

Information Technology Career Cluster
Web Development
Course Number: 11.42500

Course Description:

This course, with Hypertext Markup Language (HTML) and Cascading Style Sheet (CSS) as its foundation, will teach students to develop and design responsive web sites through coding, testing, debugging and implementation of web-based services. This course will also allow students to learn about content management systems, client side languages, server side languages, and database concepts. The course is designed to give students foundational knowledge of "front-end" and "back-end" development to address the presentation and data access layers of web site development.

Web Development is the third course in the Web Development pathway. Students enrolled in this course should have successfully completed Introduction to Digital Technology and Computer Science Principles. After mastery of the standards in this course, students should be prepared to earn an industry-recognized credential in this career area.

Course Standard 1

IT-WDEV-1

The following elements should be integrated throughout the content of this course. The following standard is included in all CTAE courses adopted for the Career Cluster/Pathways. Teachers should incorporate the elements of this standard into lesson plans during the course. The topics listed for each element of the standard may be addressed in differentiated instruction matching the content of each course. These elements may also be addressed with specific lessons from a variety of resources. This content is not to be treated as a unit or separate body of knowledge but rather integrated into class activities as applications of the concept.

Standard: Demonstrate employability skills required by business and industry.

The following elements should be integrated throughout the content of this course.

1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.

Person-to-Person Etiquette	Telephone and Email Etiquette	Cell Phone and Internet Etiquette	Communicating At Work	Listening
Interacting with Your Boss	Telephone Conversations	Using Blogs	Improving Communication Skills	Reasons, Benefits, and Barriers
Interacting with Subordinates	Barriers to Phone conversations	Using Social Media	Effective Oral Communication	Listening Strategies
Interacting with Co-workers	Making and Returning Calls		Effective Written Communication	Ways We Filter What We Hear
Interacting with Suppliers	Making Cold Calls		Effective Nonverbal Skills	Developing a Listening Attitude
	Handling Conference Calls		Effective Word Use	Show You Are Listening
	Handling Unsolicited Calls		Giving and Receiving Feedback	Asking Questions
				Obtaining Feedback
				Getting Others to Listen

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Nonverbal Communication	Written Communication	Speaking	Applications and Effective Résumés
Communicating Nonverbally	Writing Documents	Using Language Carefully	Completing a Job Application
Reading Body Language and mixed Messages	Constructive Criticism in Writing	One-on-One Conversations	Writing a Cover Letter
Matching Verbal and Nonverbal communication		Small Group Communication	Things to Include in a Résumé
Improving Nonverbal Indicators		Large Group Communication	Selling Yourself in a Résumé
Nonverbal Feedback		Making Speeches	Terms to Use in a Résumé
Showing Confidence Nonverbally		Involving the Audience	Describing Your Job Strengths
Showing Assertiveness		Answering Questions	Organizing Your Résumé
		Visual and Media Aids	Writing an Electronic Résumé
		Errors in Presentation	Dressing Up Your Résumé

1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

Teamwork and Problem Solving	Meeting Etiquette
Thinking Creatively	Preparation and Participation in Meetings
Taking Risks	Conducting Two-Person or Large Group Meetings
Building Team Communication	Inviting and Introducing Speakers
	Facilitating Discussions and Closing
	Preparing Visual Aids
	Virtual Meetings

1.3 Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Problem Solving	Customer Service	The Application Process	Interviewing Skills	Finding the Right Job
Transferable Job Skills	Gaining Trust and Interacting with Customers	Providing Information, Accuracy and Double Checking	Preparing for an Interview	Locating Jobs and Networking
Becoming a Problem Solver	Learning and Giving Customers What They Want	Online Application Process	Questions to Ask in an Interview	Job Shopping Online
Identifying a Problem	Keeping Customers Coming Back	Following Up After Submitting an Application	Things to Include in a Career Portfolio	Job Search Websites
Becoming a Critical Thinker	Seeing the Customer's Point	Effective Résumés:	Traits Employers are Seeking	Participation in Job Fairs
Managing	Selling Yourself and the Company	Matching Your Talents to a Job	Considerations Before Taking a Job	Searching the Classified Ads
	Handling Customer Complaints	When a Résumé Should be Used		Using Employment Agencies
	Strategies for Customer Service			Landing an Internship
				Staying Motivated to Search

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1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

