
# Digital Media



# Office of the State Superintendent of Education
# Postsecondary and Career Education Division
# Career and Technical Education Department

The purpose of this document is to communicate the required Career and Technical Education (CTE) academic standards for the Digital Media Program of Study, which includes the following courses: Principles of Information Technology, Digital Media, Web Technologies, and Practicum in Information Technology: Digital Media. The academic standards in this document are theoretical and performance-based. They contain content from the states of Colorado, Maryland, Tennessee, and Texas and were validated by DC business and industry partners. All content is used with permission.

In addition to academic standards, OSSE has incorporated into this document Labor Market Information (LMI) definitions and explanations for the Program of Study; program aligned Industry Recognized Credentials; and, Work-Based Learning resources and requirements by course level.

This document is intended for use by educational administrators and practitioners. A similar document is available for each state-approved CTE Program of Study.


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# Digital Media Program of Study

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## Digital Media Program of Study

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| **Principles of Information Technology** OSSEID: 5110101 | **Digital Media** OSSEID: 5110102 | **Web Technologies** OSSEID: 5110103 | **Practicum in Information Technology: Digital Media** OSSEID: 5110104 |

**Principles of Information Technology (OSSEID: 5110101)**
**Grades:** 9-12
**Prerequisite:** None
**Description:** In Principles of Information Technology, students will develop computer literacy skills to adapt to emerging technologies used in the global marketplace. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. Students will enhance reading, writing, computing, communication, and reasoning skills and apply them to the information technology environment.

**Digital Media (OSSEID: 5110102)**
**Grades:** 10-12
**Prerequisite:** Principles of Information Technology
**Description:** In Digital Media, students will analyze and assess current and emerging technologies, while designing and creating multimedia projects that address customer needs and resolve a problem. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. The knowledge and skills acquired and practiced will enable students to successfully perform and interact in a technology-driven society. Students will enhance reading, writing, computing, communication, and critical thinking and apply them to the IT environment.

**Web Technologies (OSSEID: 5110103)**
**Grades:** 11-12
**Prerequisite:** Digital Media
**Description:** In Web Technologies, students will learn to make informed decisions and apply the decisions to the field of IT. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. The knowledge and skills acquired and practiced will enable students to successfully perform and interact in a technology-driven society. Students will enhance reading, writing, computing, communication, and critical thinking and apply them to the IT environment.

**Practicum in information Technology: Networking (OSSEID: 5110104)**
**Grades:** 12
**Prerequisite:** Web Technologies
**Description:** In the Practicum in Information Technology, students will gain advanced knowledge and skills in the application, design, production, implementation, maintenance, evaluation, and assessment of products, services, and systems. Knowledge and skills in the proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an industry mentor, as an unpaid or paid internship, as part of a capstone project, or as career preparation.

## Industry Certifications

WD Certified Web Designer
Adobe Certified Associate (ACA) – Dreamweaver
Adobe Certified Associate (ACA) – Photoshop

## Work-Based Learning Examples and Resources

| Level I Course | Level II Course | Level III Course | Level IV Course |
|---|---|---|---|
| **Career Exploration**<br>Industry Visits<br>Guest Speakers<br>Participate in a CTSO | **Career Awareness**<br>*All of Level I, plus:*<br>Postsecondary Visits<br>Program-Specific Site Tours<br>Mock Interviews | **Career Preparation**<br>*All of Level I and II, plus:*<br>Job Shadow<br>Paid/Unpaid Internships | **Career Preparation**<br>Paid/Unpaid Internships<br>Apprenticeships |

**Several resources are available to help instructors meet the Level I and Level II WBL requirements, including:**

**Career Coach DC** (http://careercoachdc.emsicc.com). Online site designed to help students find and connect to a career pathway by providing the most current local data on wages, employment, job postings, and associated education and training. Resource includes a Career Assessment for students.

