Design, Multimedia, and Web Technologies

6630/36 weeks

6632/18 weeks

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Virginia Department of Education

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Course Description

**Suggested Grade Level:** 10 or 11 or 12

Students apply creativity and technology to create visual design, multimedia projects, and web projects, using industry-standard software. Work-based learning experiences allow students to apply layout and design techniques in real-world situations. Students create portfolios that include a résumé, certifications earned, and a variety of projects produced in the course.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

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</table>
| 51 | Import text, graphics, tables, and charts for use in a print or graphic design project.  
| 52 | Use time-saving features of print and/or graphic design programs.  
| 53 | Create documents utilizing a variety of layouts.  
| 54 | Create a variety of print and digital materials.  
| 55 | 

### Designing and Creating Multimedia Projects

<table>
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| 56 | Identify the components of an effective multimedia project.  
| 57 | Create a multimedia project.  
| 58 | Create an object, using graphic design software.  
| 59 | Incorporate assets into a multimedia project.  
| 60 | Enhance a multimedia project with advanced features.  
| 61 | Incorporate elements from other sources into a multimedia project.  
| 62 | Edit a multimedia project.  
| 63 | Deliver a multimedia presentation.  
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### Designing and Creating Websites

<table>
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| 65 | Evaluate the methods of creating websites.  
| 66 | Examine the concept of information architecture.  
| 67 | Apply structural requirements (i.e., information architecture) for development of a website.  
| 68 | Describe design of websites for accessibility and accommodation of persons with special needs.  
| 69 | Create a website, using design software or a programming language.  
| 70 | Apply website design features.  
| 71 | Create hyperlinks.  
| 72 | Edit a website.  
| 73 | Test a website.  
| 74 | Explain publishing, updating, and maintaining a website.  
| 75 | 

### Exploring Legal and Ethical Issues

<table>
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| 76 | Explain responsible use of design, multimedia, and web technologies.  
| 77 | Describe copyright issues and laws related to creating graphic design, multimedia, and website design projects.  
| 78 | Identify situations in which use of elements in projects is legal but may be unethical or inappropriate.  
| 79 | 

### Preparing for Industry Certification

<table>
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| 80 | Describe the process and requirements for obtaining industry certifications related to the Design, Multimedia, and Web Technologies course.  
| 81 | Identify testing skills and strategies for a certification examination.  
| 82 | Demonstrate ability to complete selected practice examinations (e.g., practice questions similar to those on certification exams).  
| 83 | 

### Developing Employability Skills

<table>
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| 84 | Explore careers in the graphic design, multimedia, and website design fields.  
| 85 | Investigate uses of graphic design, multimedia, and web technologies in business and industry.  
| 86 | Investigate new and emerging trends in design, multimedia, and web technologies, including digital technologies.  
| 87 | Develop a résumé.  
| 88 | Create a professional electronic portfolio.  
| 89 | Describe basic employment activities.  
| 90 | Identify potential employment barriers for nontraditional groups and ways to overcome the barriers.  
| 91 | 

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3
Curriculum Development

Demonstrating Knowledge of Hardware, Software, and Operating Systems

Task Number 39

Compare word processing, graphic design, multimedia creation, and web page creation.

Definition
Comparison should include

- identifying examples of each process
- comparing the similarities and differences among the processes.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Computer Applications
E-business
Graphic Design
Publication Design
Website Design

Task Number 40

Evaluate operating systems and hardware for compatibility with common software applications.

Definition
Evaluation should include examining the compatibility and requirements of

- operating systems
- input devices
- output devices
- storage
- processing
- graphic and sound cards.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Computer Problem Solving
Evaluate software used in graphic design, multimedia creation, and web page creation.

Definition
Evaluation should include

- identifying specific graphic design, multimedia, and web page creation, and text editor programs
- assessing the strengths and weaknesses of each program in relation to specific tasks
- selecting the appropriate software for the application.

Use technical support to resolve problems encountered during the creation of digital projects.

Definition
Use should include

- program help menu
- online help
- effective search techniques
- technical manuals
- online real-time assistance
- additional technical support resources.
Task Number 43

Apply appropriate method to back up files.

Definition
Application should include identifying appropriate methods to back up files, including cloud storage capabilities as well as physical storage media options.

Applying Principles of Layout and Design

Task Number 44

Identify project-management components.

Definition
Identification should include
- audience demographics (e.g., age, background, interests)
- audience size
- project purpose (e.g., to inform, to persuade, to entertain)
- content review
• design requirements
• selecting appropriate hardware and software
• production schedule (e.g., creating and using a work plan, establishing milestones and deliverables)
• assigning responsibilities within the team
• creating a work plan for the project (e.g., GANTT chart).

**FBLA Competitive Events and Activities Area**

**Business Knowledge & Skills**

American Enterprise Project

Business Financial Plan

Business Plan

Community Service Project

Computer Applications

Database Design & Application

Digital Video

E-business

Entrepreneurship

Graphic Design

Hospitality and Event Management

International Business

Introduction to Business Presentation

Introduction to Event Planning

Introduction to Social Media Strategy

Management Decision Making

Management Information Systems

Marketing

Network Design

Partnership with Business

Publication Design

Sales Presentation

Sports and Entertainment Management

Spreadsheet Application

Website Design

Word Processing

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**Task Number 45**

**Plan an effective design for a project.**
**Definition**
Planning should include preparing a storyboard, wireframe, or mockup using a variety of available programs and handwritten sketches.

**FBLA Competitive Events and Activities Area**
Business Knowledge & Skills
- American Enterprise Project
- Business Financial Plan
- Business Plan
- Community Service Project
- Computer Applications
- Database Design & Application
- Digital Video
- E-business
- Entrepreneurship
- Graphic Design
- Hospitality and Event Management
- International Business
- Introduction to Business Presentation
- Introduction to Event Planning
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- Management Decision Making
- Management Information Systems
- Marketing
- Network Design
- Partnership with Business
- Publication Design
- Sales Presentation
- Sports and Entertainment Management
- Spreadsheet Application
- Website Design
- Word Processing

**Task Number 46**
Apply principles of design, layout, and typography appropriate for a project.
Definition

Application should include making appropriate choices regarding such elements as font selection, font size, font style and effects, white space, margins, hyperlinks, and placement of graphics and text.

