooks	1. Stefan Baumgartner, “Front End Tooling with Gulp”, Manning Publication, 2016. 2. DT Editorial Services, “HTML5 Black Book”, 2nd Edition, Dreamtech Publications, 2016. 3. Ben Frain, “Responsive Web Design with HTML5 and CSS”, 4th Edition, Packt Publication, 2022.
Reference books	
Web Resources	
Journals	
MOOCs, online courses	

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination etc.

Examination Scheme: Continuous Assessment

Components	Quiz & Viva	Performance & Lab Report
Weightage (%)	50 %	50 %

Course Code	Course name	L	T	P	C
CSFS3008P	Backend Development	4	0	1	5
Total Units to be Covered: 05		Total Contact Hours: 90			
Prerequisite(s):	Frontend Devlopment - CSFS2004	Syllabus version: 1.0			

Course Objectives

1. Understand the fundamentals of web development and back-end technologies.
2. Understand and explore backend frameworks, databases and data modelling.
3. Design and Implement APIs and API related tasks.
4. Utilize back-end frameworks and libraries to streamline development processes.
5. Implement best practices for security, testing and debugging.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand Back End Development Fundamentals

CO2: Create and build web pages and applications.

CO3: Utilize frameworks and APIs.

CO4: Apply security best practices and conduct testing.

CO5: Demonstrate effective team collaboration skills.

CO-PO Mapping

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	-	-	-	3	-	-	-	1	-	-	-	-	-	-
CO 2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO 3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	2	-	-	-	2	-	-	2	-	-	-
Average	-	-	0.4	-	2	-	-	-	0.6	-	-	0.4	-	-	-