**Nepris** (https://www.nepris.com). Connects educators and learners with a network of industry professionals, virtually, bringing real-world relevance and career exposure to all students. Nepris also provides a skills-based volunteering platform for business and industry professionals to extend their educational outreach.

**Virtual Job Shadow** (https://virtualjobshadow.com). Provides interactive tools which embower students to discover, plan, and pursue their dreams. Rich video library presents a "day in the life of" view for thousands of occupations.

## Labor Market Information Definitions and Data

Career and Technical Education programs of study in the District of Columbia must meet at least one of the High Wage, High Skill, and In Demand definitions, below, to be considered as appropriate for our students and regional labor market. These definitions were created in collaboration with Career and Technical Education leaders from District of Columbia LEA's, the University of the District of Columbia Community College, and national guidance from Research Triangle International (RTI) and Education Northwest. Additionally, previous work was consulted from researchers at MIT's Labor Wage Index Project and the DC CTE Task Force's 2012 Strategic Plan for the District of Columbia.

**High Wage:** Those occupations that have a 25$^{th}$ percentile wage equal to or greater than the most recent MIT Living Wage Index for one adult in the District of Columbia, and/or leads to a position that pays at least the median hourly or annual wage for the Washington, DC, metropolitan statistical area. *(Note: A 25$^{th}$ percentile hourly wage of $17.02 or greater is required to meet this definition).*

**High Skill:** Those occupations located within the Washington, DC, metropolitan statistical area with education or training requirements of: completion of an apprenticeship program; completion of an industry recognized certification or credential; associate's degree, or higher.

**In Demand:** Those occupations in the Washington, DC, metropolitan statistical area having more than the median number of total (growth plus replacement) annual openings over a five-year period. *(Note: An occupation is required to have an annual growth plus replacement rate of 105 openings, or greater, between 2020-25 to meet this definition).*

**Data for the Digital Media Program of Study** ***(source: EMSI, August 2019)*****:**
**Standard Occupational Code (SOC):** 15-1134.00—Web Developer
**Hourly Wages**
**25$^{th}$ Percentile:** $31.85
**50$^{th}$ Percentile:** $42.80
**75$^{th}$ Percentile:** $55.38
**Annual Openings (Growth and Replacement):** 358
**Typical Entry Level Education:** Associate Degree

## Model Six-Year Plan: Digital Media Program of Study

**College:** University of the District of Columbia Community College
**Program/CIP:**
**Plan:**

**Entity:** Office of the State Superintendent of Education
**Career Cluster:** Information Technology
**Program of Study:** Digital Media

| High School | | | | | College | | | |
|---|---|---|---|---|---|---|---|---|
| **Subject** | **9th Grade** | **10th Grade** | **11th Grade** | **12th Grade** | **Semester I** | **Semester II** | **Semester III** | **Semester IV** |
| **English (4)** | English I | English II | English III | English IV | | | | |
| **Math (4)** | Algebra I | Geometry | Algebra II | Math | | | | |
| **Science (4)** | Biology | Lab Science | Lab Science | Science | | | | |
| **Social Studies (4)** | World History and Geography I: Middle Ages | World History and Geography II: Modern World | U.S. History | U.S. Government (.5) and DC History (.5) | | | | |
| **Health (.5) and Physical Ed (1)** | Health (.5) Physical Ed (.5) | Physical Ed (.5) | | | | | | |
| **World Languages (2)** | | | World Language I | World Language II | | | | |
| **Art (.5)** | | Art (.5) | | | | | | |
| **Music (.5)** | | Music (.5) | | | | | | |
| **Elective / Major Courses** | Principles of Information Technology | Digital Media | Web Technologies | Practicum in Information Technology: Digital Media | | | | |
| ***Total possible college credits completed in high school: XX*** | | | | | ***Credit hours required to complete the AAS program: XX*** | | | |

# Principles of Information Technology

(a) **General requirements.** This course is recommended for students in Grades 9-12. Students shall be awarded one credit for successful completion of this course.

