# **CSC-352: Web Engineering (Theory)**

**General Information**

| **Course Number** | CSC-352 |
| --- | --- |
| **Credit Hours** | 3+1 (Theory Credit Hour = 3, Lab Credit Hours = 1) |
| **Prerequisite** | CSC-102 (Programming Fundamentals) |
| **Semester** | VI |

## **Course Objectives / Description**

## **Course Learning Outcomes (CLOs)**

| No. | Course Learning Outcome | Domain | Level | Assessment Tool |
| --- | --- | --- | --- | --- |
| C1 | To demonstrate web engineering fundamental concepts of web technologies specially Tailwind , JavaScript, ES6, React | C | 2 | LMS |
| C2 | To develop a Front-End of the web application | C | 3 | LMS |
| C3 | To use third party APIs, images and integrating to the React Application | C | 3 | LMS |
| C4 | To analyze and debug the code. | C | 4 | LMS |

Domains: C=Cognitive, A=Affective, P=Psychomotor

Levels:

Cognitive = {1: Remembering, 2: Understanding, 3: Applying, 4: Analyzing, 5: Evaluating, 5: Creating}

Affective = {1: Receiving, 2: Responding, 3: Valuing, 4: Organizing, 5: Characterizing}

Psychomotor= {1: Imitation, 2: Manipulation, 3: Precision, 4: Articulation, 5: Naturalization}

**Course Contents**

| **Week No.** | **Topic** | **Suggested Readings (Chapters)** | **CLO** |
| --- | --- | --- | --- |
| 1 | · Introduction  o Introduction of Web Engineering  o A Brief Introduction to the Internet  o The World Wide Web  o Web vs Internet  o Web Browsers  o Web Servers  o Uniform Resource Locators  o Hypertext  o The Hyper Text Transfer protocol  o IP Address  o IPv4 vs Ipv6  o Website vs Web Application  · Domain Name Structure  · Domain Name Working  · Web Request – Response Cycle  · Categories of Web Application  o Document centric web application  o Interactive web application  o Transactional web application  o Workflow based web application  o Collaborative web application  o Portal-oriented web application  o Ubiquitous web application  o Knowledge-based web application  · Web Application Architecture  o Single Tier  o Client Server (Two Tier)  o Three Tier  · Introduction to HTML | 1-2  &  Teacher Notes | C1 & C2 |
| 2 & 3 | · Introduction to CSS  Introduction to Tailwind CSS  Basic Styling with Utility Classes  Flexbox and Grid | 3  &  Teacher Notes | C1 & C2 |

| 4 & 5 | · Introduction to JavaScript  o Variables & Const Variables  o Numbers & Strings  o Booleans  o Type Conversion  o Arrays  o Objects  o Arithmetic, Relational, Increment & Decrement Operators  o If, Else-if, And & Or  o Switch Statement  o Loops  § For  § While  § Do While Loops  § For…of  § For…in  o Scope  o Functions  § Arrow  § Anonymous  o Exception Handling  o High Order Function  o Closures  o Iterators  § .forEach() Method  § .map() Method |  | C1, C2 & C3 |
| --- | --- | --- | --- |
| 6&7 | o Iterators  § .find() Method  §. filter() Method  § .findIndex() Method  § .reduce() Method  § .some() Method  § .every() Method  § .sort() Method  Introduction to DOM  · Access Elements in the DOM  o querySelector  o querySelectorAll  o getElementById  o getElementsByTagName  o getElementsByClassName  · Bubbling in  · preventDefault & stopPropagation  · Fetch function | Teacher Notes | C1, C2 & C3 |
| **Mid Exam** | | | |
| 9  & 10&11 | · DOM Manipulation  o Node vs Element  o Changing Attributes & Values of DOM Elements  o Traversing the DOM  o Add, create & Remove DOM Elements  o Changing Multiple Elements  · Working with Events  o Browser Events  o Adding/Removing Event Listener  o Event to Wait for DOM to load  o Event Object  o Properties & Methods of Event Object  o Event Target property    · Local Storage , Cookies, Session  · ES6 Features  o Template Literal  o Arrow Function  o Classes  o Modules  o Enhanced Object Literals  o Destructuring  § Object  § Array  o Default + Rest + Spread  o Iterators & For…Of  o Generators  o Promises  o Proxies  · Introduction to React,js  o Core Features  o Thinking in React.js  o Building and App Using Components  o Creating Custom Components  o Introduction to Props  o Adding CSS Classes to JSX  o Conditional JSX  · Webpack and bundlers  o Create Hello World app using Vite  · Props  o Usage of Props  o PropTypes and DefaultProps  · | Teacher Notes | C1, C2, C3 & C4 |
| 12 &  13 | ·  · State  o Important State Concepts  o Pure Functions & setState  o Passing State to Child Components  o Passing State to Parent Components  Component Architecture  o Component Hierarchy  o Different Styles of React Components  · Events in React  · Forms  · Component Life Cycle  · Hooks Introduction  · Use State,  · Use Effect,  · Single Page Applications  · Reusable Components  ·Fetching Data From an API |  | C1 & C3 |
| 14 & 15 | · To Do App  · Scrimba Practice  Github Branch  · Git checkout  · Git merge  **· React Based Project UI based Project**  · Portfolio Website in React  · Deployment of React App  · Vercel  · Hosting  · Domain Management  · CI with GitHub Repo | 14-15 | C1, C3 & C4 |
| 15 | Project Presentations and Revision |  |  |
| **Final Exam** | | | |

