Minnesota Business, Marketing, and Information Technology Frameworks: Information Technology Cluster
**Information Technology Cluster**

The Information Technology Cluster includes learning how to design, develop, and manage information, software, and hardware programs. Students develop skills including planning, problem solving, organizational skills, communication, and teamwork. Career opportunities in information technology are available in every sector of the economy in all career fields. Students completing a program of study related to careers in this cluster will be prepared for careers in mobile application development and support, software development, multimedia application, database administration, graphic and web design, and cyber/cloud security.

**Experiential Learning**

Experiential Learning consists of Job Shadowing experiences, Service Learning experiences, School-Based Enterprise (SBE) operation, Work-Based Learning (WBL) internships, and Youth Apprenticeships. Experiential Learning is a required component of the total business, marketing, and instructional technology education program, with the intention that opportunities will be available for every student. Through involvement in Experiential Learning activities, students are able to consider multiple careers and occupations, learn expected workplace behavior, develop specific skills within an industry, and are given opportunities to apply academic and occupational skills in the workplace or a simulated workplace environment. Through these strategies, students learn how to apply what they are learning in the classroom as they prepare to transition into the world of college and career opportunities.

**Career Technical Student Organizations: Business Professionals of America (BPA) and DECA**

The mission of Business Professionals of America (BPA) is to contribute to the preparation of global professionals through the advancement of leadership, citizenship, academic and technological skills. BPA provides innovation leadership in Career and Technical Education, providing students with opportunities for growth through education, competition, community service and personal development. DECA prepares emerging leaders and entrepreneurs in marketing, finance, hospitality and management in high schools and colleges around the globe. DECA has impacted the lives of more than ten million students, educators, school administrators and business professionals since it was founded in 1946. DECA prepares the next generation to be Academically Prepared, Community Oriented, Professionally Responsible, and Experienced Leaders. Career and leadership development activities are embedded throughout the entire career cluster through classroom instruction and projects, as well as the DECA and BPA competitive event programs.

**Cluster Courses**

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<td>64 Introduction to Information Technology</td>
<td>67 Multimedia and Video 2</td>
<td>75 Advanced Programming/Computer Sci 2</td>
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<tr>
<td>65 Photography and Photojournalism</td>
<td>69 Graphic Design 2</td>
<td>76 Management Information Systems (MIS)</td>
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<tr>
<td>66 Multimedia and Video 1</td>
<td>71 Web Development 2</td>
<td>77 Data Statistics and Analytics</td>
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<tr>
<td>68 Graphic Design 1</td>
<td>72 Digital Game Design 1</td>
<td>78 Networking (CISCO) (A+)</td>
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<tr>
<td>70 Web Design 1</td>
<td>73 Digital Game Design 2</td>
<td>79 IB Information Tech in a Global Society</td>
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<tr>
<td>74 Intro to Programming/Computer Sci 1</td>
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<td>80 AP Computer Science A</td>
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### Employability Skills: Information Technology Cluster