(b) **Introduction.**

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Principles of Information Technology, students will develop computer literacy skills to adapt to emerging technologies used in the global marketplace. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. Students will enhance reading, writing, computing, communication, and reasoning skills and apply them to the information technology environment.

(4) Students will participate in at least two Career Exploration Work-Based Learning experiences in this course, which might include guest speakers and work-place tours relevant to the program of study.

(5) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(c) **Knowledge and skills.**

(1) **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:**

(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative;

(B) employ effective verbal and nonverbal communication skills;

(C) employ effective reading and writing skills;

(D) solve problems and think critically;

(E) demonstrate leadership skills and function effectively as a team member;

(F) identify and implement proper safety procedures; and

(G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.

(2) **The student identifies various employment opportunities in the IT field. The student is expected to:**

(A) identify job opportunities and accompanying job duties and tasks;

(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals; and

(C) describe the functions of resumes and portfolios.

(3) **The student uses evolving and emerging technologies to exchange information. The student is expected to:**

(A) identify and describe functions of various evolving and emerging technologies;

(B) send and receive text information and file attachments using electronic methods such as email, electronic bulletin boards, and instant message services;

(C) demonstrate effective Internet search strategies, including keywords and Boolean logic, using various available search engines;

(D) identify the various components of a Uniform Resource Locator;
(E) demonstrate ability to effectively test acquired information from the Internet for accuracy, relevance, and validity;
(F) explain issues concerning computer-based threats such as computer viruses, malware, and hacking; and
(G) explain issues concerning Internet safety such as identity theft, online predators, cyber-bullying, and phishing.

(4) **The student demonstrates knowledge of the hardware components associated with information systems. The student is expected to:**
(A) identify major hardware components and their functions;
(B) use available reference tools as appropriate; and
(C) connect and use a variety of peripheral devices such as mouse, keyboard, microphone, digital camera, and printer.

(5) **The student demonstrates knowledge of the different software associated with information systems. The student is expected to:**
(A) differentiate between systems and application software;
(B) identify and explain major operating system fundamentals and components such as disk operations, graphical user interface components, and hardware drivers;
(C) explain the purpose of file types across software products;
(D) demonstrate use of computer numbering systems and internal data representation such as identifying the hexadecimal value of a color;
(E) compare and contrast open source and proprietary software;
(F) explain use of system management tools;
(G) apply proper file management techniques such as creating, naming, organizing, copying, moving, and deleting files;
(H) use appropriate file protection and security; and
(I) explain the process for discovering, quarantining, and removing viruses from a computer system.

(6) **The student analyzes network systems. The student is expected to:**
(A) identify hardware associated with telecommunications and data networking such as servers, routers, switches, and network connectors;
(B) identify and describe various types of networks such as peer-to-peer, local area networks, wide area networks, wireless, and Ethernet;
(C) identify functions of network operating systems; and
(D) explain troubleshooting techniques for various network connection issues.

(7) **The student applies word-processing technology. The student is expected to:**
(A) identify the terminology associated with word-processing software;
(B) edit a variety of text documents using functions such as pagination, appropriate white space, tab settings, and font style, size, and color; and
(C) create professional documents such as memorandums, technical manuals, or proposals using advanced word-processing features.

(8) **The student applies spreadsheet technology. The student is expected to:**
(A) identify the terminology associated with spreadsheet software;
(B) use numerical content to perform mathematical calculations;
(C) use student-created and preprogrammed functions to produce documents such as budget, payroll, statistical tables, and personal checkbook register;

(D) identify, generate, and describe the function of comma separated value files;
(E) create and analyze spreadsheets incorporating advanced features such as lookup tables, nested IF statements, subtotals, cell protection conditional formatting, charts, and graphs; and
(F) perform sorting, searching, and data filtering in documents.