FBLA Competitive Events and Activities Area
Business Knowledge & Skills
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Business Financial Plan
Business Plan
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Entrepreneurship
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International Business
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Management Information Systems
Marketing
Network Design
Partnership with Business
Publication Design
Sales Presentation
Sports and Entertainment Management
Spreadsheet Application
Website Design
Word Processing

Task Number 47

Enhance appearance of a project.

Definition
Enhancement should include
• using such elements as lines, colors, logos, and other graphics to establish focal points and directional flow
• working with teams to blend individual design preferences into cohesive final projects
• implementing project management principles.

**FBLA Competitive Events and Activities Area**

**Business Knowledge & Skills**
- American Enterprise Project
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- Sports and Entertainment Management
- Spreadsheet Application
- Website Design
- Word Processing

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### Designing and Creating Visual Design Projects

#### Task Number 48
Evaluate a print or graphic design project to determine whether it meets the designated guidelines.

**Definition**
Evaluation should determine whether

- audience and purpose were addressed
- appropriate medium of delivery was used
- content (e.g., text, graphics, styles, fonts) was delivered effectively
- principles of layout and design were followed.

**FBLA Competitive Events and Activities Area**
**Business Knowledge & Skills**
- American Enterprise Project
- Business Financial Plan
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- Introduction to Business Presentation
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- Partnership with Business
- Publication Design
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- Spreadsheet Application
- Website Design
- Word Processing

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**Task Number 49**

Create original content for a digitally designed project.

**Definition**
Creation should include

- determining audience and purpose
- determining appropriate medium of delivery
- developing content (e.g., text, graphics, styles)
- communicating content through aesthetic appeal
- applying principles of design, layout, and typography in regard to columns, text alignment, headlines, color scheme, and captions.
Task Number 50

Demonstrate proofing skills through use of online tools and individual critiquing to check for format, style, correctness, and clarity.

Definition

Demonstration should include

- reviewing and revising rough draft copy according to the five Cs of effective writing: complete, correct, clear, concise, and courteous
- implementing peer review.
Task Number 51

Import text, graphics, tables, and charts for use in a print or graphic design project.

Definition

Importing should include

- creating original or acquiring existing text, graphics, tables, and charts for placement to enhance a graphic design project
- using open-source graphics vs. original work.

FBLA Competitive Events and Activities Area
Business Knowledge & Skills
American Enterprise Project
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E-business
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Introduction to Social Media Strategy
Marketing
Partnership with Business
Task Number 52

Use time-saving features of print and/or graphic design programs.

Definition
Use should include

- creating a master canvas
- defining and applying styles
- customizing a color palette
- working with layers.

FBLA Competitive Events and Activities Area
Business Knowledge & Skills
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Task Number 53
Create documents utilizing a variety of layouts.

Definition
Creation should include

- using multiple columns, sections, pages, and element positions
- following guidelines that result in desired document effect and appearance for the intended audience.

FBLA Competitive Events and Activities Area
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Publication Design
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Spreadsheet Application
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Word Processing

Task Number 54

Create a variety of print and digital materials.

Definition
Creation should include applying principles of design, layout, and typography to produce such documents as

- flyers
- newsletters
- business cards
- greeting cards
- brochures
- posters
- postcards
- calendars
• cookbooks
• coloring books
• illustrated children’s books
• infographics.

**FBLA Competitive Events and Activities Area**

**Business Knowledge & Skills**

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Partnership with Business
Publication Design
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Spreadsheet Application
Website Design
Word Processing

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**Task Number 55**

**Publish digital images in various formats.**

**Definition**

Publication should include

- exporting to web, print, and video
- exporting images to various digital formats (e.g., png, jpeg, pdf, svg).
Designing and Creating Multimedia Projects

Task Number 56

Identify the components of an effective multimedia project.

Definition
Identification may include

- purpose of project
- intended audience
- length of project
- type(s) of output
- development time
- availability of equipment
- effective use of design elements
- concise text.

FBLA Competitive Events and Activities Area
Business Knowledge & Skills
American Enterprise Project
Business Financial Plan
Business Plan
Community Service Project
Computer Applications
Database Design & Application
Digital Video
E-business
Task Number 57

Create a multimedia project.

Definition
Creation should include

- determining purpose, audience, length, output, development time, and availability of equipment
- developing a storyboard, wireframe, or sketch
- adding content
- applying design elements and principles of design effectively.

FBLA Competitive Events and Activities Area
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Introduction to Social Media Strategy
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Partnership with Business
Publication Design
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Task Number 58

Create an object, using graphic design software.

Definition
Creation should include

- planning a design
- using software to create a graphic object
- determining the format for saving a file or image, based on intended use.

FBLA Competitive Events and Activities Area
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Task Number 59

Incorporate assets into a multimedia project.

Definition
Incorporation could include creating, importing, and formatting video, audio, charts, graphs, tables, and/or dynamic data.
FBLA Competitive Events and Activities Area
Business Knowledge & Skills
American Enterprise Project
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Task Number 60

Enhance a multimedia project with advanced features.

Definition
Enhancement could include

- transitions
- timing
- animation (e.g., keyframe interpolation, motion paths, animated masking, shape morphing).

FBLA Competitive Events and Activities Area
Business Knowledge & Skills
American Enterprise Project
Business Financial Plan
Business Plan
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Computer Applications
Database Design & Application
Digital Video
Task Number 61

Incorporate elements from other sources into a multimedia project.

Definition
Incorporation should include

- visual elements (e.g., scans, digital photographs, video clips, graphics)
- audio elements
- graphic elements.