#### Topic/Strand 1: Academic Foundations

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<th>Performance Indicator/Standard</th>
<th>Measures/Benchmarks</th>
<th>Sample Learning Targets</th>
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<tbody>
<tr>
<td>IT01.01 Demonstrate language arts knowledge and skills required for effective business communications.</td>
<td>IT01.01.01 Adapt language for audience, purpose, and situation. IT01.01.02 Organize written information and evaluate for accuracy, clarity, fact, and relevancy. IT01.01.03 Compose and edit focused copy for a variety of written documents. IT01.01.04 Use correct grammar, spelling, punctuation, and capitalization when developing information for print or electronic use. IT01.01.05 Present formal and informal presentations including discussion, information requests, interpretation, and persuasive arguments.</td>
<td>I will be able to develop web site text focused on a specific target audience. I will be able to write a simple program in a computer language. I will be able to read and understand programming problem descriptions.</td>
</tr>
<tr>
<td>IT01.02 Communicate idea using appropriate industry terminology.</td>
<td>IT01.02.01 Express information, processes, and ideas using technical industry terminology.</td>
<td>I will be able to apply technical industry terminology to professional communications and work performance tasks.</td>
</tr>
<tr>
<td>IT01.03 Demonstrate mathematics knowledge and skills required to solve problems and communicate information.</td>
<td>IT01.03.01 Demonstrate knowledge of basic arithmetic operations such as addition, subtraction, multiplication, and division and the use of relational expressions such as equal to, not equal to, greater than, and less than. IT01.03.02 Apply data and measurements to solve a problem. IT01.03.03 Analyze mathematical problem statements for missing and/or irrelevant data. IT01.03.04 Analyze and apply data when interpreting operational documents.</td>
<td>I will be able to write programs demonstrating proficiency in mathematics. I will be able to choose appropriate data to test my programs.</td>
</tr>
<tr>
<td>IT01.04 Demonstrate science knowledge and skills required to solve problems and communicate information.</td>
<td>IT01.04.01 Evaluate and apply analytical problem-solving methods, data gathering, direct and indirect observation, predictions, and problem identification.</td>
<td>I will be able to create computer programs that follow accepted computer science guidelines.</td>
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## Topic/Strand 2: Business and Workplace Communications

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<tr>
<td>IT02.01 Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.</td>
<td>IT02.01.01 Demonstrate use of content, technical concepts, and vocabulary when analyzing information and following directions. IT02.01.02 Interpret and communicate information, data, and observations to apply information learned from reading to actual practice.</td>
<td>I will be able to explain technical terminology and procedures that apply to my work. I will be able to incorporate programming comments into my web site development to aid other developers in using and modifying code. I will be able to read and understand technical material as it applies to computer programming.</td>
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<tr>
<td>IT02.02 Demonstrate use of the concepts, strategies, and systems for obtaining and conveying ideas and information to enhance communication in the workplace.</td>
<td>IT02.02.01 Document and report on designs and codes used to develop a web site. IT02.02.02 Communicate clearly with other peers/employees on workplace projects or objectives.</td>
<td>I will be able to produce programs with proper commenting and correct code. I will be able to produce documentation to describe a program using tools such as flow charts, pseudocode or UML.</td>
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<tr>
<td>IT02.03 Locate, organize, and reference written information from various sources to communicate with stakeholders.</td>
<td>IT02.03.01 Locate, organize, and reference written information from various sources to communicate with co-workers and clients/participants.</td>
<td>I will be able to search Internet sources for assistance with web site programming and content.</td>
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<tr>
<td>IT02.04 Evaluate and use information resources to accomplish specific occupational tasks.</td>
<td>IT02.04.01 Evaluate and use information resources to accomplish specific occupational tasks.</td>
<td>I will be able to compare and contrast the pros and cons of different computer languages.</td>
</tr>
<tr>
<td>IT02.05 Use correct grammar, punctuation, and terminology to write and edit documents.</td>
<td>IT02.05.01 Compose web site text and programming documentation that is clear, succinct, and accurate using correct grammar, spelling, punctuation, and capitalization.</td>
<td>I will be able to create written communications with clear messages and accurate formats. I will be able to write using correct grammar, spelling, punctuation, and capitalization.</td>
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<tr>
<td>IT02.06 Develop and deliver formal and informal presentations using appropriate media to engage and inform audiences.</td>
<td>IT02.06.01 Prepare and deliver oral presentations to provide information for specific purposes and audiences that sustains the listener’s attention and interest. IT02.06.02 Present or demonstrate web and graphic arts design work. IT02.06.03 Revise web or graphic arts design work based on critique and feedback. IT02.06.04 Identify and prepare support materials that will enhance an oral presentation.</td>
<td>I will be able to present my web site or graphic arts design work to various audiences. I will be able to revise my work based on feedback to enhance the quality of the work and better meet client needs. I will be able to present and explain my software designs/programming using standard presentation software.</td>
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### Topic/Strand 3: Critical Thinking and Problem-Solving