(9) **The student explores computer programming concepts. The student is expected to:**
(A) identify the function of compilers and interpreters;
(B) explain the difference between the operation of compilers and interpreters;
(C) identify various computer languages and how the languages are used in software development;
(D) recognize data representation in software development such as string, numeric, character, integer, and date;
(E) identify and explain the concept of algorithms; and
(F) describe the flow of a structured algorithm, including linear and iterative instructions such as using a flow chart.

(10)**The student explores database technology. The student is expected to:**
(A) identify the terminology associated with database software and database functions;
(B) explore the application of databases;
(C) identify and explain the purpose and elements of a query language;
(D) identify and explain the purpose of fields and records; and
(E) describe the process of constructing a query, including multiple search parameters.

(11)**The student applies presentation management technology. The student is expected to:**
(A) identify the terminology and functions of presentation software; and
(B) create, save, edit, and produce presentations incorporating advanced features such as links, hyperlinks, audio, and graphics.

(12)**The student applies design and web publishing techniques. The student is expected to:**
(A) identify the terminology associated with web page development and interactive media;
(B) identify and explain design elements such as typeface, color, shape, texture, space, and form;
(C) identify and explain design principles such as unity, harmony, balance, scale, and contrast;
(D) identify and explain common elements of Hyper Text Markup Language (HTML) such as tags, stylesheets, and hyperlinks; and
(E) create a web page containing links, graphics, and text using appropriate design principles.

(13)**The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:**
(A) explain and demonstrate ethical use of technology and online resources;
(B) adhere to intellectual property laws;
(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law;
(D) examine the consequences of plagiarism;
(E) identify and explain unethical practices such as hacking, online piracy, and data vandalism; and
(F) demonstrate ethical use of online resources, including citation of source.

# Digital Media

(a) **General requirements.** This course is recommended for students in Grades 10-12. Prerequisite: Principles of Information Technology. Students shall be awarded one credit for successful completion of this course.

(b) **Introduction.**

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Digital Media, students will analyze and assess current and emerging technologies, while designing and creating multimedia projects that address customer needs and resolve a problem. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. The knowledge and skills acquired and practiced will enable students to successfully perform and interact in a technology-driven society. Students will enhance reading, writing, computing, communication, and critical thinking and apply them to the IT environment.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) **Knowledge and skills.**

(1) **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:**

(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative;

(B) employ effective verbal and nonverbal communication skills;

(C) employ effective reading and writing skills;

(D) solve problems and think critically;

(E) demonstrate leadership skills and function effectively as a team member;

(F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of information technology; and

(G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.

(2) **The student identifies employment opportunities in the IT field with a focus in the area of digital media. The student is expected to:**

(A) identify job opportunities and accompanying job duties and tasks;

(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals;

(C) demonstrate an understanding of the functions of resumes and portfolios; and

(D) create a digital portfolio.

(3) **The student uses emerging technologies to exchange and gather information and resources. The student is expected to:**
- (A) collaborate using various electronic technologies such as email, blogs, chat rooms, discussion threads, social media, podcasting, and wikis;
- (B) demonstrate appropriate search strategies for finding resources or assets on the Internet;
- (C) discuss recent digital media technologies; and
- (D) evaluate and select appropriate software for the development of projects.

(4) **The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:**
- (A) explain and demonstrate ethical use of technology and online resources;
- (B) compare and contrast fair use, open source, and creative commons;
- (C) adhere to intellectual property laws and regulations;
- (D) differentiate between copyright and trademarks;
- (E) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law;
- (F) define and identify unethical practices such as hacking, online piracy, and data vandalism;
- (G) demonstrate ethical use of Internet and online resources, including citation of source; and
- (H) describe the function of a non-disclosure agreement and intellectual property agreement.