FBLA Competitive Events and Activities Area
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Introduction to Social Media Strategy
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Partnership with Business
Publication Design
Sales Presentation
Task Number 62

Edit a multimedia project.

**Definition**
Editing should include

- proofreading project components for accuracy, mechanics, and clarity
- checking formatting
- analyzing for effective project components
- revising project to include edits
- implementing third-party feedback (e.g., peer review).

FBLA Competitive Events and Activities Area
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Website Design
Word Processing

Task Number 63

Deliver a multimedia presentation.
Definition
Delivery should include

- demonstrating principles of effective communication
- coordinating verbal delivery with multimedia presentation
- using presentation skills to enhance effectiveness of delivery
- creating handouts and other visuals to enhance the presentation
- adhering to a planned timeframe
- wearing appropriate attire
- answering questions effectively.

FBLA Competitive Events and Activities Area
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Word Processing

Task Number 64

Evaluate a multimedia project to determine whether it meets the designated guidelines.

Definition
Evaluation could include the use of a survey or other feedback formats to determine whether

- audience and purpose were effectively addressed
- medium of delivery was appropriate and used effectively
- content was clear and concise
- content was delivered effectively
- length of presentation was appropriate
Designing and Creating Websites

Task Number 65

Evaluate the methods of creating websites.

Definition
Evaluation should include

- identifying website design software, text editing software, content management and revision control systems, and programming languages that may be used to create web pages
- reviewing the features of the programs and languages
- comparing design software and programming languages
- analyzing changes over time to adhere to current web coding standards
- reviewing the roles of Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), and JavaScript in current website design
- analyzing responsive design.
Task Number 66

Examine the concept of information architecture.

Definition
Examination should include

- using information to create effective web pages
- comparing examples of content management systems for web development (e.g., Canvas, Explorer, Drupal, Joomla!, WordPress)
- addressing components such as ease of use for non-technical users, security issues, and technical capabilities.

Task Number 67

Apply structural requirements (i.e., information architecture) for development of a website.

Definition
Application should include

- creating a storyboard or wireframe
- developing a navigational method
- establishing a homepage
- choosing content
- choosing appropriate graphics
- creating responsive layouts suitable for commonly used devices (e.g., mobile phone, tablet)
- citing sources.
Task Number 68

Describe design of websites for accessibility and accommodation of persons with special needs.

Definition
Description should include

- accessibility issues pertaining to website content
- guidelines based on the Americans with Disabilities Act (ADA) guidelines for compliance with the Web Accessibility Initiative (WAI)
- methods for removing accessibility barriers.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Coding and Programming
Computer Applications
E-business
Website Design
Word Processing

Task Number 69

Create a website, using design software or a programming language.

Definition
Creation should include implementing the structural requirements by using a software program and/or programming language for web page creation.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Coding and Programming
Computer Applications
E-business
Website Design
Word Processing

Task Number 70
Apply website design features.

**Definition**
Application should include using current trends to enhance the design.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills
Coding and Programming
Computer Applications
E-business
Website Design
Word Processing

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**Task Number 71**

Create hyperlinks.

**Definition**
Creation should include

- internal page and site links
- external links to other Uniform Resource Locators (URL)
- email links.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills
Coding and Programming
Computer Applications
E-business
Website Design
Word Processing

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**Task Number 72**

Edit a website.

**Definition**
Editing should include

- proofreading and editing content for accuracy, clarity, and correctness
- reviewing pages for desired formatting and layout
- reviewing pages for functionality
- validating the language and/or code used.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills
Coding and Programming
Task Number 73

Test a website.

Definition
Testing should include

- viewing through multiple browsers to ensure page elements display as intended (e.g., colors, fonts, animation, graphics)
- reviewing pages for broken links and/or unlinked objects
- viewing on various devices with Internet connectivity
- accessing web pages via connections of various speeds to ensure pages load quickly.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Coding and Programming
Computer Applications
E-business
Website Design
Word Processing

Task Number 74

Explain publishing, updating, and maintaining a website.

Definition
Explanation should include

- selecting the host for the website
- examining the client-server architecture of the web
- outlining the procedure for publishing the website
- outlining the importance of updating and maintaining the website.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Coding and Programming
Computer Applications
E-business
Website Design
Word Processing
Task Number 75

Describe methods and tools used in digital marketing.

Definition
Description could include

- registering with search engines
- identifying factors that detract from search engine optimization (SEO)
- investing in paid search advertising
- posting hyperlinks from other sites
- posting banner ads on other sites
- sending electronic group announcements
- promoting through social media
- launching content marketing and mailing lists
- using analytics to test effectiveness of advertising techniques.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills

Coding and Programming
Computer Applications
E-business
Marketing
Website Design
Word Processing

Exploring Legal and Ethical Issues

Task Number 76

Explain responsible use of design, multimedia, and web technologies.

Definition
Explanation should address

- security issues
- cyberbullying and/or bullying
- cybercrime.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills

Business Ethics
Business Law
Cyber Security
Task Number 77

Describe copyright issues and laws related to creating graphic design, multimedia, and website design projects.

Definition
Description should include

- explaining copyright issues, including the reasons for copyright laws and the importance of compliance with them
- identifying copyright issues and laws pertaining to elements used in projects
- citing examples of copyright infringement
- explaining the consequences of illegal use of copyrighted elements
- describing methods for obtaining permission to use copyrighted elements
- describing methods for adhering to copyright laws when using elements from other sources
- maintaining documentation of permissions granted for use of copyrighted elements
- explaining free use or open use.

FBLA Competitive Events and Activities Area
Business Knowledge & Skills
American Enterprise Project
Business Financial Plan

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Sales Presentation
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Website Design
Word Processing

Task Number 78
Identify situations in which use of elements in projects is legal but may be unethical or inappropriate.

**Definition**
Identification should include

- distinguishing between legal and ethical use of elements
- citing examples of unethical use of elements (e.g., “partial” plagiarism, questionable content).

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills
Business Ethics
Business Law

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**Task Number 79**

Describe licensing agreements associated with software usage.