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<tbody>
<tr>
<td>IT03.01 Apply generally accepted practices and principles to create products that solve business problems or address business needs.</td>
<td>IT03.01.01 Identify and apply the elements of design to a layout in order to solve a customer scenario. IT03.01.02 Identify and apply the principles of design (communication, organization, and attractiveness) to a layout in order to solve a customer scenario. IT03.01.03 Identify and apply the principles of typography to effectively communicate primary and secondary meanings.</td>
<td>I will be able to analyze a business communication need and develop a graphic design to communicate the appropriate message to the intended audiences. I will be able to explain methods of communicating through the use of text and graphic elements. I will be able to utilize appropriate codes/tags to create a webpage design layout.</td>
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<tr>
<td>IT03.02 Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize, and evaluate).</td>
<td>IT03.02.01 Analyze elements of a problem to develop creative solutions. IT03.02.02 Use problem-solving methods to develop proposed solutions. IT03.02.03 Evaluate ideas, proposals, and solutions to problems. IT03.02.04 Identify and evaluate alternatives using a variety of problem-solving and critical thinking skills.</td>
<td>I will be able to compare and contrast HTML and CSS. I will be able to apply problem-solving processes to develop a graphic design solution to a business problem. I will be able to describe the requirements for a web site including web accessibility. I will be able to evaluate the effectiveness of my completed work in solving the problem to be addressed.</td>
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<tr>
<td>IT03.03 Employ creativity and innovation to solve problems and make decisions.</td>
<td>IT03.03.01 Generate creative and innovative ideas to solve problems by brainstorming possible solutions. IT03.03.02 Critically analyze information to determine value to the problem or decision. IT03.03.03 Describe the problem and how a design (or designs) will create a solution to the problem.</td>
<td>I will be able to apply creativity and innovation to communicate a message or solve a problem through graphic design. I will be able to develop creative and innovative web site designs utilizing available media and content sources. I will be able to creatively adapt coding elements to produce programming that solves a business problem.</td>
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## Topic/Strand 4: Information Technology Applications

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<tr>
<td>IT04.01 Employ collaborative/groupware communication and scheduling applications to facilitate group work and workflow.</td>
<td>IT04.01.01 Save and access documents on secured locations outside the user computing device. IT04.01.02 Manage personal schedules and contact information. IT04.01.03 Facilitate group work through management of shared calendars, files, and communication tools. IT04.01.04 Assess potential business uses for cloud, mobile, and digital technology tools.</td>
<td>I will be able to save documents to desired locations on a server or in cloud-based storage. I will be able to use groupware tools to manage my calendar and email contacts. I will be able to use shared collaboration tools to work with peers. I will be able to describe the potential business uses of cloud, mobile, and digital technology tools (i.e. Square, QR Codes, Electronic Signatures).</td>
</tr>
<tr>
<td>IT04.02 Use computer-based systems and applications to manage work tasks.</td>
<td>IT04.02.01 Utilize computer application software to create and store support documentation for technology products and designs. IT04.02.02 Operate computer-managed equipment, peripherals, and network devices to complete work tasks.</td>
<td>I will be able to use word processing and spreadsheet software to document and store reference and coding documentation. I will be able to use computer systems to manage and operate office peripherals.</td>
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<tr>
<td>IT04.03 Operate Internet-based applications to perform work tasks.</td>
<td>IT04.03.01 Select, access, and operate Internet-based applications to perform workplace tasks to industry standards.</td>
<td>I will be able to select, access, and use Internet-based applications to perform workplace tasks.</td>
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### Topic/Strand 5: Intercultural Competence