(5) **The student analyzes and applies design and layout principles in digital media. The student is expected to:**
- (A) compare and contrast printed and digital communications products that demonstrate appropriate and inappropriate use of design and layout principles;
- (B) identify and apply perspective such as backgrounds, light, shades, shadows, and scale to capture a focal point and create depth;
- (C) identify and apply principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space;
- (D) identify and apply three-dimensional effects such as foreground, middle distance, and background images;
- (E) identify and apply concepts of typography;
- (F) identify and apply color theory; and
- (G) create and improve digital products by applying the appropriate design and layout principles.

(6) **The student designs and creates digital graphics. The student is expected to:**
- (A) compare and contrast the characteristics of raster-based bitmap graphics and vector-based graphics;
- (B) create and modify digital graphics using appropriate vector-based and raster-based software following standard design principles;
- (C) export and set graphics to be used in both print and digital formats;
- (D) demonstrate knowledge of graphic resolution, file size, file formats, and file management;
- (E) determine the type of data stored in a file based on its file extension and select appropriate software to modify, create, and view the file; and
- (F) differentiate between the color mode selections in determining product output.

(7) **The student demonstrates appropriate use of digital photography equipment and techniques. The student is expected to:**
- (A) demonstrate proper use of safety procedures while using digital photography equipment;
- (B) capture still shot images using digital photography equipment incorporating various photo composition techniques such as lighting, perspective, candid versus posed, rule of thirds, and level of horizon;

(C) transfer still shot images from equipment to the computer; and
(D) demonstrate photographic enhancement techniques such as feathering, layering, masking, and color enhancement using appropriate photo editing software.

(8) **The student demonstrates appropriate use of video equipment and techniques. The student is expected to:**
(A) demonstrate proper use of safety procedures while using digital video equipment;
(B) demonstrate proper use of terminology in relation to video technology;
(C) demonstrate proper ethics in the use of digital video photography equipment to capture video images;
(D) transfer video images from equipment to the computer;
(E) apply videographic enhancement and editing techniques such as panning, transitioning, zooming, content editing, and synchronizing audio and video using appropriate digital manipulation software; and
(F) export video files in digital formats to be used in various delivery systems such as podcasts, downloadable media, social media, and streaming video.

(9) **The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:**
(A) demonstrate proper use of safety procedures while using digital audio equipment;
(B) demonstrate proper use of terminology and concepts in relation to audio technology;
(C) demonstrate proper use of digital audio equipment to capture audio files;
(D) transfer audio files from equipment to the computer;
(E) demonstrate proper use of audio editing software such as adding effects, fading, volume control, and manipulation of waveforms using appropriate digital manipulation software; and
(F) export audio files to be used in digital formats in various delivery systems such as podcasts, downloadable files, social media, and streaming video.

(10) **The student demonstrates appropriate use of animation. The student is expected to:**
(A) plan and create a linear and non-linear animation using accepted standards such as design principles, frames and key frames, integration of audio into an animation, and user interactive controls;
(B) deploy animation to be used in various digital formats and on various video animation players; and
(C) create an interactive animation.

(11) **The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:**
(A) initiate a project, including identifying the purpose, audience, and audience needs for design plans;
(B) develop a plan for a media project such as a storyboard and stage development and identify equipment and resources;
(C) execute and monitor and control a project along its timeline and make suggested revisions until completion of the project; and
(D) close a project, including identifying lessons learned.

(12) **The student deploys digital media into print, web-based, and video products. The student is expected to:**

(A) incorporate video, audio, text, graphics, and animations into a web page;

(B) incorporate various digital media products into an electronic document such as a newsletter, social media outlet, poster, or report; and

(C) incorporate various digital media products into an interactive product such as an animation, computer program, simulation, interactive website, or application.

# Web Technologies

(a) **General requirements.** This course is recommended for students in Grades 11-12. Prerequisite: Digital Media. Students shall be awarded one credit for successful completion of this course.

(b) **Introduction.**

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Web Technologies, students will learn to make informed decisions and apply the decisions to the field of IT. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. The knowledge and skills acquired and practiced will enable students to successfully perform and interact in a technology-driven society. Students will enhance reading, writing, computing, communication, and critical thinking and apply them to the IT environment.