**Definition**
Description should include

- explaining licensing agreements, including the reasons for their existence and the importance of compliance
- describing methods to ensure compliance with licensing agreements when using software.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills
Business Ethics
Business Law
E-business
Public Service Announcement
Website Design

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**Preparing for Industry Certification**

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**Task Number 80**

Describe the process and requirements for obtaining industry certifications related to the Design, Multimedia, and Web Technologies course.
Definition

Description should include a list of industry certifications related to the Design, Multimedia, and Web Technologies course and the process and/or requirements for obtaining the certifications from

- official websites of the testing organization and/or vendor
- materials from publishers that have developed practice materials and tests based on information from the testing organization and/or vendor
- information from certified instructors or industry-certified professionals.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills

Electronic Career Portfolio
Job Interview

Task Number 81

Identify testing skills and strategies for a certification examination.

Definition

Identification of testing skills and strategies should be undertaken by

- conducting a web search for resources
- reviewing materials from exam and practice-exam publishers
- interviewing certified instructors and/or industry-certified professionals.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills

Computer Applications
Database Design and Application
Electronic Career Portfolio
Job Interview
Spreadsheet Applications
Word Processing

Task Number 82

Demonstrate ability to complete selected practice examinations (e.g., practice questions similar to those on certification exams).

Definition

Demonstration should include completing practice examinations for selected certifications related to the course obtained from vendor sites and/or materials from publishers. The level of
performance on a practice examination serves as a gauge of the applicant's readiness for formal industry testing.

**FBLA Competitive Events and Activities Area**

Business Knowledge and Skills

Computer Applications

Database Design and Application

Electronic Career Portfolio

Job Interview

Spreadsheet Applications

Word Processing

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**Task Number 83**

**Complete an industry certification examination representative of skills learned in this course (e.g., MOS, IC3, ACA, CIW).**

**Definition**

Completion of an industry certification examination will be achieved when the student applicant earns an examination score deemed "passing" by the testing organization. Qualifying examinations are those currently approved at the state level as representative of Design, Multimedia, and Web Technologies skills.

Students should be encouraged to attain industry certification and create an electronic portfolio as evidence of their design, multimedia, and web technologies skill level and general employability.

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**FBLA Competitive Events and Activities Area**

Business Knowledge and Skills

Computer Applications

Database Design and Application

Electronic Career Portfolio

Job Interview

Spreadsheet Applications

Word Processing

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**Developing Employability Skills**

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**Task Number 84**
Explore careers in the graphic design, multimedia, and website design fields.

**Definition**
Exploration should result in a list of relevant job titles and should include the

- preparation required for each
- opportunities for advancement
- employment trends in the field, including gig employment.

Students should use job databanks and match their abilities, aptitudes, and job expectations with industry standards.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills

- E-business
- Electronic Career Portfolio
- Graphic Design
- Job Interview
- Publication Design
- Website Design

**Task Number 85**

**Investigate uses of graphic design, multimedia, and web technologies in business and industry.**

**Definition**
Investigation should include

- listing common uses of graphic design, multimedia, and web technologies within business and industry
- describing the benefits of graphic design and/or multimedia presentation tools over other tools
- citing several business scenarios that illustrate the benefits of graphic design and/or multimedia presentation tools
- describing the advantages of interactive websites to business and industry and individuals
- understanding the importance of responsive design.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills

- E-business
- Electronic Career Portfolio
- Graphic Design
- Job Interview
- Publication Design
- Website Design
Task Number 86

Investigate new and emerging trends in design, multimedia, and web technologies, including digital technologies.

Definition
Investigation should use a variety of current, credible sources (e.g., books, periodicals, Internet) to generate a report summarizing the trends.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
E-business
Electronic Career Portfolio
Graphic Design
Job Interview
Publication Design
Website Design

Task Number 87

Develop a résumé.

Definition
Development should include information such as

- contact information
- educational background
- work experience
- honors, awards, and certifications
- membership in organization and/or community activities, leadership positions held, and community service
- skills and qualifications.

Students should explain the importance of keeping a résumé current and updated to reflect experience and education even if they are not currently involved in a job search.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Computer Applications
E-business
Electronic Career Portfolio
Future Business Leader
Graphic Design
Job Interview
Publication Design
Website Design
Task Number 88

Create a professional electronic portfolio.

Definition
Creation should include compiling one’s résumé and a variety of graphic design documents and projects, multimedia projects, and website projects that are representative of the student’s knowledge, skills, and abilities.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
Electronic Career Portfolio
Graphic Design
Job Interview
Publication Design

Task Number 89

Describe basic employment activities.

Definition
Description could include

- completion of a job application form with attention to completeness, correctness, and legibility and addressing electronic-specific concerns, such as inclusion of keywords and attention to security issues
- interviewing techniques, including preparation, attire, and demeanor
- creation of an interview follow-up letter, with focus on format, content, and prompt delivery of letter
- evaluation of self-performance, including quality of work, achievement of goals, compliance with expectations, personal development plan, and effectiveness of communications
- resignation from a job, following accepted standards for method, timing, and delivery
- participation in an exit interview, including what and what not to say.

FBLA Competitive Events and Activities Area
Business Knowledge and Skills
E-Business
Electronic Career Portfolio
Graphic Design
Job Interview
Publication Design
Website Design

Task Number 90
**Identify potential employment barriers for nontraditional groups and ways to overcome the barriers.**

**Definition**
Identification should include unlawful discrimination in hiring or promoting with regard to a person’s race, sex, color, national origin, religion, sexual orientation, gender identity, age, political affiliation, or disability. Ways to overcome the barriers should include scholarships, work-based learning opportunities, and minority assistance programs.

