

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Bachelor of Engineering (B.E. CSE) • First Year • Semester 01 • Chitkara University

CoursePlan: Introduction to Web Technologies (26CSE0102 / 26CSE0106)

Course: Introduction to Web Technologies • Code: 26CSE0102 • Credits: 3 (L-T-P: 2-0-2) • Academic Year: 2026–27

1. COURSE OVERVIEW & OBJECTIVES

This foundational curriculum provides engineering students with an in-depth understanding of the architectural underpinnings of the World Wide Web, client-server models, modern standards-compliant HTML5 semantic structuring, CSS3 responsive interface styling, the Bootstrap 5 framework, and production deployment workflows. Students gain both theoretical foundations and hands-on laboratory mastery required to engineer scalable, accessible, and high-performance web applications.

2. PRESCRIBED MODULAR SYLLABUS (UNITS 1 – 6)

Unit 1: Web Technologies & Internet Foundations Introduction to Web Technologies, Evolution of the World Wide Web (Web 1.0, Web 2.0, Web 3.0), Internet Architecture and Protocols, Client–Server Architecture (2-Tier, 3-Tier, and N-Tier Models), Frontend vs. Backend Technologies, Static vs. Dynamic Websites, Web Application Lifecycle, Stages of Web Application Development. Web Browsers, Browser Rendering Pipeline (DOM, CSSOM, Render Tree, Layout, Paint, Composite), Developer Tools. HTTP and HTTPS Protocols, Request–Response Model, HTTP Request & Response Components, HTTP Methods (GET, POST, PUT, DELETE, PATCH, HEAD), HTTP Status Codes (2xx, 3xx, 4xx, 5xx). Domain Name System (DNS), Domain Names, Domain Name Resolution Workflow, Top-Level Domains (TLDs). URL Syntax, Absolute and Relative URLs, Query Parameters. Web Hosting Architectures, Types of Web Hosting (Shared, VPS, Dedicated, Cloud), Domain and Hosting Integration.

Unit 2: HTML & HTML5 Architecture Introduction to HTML5, HTML5 Document Structure (<!DOCTYPE html>, <html>, <head>, <body>), HTML Elements vs. Attributes, Void Elements, Semantic Layout Elements (<header>, <nav>, <main>, <article>, <section>, <aside>, <footer>). Headings (<h1>–<h6>), Paragraphs, Text Formatting (, , <mark>, <code>, <small>), Comments. Hyperlinks (<a>, href, target, rel), Images (, src, alt, width, height), Image Maps. Nested Lists (Ordered, Unordered, Description Lists). Tabular Data Representation (<table>, <caption>, <thead>, <tbody>, <tfoot>, <tr>, <th>, <td>, colspan, rowspan). HTML5 Forms (<form>, <input>, <label>, <textarea>, <select>, <button>), Modern Input Types (email, number, date, range, tel, url), Client-Side Validation (required, pattern regex, min, max). Native Multimedia (<audio>, <video>, <source>, <track>, <canvas>, <svg>), Embedded Frames (<iframe>). Document Head Metadata (<meta>, charset, viewport, OpenGraph tags), Web Accessibility Principles (WCAG 2.1, Semantic Elements, ARIA Roles), and Semantic SEO Essentials.

Unit 3: UI & UX Design Fundamentals Distinction between User Interface (UI) and User Experience (UX), Core Principles of Human-Computer Interaction (HCI). User-Centered Design (UCD) Process: Research, Empathize, Define, Ideate, Prototype, and Test. Usability Heuristics (Steve Krug's "Don't Make Me Think" and Jakob Nielsen's Heuristics). Information Architecture (IA) and User Flow Diagrams. Wireframing, Low-Fidelity sketches, and High-Fidelity interactive mockups. Visual Hierarchy, Grid Systems, Gestalt Principles in Web Design. Typography Rules (Typefaces, Font Pairings, Hierarchy, Readability), Color Theory (Color Wheel, Contrast Ratios, Accessible Palettes). Design Systems and UI Component Patterns. Accessibility and Inclusivity Guidelines.

