# Web Design Focus

The Web Design program provides students with the principles of Programming and Web Design. Areas of study include methodology, algorithms, data structures and object-oriented programming. Java, Python, javascript and C++ are the primary languages taught.

## Introduction

The competencies in this document are designed to clearly state what the student should know and be able to do upon completion of an advanced high school General Web Design program. These standards are designed for a two course sequence that prepares the student for technical assessments directly aligned to the standards.

These exit-level competencies are designed for the student to complete all competencies through their completion of a program of study. These competencies are intended to guide curriculum objectives for a program of study.

The standards are organized as follows:

* Competencies are general statements that identify major areas of knowledge, understanding, and the skills students are expected to learn in key subject and career areas by the end of the program.
* Standards follow each content standard. Standards identify the more specific components of each Competency and define the expected abilities of students within each Competency.
* Learning Targets are very specific criteria statements for determining whether a student meets the Standard. Learning Targets may also be used as learning outcomes, which teachers can identify as they plan their program learning objectives.

The crosswalk and alignment section of the document shows where the Learning Targets support the New Hampshire Content Standards. Where correlation with an academic content standard exists, students in the General Programming program perform learning activities that support, either directly or indirectly, achievement of the academic Competencies that are listed.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to the General Web Design program. CTSOs are co-curricular national organizations that directly reinforce learning in the CTE classroom through curriculum resources, competitive events, and leadership development. CTSOs provide students the ability to apply academic and technical knowledge, develop communication and teamwork skills, and cultivate leadership skills to ensure college and career readiness.

The Employability Skills for Career Readiness identifies the “soft skills” needed to be successful in all careers and must be taught as an integrated component of all CTE course sequences. These Competencies are available in a separate document.

The Standards Reference Code is only used to identify or align Learning Targets listed in the Competency to daily lesson plans, curriculum documents, or national standards. The Standards Reference Code is an abbreviated name for the program, and the Competency, Standard, and Learning Targets are referenced in the program Competency. This abbreviated code for identifying competencies uses each of these items. For example, WCS is the Standards Reference Code for General Web Design. For Competency 2, Standard 3 and Learning Target 4 the Standards Reference Code would be WCS.2.3.4.

# Algorithms and Programming

Create meaningful and efficient programs including choosing which information to use and how to process and store it, breaking apart large problems into smaller ones, recombining existing solutions, and analyzing different solutions.