**FBLA Competitive Events and Activities Area**
Business Knowledge and Skills

E-business

Electronic Career Portfolio

Future Business Leader

Graphic Design

Job Interview

Publication Design

Website Design

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**SOL Correlation by Task**

<table>
<thead>
<tr>
<th>Task</th>
<th>SOL Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demonstrating Knowledge of Hardware, Software, and Operating Systems</strong></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Compare word processing, graphic design, multimedia creation, and web page creation. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>40</td>
<td>Evaluate operating systems and hardware for compatibility with common software applications. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 Mathematics: COM.7, COM.9, COM.10, COM.11, COM.12, COM.17</td>
</tr>
<tr>
<td>41</td>
<td>Evaluate software used in graphic design, multimedia creation, and web page creation. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>42</td>
<td>Use technical support to resolve problems encountered during the creation of digital projects. English: 10.2, 10.5, 10.8, 11.2, 11.5, 11.8, 12.2, 12.5, 12.8</td>
</tr>
<tr>
<td>43</td>
<td>Apply appropriate method to back up files. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td><strong>Applying Principles of Layout and Design</strong></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Identify project-management components. English: 10.1, 11.1, 12.1 Mathematics: COM.1, COM.3</td>
</tr>
<tr>
<td>45</td>
<td>Plan an effective design for a project. English: 10.1, 11.1, 12.1 Mathematics: COM.1, COM.3</td>
</tr>
<tr>
<td>46</td>
<td>Apply principles of design, layout, and typography appropriate for a project. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 Mathematics: COM.11</td>
</tr>
</tbody>
</table>

**Designing and Creating Visual Design Projects**
<table>
<thead>
<tr>
<th>Task</th>
<th>SOL Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Evaluate a print or graphic design project to determine whether it meets the designated guidelines. English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>49</td>
<td>Create original content for a digitally designed project. English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>50</td>
<td>Demonstrate proofing skills through use of online tools and individual critiquing to check for format, style, correctness, and clarity. English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>51</td>
<td>Import text, graphics, tables, and charts for use in a print or graphic design project. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 Mathematics: COM.7, COM.9, COM.11, COM.12</td>
</tr>
<tr>
<td>52</td>
<td>Use time-saving features of print and/or graphic design programs. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>53</td>
<td>Create documents utilizing a variety of layouts. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 Mathematics: COM.11</td>
</tr>
<tr>
<td>54</td>
<td>Create a variety of print and digital materials. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td><strong>Designing and Creating Multimedia Projects</strong></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Identify the components of an effective multimedia project. English: 10.5, 11.5, 12.5 Mathematics: COM.1, COM.3</td>
</tr>
<tr>
<td>57</td>
<td>Create a multimedia project. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 Mathematics: COM.1, COM.3</td>
</tr>
<tr>
<td>59</td>
<td>Incorporate assets into a multimedia project. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>60</td>
<td>Enhance a multimedia project with advanced features. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>61</td>
<td>Incorporate elements from other sources into a multimedia project. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>62</td>
<td>Edit a multimedia project. English: 10.2, 10.5, 10.6, 10.7, 11.2, 11.5, 11.6, 11.7, 12.2, 12.5, 12.6, 12.7</td>
</tr>
<tr>
<td>63</td>
<td>Deliver a multimedia presentation. English: 10.1, 10.2, 10.5, 11.1, 11.2, 11.5, 12.1, 12.2, 12.5</td>
</tr>
<tr>
<td>64</td>
<td>Evaluate a multimedia project to determine whether it meets the designated guidelines. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td><strong>Designing and Creating Websites</strong></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>Evaluate the methods of creating websites. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>66</td>
<td>Examine the concept of information architecture. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>67</td>
<td>Apply structural requirements (i.e., information architecture) for development of a website. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>68</td>
<td>Describe design of websites for accessibility and accommodation of persons with special needs. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 History: VUS 13, 14, Govt 7, 8, 9, 15</td>
</tr>
<tr>
<td>69</td>
<td>Create a website, using design software or a programming language. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>70</td>
<td>Apply website design features. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>71</td>
<td>Create hyperlinks. English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
</tr>
<tr>
<td>72</td>
<td>Edit a website. English: 10.6, 10.7, 11.6, 11.7, 12.6, 12.7</td>
</tr>
<tr>
<td>73</td>
<td>Test a website. English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>Task</td>
<td>SOL Correlations</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>74</td>
<td>Explain publishing, updating, and maintaining a website. English: 10.5, 10.6, 11.5, 11.6, 12.5, 12.6</td>
</tr>
<tr>
<td>75</td>
<td>Describe methods and tools used in digital marketing. English: 10.2, 10.5, 11.5, 12.2, 12.5</td>
</tr>
</tbody>
</table>

**Exploring Legal and Ethical Issues**

<table>
<thead>
<tr>
<th>Task</th>
<th>SOL Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>Explain responsible use of design, multimedia, and web technologies. English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>77</td>
<td>Describe copyright issues and laws related to creating graphic design, multimedia, and website design projects. English: 10.5, 11.5, 12.5 History: Govt 7, 8, 9, 15</td>
</tr>
<tr>
<td>78</td>
<td>Identify situations in which use of elements in projects is legal but may be unethical or inappropriate. English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>79</td>
<td>Describe licensing agreements associated with software usage. English: 10.5, 11.5, 12.5</td>
</tr>
</tbody>
</table>

**Preparing for Industry Certification**

<table>
<thead>
<tr>
<th>Task</th>
<th>SOL Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Describe the process and requirements for obtaining industry certifications related to the Design, Multimedia, and Web Technologies course.</td>
</tr>
<tr>
<td>81</td>
<td>Identify testing skills and strategies for a certification examination. English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>82</td>
<td>Demonstrate ability to complete selected practice examinations (e.g., practice questions similar to those on certification exams). English: 10.5, 11.5, 12.5</td>
</tr>
<tr>
<td>83</td>
<td>Complete an industry certification examination representative of skills learned in this course (e.g., MOS, IC3, ACA, CIW). English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
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</tbody>
</table>

