Department of Education | College, Career and Technical Education

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Web Design Foundations

Primary Career Cluster:	Information Technology (IT)
Course Contact:	CTE.Standards@tn.gov
Course Code(s):	C10H16
Pre-requisite(s):	*Computer Science Foundations* (6095), *Algebra I* (G02X02, G02H00), *Geometry* (G02H11, G02X03)
Credit:	1
Grade Level:	10
Focus Elective Graduation Requirement:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other *IT* courses.
Program of Study (POS) Concentrator:	This course satisfies one out of two required courses that meet the Perkins V concentrator definition, when taken in sequence in the approved program of study.
Programs of Study and Sequence:	This is the second course in the *Web Design* program of study.
Aligned Student Organization(s)	SkillsUSA: http://www.tnskillsusa.com Technology Student Association (TSA): http://www.tntsa.org
Coordinating Work-Based Learning:	Teachers are encouraged to use embedded WBL activities such as informational interviewing, job shadowing, and career mentoring. For information, visit https://www.tn.gov/content/tn/education/career-and-technical-education/work-based-learning.html.
Promoted Student Industry Credentials:	Credentials are aligned with post-secondary and employment opportunities and with the competencies and skills that students acquire through their selected program of study. For a listing of promoted student industry credentials, visit https://www.tn.gov/education/career-and-technical-education/student-industry-certification.html
Teacher Endorsement(s):	037, 041, 055, 056, 057, 070, 153, 157, 203, 204, 230, 231, 232, 233, (042 and 043), (042 and 044), (042 and 045), (042 and 046), (042 and 047), (042 and 077), (042 and 078), (042 and 079), (043 and 044), (043 and 045), (043 and 046), (043 and 047), (043 and 077), (043 and 078), (043 and 079), (044 and 045), (044 and 046), (044 and 047), (044 and 077), (044 and 078), (044 and 079), (045 and 046), (045 and 047), (045 and 077), (045 and 078), (045 and 079), (046 and 047), (046 and 077), (046 and 078), (046 and 079), (046 and 047), (046 and 077), (047 and 077), (047 and 078), (047 and 079), (077 and 078), (077 and 079), (078 and 079), 311, 434, 435, 436, 470, 475, 476, 477, 516, 519, 582, 583, 595, 543, 711, 740, 953, 982
Required Teacher Certifications/Training:	None
Teacher Resources:	https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-information-technology.html Best for All Central: https://bestforall.tnedu.gov/

Approved January 30, 2015; Amended January 25, 2018

Course-At-A-Glance

CTE courses provide students with an opportunity to develop specific academic, technical, and 21st century skills necessary to be successful in career and in life. In pursuit of ensuring every student in Tennessee achieves this level of success, we begin with rigorous course standards which feed into intentionally designed programs of study.

Students engage in industry relevant content through general education integration and experiences such as career & technical student organizations (CTSO) and work-based learning (WBL). Through these experiences, students are immersed with industry standard content and technology, solve industry-based problems, meaningfully interact with industry professionals, and use/produce industry specific, informational texts.

Using a Career and Technical Student Organization (CTSO) in Your Classroom

CTSOs are a great resource to put classroom learning into real-life experiences for your students through classroom, regional, state, and national competitions, and leadership opportunities. Below are CTSO connections for this course, note this is not an exhaustive list.

- Participate in CTSO Fall Leadership Conference to engage with peers by demonstrating logical thought processes and developing industry specific skills that involve teamwork and project management
- Participate in contests that highlight job skill demonstration; interviewing skills; community service activities, extemporaneous speaking, and job interview
- Participate in leadership activities such as Student2Student Mentoring, National Week of Service, Officer Training, and Community Action Project

For more ideas and information, visit Tennessee SkillsUSA at http://www.tnskillsusa.com.

Using Work-based Learning in Your Classroom

Sustained and coordinated activities that relate to the course content are the key to successful work-based learning. Possible activities for this course include the following. This is not an exhaustive list.

- **Standards 1**| Invite an industry partner to discuss occupational safety protocols.
- **Standards 2-5**| Conduct an informational interview with an industry partner as a mock client.
- **Standards 6-8** | Invite an industry partner to demonstrate site mapping.
- **Standards 9-11** | Invite a copyright attorney to present on copyright laws.
- **Standards 12-18** | Job shadow a Web Designer.
- **Standards 19-21** | Visit a local company with this equipment and have the students see the operation.
- **Standards 22-23** | Visit a local publishing company.
- **Standards 24-28** | Visit a local marketing firm.
- **Standards 29-33** | Work with an industry partner on an integrated project.
- **Standards 34-35** | Present a quality assurance plan to a local agency for evaluation.

For more ideas and information, visit https://www.tn.gov/education/career-and-technical-education/work-based-learning.html.