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<tr>
<td>IT05.01 Understand the environmental, social, global, and economic impacts of decisions within an organization.</td>
<td>IT05.01.01 Explain the cultural, social, historical, and business changes that have influenced technology use in business. IT05.01.02 Adhere to policies and procedures related to information security. IT05.01.03 Analyze current global issues related to publishing, AV technologies, telecommunications, printing, and media.</td>
<td>I will be able to describe the impact of visual graphics used for business in a global environment. I will be able to explain the difference between identity theft and fraud, and know the steps for prevention and resolution when such activities occur.</td>
</tr>
<tr>
<td>IT05.02 Implement quality control systems and practices to ensure quality products and information security.</td>
<td>IT05.02.01 Describe quality control standards and practices common to the workplace. IT05.02.02 Adhere to policies and procedures related to information security.</td>
<td>I will be able to apply appropriate file naming and access rights for directories and files. I will be able to explain the difference between identity theft and fraud, and know the steps for prevention and resolution when they occur.</td>
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<td>IT05.03 Employ project management knowledge, skills, and tools to enhance results and complete work tasks.</td>
<td>IT05.03.01 Develop goals and objectives. IT05.03.02 Prioritize tasks to be completed. IT05.03.03 Create positive team dynamics and effectively complete tasks by adapting to cultural differences and commonalities of team members. IT05.03.04 Use project management skills to improve workflow, work quality, and completion time.</td>
<td>I will be able to identify and prioritize project goals and tasks to be completed. I will be able to analyze my own intercultural development and adapt to differences and commonalities of my team members. I will be able to develop a plan and timeline for completing a workplace project.</td>
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### Topic/Strand 6: Safety, Health and Environmental

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<tbody>
<tr>
<td>IT06.01 Maintain safe and healthy working environments by implementing personal and jobsite safety rules and industry-appropriate regulations.</td>
<td>IT06.01.01 Adhere to OSHA health and safety regulations to support a safe and healthy work environment. IT06.01.02 Implement technology use techniques to avoid technology-related injuries and fatigue. IT06.01.03 Demonstrate safe use of technology and equipment according to manufacturer safety regulations. IT06.01.04 Explain and comply with sexual harassment policies to create a non-hostile work environment.</td>
<td>I will be able to explain the importance of OSHA regulations and identify the areas of business operations that they regulate. I will be able to demonstrate computer use that prevents repetitive-stress injuries and fatigue. I will be able to demonstrate proper and safe use of office technology equipment. I will be able to explain policies that support a professional, non-hostile work environment.</td>
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## Topic/Strand 7: Leadership and Teamwork

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| IT07.01 Demonstrate interpersonal skills to accomplish organizational goals and objectives. | IT07.01.01 Exhibit personal and interpersonal skills appropriate to the workplace.  
IT07.01.02 Build effective working relationships using interpersonal skills.  
IT07.01.03 Use positive interpersonal skills to work cooperatively with co-workers representing different cultures, genders, and backgrounds. | I will be able to work individually and with others to accomplish daily work and projects.  
I will be able to demonstrate effective verbal and non-verbal communication skills.  
I will be able to demonstrate interpersonal skills used in professional environments (i.e. leadership, respect, positive attitude, integrity,). |
| IT07.02 Employ teamwork skills to achieve collective goals and use team members’ talents effectively. | IT07.02.01 Organize team involvement within groups.  
IT07.02.02 Distribute responsibility and work load fairly.  
IT07.02.03 Recognize a variety of viewpoints in making decisions to accomplish business objectives.  
IT07.02.04 Employ conflict management skills to facilitate solutions. | I will be able to participate in work-related planning, production, and group presentations.  
I will be able to demonstrate accountability for completion of work assigned to me or my team.  
I will be able to apply conflict-management skills to conflicts that arise among team members. |
| IT07.03 Use leadership skills and ongoing training to accomplish organizational goals and objectives. | IT07.03.01 Employ organizational and team development skills to foster positive working relationships and accomplish organizational goals.  
IT07.03.02 Identify traits of effective teams in relation to self, team, community, diversity, and environment. | I will be able to work in a team to generate ideas, solve, or critique a desktop publishing task. |
### Topic/Strand 8: Ethics and Legal Responsibilities