**Developing Employability Skills**

<table>
<thead>
<tr>
<th>Task</th>
<th>SOL Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>Explore careers in the graphic design, multimedia, and website design fields. English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History: Govt 7, 8, 9, 15</td>
</tr>
<tr>
<td>85</td>
<td>Investigate uses of graphic design, multimedia, and web technologies in business and industry. English: 10.5, 10.6, 11.5, 11.6, 12.5, 12.6 History: Govt 7, 8, 9, 15</td>
</tr>
<tr>
<td>86</td>
<td>Investigate new and emerging trends in design, multimedia, and web technologies, including digital technologies. English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>87</td>
<td>Develop a résumé. English: 10.5, 10.6, 10.7, 11.5, 11.6, 11.7, 12.5, 12.6, 12.7</td>
</tr>
<tr>
<td>88</td>
<td>Create a professional electronic portfolio. English: 10.2, 10.5, 10.6, 10.7, 11.2, 11.5, 11.6, 11.7, 12.2, 12.5, 12.6, 12.7</td>
</tr>
<tr>
<td>89</td>
<td>Describe basic employment activities. English: 10.1, 10.5, 10.6, 10.7, 11.1, 11.5, 11.6, 11.7, 12.1, 12.5, 12.6, 12.7</td>
</tr>
<tr>
<td>90</td>
<td>Identify potential employment barriers for nontraditional groups and ways to overcome the barriers. English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8</td>
</tr>
</tbody>
</table>

**Teacher Resources**

**Instructional Scenarios**

**Layout and Design**

**Duty/Concept Area(s):** Applying Principles of Layout and Design

**Scenario:**

---

39
Congratulations! You have been hired by GamesRUs. You have been given two tasks to help promote the new PS5 and two new games that come as a package.

- The first task is to create a catalog page that presents the items as a package deal. Remember the idea of the catalog page is to make the item look presentable and desirable.
- The second task is to create an advertisement flyer for each of the products. The advertisement flyer should show all three products and make them look appealing.

**Big Question:** How important are aesthetics in advertising presentations?

**Focused Questions:** Does presentation matter in advertising?

---

**Design Event Advertising Project**

Duty/Concept Area(s): Designing and Creating Visual Design Projects

Scenario:
You are a graphic designer working for an advertising agency and have been assigned to create a poster for an upcoming event. You will need to utilize imagery and typography to properly depict the event to its audience. The client is requiring the following information to be included on the poster: date, time, venue, cost, and name of event at a minimum.

**Big Question:**
- How will the overall design (e.g., font, color, layout) of my project appeal to my audience?
- What design choices did I make to ensure my design markets to the correct audience?

**Focused Questions:**
- Who is your audience?
- What color scheme will you use? Why?
- What event does the poster advertise?
- What color format will I work in (e.g., RGB/CMYK)?
- Does my poster define the purpose without distracting the audience?

**SOL Correlation:** COM.1, COM.10, COM.12

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**What Happened?**

Duty/Concept Area(s): Demonstrating Knowledge of Hardware, Software, and Operating Systems

Scenario:
Follow how a document is created, saved, edited and processed, and retrieved. Discuss how networks carry the information. By the end of the unit, students will understand the information processing cycle. Move into a discussion of processing speeds and how the amount of memory impacts processing. Discuss file types and extensions (e.g., concurrent discussion of what application software is, operating systems, security, and other utility software)

**Big Question:** How is data use and storage impacted by the hardware and software used?

**Focused Questions:**
- What is the information processing system? Give examples of input and output devices.
- What is the most efficient way to organize files?
Project-Based Assessment:
Have students in groups of four create a presentation on the information processing cycle (target audience can be varied: older citizens, language impacted people, younger students, etc.). Have them include examples of input and output devices that are used along the data paths of the information processing cycle. Have students create a PDF file of the project to be shared with instructor and editable document file (note: have students compare file sizes).

Resources:
Webopedia
Lifewire: Accessories and hardware
Planning Tank: Information processing cycle
Computer Basics: Input Devices

How-To Informational Video

Duty/Concept Area(s): Designing and Creating Multimedia Projects

Scenario:
You have a reputation for creating informative and instructional videos. As your reputation grows, the number of requests for your videos has grown. You decide to create a how-to video so others have access to your methods.

1. Brainstorm and identify a topic for your how-to video.
2. Identify your audience.
3. Identify effective components for a how-to video.
   a. Search for some similar how-to videos
   b. Determine what is valuable and what needs improvement. Review the design elements, purpose, audience, and text.
4. Share potential ideas with peers for feedback.
5. Create a storyboard for your video. Include the script, sketches, pictures, or video clip for each sequence.
   a. Include an introduction.
   b. Include a fun fact or trivia related to your topic.
   c. Illustrate steps that are easy to understand for all viewers.
6. Create the final video, making sure it is no longer than three minutes.

Big Question: What makes an informational video go viral?

Focused Questions:

1. Why would someone watch your video?
2. How do you capture your target audience’s attention?
3. What makes a viewer abandon a video in the first few seconds?
4. Why do people prefer watching informational videos over using printed directions?
5. When, where, and on what size device will someone watch your video?

Resources:
Adobe Spark
Adobe Spark Video Maker

Holiday Web Page

Duty/Concept Area(s): Designing and Creating Websites

Scenario:
In the week before the winter break, Design, Multimedia, and Web Technologies students will create a festive holiday web page using the following resource: GCTAA: Web Page Design
**Big Question:** How do HTML and CSS combine to produce a web page combining text, color, text fonts, and images?

**Focused Questions:**
- What is the difference between absolute and relative size units and the appropriate uses of each?
- What is a text font? How can you use custom fonts with CSS?

**SOL Correlation:**
Reinforce and apply concept of ratio and proportion as it relates to specifying relative sizes which scale with the dimensions of the viewport in which they are rendered.

**ARI Curriculum Companion: Working with Ratios and Proportions**

**Project-Based Assessment:**
Students will use their web development skills to create a web page involving HTML, CSS, images, and a custom font.

