CURRICULUM FRAMEWORK FOR THREE YEAR UG DEGREE / FOUR YEAR UG DEGREE (HONOURS) / FOUR YEAR UG DEGREE (HONOURS WITH RESEARCH)

Skill Enhancement Course (SEC) for UG Programme

Department of Computer Science

North Lakhimpur University

(As approved by Board of Studies in Computer Science held on 18/06/2026 and passed by Academic Council held on .....)

Semester-I

Course Code : **SEC–3-CSC-101**
Course Title : **Introduction to Web Design**
Nature of the Course : **SEC**
Total Credit assigned : **3**
Component of the Course : **Lecture: 1 Practical: 2 Tutorial: 0**
Distribution of Marks : **End Semester: 28 Practical: 40 In Semester: 12**

The main objectives of this course are:

Objective-1. Introduce HTML syntax, document structure, text formatting, hyperlinks, images, lists and tables for static web-page development.
Objective-2. Develop the ability to organise web content using hyperlinks, images, ordered/unordered lists and well-structured tables.
Objective-3. Enable students to design accessible forms using suitable controls and semantic HTML elements.
Objective-4. Develop the skill to style and create responsive static websites using CSS, media queries, responsive images and Bootstrap.

Course Content

Unit	Content	Marks	L	P	T
I	Introduction to HTML - Introduction to markup languages - HTML syntax - Document structure - Text formatting	2	3	12	0
II	Hyperlinks and Images - Creating hyperlinks - Linking to internal and external pages - Inserting images - Image formatting	4	3	8	0
III	Lists and Tables - Creating lists - Ordered and unordered lists - Creating tables - Table formatting	5	1	8	0
IV	Forms and Semantic Markup - Creating forms - Form elements - Semantic markup - Web accessibility	4	2	8	0
V	Introduction to CSS - CSS syntax - Applying styles to HTML elements	9	4	12	0

Unit	Content	Marks	L	P	T
	- CSS selectors - CSS Box Model - Layouts and positioning - Creating columns - Creating menus				
VI	Responsive Web Design - Meaning and need of responsive design - Media queries - Responsive images - Bootstrap framework	4	2	12	0
	Total	**28**	**15**	**60**	**0**

Mode of In-Semester Assessment (12 Marks)

Mode of In-Semester assessment (12 Marks):

A. Sessional Activity

B. Sessional Tests: (two Sessional Tests)

Sessional activity:

- Quizzes& Assignments
  - Weekly quizzes on HTML tags, CSS properties, and responsive design concepts.
  - Assignments on creating structured web pages using HTML and styling them with CSS.
- Viva& Problem-Solving Sessions
  - Oral viva covering HTML structure, CSS styling techniques, and responsive design principles.
  - Problem-solving discussions on layout techniques and debugging common HTML/CSS issues.

Laboratory Work

1. Create structured HTML pages with headings, paragraphs, text formatting and document structure.
2. Design pages containing hyperlinks, images, lists and formatted tables.
3. Create forms using appropriate input controls and semantic HTML elements.
4. Apply CSS selectors, Box Model properties, layout and positioning techniques.
5. Develop responsive web pages using media queries, responsive images and Bootstrap.
6. Complete a mini project consisting of a functional static website.

Expected Course Learning Outcomes

By the end of the course, students will be able to:

CLO	Expected Course Learning Outcome
CLO1	Explain HTML syntax, document structure and basic content elements including text, hyperlinks, images, lists and tables.
CLO2	Design accessible forms using appropriate form controls and semantic HTML elements.
CLO3	Apply CSS selectors, Box Model, layout and positioning techniques to style web pages.
CLO4	Create a responsive static website using media queries, responsive images and Bootstrap.

Cognitive Map of CLOs Based on Revised Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyse	Evaluate	Create
Factual Knowledge	CLO1	CLO1				
Conceptual Knowledge		CLO1, CLO2, CLO3, CLO4	CLO2, CLO3, CLO4	CLO3		
Procedural Knowledge		CLO2, CLO3, CLO4	CLO2, CLO3, CLO4	CLO3, CLO4		CLO4
Metacognitive Knowledge						

Mapping of CLOs with Programme Specific Outcomes (PSOs)

CLO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CLO1	2					1				
CLO2			2			1				1
CLO3			2	2						
CLO4			3	2					1	1
Average Contribution	**2**		**2.33**	**2**		**1**			**1**	**1**

Scale: 3 = High contribution, 2 = Moderate contribution, 1 = Low contribution; blank = No direct contribution.