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| IT08.01 Demonstrate knowledge of ethical and legal issues related to technology products and communications. | IT08.01.01 Demonstrate knowledge of copyright and intellectual property law.  
IT08.01.02 Demonstrate ethical behavior as it relates to the graphic design industry. | I will be able to identify legal and ethical responsibilities of using original graphic work, and using free-use and copyrighted graphics.  
I will be able to explain intellectual property rights in a global community. |
| IT08.02 Describe businesses’ responsibility to know and abide by laws and regulations that affect technology applications and communications. | IT08.02.01 Identify the copyright laws in relation to seeking formal permission for use of proprietary materials.  
IT08.02.02 Determine correct code to use in a web document to meet W3C coding and accessibility standards. | I will be able to explain how to obtain formal permission to use copyrighted material in a graphic design project.  
I will be able to use HTML and CSS for website navigational accessibility. |
| IT08.03 Apply ethical reasoning to a variety of workplace situations in order to make ethical decisions. | IT08.03.01 Evaluate alternative responses to workplace situations based on legal responsibilities and employer policies.  
IT08.03.02 Evaluate alternative responses to workplace situations based on personal or professional ethical responsibilities.  
IT08.03.03 Explain personal and long-term workplace consequences of unethical or illegal behaviors.  
IT08.03.04 Determine the most appropriate response to workplace situations based on legal and ethical considerations. | I will be able to explain legal issues that impact web design professionals.  
I will be able to demonstrate ethical behavior and compliance with intellectual property laws and copyright laws when creating a website.  
I will be able to legally produce or acquire graphics content.  
I will be able to explain common forms of cybercrimes and methods of preventing them. |
| IT08.04 Exhibit ethical conduct in writing, creating, printing, and publishing technology products. | IT08.04.01 Analyze ethical conduct that provides proper credit to those whose ideas and content have been used.  
IT08.04.02 Analyze ethical standards that apply to the delivery of quality performance and products.  
IT08.04.03 Identify the proper use of proprietary information. | I will be able to demonstrate methods of giving credit to others’ contributions to a graphic design project. |
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| IT09.01 Identify and demonstrate positive work behaviors and personal qualities needed to be employable. | IT09.01.01 Demonstrate self-discipline, self-worth, positive attitude, and integrity in a work situation.  
IT09.01.02 Demonstrate flexibility and willingness to learn new knowledge and skills.  
IT09.01.03 Apply communication strategies when adapting to a culturally diverse environment.  
IT09.01.04 Identify positive work qualities typically desired in this career cluster's pathways. | I will be able to demonstrate behaviors, attitudes, and traits needed in a professional employment setting. |
| IT09.02 Develop strategies to make an effective transition from school to career. | IT09.02.01 Investigate education and occupational opportunities using a variety of resources (e.g., speakers, research, job shadowing, etc.)  
IT09.02.02 Identify career opportunities utilizing technology skills that align with personal skills and interests. | I will be able to explain the importance of developing career skills, their effect on my employability, and my future success.  
I will be able to describe the training and education requirements for a business career matching my skills and interests. |
| IT09.03 Maintain a career portfolio to document knowledge, skills, and experience in a career field. | IT09.03.01 Utilize personal inventory tools to identify personal traits, behaviors, and skills.  
IT09.03.02 Select model documents and electronic communications to include in a career portfolio.  
IT09.03.03 Organize electronic or physical portfolio for use in demonstrating knowledge, skills, certifications, and experiences. | I will be able to compile a portfolio with examples of my best work for each document type created. |
| IT09.04 Analyze employment and career opportunities related to graphic design, web design, and programming and the economic factors influencing the career field. | IT09.04.01 Identify the technology industry’s economic base, business practices, and projected growth for career opportunities. | I will be able to describe the outlook for trending technology career fields and the economics affecting these trends. |
| IT09.05 Complete required training, education, and certification to prepare for employment in a particular career field. | IT09.05.01 Identify training, education, and certification requirements for occupational choice.  
IT09.05.02 Participate in career-related training and/or degree programs.  
IT09.05.03 Pass certification tests to qualify for licensure and/or certification in chosen occupational area. | I will be able to demonstrate the knowledge and skills needed to pass a Technical Skills Assessment (TSA) on word processing basics. |
Career Field: Arts, Communication, and Information Systems

Cluster: Information Technology  
Program: 140710

Course Title: Graphic Design 1  
Course Code: 68

Alternate Course Titles: Design Basics, Web and Digital Design

Course Description: This course will introduce students to the technical, artistic, and conceptual principles of graphic design. Areas of study include past and current uses of graphic design, elements of design, technical software skills, media vocabulary, layout principles, structure and style, history of design, and ethical and legal issues related to graphic design. Students will use this knowledge of principles to create and present original graphic art products using both technical skill and artistic principles that communicate a message. Students will also analyze and comment on graphic presentations for their effectiveness, style and structure, intent, and message. Students will revise and improve graphic designs to meet the needs of the customer using feedback.