(4) Students will participate in a Career Preparation Work-Based Learning experience in this course, which might include paid or unpaid internship experiences relevant to the program of study.

(5) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(c) **Knowledge and skills.**

(1) **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:**

(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative;

(B) employ effective verbal and nonverbal communication skills;

(C) examine the role of certifications, resumes, and portfolios in the web technology profession;

(D) solve problems and think critically;

(E) demonstrate leadership skills and function effectively as a team member; and

(F) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.

(2) **The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:**

(A) identify job opportunities and accompanying job duties and tasks;

(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals;

(C) demonstrate an understanding of the functions of resumes and portfolios; and

(D) create a portfolio.

(3) **The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:**

(A) identify networking components and define the impact of networking components on web development;

(B) evaluate the various input, processing, output, and storage devices and storage services;

(C) identify current and future Internet protocols such as hypertext transfer protocol, file transfer protocol, telnet, and email; and
(D) describe new trends in web technology and evaluate their impact on web development.

(4) **The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:**
(A) explain and demonstrate ethical use of technology and online resources;
(B) differentiate between copyright and trademarks;
(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law;
(D) examine the consequences of plagiarism;
(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources;
(F) discuss the process of acquiring rights to use copyrighted and trademarked content in a website;
(G) demonstrate appropriate behavior and adherence to acceptable use policies when accessing and using online resources;
(H) explain the importance of information privacy such as securing credit card information, passwords, and personal information;
(I) describe the function of a non-disclosure agreement; and
(J) discuss website accessibility concerns.

(5) **The student evaluates electronic information. The student is expected to:**
(A) identify appropriate methods to analyze the design and functionality of web pages;
(B) demonstrate skill in testing the accuracy and validity of information acquired; and
(C) synthesize information from data acquired from online resources.

(6) **The student creates and modifies web and digital media designs. The student is expected to:**
(A) implement functional design elements such as proximity, repetition, contrast, alignment, color theory, consistency, image file size, and typography;
(B) identify, create, modify, and use common file formats such as text, image, video analog and digital, and audio files;
(C) select, create, modify, and integrate effective digital content such as vector-based and raster graphics, motion graphics, video, and audio;
(D) create web pages using current web standards and web development skills such as version control, documentation, web application security, validation, accessibility, and compatibility across multiple browsers and devices;
(E) demonstrate proper use of folder structure hierarchy; and
(F) use web coding standards to evaluate the design and functionality of web pages such as the World Wide Web Consortium (W3C) guidelines.

(7) **The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:**
(A) explain the importance of Internet programming standards;
(B) differentiate among various web coding standards such as HyperText Markup Language, and cascading style sheets;
(C) use standard applications to develop web applications such as text-based editing programs, word processors, and web authoring software;
(D) compare and contrast the impact of different browsers on web development;
(E) explain client-server applications and describe the process of a client-server transaction;
(F) identify the advantages and disadvantages of client-side processing;
(G) identify security issues related to client-side processing;

(H) use standard scripting languages to produce interactive web applications;
(I) identify characteristics of various scripting languages; and
(J) explain the process to construct secure transaction interfaces from the web server to the customer.

(8) **The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:**
(A) compare the advantages and disadvantages of running a personal server versus using a server provider;
(B) explain the Transmission Control Protocol/Internet Protocol;
(C) identify hardware and software requirements for web servers;
(D) evaluate server providers;
(E) describe the process of establishing a domain name;
(F) simulate the administration of web servers, including uploading and managing files;
(G) collect and analyze usage statistics;
(H) maintain documentation of the server environment such as specifications, passwords, and software versions;
(I) summarize the process of server backup and restoration of software features;
(J) propose security measures to protect web servers from electronic threats such as unauthorized access and negative intentions; and
(K) evaluate security measures such as using a firewall, Secure Socket Layer (SSL) connections, and Hypertext Transfer Protocol Secure (HTTPS) transactions.