Unit 4: CSS3 Styling & Responsive Web Design Introduction to Cascading Style Sheets (CSS3), Syntax and Rule Structure, Stylesheet Inclusion Methods (Inline, Internal, External). Cascading Order, Inheritance, and Specificity Hierarchy. CSS Selectors (Type, Class, ID, Universal, Combinators, Attribute Selectors, Pseudo-Classes, Pseudo-Elements). CSS Box Model (Content, Padding, Border, Margin, box-sizing: border-box). Display Properties (block, inline, inline-block, none). CSS Positioning Schemes (static, relative, absolute, fixed, sticky, z-index). Modern Flexbox Layout Engine (flex container, flex items, flex-direction, justify-content, align-items, flex-wrap, gap, flex-grow, flex-shrink, order). Responsive Web Design (RWD) Principles, CSS Media Queries, Mobile-First Breakpoints. 2D and 3D Transforms (translate, rotate, scale, skew), CSS Transitions (transition-property, duration, timing-function, delay), and Keyframe Animations (@keyframes).

Unit 5: Bootstrap 5 Framework & Mobile-First Web Engineering Introduction to CSS Frameworks, Overview of Bootstrap 5 Architecture (Vanilla JS, No jQuery dependency). Mobile-First Responsive Philosophy. Bootstrap 12-Column Responsive Grid System, Containers (container, container-fluid, responsive breakpoint containers), Rows, and Columns. Responsive Breakpoint Utilities (xs, sm, md, lg, xl, xxl). Spacing (Margin & Padding utilities), Typography, Colors, and Flexbox Utility Classes. Core UI Components: Navigation Bars (Responsive Navbars, Offcanvas), Dropdowns, Nav-tabs, Cards, Buttons, Badges, Modals, Accordions, Carousels, and Dismissible Alerts. Bootstrap Form Controls, Floating Labels, and Input Groups. Customizing Bootstrap via CSS Overrides and Variables. Rapid UI Prototyping.

Unit 6: Website Testing, Performance Optimization & Deployment Cross-Browser Compatibility and Browser Engines (Blink, Gecko, WebKit). Developer Tools for Network Inspection, Console Debugging, and CSS Auditing. W3C HTML5 and CSS3 Markup Validation Standards. Web Performance Optimization and Core Web Vitals (Largest Contentful Paint, Interaction to Next Paint, Cumulative Layout Shift). Asset Optimization: Minification and Bundling of HTML, CSS, and JavaScript; Modern Image Formats (WebP, SVG) and Compression Techniques. Production Build Preparation. Static Website Deployment Platforms (GitHub Pages, Netlify, Vercel). Custom Domain Mapping, DNS Record Configuration (CNAME, A Records), SSL/TLS Certificate Provisioning. Ongoing Maintenance and Web Security Best Practices.

3. EXAMINATION & ASSESSMENT SCOPE

MAPPING

Assessment Stage	Syllabus Units & Topics Covered	Format	Weightage
CAT-1 (Continuous Assessment 1)	Unit 1 (Complete) + Unit 2 (HTML Foundations up through Tabular Data: Tables, Colspan, Rowspan)	CAT-1 EXAM	20 Marks
CAT-2 (Continuous Assessment 2)	Unit 2 (Part II: Forms, Multimedia, SEO) + Unit 3 (UI/UX) + Unit 4 (CSS3 & Flexbox)	CAT-2 EXAM	20 Marks
End-Term Examination	Comprehensive Curriculum: Units 1, 2, 3, 4, 5, and 6	END-SEM	50 Marks
Lab Practicals & Viva	Hands-on Experiments: HTML5, CSS3, Flexbox, Bootstrap 5 & Deployment	Continuous Evaluation	10 Marks

4. PRESCRIBED TEXTBOOKS & ACADEMIC REFERENCES

Author(s)	Title & Edition	Publisher
Jon Duckett	<i>HTML and CSS: Design and Build Websites</i>	John Wiley & Sons
Robin Nixon	<i>Learning PHP, MySQL & JavaScript with jQuery, CSS & HTML5</i>	O'Reilly Media
Mozilla Developer Network	<i>MDN Web Docs — Web Standards, HTML5, CSS3 Reference</i>	developer.mozilla.org
World Wide Web Consortium	<i>W3C Technical Recommendations & Accessibility (WCAG 2.1)</i>	w3.org