CTSO Competitive Events:
BPA: Graphic Design Promotion

SkillsUSA: Graphic Design

Suggested Technical Skill Assessments (TSA) or Industry-Recognized Credentials:
Precision Exams—3D Animation

Performance Indicators/Standards and Measures/Benchmarks were developed from the following sources:

- Minnesota Technical Skills Attainment
- Minnesota Common Core Competencies
- ISTE National Educational Technology Standards for Students (NETS-S)
- National Business Education Association Standards
- States’ Career Clusters Initiative
- MBA Research National Standards for Business Administration
- Minnesota Academic Standards in the Arts
- International Baccalaureate Curriculum – Visual Arts
### Topic/Strand 10: Technical Skills

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| IT68.10.01 Communicate ideas using appropriate industry terminology. | IT68.10.01.01 Understand the elements and principles of media arts.  
IT68.10.01.02 Analyze how the elements in media arts such as image, sound, space, time, motion, and sequence or visual art elements including color, line, shape, value, form, texture, and space are combined to communicate meaning in the creation of, presentation of, or response to graphic design.  
IT68.10.01.03 Evaluate how the principles of media arts such as repetition, unity, and contrast are used in the creation of, presentation of, or response to media artworks. | I will be able to communicate meaning through describing the use and purpose of media arts elements and their use in connection with each other.  
I will be able to explain how elements influence the design (dimensions of color, perceptions of color, relationship to other graphics). |
| IT68.10.02 Demonstrate knowledge and history of graphic design including its cultural use, fundamental principles and elements, typography, color, measurement, and narratives. | IT68.10.02.01 Analyze how the characteristics of a variety of styles and genres such as documentary, narrative, or abstract, contribute to the creation of, presentation of, or response to graphic design.  
IT68.10.02.02 Apply understanding of diverse cultures related to the creation or interpretation of a graphic design.  
IT68.10.02.03 Understand design as a visual language built on fundamental principles and elements.  
IT68.10.02.04 Describe the history and modern use of typography.  
IT68.10.02.05 Define typographic terms and explain measurement systems.  
IT68.10.02.06 Investigate color theory and its cultural, symbolic, and psychologic influences.  
IT68.10.02.07 Explore the variety of uses of text and graphic design elements in historical and modern use. | I will be able to describe graphic design techniques and the processes involved in their use today and historically.  
I will be able to explain how graphic elements have evolved and their use culturally and for visual communication today.  
I will be able to demonstrate the principles and elements of design as a visual language. |
| IT68.10.03 Demonstrate knowledge and effective use of professional design components in the creation and presentation of a graphic design project. | IT68.10.03.01 Demonstrate knowledge of typography styles and applications.  
IT68.10.03.02 Describe the uses of shape, space, line, size color, texture, organization, and typography as compositional content.  
IT68.10.03.03 Organize and present written, graphic, and numeric information in business infographic formats.  
IT68.10.03.04 Explain how the principles of design including unity, variety, hierarchy, dominance, proportion, and balance affect the design composition as a whole. | I will be able to explain how the principles of design have been used in an original graphic design project.  
I will be able to create a portfolio or present my graphic design work or samples.  
I will be able to edit a graphic design using feedback from others.  
I will be able to provide feedback to others on how the principles of design are interpreted. |
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<tr>
<td>IT68.10.03.05 Explain how the supporting principles of scale, emphasis, rhythm, movement, proximity, and repletion affect internal relationships of the elements within a design composition.</td>
<td>I will be able to demonstrate professional graphic design techniques using industry-standard software. I will be able to create graphic designs that communicate to a target audience. I will be able to demonstrate typographic skills while creating design solutions.</td>
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<tr>
<td>IT68.10.04 Create an original graphic design that demonstrates business meaning and communicates an intended message.</td>
<td>IT68.10.04.01 Develop graphic design concepts through processes that are informed by skills, techniques, and media. IT68.10.04.02 Develop design projects to communicate meaning to a specific audience. IT68.10.04.03 Choose and apply appropriate typography and color to design.</td>
<td>I will be able to demonstrate professional graphic design techniques using industry-standard software. I will be able to create graphic designs that communicate to a target audience. I will be able to demonstrate typographic skills while creating design solutions.</td>
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<tr>
<td>IT68.10.05 Employ project management skills to improve workflow, quality, and on-time completion of projects.</td>
<td>IT68.10.05.01 Develop goals and objectives. IT68.10.05.02 Prioritize tasks to be completed. IT68.10.05.03 Develop timelines for completion of work tasks.</td>
<td>I will be able to develop and follow a work plan to meet project completion deadlines.</td>
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Career Field: Arts, Communication, and Information Systems