(9) **The student evaluates a problem and creates a project management plan for meeting client requirements. The student is expected to:**
(A) communicate with clients to analyze requirements to meet the needs of the client and target audience;
(B) document design properties, necessary tools, and resources and identify and address risks;
(C) develop and use a timeline task list such as critical milestones, potential challenges, and interdependencies; and
(D) use various methods to evaluate the progress of the plan and modify as necessary.

(10) **The student creates and implements a web product using a project management plan. The student is expected to:**
(A) create and simulate the publication of a multipage web product using client required content and web design concepts;
(B) develop a test plan for a multipage web product for testing usability, effectiveness, reliability, and customer acceptance;
(C) explain the quality assurance process; and
(D) develop and implement a quality assurance plan.

# Practicum in Information Technology: Digital Media

(a) **General requirements.** This course is recommended for students in Grade 12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Information Technology Career Cluster. Prerequisite: Web Technologies. Students shall be awarded one credit for successful completion of this course.

(b) **Introduction.**

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In the Practicum in Information Technology, students will gain advanced knowledge and skills in the application, design, production, implementation, maintenance, evaluation, and assessment of products, services, and systems. Knowledge and skills in the proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an industry mentor, as an unpaid or paid internship, as part of a capstone project, or as career preparation.

(4) Students will participate in a Career Preparation Work-Based Learning experience in this course, which includes paid or unpaid internship, pre-apprenticeship, or apprenticeship experiences relevant to the program of study.

(5) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(c) **Knowledge and skills.**

(1) **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:**

(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work;

(B) identify and demonstrate qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills;

(C) employ effective reading and writing skills;

(D) employ effective verbal and nonverbal communication skills;

(E) solve problems and think critically;

(F) demonstrate leadership skills and function effectively as a team member;

(G) identify and implement proper safety procedures;

(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and

(I) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.

(2) **The student identifies various employment opportunities in the IT field. The student is expected to:**

(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals;

(B) develop a resume that includes letters of recommendation and a portfolio appropriate to a chosen career plan; and
(C) illustrate interview skills for successful job placement.

(3) **The student applies academic knowledge and skills to research and develop projects. The student is expected to:**
(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards;
(B) demonstrate proper use of mathematics concepts in the development of products or services; and
(C) demonstrate proper use of science principles in the development of products or services.

(4) **The student selects an approach for conducting research to discover a problem in the field of IT with the appropriate supervision and guidance. The student is expected to:**
(A) identify a problem relating to information technology; and
(B) describe and use an approach such as top-down or bottom-up for conducting a research activity.

(5) **The student creates a technological solution for a problem in the field of IT. The student is expected to:**
(A) apply critical-thinking strategies to develop a solution using appropriate technologies and resources, IT concepts, and industry standards;
(B) apply decision-making techniques to the selection of technological solutions; and
(C) explain how the proposed technological solution will resolve the problem.

(6) **The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:**
(A) work closely with a mentor throughout the design, creation, and implementation process;
(B) develop a product or service that meets a specified need following a problem-solving strategy;
(C) identify areas where quality, reliability, and safety can be designed into a product or service;
(D) develop and implement a security management plan to address security requirements;
(E) develop a sustainability plan for the product or service;
(F) develop an evaluation method for analyzing the effect of the product or service on client satisfaction and problem resolution;
(G) develop a project portfolio that documents the research and development process; and
(H) present the portfolio to a panel of professionals using formal presentation skills.

(7) **The student creates a personal portfolio. The student is expected to:**
(A) create a portfolio that documents all projects and accomplishments such as academics, volunteer experience, employment experience, awards, and certifications;
(B) organize and prioritize information within the portfolio; and
(C) use written, verbal, and visual communication techniques consistent with IT industry standards.