## 1.0 Web Design and Development

### 1.1 History of Web Design

1.1.1 Describe the role of the World Wide Web Consortium (W3C) in defining web standards

1.1.2 Research the history of the World Wide Web

1.1.3 Compare and contrast the Internet and the World Wide Web

### 1.2 Layout and Design Theory

1.2.1 Explain and apply color theory

1.2.2 Explain and apply the principles of design

1.2.3 Explain and apply the elements of design

1.2.4 Explain and apply effective typography

1.2.5 Evaluate the use of white space

1.2.6 Describe the web design and development cycle

### 1.3 Terminology

1.3.1 Define common terminology and their acronyms

1.3.2 Differentiate between front-end and back-end development

1.3.3 Explain the various roles and careers related to web design

1.3.4 Research career opportunities

### 1.4 Social Media and Web Development

1.4.1 Describe the role of social media in web development

1.4.2 Explain the correlation between social media platforms and web links

1.4.3 Describe the relationship of advertising, social media, and websites

1.4.4 Discuss current trends in social media

1.4.5 Create and implement a strategy that uses social networks to drive traffic to a website

### 1.5 E-Commerce

1.5.1 Define e-commerce as it relates to web development

1.5.2 Demonstrate how to integrate a shopping cart into a web page

1.5.3 Evaluate payment processing options

1.5.4 Discuss security concerns as they relate to e-commerce

## 2.0 Constructing a Website

### 2.1 File Management

2.1.1 Create a maintainable directory structure for a website

2.1.2 Apply appropriate file naming protocols

2.1.3 Demonstrate and use correct file paths for relative and absolute links

2.1.4 Recognize the relationship between local and remote site structures

2.1.5 Develop data backup procedures

### 2.2 Proper Layout

2.2.1 Identify commonly used layout techniques for web design

2.2.2 Develop an appropriate navigation system (site map)

2.2.3 Develop wireframes for initial responsive design concepts

2.2.4 Develop responsive design for various devices

2.2.5 Identify the uses of Cascading Style Sheets (CSS)

### 2.3 Web Content

2.3.1 Discuss and differentiate voice, tone, and style as it applies to web writing

2.3.2 Determine the primary and secondary purposes of web content

2.3.3 Identify target audiences and reading levels for specific websites

2.3.4 Identify and create a list of keywords and descriptions (meta tags) to include in web content for search engine optimization (SEO)