Cluster: Information Technology

Course Title: Web Design 1

Alternate Course Titles: Web Page Design, Website Design

Course Description: This course will introduce students to web page design. In this hands-on, project-oriented course, students will explore new and exciting options available with HTML5 and CSS3. Students will design and create multiple page Web sites with text, graphics, multimedia elements, and interactivity. This course covers the use of HTML5 (Hypertext Markup Language version 5), CSS3 (Cascading Style Sheets version 3), the optimization of graphics, and the application of multimedia elements to produce efficient, interactive web sites. Units will include Getting Started with HTML, Structuring Content in a Web Document, Getting Started with CSS, Laying Out Elements with CSS, Formatting Text with CSS, Inserting and Working with Links, Inserting and Working with Images, and Organizing Content with Lists and Tables. Students will create web sites to communicate a client’s message through the application of the principles and elements of design. Students will also research career pathway opportunities related to website design.

CTSO Competitive Events:
BPA: Fundamentals of Web Design

SkillsUSA: Web Design

Suggested Technical Skill Assessments (TSA) or Industry-Recognized Credentials:
Precision Exams—Web Development I
Precision Exams—Business Web Page Design

Performance Indicators/Standards and Measures/Benchmarks were developed from the following sources:
• Minnesota Technical Skills Attainment
• Minnesota Common Core Career Technical Competencies
• ISTE National Educational Technology Standards for Students (NETS-S)
• National Business Education Association Standards
• States’ Career Clusters Initiative
### Topic/Strand 10: Technical Skills

<table>
<thead>
<tr>
<th>Performance Indicator/Standard</th>
<th>Measures/Benchmarks</th>
<th>Sample Learning Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT70.10.01 Employ planning and time management skills and tools to enhance results and complete work tasks.</td>
<td>IT70.10.01.01 Develop goals and objectives. IT70.10.01.02 Prioritize tasks to be completed. IT70.10.01.03 Develop timelines using time management knowledge and skills. IT70.10.01.04 Use project management skills to improve workflow and minimize costs.</td>
<td>I will be able to create and refine design concepts.</td>
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<tr>
<td>IT70.10.02 Demonstrate the effective use of website development tools on web development projects.</td>
<td>IT70.10.02.01 Select and use appropriate and efficient software tools.</td>
<td>I will be able to utilize integrated development environments (such as Visual Studio, Dreamweaver, Flash, Waterproof, etc.) for web development projects.</td>
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<tr>
<td>IT70.10.03 Demonstrate the effective use of website design and development techniques on web development projects.</td>
<td>IT70.10.03.01 Apply web design skills to web development projects. IT70.10.03.02 Implement appropriate coding for inclusion of a variety of web page elements. IT70.10.03.03 Create websites that follow accepted W3C guidelines.</td>
<td>I will be able to produce web site designs that demonstrate principles of website usability, readability, and accessibility. I will be able to create HTML documents with proper tags, comments, attributes, and div elements. I will be able to create an embedded style sheet using CSS (Cascading Style Sheets). I will be able to use CSS to format page appearance and link to an external style sheet. I will be able to use HTML to link to webpages or pdf files. I will be able to insert images and colors into a webpage using HTML/CSS. I will be able to create HTML links using images. I will be able to create HTML lists and tables. I will be able to apply principles and elements of design (color theory and schemes, proximity, alignment, repetition, web graphics, optimization, typography) to web site design and development.</td>
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Career Field: Arts, Communication, and Information Technology