Course Description

Web Design Foundations is a course that prepares students with work-related web design skills for advancement into postsecondary education and industry. The course is intended to develop fundamental skills in both theory and practical application of the basic web design and development process, project management and teamwork, troubleshooting and problem solving, and interpersonal skill development. Laboratory facilities and experiences simulate those found in the web design and development industry; where interaction with a "client" is indicated in the standards, it is expected that students' peers or the instructor may serve as mock clients in lieu of an actual relationship with an industry partner. Upon completion of this course, proficient students will be prepared for more advanced coursework in the Web Design program of study.

Program of Study Application

This is the second course in the *Web Design* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Information Technology website at https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-information-technology.html.

Course Standards

Safety

1) Accurately read, interpret, and demonstrate adherence to safety rules, including rules published by the (1) National Science Teachers Association (NSTA), (2) rules pertaining to electrical safety, (3) Internet safety, (4) Occupational Safety and Health Administration (OSHA) guidelines, and (5) state and national code requirements. Be able to distinguish between rules and explain why certain rules apply.

Client Relations

2) Create a questionnaire and conduct an interview with a client to gather specific information to guide the web development project. Develop interview questions that will determine the purpose; target audience; branding and perception goals; content sources; and any factors that will affect the project schedule.

3) Using the information gathered from the client interview, write a project brief that identifies the goals, audience profile, audience perception, primary message of the web site, and the competitive advantage of the client. Allow the client to review the project brief and make corrections based on client feedback.

4) Research the specifications that will be required to produce a web site that meets the needs of the project brief. Using the findings, produce technical specifications for the web site. For example, the specifications should consider the screen resolution, browser compatibility, download time for the web site, and accessibility.

5) Demonstrate an understanding of maintenance requirements for a web site that is aligned with the project brief. Develop a plan that thoroughly describes how the site will be consistently updated and reviewed. Write a text explaining the maintenance requirements

and plan to a client. For example, a web site maintenance plan should include, but is not limited to, any automated processes for changing content, required training for content contributors, and assignments for specific updates (e.g., keyword, search engine, Meta data, and graphics).

Site Mapping

6) Conduct a brainstorming session to solicit a client's feedback on web site content. Create an outline that organizes the content into categories. Ensure that the outline is aligned with the project brief and that there is space for future expansion. Present the outline to the client for review and approval. For example, use a mind mapping process to capture all the ideas and topics for a web site development project

7) Applying the content outline, develop a diagram that visually represents the web site structure. The site map (or web site wireframe) should show the interconnection of features such as the homepage, links, and content for each link. For example, use software like Google Drawings, Microsoft Visio, OmniGiraffe, Adobe Illustrator, or Microsoft Office to create a web site wireframe.

8) Convert the web site wireframes to individual web page wireframes. A wireframe should consider each element (e.g., navigation, images, content, functionality, and footer) and group the information of its corresponding page.

Copyright/Licensing

9) Explore the use of stock images and demonstrate an understanding of the various types of stock images like stock photography, microstock photography, and free (e.g., open source) images. Identify the advantages and disadvantages of using these images.

10) Compare and contrast royalty-free and rights-managed licensing and explain how each licensing affects the use of images. Research and describe the process to obtain permission to use copyrighted photography.

11) Investigate multiple photosharing services and how they embed metadata within images to assist in keyword searches. As a class, create a photosharing system (class use only) for student-created images that include embedded metadata.

Introduction to Design and Layout

12) Demonstrate an understanding for how specific characteristics affect the quality and size of a digital image. Define the following terminology and explain their effects on digital images:
    a. Pixels
    b. Color depth
    c. Resolution
    d. Palettes
    e. Dithering

13) Compare and contrast raster and vector graphics and provide scenarios when it is best to use each format. Further, explore their applications to vector-based drawing and paint programs. Describe advantages and disadvantages of using each program type.

14) Research and identify the extensions of various image file formats like Bitmap, Tagged Image File Format, Windows Metafile, Joint Photographic Experts Group, Portable Network Graphics, and Graphics Interchange Format. Describe which file formats are supported by all browsers and which formats require special software or a plug-in to view an image. Explain when it is most appropriate to apply specific image file formats.

15) In teams, investigate image optimization and its importance. Describe how file formats influence image optimization and identify optimization guidelines and sources to apply to web graphics.

16) Explain the graphic design concept of composition. Include various applications like visual hierarchy, grouping, visual cues, and integration of elements.

17) Explore the use of grid-based layout and why it is used to create coherent, organized web pages. Give examples of when it is suitable to use one-, two-, and three-column layouts to display content. For example, research and discuss how the golden ratio (golden mean) is used to create a design grid.

18) Drawing on multiple resources, demonstrate an understanding of typography, including related definitions like measure and lead. Explain a designer's application of the following typography characteristics to create balance and relationship between elements on a web page.
    a. Legibility
    b. Typeface
    c. Case
    d. Emphasis
    e. Type size and accessibility

Composition

19) Conduct research to determine how various colors are perceived by specific audiences and cultures. Citing evidence from research findings, explain the following concepts:
    a. Symbols, objects and images that attract or repel audiences
    b. Color combinations that complement each other
    c. Smooth color transitions and the effects on download time

    For example, create a class demonstration showing which colors are most complementary and how many colors define a color scheme.