Suggested Readings

1. Duckett, J. (2011). HTML and CSS: Design and build websites. John Wiley & Sons.

2. Robbins, J. N. (2012). Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics. O'Reilly Media.

3. McFarland, D. S. (2012). CSS3: The missing manual. O'Reilly Media.

Semester-II

Course Code : **SEC –3-CSC-201**
Course Title : **Dynamic Web Development**
Nature of the Course : **SEC**
Total Credit assigned : **3**
Component of the Course : **Lecture: 1 Practical: 2 Tutorial: 0**
Distribution of Marks : **End Semester: 28 Practical: 40 In Semester: 12**

Course Objectives

The main objectives of this course are:

Objective-1. Introduce the dynamic web-development process, tools and technologies used for client-side web applications.
Objective-2. Develop JavaScript programming skills using variables, operators, control structures, functions, events and DOM manipulation.
Objective-3. Enable students to implement AJAX, JSON and JavaScript libraries while considering basic security and performance issues.
Objective-4. Develop the ability to create dynamic web applications using DHTML, XML validation, parsing and transformation.

Course Content

Unit	Content	Marks	L	P	T
I	Introduction to Web Development - Overview of web development - The web development process - Web development tools and technologies	3	2	8	0
II	JavaScript Basics - Introduction to JavaScript - Variables, data types and operators - Control statements and loops - Functions and events - DOM manipulation - Debugging JavaScript	10	4	16	0
III	DHTML and XML - Introduction to DHTML - Creating and manipulating HTML elements - Styling with CSS - Animations and effects - Introduction to XML - XML syntax and structure - DTDs and XML Schemas - XML parsing and transformation - Combining DHTML and XML to create dynamic web applications	7	4	16	0

Unit	Content	Marks	L	P	T
IV	Advanced JavaScript - AJAX and JSON - Using JavaScript libraries such as jQuery - Security and performance issues	8	5	20	0
	Total	**28**	**15**	**60**	**0**

Mode of In-Semester Assessment (12 Marks)

Mode of In-Semester assessment (12 Marks):

A. Sessional Activity

B. Sessional Tests: (two Sessional Tests)

Sessional activity:

1. JavaScript Basics

- Write a program using **JavaScript variables, loops, functions, and event handling**.
- Create a simple **interactive webpage using DOM manipulation**.

2. Advanced JavaScript

- Develop a **webpage that fetches and displays data using AJAX and JSON**.
- Use **jQuery to create animations and interactive elements**.

3. DHTML Implementation

- Design a **dynamic webpage using DHTML** that modifies elements dynamically using JavaScript.
- Implement **CSS animations and effects**.

4. XML and Data Handling

- Create an **XML document with DTD or XML Schema validation**.
- Implement XML parsing and transformation to **display structured data on a webpage**.

Laboratory Work

1. Develop a JavaScript calculator for basic arithmetic operations.
2. Create a JavaScript form validation program with user feedback.
3. Use jQuery to create an image slideshow with navigation controls.
4. Create a DHTML webpage with navigation bar, dropdown menus and animations.
5. Create an XML document with DTD/XML Schema and transform it into an HTML page.
6. Use AJAX to retrieve data and display it dynamically on a webpage.

Expected Course Learning Outcomes

By the end of the course, students will be able to:

CLO	Expected Course Learning Outcome
CLO1	Describe the dynamic web-development process, tools and technologies used for client-side applications.
CLO2	Write and debug JavaScript programs using variables, operators, control statements, functions, events and DOM manipulation.
CLO3	Implement AJAX, JSON and JavaScript libraries while analysing basic security and performance issues.
CLO4	Create dynamic web applications using DHTML, CSS effects, XML validation, parsing and transformation.

Cognitive Map of CLOs Based on Revised Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyse	Evaluate	Create
Factual Knowledge	CLO1	CLO1				
Conceptual Knowledge		CLO1, CLO2, CLO3	CLO2, CLO3	CLO3		
Procedural Knowledge		CLO2, CLO3	CLO2, CLO3, CLO4	CLO2, CLO3	CLO2	CLO4
Metacognitive Knowledge						

Mapping of CLOs with Programme Specific Outcomes (PSOs)

CLO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CLO1	2			1						
CLO2	3		2	2						
CLO3	2	2		2	1				1	
CLO4			3	2						
Average Contribution	**2.33**	**2**	**2.5**	**1.75**	**1**				**1**	

Scale: 3 = High contribution, 2 = Moderate contribution, 1 = Low contribution; blank = No direct contribution.

Suggested Readings

1. Flanagan, D. (2011). JavaScript: The definitive guide. O'Reilly Media.
2. Bibeault, B., De Rosa, A., & Katz, Y. (2015). jQuery in action. Manning Publications.
3. Vohra, A. (2007). Pro XML development with Java technology. Apress.