2.3.5 Apply grammar and spelling conventions to content

2.3.6 Evaluate existing content for web use (e.g., images, print documents, text, video, etc.)

2.3.7 Create a branding message that will present a professional image

2.3.8 List and describe best practices in content creation that foster indexing and ranking of websites

### 2.4 Media

2.4.1 Describe common media file formats

2.4.2 Identify appropriate software for media creation

2.4.3 Create and edit media files (e.g., sound, video, graphics, multimedia)

2.4.4 Optimize media files for uploading using compression tools

2.4.5 Embed media files in a web design

2.4.6 Calculate and convert images to desired sizes and resolution

2.4.7 Manipulate scalable vector graphics (SVG) by altering code

2.4.8 Animate an SVG with CSS

### 2.5 Accessibility

2.5.1 Describe regional, national, and international legal requirements and standards for accessibility on the web

2.5.2 Identify types of disabilities that should be considered when designing websites

2.5.3 Optimize websites to accommodate users with special needs

2.5.4 Explain website usability procedures

2.5.5 Research ADA compliance regulations and policies

## 3.0 Web Development

### 3.1 Develop Website

3.1.1 Explain the role of Hypertext Markup Language (HTML) in web development

3.1.2 Differentiate among the different forms of HTML

3.1.3 Identify HTML tags for authoring a web page document

3.1.4 Code a basic web page utilizing proper HTML document structure in a text editor

3.1.5 Utilize verification tools to verify code

### 3.2 Cascading Style Sheets

3.2.1 Describe the role of CSS in relation to web design

3.2.2 Identify the structure of CSS style rules

3.2.3 Describe CSS selector types

3.2.4 Differentiate between internal, external, and inline style sheets

3.2.5 Use CSS to style and layout webpage content

3.2.6 Utilize online validation tools for CSS

3.2.7 Compare and contrast static, relative, absolute, and fixed positioning

3.2.8 Describe the function of a CSS preprocessor

### 3.3 Web Scripting

3.3.1 Explain the use of current web scripting technologies

3.3.2 Implement scripting (e.g., rollovers, form scripts, etc.)

3.3.3 Compare and contrast client (browser) scripting and server scripting (e.g., PHP, JavaScript, ASP.NET, etc.)

3.3.4 Enhance interactivity of websites using current scripting trends

3.3.5 Compare and contrast static versus dynamic websites

3.3.6 Utilize online validation tools for web scripting

### 3.4 Databases

3.4.1 Identify and describe relational databases

3.4.2 Analyze various databases used in web development

3.4.3 Describe the purpose of a database as it relates to web development

3.4.4 Incorporate a database into a website

3.4.5 Utilize online validation tools for databases

### 3.5 Content Management

3.5.1 Identify content management systems (CMS) (e.g., WordPress, Joomla, etc.)

3.5.2 Evaluate current trends in CMS (e.g., blogging, online magazine, corporate websites, etc.)

3.5.3 Build a theme for a self-hosted CMS

## 4.0 Publishing a Website

### 4.1 Web Hosting

4.1.1 Identify the various server operating systems used to host web pages

4.1.2 Describe how servers work in a hosting environment

4.1.3 Explain the relationship between client and server

4.1.4 Explain common web server maintenance routines

4.1.5 Describe the technical requirements involved in choosing a web host

### 4.2 Publishing

4.2.1 Identify the purpose of Secure File Transfer Protocol (SFTP)

4.2.2 Demonstrate the use of SFTP

4.2.3 Preview and test web pages for compatibility using various browsers and output devices

4.2.4 Describe the process of locating and registering a domain name

4.2.5 Explain domain name servers (DNS)

### 4.3 Maintain Content

4.3.1 Evaluate content with client for relevancy

4.3.2 Evaluate content for viability

4.3.3 Monitor validity of hyperlinks

4.3.4 Maintain and update all website documentation (e.g., prototype, site map, navigation, etc.)

4.3.5 Analyze web analytics for purposes of improving traffic, user experience, and meeting targeted goals

# Data and Analysis

Synthesize concepts, practices and processes of data collection, resource management, and techniques to different types of data in order to discover useful information that can communicate storytelling and to inform decision-making.

## 5.0 Data and Analysis

### 5.1 Storage

5.1.1 Save, retrieve, copy, and delete files from a computing device.

5.1.2 Explain how computers store information in bits and bytes and define what information is stored.

5.1.3 Describe how numbers, text, and media are represented in bits/bytes and stored as files.

5.1.4 Assess the benefits and drawbacks of various storage models, including cloud storage, by considering factors such as cost, speed, reliability, accessibility, privacy, and integrity.

### 5.2 Collection, Visualization, And Transformation

5.2.1 Collect data using an appropriate tool and organize it.

5.2.2 Collect, organize, and present data in at least three different formats and use it to support a claim or tell a story.

5.2.3 Analyze how data collection and visualization/storytelling can be shaped by human motive, perspective, and bias.

5.2.4 Develop a simple algorithm or program that allows them to organize and represent a dataset to analyze findings, predict future outcomes, or infer trends

5.2.5 Describe the attributes that define big data, including volume, velocity, variety, veracity, and value and consider how big data has transformed our everyday lives.

### 5.3 Inference And Models

5.3.1 Identify patterns in data, charts, and/or graphs.

5.3.2 Create a simple model that organizes patterns observed in data, charts, and/or graphs.

5.3.3 Make predictions based on patterns found in data, charts, and/or graphs.

5.3.4 Create a computational model based on patterns observed in data and use it to predict future outcomes.

# Networks and the Internet

Apply networking concepts, using various models to implement protocols and standards when moving data. Design systems with working switching and routing "packets" to ensure data flows to the correct destination. Ensure data traffic flows through the internet effectively.

# Computing Systems

Apply concepts of physical components and software that make up a computing system which communicate and process information in digital form, along with practices and methodology for troubleshooting issues in those systems.

# Cybersecurity

Prove how to detect, prevent and mitigate threats in order to secure a computing system or network in an ethical manner, and in accordance with international, federal,state, local and cyber laws and regulations.

## 6.0 Ethical and Secure use of Information

### 6.1 Copyright Laws

6.1.1 Research laws that govern intellectual property in diverse forms

6.1.2 Evaluate Creative Commons licensing and other free-content license types

6.1.3 Cite the boundaries of third-party work

6.1.4 Explain terms related to copyright, trademarks, patents, and other intellectual property

### 6.2 Security Issues

6.2.1 Explain invasion of privacy in the use of technology

6.2.2 Model acceptable security practices

6.2.3 Analyze the implications of a personal digital footprint

6.2.4 Differentiate between secure and unsecure web protocols

6.2.5 Explain implications of General Data Protection Regulations (GDPR)

6.2.6 Explain the implications of the California Consumer Privacy Act (CCPA)

6.2.7 Compare and contrast global privacy policies and cultural impact

6.2.8 Describe how a security certificate protects a website

### 6.3 Ethics

6.3.1 Model legal and ethical use of information

6.3.2 Describe the purpose of a non-disclosure agreement (NDA)

6.3.3 Analyze content for bias

### 6.4 Hardware and Software

6.4.1 Explain the composition of a computer system including physical and nonphysical components.

6.4.2 Describe and model how hardware and software work together (i.e., sending, receiving, processing, storing information as bits)