**CLO-PLO Map**

| **Graduate Attribute (PLOs)** | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CLOs** | **GA1** | **GA2** | **GA3** | **GA4** | **GA5** | **GA6** | **GA7** | **GA8** | **GA9** | **GA10** | **GA11** | **GA12** |
| CLO 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLO 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLO 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLO 4 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Textbook**

**Reference Material**

**Instructor**

| **Name** |  |
| --- | --- |
| **Designation** | Lecturer |
| **Department** | Computer Science |

**Computer Science/Software Engineering**

**Program Learning Outcomes**

**GA: Graduate Attributes**

**GA1 Computing Knowledge:** An ability to apply knowledge of mathematics, science, computing fundamentals and computing specialization to the solution of complex computing problems.

**GA2 Problem Analysis:** An ability to identify, formulate, research literature, and analyze complex computing problems reaching substantiated conclusions using first principles of mathematics, natural sciences and computing sciences.

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**GA4 Investigation:** An ability to investigate complex computing problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

**GA5 Modern Tool Usage:** An ability to create, select and apply appropriate techniques, resources, and modern IT tools, including prediction and modeling, to complex computing activities, with an understanding of the limitations.

**GA6 The Computer Scientist and Society:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional computing practice and solution to complex computing problems.

**GA7 Environment and Sustainability:** An ability to understand the impact of professional computing solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

**GA8 Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.

**GA9 Individual and Teamwork:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

**GA10 Communication:** An ability to communicate effectively, orally as well as in writing, on complex computing activities with the computing community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**GA11 Project Management:** An ability to demonstrate management skills and apply computing principles to one’s own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

**GA12 Lifelong Learning:** An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments

# **CSC-352: Web Engineering Lab**

**General Information**

| **Course Number** | CSC-352 |
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| **Prerequisite** | CSC-102 (Programming Fundamentals) |
| **Semester** | VI |

## **Course Objectives / Description**

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**Course Contents**

| **Week No.** | **Topic** | **Suggested Readings (Chapters)** | **CLO** |
| --- | --- | --- | --- |
| 1 | · Introduction to HTML  o Creating an HTML Document  o Nesting HTML Elements  o Heads Elements & Scripts in HTML  o HTML Layout Elements  o Embedding Audios & Videos in HTML  o Navbar & List Items in HTML  o Headings in HTML  o HTML Paragraphs & Text Formatting  o Text Formatting in HTML  o HTML Table  o Page Linking in HTML  o Forms & Inputs  o Inline & Block Elements  What is Git  What is GiHhub  Creating GitHub Account  Creating GitHub Repo  Creating GitHub Readme  Clone Repos  Staging  GitHub Code Pushing Process with examples  Pull Changes  Push Changes | 1-2  &  Teacher Notes | C1 & C2 |
| 2 & 3 | HTML tags attributes  · Introduction to CSS  o CSS Documents & The Cascade  o Selectors, Properties & Values  o Classes & IDs  o Specificity in CSS  o Setting Widths & Heights  o Length Units  o Colors & Color Types  o Padding  o Margin  o Borders  o The Box Model  o Visibility  o Working with Fonts  o Element Flow in HTML and CSS (Block & Inline elements)  o Float Layout  o Position Property  o CSS Pseudo Classes  Introduction to Tailwind CSS  Basic Styling with Utility Classes  Text Styling  Backgrounds and Borders  Spacing and Sizing  Flexbox and Grid  Source Code Elements  Screen SizesResponsive Design with Tailwind  o Typography  o Floats  o Flex  o Alignment  o Borders  o Position of Elements  o Shadows  Visibility  o Badge  o Breadcrumbs  o Buttons & Button Groups  o Cards  o Carousel  o Paginators  o Progress & Spinner  o Table  o Toasts, Popovers & Tooltips | 3  &  Teacher Notes | C1 & C2 |

| 4 & 5 | · Introduction to JavaScript  o Variables & Const Variables  o Numbers & Strings  o Booleans  o Type Conversion  o Arrays  o Objects  o Arithmetic, Relational, Increment & Decrement Operators  o If, Else-if, And & Or  o Switch Statement  o Loops  § For  § While  § Do While Loops  § For…of  § For…in  o Scope  o Functions  § Arrow  § Anonymous  o Exception Handling  o High Order Function  o Closures  o Iterators  § .forEach() Method  § .map() Method |  | C1, C2 & C3 |
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| CLO 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLO 4 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Textbook**

**Reference Material**

**Instructor**

| **Name** | Haseeb Ullah |
| --- | --- |
| **Designation** | Lecturer |
| **Department** | Computer Science |

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