Semester-III

Course Code : **SEC –3-CSC-301**
Course Title : **Advanced Web Design**
Nature of the Course : **SEC**
Total Credit assigned : **3**
Component of the Course : **Lecture: 1 Practical: 2 Tutorial: 0**
Distribution of Marks : **End Semester: 28 Practical: 40 In Semester: 12**

Course Objectives

The main objectives of this course are:

Objective-1. Introduce the modern web stack by explaining the roles and interactions of clients, web servers and databases.
Objective-2. Develop responsive interfaces using advanced HTML, semantic markup, validation, CSS Grid, Flexbox, preprocessors, animations and transitions.
Objective-3. Enable students to design and integrate RESTful APIs, CRUD operations, API authentication and external API services in web applications.
Objective-4. Develop the ability to deploy, monitor and maintain websites using manual deployment methods and automated CI/CD pipelines.

Course Content

Unit	Content	Marks	L	P	T
I	The Web Stack - Introduction to web development and the modern web stack - Clients, web servers and databases - Client-server architecture - Frontend, backend and database components - Interaction between components - HTTP and HTTPS protocols	6	3	12	0
II	Advanced HTML and CSS - Advanced HTML techniques - Semantic HTML - Forms and validation - Responsive web design - CSS Grid and Flexbox - CSS preprocessors such as SASS/SCSS - Animations and transitions	6	2	12	0
III	APIs and Data Integration - Introduction to APIs - RESTful architecture - CRUD operations - HTTP methods: GET, POST, PUT and DELETE	8	5	24	0

Unit	Content	Marks	L	P	T
	- Working with external APIs - API authentication basics				
IV	Website Deployment and Maintenance - Introduction to website deployment - Manual deployment - Testing (load, user, VAPT) atleast one testing tool must be introduced. - Continuous Integration and Continuous Deployment (CI/CD) - CI/CD pipelines and workflow - Deployment best practices - Website monitoring and maintenance	8	5	12	0
	Total	**28**	**15**	**60**	**0**

Mode of In-Semester Assessment (12 Marks)

Mode of In-Semester assessment (12 Marks):

A. Sessional Activity

B. Sessional Tests: (two Sessional Tests)

Sessional activity:

1. Understanding the Web Stack

- **Diagram the architecture** of a web stack (client, server, database).
- **Analyze request-response cycles** in web applications.

2. Advanced HTML and CSS

- **Create responsive web pages** using CSS preprocessors (e.g., SASS).

3. APIs and Data Integration

- **Integrate a third-party API** (e.g., weather, payment, or maps) into a web application.
- **Handle API authentication and data fetching** using AJAX or Fetch API
- **Develop a RESTful API** to handle CRUD operations using a backend framework (e.g., Express.js, Flask).

4. Website Deployment and Maintenance

- **Deploy a simple website** using manual methods and CI/CDpipelines.
- **Compare different deployment strategies** and their benefits.

Laboratory Work

1. Study and document web stack components and their interaction.
2. Practise advanced HTML, forms, validation, CSS Grid, Flexbox and CSS preprocessors.
3. Integrate external APIs into web applications using a suitable data-fetching method.
4. Design and implement RESTful APIs with CRUD operations using a suitable backend framework such as Express.js or Flask.
5. Test APIs using suitable testing tools.
6. Deploy and maintain a simple website using manual deployment and automated CI/CD workflow.

Expected Course Learning Outcomes

By the end of the course, students will be able to:

CLO	Expected Course Learning Outcome
CLO1	Analyse the roles of clients, web servers and databases and their interaction in the modern web stack.
CLO2	Develop responsive web pages using advanced HTML, semantic markup, forms, validation, CSS Grid, Flexbox, preprocessors, animations and transitions.
CLO3	Design and integrate RESTful APIs with CRUD operations, API testing, authentication and external API services.
CLO4	Deploy, monitor and evaluate websites using manual deployment methods, automated CI/CD pipelines and maintenance practices.

Cognitive Map of CLOs Based on Revised Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyse	Evaluate	Create
Factual Knowledge	CLO1	CLO1				
Conceptual Knowledge		CLO1, CLO2, CLO3, CLO4	CLO2, CLO3, CLO4	CLO1, CLO3, CLO4	CLO4	
Procedural Knowledge		CLO2, CLO3, CLO4	CLO2, CLO3, CLO4	CLO3, CLO4	CLO4	CLO2, CLO3, CLO4
Metacognitive Knowledge						

Mapping of CLOs with Programme Specific Outcomes (PSOs)

CLO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CLO1	3	2								
CLO2			3	2						1
CLO3	2	2	3	3	1					
CLO4			2	3				2	1	
Average Contribution	**2.5**	**2**	**2.67**	**2.67**	**1**			**2**	**1**	**1**

Scale: 3 = High contribution, 2 = Moderate contribution, 1 = Low contribution; blank = No direct contribution.

Suggested Readings

1. Schmitt, C. (2012). Designing web and mobile graphics: Fundamental concepts for web and interactive projects. Pearson Education.

2. Robbins, J. N. (2012). Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics. O'Reilly Media.

3. Richardson, L., Amundsen, M., & Ruby, S. (2013). RESTful web APIs: Services for a changing world. O'Reilly Media.