Cluster: Information Technology
Course Title: Introduction to Programming
Alternate Course Titles: Computer Programming

Course Description: This course will introduce a student to computer programming. The course content will cover both procedure-oriented and object-oriented programming. Structured programs will be written with a computer programming language with an emphasis on procedure-oriented programming. Topics will include objects, classes, methods, properties, flowcharting, pseudocode, top-down design, logic structures, data types, decisions, subroutines, looping, and arrays. The course will also discuss current events and ethical issues that relate to the computer world today as well as look at different computer science careers.

CTSO Competitive Events:
SkillsUSA: Computer Programming

Suggested Technical Skill Assessments (TSA) or Industry-Recognized Credentials:
- Precision Exams—Computer Programming IA
- Precision Exams—Computer Programming IB Python
- Precision Exams—Computer Programming IB C++
- Precision Exams—Computer Programming IB Java

Performance Indicators/Standards and Measures/Benchmarks were developed from the following sources:
- Minnesota Technical Skills Attainment
- Minnesota Common Core Competencies
- National Council of Economic Education
- ISTE National Educational Technology Standards for Students (NETS-S)
- National Business Education Association Standards
- States’ Career Clusters Initiative
### Topic/Strand 10: Technical Skills

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| **IT74.10.01** Demonstrate knowledge of the hardware components and operating systems. | **IT74.10.01.01** Identify the elements of the information processing cycle.  
**IT74.10.01.02** Use available reference tools as appropriate.  
**IT74.10.01.03** Describe the function of various computer system hardware components. | I will be able to describe the operation and interaction of computer hardware system components.  
I will be able to use reference materials to operate and troubleshoot computer hardware systems. |
| **IT74.10.02** Understand the fundamentals of software development. | **IT74.10.02.01** Explain the software development cycle.  
**IT74.10.02.02** Describe the types of languages used in software development.  
**IT74.10.02.03** Summarize how data is organized in software development. | I will be able to write programs utilizing various programming concepts appropriate to the task.  
I will be able to develop software using an accepted program methodology. |
| **IT74.10.03** Identify and analyze customer software needs and requirements to guide programming and software development. | **IT74.10.03.01** Gather data to identify customer requirements using modern technologies.  
**IT74.10.03.02** Conduct needs analysis.  
**IT74.10.03.03** Analyze program requirements, operational specifications, and intended outcomes. | I will be able to design and develop a program that meets the customer/user requirements.  
I will be able to gather information to identify the operation and outcome needs of programs and applications I develop. |
| **IT74.10.04** Demonstrate the effective use of tools for software development to develop software applications. | **IT74.10.04.01** Integrate software tools in developing software applications.  
**IT74.10.04.02** Identify the potential importance and impact of new IT technologies.  
**IT74.10.04.03** Apply language-specific programming tools and techniques. | I will be able to analyze the potential of emerging technologies in programming.  
I will be able to use programming tools and techniques unique to specific programming languages. |
| **IT74.10.05** Design a software application using the software development process. | **IT74.10.05.01** Describe software development processes and methodology.  
**IT74.10.05.02** Describe trade-offs involved in design choices. | I will be able to describe the software development process and the decisions programmers make in design and code. |
| **IT74.10.06** Develop a computer application to demonstrate proficiency using the appropriate programming language. | **IT74.10.06.01** Explain programming language concepts.  
**IT74.10.06.02** Develop applications using appropriate programming languages.  
**IT74.10.06.03** Summarize program development methodology.  
**IT74.10.06.04** Implement software testing procedures to ensure quality products. | I will be able to test a program using a variety of techniques and data.  
I will be able to utilize program design and code compiling applications to develop a program/application.  
I will be able to debug a program. |