Workplace Ethics	Personal Characteristics	Employer Expectations	Business Etiquette	Communicating at Work
Demonstrating Good Work Ethic	Demonstrating a Good Attitude	Behaviors Employers Expect	Language and Behavior	Handling Anger
Behaving Appropriately	Gaining and Showing Respect	Objectionable Behaviors	Keeping Information Confidential	Dealing with Difficult Coworkers
Maintaining Honesty	Demonstrating Responsibility	Establishing Credibility	Avoiding Gossip	Dealing with a Difficult Boss
Playing Fair	Showing Dependability	Demonstrating Your Skills	Appropriate Work Email	Dealing with Difficult Customers
Using Ethical Language	Being Courteous	Building Work Relationships	Cell Phone Etiquette	Dealing with Conflict
Showing Responsibility	Gaining Coworkers' Trust		Appropriate Work Texting	
Reducing Harassment	Persevering		Understanding Copyright	
Respecting Diversity	Handling Criticism		Social Networking	
Making Truthfulness a Habit	Showing Professionalism			
Leaving a Job Ethically				

1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team work skills.

Expected Work Traits	Teamwork	Time Management
Demonstrating Responsibility	Teamwork Skills	Managing Time
Dealing with Information Overload	Reasons Companies Use Teams	Putting First Things First
Transferable Job Skills	Decisions Teams Make	Juggling Many Priorities
Managing Change	Team Responsibilities	Overcoming Procrastination
Adopting a New Technology	Problems That Affect Teams	Organizing Workspace and Tasks
	Expressing Yourself on a Team	Staying Organized
	Giving and Receiving Constructive Criticism	Finding More Time
		Managing Projects
		Prioritizing Personal and Work Life

1.6 Present a professional image through appearance, behavior and language.

On-the-Job Etiquette	Person-to-Person Etiquette	Communication Etiquette	Presenting Yourself
Using Professional Manners	Meeting Business Acquaintances	Creating a Good Impression	Looking Professional
Introducing People	Meeting People for the First Time	Keeping Phone Calls Professional	Dressing for Success
Appropriate Dress	Showing Politeness	Proper Use of Work Email	Showing a Professional Attitude
Business Meal Functions		Proper Use of Cell Phone	Using Good Posture
Behavior at Work Parties		Proper Use in Texting	Presenting Yourself to Associates
Behavior at Conventions			Accepting Criticism

International Etiquette			Demonstrating Leadership
Cross-Cultural Etiquette			
Working in a Cubicle			

Course Standard 2

IT-WDEV-2

Develop a web page using Hypertext Markup Language (HTML) and Cascading Style Sheet (CSS).

- 2.1 Explore the historical significance and progression of web design/development languages (e.g., HTML, CSS, HTML5, and JavaScript).
- 2.2 Distinguish between CSS and HTML.
- 2.3 Demonstrate knowledge of HTML5 elements.
- 2.4 Build a website using <div> tags rather than tables.
- 2.5 Evaluate various HTML and CSS frameworks (e.g., HTML5 boilerplate, Bootstrap, Foundation or others).
- 2.6 Analyze pros and cons of using a HTML and CSS frameworks.
- 2.7 Demonstrate the difference between a class versus ID.
- 2.8 Apply selector, property, and value using HTML5.
- 2.9 Investigate the pros and cons of using inline styles.
- 2.10 Compare the pros and cons of pixels versus em.
- 2.11 Differentiate between margin and padding.
- 2.12 Apply appropriate positioning to items on a web page.
- 2.13 Evaluate compatibility issues for browsers/browser versions and demonstrate ways to overcome those issues.

Course Standard 3

IT-WDEV-3

Apply concepts of JavaScript to web page development.

- 3.1 Understand scripting in JavaScript and how it applies to web page development.
- 3.2 Demonstrate how JavaScript can enhance a project.
- 3.3 Compare the pros and cons of using various JavaScript libraries (e.g., jQuery, Prototype, MooTools).
- 3.4 Distinguish between variables and functions in writing JavaScript.
- 3.5 Explore different causes of JavaScript security, including Cross site scripting (XSS) and the problems with using eval().
- 3.6 Create code from design mockup.

Course Standard 4

IT-WDEV-4

Create a single functional webpage based on a design mockup and user requirements, perhaps a résumé (Client Side Languages).

- 4.1 Generate HTML that incorporates major formatting tags as well as mixed media assets.
- 4.2 Utilize CSS to achieve different visual looks for a webpage without modifying the underlying html.
- 4.3 Build a styled HTML page implementing a form that incorporates JavaScript checking and interacts with the data provided.

- 4.4 Implement a third party JavaScript tool and explain how it works and what it does.
- 4.5 Write code that is compatible across a given set of web browsers and versions (most notably Internet Explorer (IE), Chrome, Firefox, and Safari).
- 4.6 Demonstrate ability to apply security principles to HTML and JavaScript.
- 4.7 Evaluate the selection and use of software libraries in building client facing portions of the webpage (e.g., HTML5 Boilerplate, Bootstrap, Foundation, jQuery, Angular).