**Resources:**
GCTAA: Web Page Design

**Design Event Advertising Project**

**Duty/Concept Area(s):** Designing and Creating Advanced Visual Design Projects

**Scenario:**
You are a graphic designer working for a publishing company and are tasked with the job of creating three magazine covers for an organization. You will need to define a specific industry or hobby to establish the theme. Remember that the cover reinforces the brand of the magazine.

Magazine covers offer information about what is inside that specific issue. Your designs should identify the personality of the magazine and attract the correct target audience. All magazine covers are required to include: logo, lead article, price, bar code, main image (photograph or illustration created by you), and at least three cover lines (articles).

**Big Question:**
- How will the overall design (e.g., font, color, layout) of my project appeal to my audience?
- What design choices did I make to ensure successful sales of the publication?

**Focused Questions:**
- Who is your audience?
- What color scheme will you use? Why?
- What color format will I work in (e.g., RGB/CMYK)?
- Is the magazine cover easy to read?
- Does the magazine cover stand out and make you want to pick it up as you walk by?

**SOL Correlation:** COM.1, COM.10, COM.12

**Project Management**

**Duty/Concept Area(s):** Enhancing Project Management Skills

**Scenario:**
The teacher will define project management and then lead a discussion on the steps required for project management success. Also, there should be a discussion of the results of not following the appropriate steps.

**Big Question:**

What are the skills associated with project management?

**Focused Questions:**

What skills associated with project management leads to the project being successful?

**Project-Based Assessment:**

Project management is a series of task that work together to make a project successful. The practice of project management assists you in avoiding red flags, saving money, and catching risks before they become a problem. Match the project management task on the left with the results on the right by simply draw a line from the tasks to the results.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan the entire project out with the team working on the project.</td>
<td>The project is going as planned and manages to stay on budget.</td>
</tr>
<tr>
<td>The project team work together to set deadlines for small tasks affiliated with bigger tasks necessary for the project.</td>
<td>The team knows the goal of the project and when it is expected to end.</td>
</tr>
<tr>
<td>Have meeting with people affected by the project.</td>
<td>Any member of the team can review the project chart and know when their task is due.</td>
</tr>
<tr>
<td>Set a budget for the project.</td>
<td>Members of the team are excited about the project and know exactly what to expect.</td>
</tr>
<tr>
<td>Develop a Gantt chart and make it public so all members of the project team know the deadlines.</td>
<td>All members of the project team are aware of smaller tasks deadlines.</td>
</tr>
</tbody>
</table>

**Customer Website Project**

**Duty/Concept Area(s):** Examining Web Technologies; Designing and Creating Advanced Websites

**Scenario:**

Build a website for a customer to meet their needs, utilizing HTML, CSS, and JavaScript.

**Big Question:** What are the skills and business practices needed to develop a public facing website for a customer?

**Focused Questions:**

- What are the customer needs that can be addressed using a public website?
- How can an iterative approach to web development involving customer feedback be utilized to meet customer needs?
- What are the specific technical skills required?
- What are the design skills required?

**Project-Based Assessment:**

GCTAA Project: Part 1
GCTAA Project: Part 2

**Resources:**
Cyber Security and Cyber Forensics Infusion Units

Cyber Security and Cyber Forensics Infusion Units (CYBR) were designed to be infused with designated CTE courses to help students in those programs achieve additional, focused, validated tasks/competencies in personal and professional cyber security skills. These units are not mandatory, and, as such, the tasks/competencies are marked as "optional," to be taught at the instructor's discretion.

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”
Appendix: Credentials, Course Sequences, and Career Clusters

Industry Credentials: Only apply to 36-week courses

- Adobe Certified Associate (ACA) Examinations
- App Development with Swift Level 1 Examination
- Avid Certified Professional for Media Composer Certification Examination
- Avid Certified User for Media Composer Certification Examination
- AWS Certified Cloud Practitioner Certification Examination
- Certified Internet Web (CIW) Advanced HTML 5 and CSS 3 Specialist Examination
- Certified Internet Web (CIW) Data Analyst Examination
- Certified Internet Web (CIW) Database Design Specialist Examination
- Certified Internet Web (CIW) E-Commerce Services Specialist Examination
- Certified Internet Web (CIW) Internet Business Associate Examination
- Certified Internet Web (CIW) JavaScript Specialist Examination
- Certified Internet Web (CIW) JavaScript Specialist Examination
- Certified Internet Web (CIW) Site Development Associate Examination
- Certified Internet Web (CIW) Social Media Strategist Examination
- Certified Internet Web (CIW) User Interface Designer Examination
- Certified Internet Web (CIW) Web Design Specialist Examination
- Certified Internet Web (CIW) Web Security Specialist Examination
- Cloud Essentials Certification Examination
- Code HS Level 1 Certification Examinations
- College and Work Readiness Assessment (CWRA+)
- Communication Skills for Business Examination
- Computer Programming Assessment
- IC3 Digital Literacy Certification Examination
- Interactive Media Assessment
- Microsoft 365 Fundamentals Examination
- Microsoft Certified Azure Fundamentals Examination
- Microsoft Dynamics 365 Fundamentals Examination
- Microsoft Office Specialist (MOS) Examinations
- Microsoft Technology Associate (MTA) Examinations
- National Career Readiness Certificate Assessment
- Web Design Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Accounting (6320/36 weeks)
- Accounting, Advanced (6321/36 weeks)
- Business Law (6131/36 weeks)
- Business Law (6132/18 weeks)
- Business Management (6135/36 weeks)
- Business Management (6136/18 weeks)
- Computer Information Systems (6612/36 weeks)
- Computer Information Systems (6614/18 weeks)
- Computer Information Systems, Advanced (6613/36 weeks)
- Computer Information Systems, Advanced (6615/18 weeks)
- Computer Network Software Operations (6650/36 weeks)
- Computer Network Software Operations, Advanced (6651/36 weeks)
- Cybersecurity Software Operations (6304/36 weeks)
- Design, Multimedia, and Web Technologies, Advanced (6631/36 weeks)
- Design, Multimedia, and Web Technologies, Advanced (6633/18 weeks)
- Digital Applications (6611/36 weeks)
- Digital Applications (6617/18 weeks)
- Information Technology Fundamentals (6670/36 weeks)
- International Baccalaureate Business Management (IB6135/36 weeks)
- International Baccalaureate Information Technology in a Global Society (IB6613/36 weeks)
- Legal Administration (6736/18 weeks)
- Legal Administration (6735/36 weeks)
- Medical Administration (6731/18 weeks)
- Medical Administration (6730/36 weeks)
- Office Administration (6622/18 weeks)
- Office Administration (6621/36 weeks)
- Office Specialist I--Preparation (6740/36 weeks)
- Office Specialist II--Preparation (6741/36 weeks)
- Office Specialist III--Preparation (6742/36 weeks)
- Principles of Business and Marketing (6116/18 weeks)
- Principles of Business and Marketing (6115/36 weeks)
- Programming (6640/36 weeks)
- Programming, Advanced (6641/36 weeks)