20) Demonstrate an understanding of the relationship between pixels and display color. Explain how black and white are each created using color schemes CMYK (cyan, magenta, yellow, and black) and RGB (red, green, blue) respectively. Furthermore, describe the differences between subtractive and additive colors and how they are applied to print media versus a computer monitor display.

21) Consider the two standardized numeric formats for color on the computer screen—RGB values and Hexadecimal code. Compare and contrast the format of values for each and briefly explain how they are applied to represent color.

Writing, Critiquing, and Publishing Content for the Web

22) In teams, research writing styles on various web sites (include sites of well-known organizations and companies). Identify characteristics that are consistently used and include examples of what made the text memorable and easy to scan. Use the research findings to create guidelines for the class to apply to upcoming web design and development projects. During the survey of writing styles on the web, take notice of the following:
    a. Location of important information on the page
    b. Use of bulleted lists and tables
    c. Length and simplicity of paragraphs
    d. Headlines and introduction sentences
    e. Tone and voice used
    f. Accuracy of information (current or outdated)

23) Given a specific topic from a web development project, write content for a web page and apply the class writing guidelines. Proofread and rewrite the content to align with the class guidelines. Give the writing assignment to multiple classmates for review. Revise the content based on reviewer feedback. Follow this multistep process until the written product is appropriate for publication on a web site.

Marketing, Branding, Identity, and eCommerce

24) Research various logos of well-known companies and organizations on the web. Identify shapes and colors that are consistently used and include examples of what made the logos unique, attractive, and memorable.

25) Drawing from various resources, identify several ways that a web designer can apply and strengthen brand management and identity. Consider the concepts consistent color and logo placement and explain the application of each.

26) Investigate how to setup and implement a secure e-commerce site. Citing evidence from reliable resources, describe 1) measures to prevent shopping cart vulnerabilities, 2) pre-built shopping software, and 3) hosting options for shopping cart software.

27) In teams, examine how demographics, psychographics, and audience data are used to market a product or service online. Using this information, create a questionnaire to survey people about a product or service. For example, the questionnaire could survey alternative promotion methods, market growth drivers and barriers.

28) As a team, use the survey results and develop a marketing plan that identifies the following for a web development project.
    a. Promotions for both global (mass) and niche (micro) markets
    b. Web marketing strategies and goals
    c. Market growth drivers and barriers

d. Product distribution and availability
e. Product or service pricing
f. Advertising options to be used (e.g., links, banner ads, viral marketing, social media)

Introducing Coding Skills

29) Research the history of markup languages; briefly describe the function of markup languages and why they are different from programming languages.

30) Explore the origin of the HTML standard and creation of the World Wide Web Consortium (W3C). Discuss the six versions of the HTML standard and how each differs from the other. Explain the role of standardization and provide examples of how it promotes universality for all web users.

31) Define HTML tags distinguishing between empty tags and container tags. Explain their application to web development, why Hypertext Markup Language (HTML) evolved, and provide examples of tags frequently used. Create a simple web page that consists of paragraph text, text hyperlinks, tables, and elements in frames.

32) Demonstrate understanding of Cascading Style Sheets (CSS). Investigate and report how CSS separate formatting elements from HTML and solve a number of design limitations like:
    a. Proprietary HTML extensions
    b. Text-to-image conversion to retain fonts
    c. Page layout using tables
    d. Images controlling white space

33) Explore the use of Cascading Style Sheets (CSS) for page layout and cite evidence why CSS provides more flexible and precise layout capabilities than tables and frames. Explain and demonstrate coding for the following elements of CSS page layout.
    a. CSS Box Model (e.g., inline, block)
    b. Document Flow and Positioning (e.g., static, relative, absolute, fixed, float, z-index)
    c. CSS Positioning Schemes (e.g., two-column layout, three-column layout)

Organization

34) As a class, define the guidelines for effective use of file and folder management techniques to maintain directory structure for forthcoming web site class projects. The guidelines should address efficient methods for maintaining site root and subfolders for assets (e.g., images, templates, CSS), as well as the correct way to use file paths for relative, site root relative, and absolute links.

Troubleshooting & Problem Solving

35) Troubleshooting and formal testing is a systematic quality assurance process and should be routinely completed throughout the life cycle of a web site. There are various multistep testing procedures for a web site. The following recommendations provide a general approach to testing:
    a. Review the content for accuracy, spelling, and grammar

b. Review site for broken links
c. Test the functionality of the web site as defined by the project specifications
d. Validate the HTML and CSS coding
e. Check the accessibility using automated tools
f. Test site on various browsers that the target audience uses
g. Analyze the connection speed and size of web pages
h. Conduct usability testing with target audience
i. Work with the server administrator to conduct load testing
j. Conduct authentication testing and review file authorizations

As a class, develop a quality assurance plan that incorporates the above testing procedures, as well as outlines how the testing will be managed, how the issues will be prioritized, and how problems will be solved.

Standards Alignment Notes

*References to other standards include:

- P21: Partnership for 21st Century Skills Framework for 21st Century Learning
    - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.