Course Standard 5

IT-WDEV-5

Explain the components needed to develop a dynamic website (Web Development Stack).

- 5.1 Explain the role of the web server in the development stack.
- 5.2 Explain the role of the database in the development stack.
- 5.3 Explain the role of the server side language in the development stack.
- 5.4 Debate the appropriate web stack for a given problem set.
- 5.5 Demonstrate security mitigation techniques that can be addressed at each level of the development stack.

Course Standard 6

IT-WDEV-6

Use a server side language to build a multi-page website incorporating a web form, at least two templates with shared portions, and data-driven home page (Server Side Languages).

- 6.1 Explore the history of common server side languages (e.g., Ruby On Rails, PHP or others).
- 6.2 Explain the differences in server side languages in terms of syntax and function.
- 6.3 Debate the merits and use of software design patterns as it relates to a dynamic web site.
- 6.4 Build a server script demonstrating language control structures and mathematical computations.
- 6.5 Build a script demonstrating data storage using cookies, sessions, a database, and file storage.
- 6.6 Write code to perform a file upload and validate the uploaded file against given business rules.
- 6.7 Incorporate a third party library into a script and explain what it does and how it works.
- 6.8 Explain how a third party library was chosen if multiple libraries with the same purpose are available.
- 6.9 Install and configure a Content Management Systems (CMS).
- 6.10 Demonstrate ability to apply security principles to Server Side Code as it relates to data storage and display.
- 6.11 Explain at least one website attack vector and how to mitigate the risk of that attack.

Course Standard 7

IT-WDEV-7

Utilize on-page Search Engine Optimization (SEO) throughout a website.

- 7.1 Apply responsive design and development.
- 7.2 Understand search engine crawlers, such as Google, Bing, Yahoo!, and Baidu, in regards to crawling, indexing and ranking of webpages.
- 7.3 Master and apply effective use of meta-tags in HTML head of each webpage of a site (title tag, description tag, and keywords tag) and the URL file name.
- 7.4 Understand image optimization of .jpeg, .gif and .png (compressing, html tag).
- 7.5 Plan and employ an internal link strategy of a site.
- 7.6 Research search engine algorithms, how frequently they are updated, and how they impact a site's ranking.
- 7.7 Comprehend and apply best practice techniques for keywords and keywords research.
- 7.8 Apply semantic markup to every page of a site (effectively using H1, H2, H3, paragraph, and list tags).
- 7.9 Demonstrate how semantic markup impacts a site's architecture, web coding, usability and display flexibility.
- 7.10 Examine basic SEO tools such as Google Search Console (formerly Google Webmaster Tools) Bing Webmaster Tools, and Google Analytics.

Course Standard 8

IT-WDEV-8

Apply concepts involved in the software development life cycle (SDLC) as it pertains to web development.

- 8.1 Explain the different steps of SDLC (Plan, Analyze, Design, Develop, and Implement Maintain).
- 8.2 Research and describe the different types of collaboration platforms used in web development (e.g., GITHUB, Apache Subversion (SVN) or others).

Course Standard 9

IT-WDEV-9

Ensure websites meet all special considerations and are in compliance with industry and government regulations.

- 9.1 Explain what encryption (https) is and under what circumstances it would be appropriate to implement on a website.
- 9.2 Research and explain a specialized web compliance practice based on a governmental or industry guideline - Payment Card Industry (PCI), Section 508, American Disability Act (ADA), etc.
- 9.3 Explain how security could differ between an application on the internet vs. an intranet.
- 9.4 Determine the fault involved in a data breach and research types of protections pertinent for a particular website.
- 9.5 Explore principles of e-commerce as they apply to web development, mobile devices, banking, and government regulations.

Course Standard 10

IT-WDEV-10

Examine how related student organizations are integral parts of career and technology education courses through leadership development, school and community service projects and competitive events.

- 10.1 Explain the goals, mission, and objectives of the career-technical student organization (CTSO).
- 10.2 Explore the impact and opportunities a student organization can develop to bring business and education together in a positive working relationship through innovative leadership and career development programs.
- 10.3 Explore the local, state, and national opportunities available to students through participation in related student organization including but not limited to conferences, competitions, community service, philanthropy, and other CTSO activities.
- 10.4 Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development.
- 10.5 Explore the competitive events related to the content of this course and the required competencies, skills, and knowledge for each related event for individual, team, and chapter competitions.