**Career Cluster: Arts, Audio/Video Technology and Communications**

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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<tbody>
<tr>
<td><strong>Audio and Video Technology and Film</strong></td>
<td>Audio and Video Equipment Technician</td>
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<td>Audio-Video Designer, Engineer</td>
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<td>Editor</td>
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<td>Graphic Designer</td>
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<td></td>
<td>Multimedia Artist, Animator</td>
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<td>Producer</td>
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<td></td>
<td>Sound Engineering Technician</td>
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<td></td>
<td>Videographer</td>
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<tr>
<td><strong>Journalism and Broadcasting</strong></td>
<td>Art Director</td>
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<td></td>
<td>Broadcast Technician</td>
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<td>Editor</td>
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<td>Program Director</td>
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<td>Radio, TV Announcer</td>
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<td>Radio, TV Reporter</td>
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<tr>
<td><strong>Printing Technology</strong></td>
<td>Desktop Publisher</td>
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<td>Job Printer</td>
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<td>Prepress Technician</td>
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<td></td>
<td>Press Operator</td>
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<td>Production, Planning, Expediting Clerk</td>
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<tr>
<td><strong>Visual Arts</strong></td>
<td>Commercial Photographer</td>
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<td>Costume Designer</td>
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<td>Fashion Designer</td>
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<td>Fashion Illustrator</td>
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<td>Graphic Designer</td>
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<td>Illustrator</td>
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<td>Interior Designer</td>
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<td>Media Planner, Buyer</td>
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<td>Multimedia Artist, Animator</td>
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<td>Photographic Process Technician</td>
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<td>Textile Designer</td>
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## Career Cluster: Information Technology

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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<tbody>
<tr>
<td>Information Support and Services</td>
<td>Account Executive&lt;br&gt;Administrative Assistant&lt;br&gt;Applications Integrator&lt;br&gt;Communications Equipment Operator&lt;br&gt;Computer Support Specialist&lt;br&gt;Computer Systems Engineer, Architect&lt;br&gt;Customer Service Representative&lt;br&gt;Data Entry Specialist&lt;br&gt;Data Modeler&lt;br&gt;Database Administrator&lt;br&gt;Database Analyst&lt;br&gt;Executive Assistant&lt;br&gt;Front Office Assistant&lt;br&gt;Geographic Information Systems (GIS) Technician&lt;br&gt;Information Systems Analyst&lt;br&gt;Instructional Coordinator&lt;br&gt;Internet Entrepreneur&lt;br&gt;Maintenance Technician&lt;br&gt;Medical Transcriptionist&lt;br&gt;Multimedia Artist, Animator&lt;br&gt;Network Systems and Data Communication Analyst&lt;br&gt;Paralegal&lt;br&gt;Receptionist&lt;br&gt;Records Processing Assistant&lt;br&gt;Software Test Engineer&lt;br&gt;Systems Analyst&lt;br&gt;Technical Writer&lt;br&gt;Word Processor</td>
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<tr>
<td>Web and Digital Communications</td>
<td>Applications Integrator&lt;br&gt;Computer Support Specialist&lt;br&gt;Computer Systems Engineer, Architect&lt;br&gt;Game Designer, Programmer&lt;br&gt;Graphic Designer&lt;br&gt;Instructional Coordinator&lt;br&gt;Multimedia Artist, Animator&lt;br&gt;Project Manager&lt;br&gt;Radiologic Technologist, Radiographer&lt;br&gt;Software Test Engineer&lt;br&gt;Systems Analyst&lt;br&gt;Web Developer&lt;br&gt;Webmaster</td>
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## Career Cluster: Science, Technology, Engineering and Mathematics

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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<tbody>
<tr>
<td>Engineering and Technology</td>
<td>Architect&lt;br&gt;Assembler&lt;br&gt;Civil Engineering Technician&lt;br&gt;Commercial and Industrial Designer&lt;br&gt;Computer Hardware Engineer&lt;br&gt;Computer Programmer&lt;br&gt;Computer Software Engineer&lt;br&gt;Engineering Technician&lt;br&gt;Industrial Engineering Technician&lt;br&gt;Landscape Architect&lt;br&gt;Machine Setter, Operator</td>
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<tr>
<td>Pathway</td>
<td>Occupations</td>
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<tr>
<td>Materials Engineer</td>
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<td>Mechanical Drafter</td>
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<tr>
<td>Mechanical Engineering Technician</td>
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<tr>
<td>Network and Computer Systems Administrator</td>
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<td>Network Systems and Data Communication Analyst</td>
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<td>Production, Planning, Expediting Clerk</td>
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<td>Project Manager</td>
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<td>Quality Technician</td>
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<td>Statistician</td>
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<tr>
<td>Stockroom, Warehouse, or Storage Yard Stock Clerk</td>
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<tr>
<td>Systems Analyst</td>
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<tr>
<td>Technical Writer</td>
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<tr>
<td>Telecommunications Specialist</td>
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<td>Transportation Manager</td>
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