6.4.3 Describe and model how application software, systems software, and hardware interact together

6.4.4 Program a physical device that collects and exchanges information between its hardware and software components.

6.4.5 Create an integrated and embedded system that consists of multiple physical devices that collect and exchange information.

# Web Design Curriculum Framework

## Program of Study

The program of study illustrates the sequence of academic and career and technical education coursework that is necessary for the student to successfully transition into postsecondary educational opportunities and employment in their chosen career path.

## Program Structure

The core course sequencing provided in the following table serves as a guide to schools for their programs of study. Each course is listed in the order in which it should be taught and has a designated level. Complete program sequences are essential for the successful delivery of all state standards in each program area.

**Web Design I**

**Web Design II**

**Web Design III (optional)**

The core course sequencing with the complementary courses provided in the following table serves as a guide to schools for their programs of study. Each course is listed in the order in which it should be taught and has a designated level. A program does not have to utilize all of the complementary courses in order for their students to complete their program of study. Complete program sequences are essential for the successful delivery of all state standards in each program area.

## Web Design I

This course will introduce students to the essential ideas of Web Design and show how computing and technology can influence the world. This course focuses on technology and Web Design as a means to solve computational problems and find creative solutions. The appropriate use of technology and industry-standard equipment is an integral part of this course.

### Technical Competencies

[**1.0 Web Design and Development**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**2.0 Constructing a Website**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**3.0 Web Development**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**5.0 Data and Analysis**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**6.0 Ethical and Secure Use of Information**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

### CTE Professionalism and IT Essentials Competencies

Terminology and Communications

Tools and Equipment

Project Management

Applied Mathematics

Safety

## Web Design II

This course follows The College Board Advanced Placement curriculum and prepares students for the AP Programming Principles exam. This course will introduce students to the essential ideas of Web Design and show how computing and technology can influence the world. This course focuses on technology and programming as a means to solve computational problems and find creative solutions. Students will creatively address real-world issues and concerns while using the same processes and tools as artists, writers, computer scientists, and engineers to bring ideas to life. The appropriate use of technology and industry standard equipment is an integral part of this course.

### Technical Competencies

[**1.0 Web Design and Development**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**2.0 Constructing a Website**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**3.0 Web Development**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**4.0 Publishing a Website**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**5.0 Data and Analysis**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

[**6.0 Ethical and Secure Use of Information**](https://docs.google.com/spreadsheets/d/1VMFFQnsWPcs7pZp0EJYTnQZ-Y6Zyoc45wmego6U5VDk/edit?usp=sharing)

### CTE Professionalism and IT Essentials Competencies

Terminology and Communications

Tools and Equipment

Project Management

Applied Mathematics

Safety

## Web Design III

This course is a continuation of Web Design I or AP Programming Principles. This course provides intermediate Programming students with instruction in advanced techniques and processes, particularly as it relates to the language of Java. The areas of major emphasis in the course will be on object-oriented programming methodology, algorithms, data structures and ethics. Topics will include program design, program implementation, standard data structures, and standard algorithms. The appropriate use of technology and industry-standard equipment is an integral part of this course.

### Technical Competencies

Students have achieved all program content standards and will pursue advanced study through investigation and indepth research

### CTE Professionalism and IT Essentials Competencies

Students have achieved all program content standards and will pursue advanced study through investigation and indepth research.

### Sample Topics

* Internship
* Capstone Project
* Portfolio
* Class Project Manager
* Teaching Assistant
* CTSO Leadership