

CURRICULUM MAPPING TEMPLATE

Program: Computer Programming/Programmer 11.0201

| Segment | CTE Segments/Performance Elements | CTE Concepts | Math Concepts | Common Core Math Standards Middle School | Common Core Math Standards High School |
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| 1 | Business Communication | | | | |
| | <p>I. ACADEMIC FOUNDATIONS A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities. 1. Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice. 2. Demonstrate use of the concepts, strategies, and systems for obtaining and conveying ideas and information to enhance communication in the workplace. 3. Locate, organize and reference written information from various sources to communicate with co-workers and clients/participants. 4. Evaluate and use information resources to accomplish specific occupational tasks. 5. Use correct grammar, punctuation and terminology to write and edit documents. 6. Develop and deliver formal and informal presentations using appropriate media to engage and inform audiences. 7. Interpret verbal and nonverbal cues/behaviors to enhance communication with co-workers and clients/participants.</p> <p>B. Demonstrate mathematics knowledge and skills required to pursue the full range of post-secondary education and career opportunities. 6. Construct charts/tables/graphs from functions and data.</p> | <p>A2-A7 Students create presentations (ex. Career/College Presentation)</p> <p>B6 Programs that create charts</p> <p>Spreadsheets</p> <p>Students use charts and tables assignments</p> | <p>A2-A7 Statistics – charts and tables</p> <p>B6 Statistics – charts and tables</p> | <p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 7.SP.5; 8.SP.1;</p> | <p>S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.MD.1; S.CP.1</p> |

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| | <p>II. COMMUNICATIONS</p> <p>A. Develop and interpret tables, charts, and figures to support written and oral communications.</p> <ol style="list-style-type: none"> 1. Create tables, charts, and figures to support written and oral communications. 2. Interpret tables, charts, and figures used to support written and oral communication. 3. Effectively use organizational protocols and systems to fulfill customer service requirements. <p>B. Apply active listening skills to obtain and clarify information.</p> <ol style="list-style-type: none"> 1. Interpret a given verbal message/information. 2. Respond with restatement and clarification techniques to clarify information. 3. Model behaviors that demonstrate active listening. 4. Schedule customer appointments. <p>C. Listen to and speak with diverse individuals to enhance communication skills.</p> <ol style="list-style-type: none"> 1. Apply factors and strategies for communicating with a diverse workforce. 2. Demonstrate ability to communicate and resolve conflicts within a diverse workforce. <p>D. Exhibit public relations skills to increase internal and external customer/client satisfaction.</p> <ol style="list-style-type: none"> 1. Communicate effectively when developing positive customer/client relationships. 3. Use correct grammar to communicate verbally. 4. Listen to a presentation and record important information. Report back identifying central themes and use key points to explain how the message applies to a similar situation. | <p>A1-A2</p> <p>Students create presentations (ex. Career/College Presentation)</p> <p>Textbooks/Curriculum have charts and tables</p> | <p>A1-A2</p> <p>Statistics – charts and tables</p> | <p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 7.SP.5; 8.SP.1;</p> | <p>S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.MD.1; S.CP.1</p> |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</p> <ol style="list-style-type: none"> 1. Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate). | <p>A1</p> <p>All computer programs solve problems</p> <p>Logic Puzzles/Logic Groups</p> | <p>A1</p> <p>Algebra – Solving equations</p> <p>Logic – Math symbols and math sequences</p> | <p>6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4</p> | <p>A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6</p> |

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| <p>IV. INFORMATION TECHNOLOGY APPLICATIONS</p> <p>A. Use Personal Information Management (PIM) applications to increase workplace efficiency.</p> <p>2. Create memos and notes.</p> <p>B. Employ technological tools to expedite workflow.</p> <p>1. Use information technology tools to manage and perform work responsibilities.</p> <p>2. Use email to share files and documents.</p> <p>3. Identify the functions and purpose of email systems.</p> <p>4. Use email to communicate within and across organizations.</p> <p>5. Access and navigate Internet (e.g., use a web browser).</p> <p>6. Search for information and resources.</p> <p>7. Evaluate Internet resources for reliability and validity.</p> <p>8. Prepare simple documents and other business communications.</p> <p>9. Prepare reports and other business communications by integrating graphics and other non-text elements.</p> <p>10. Prepare complex multi-media publications.</p> <p>11. Prepare presentations for training, sales and information sharing.</p> <p>12. Deliver presentations with supporting materials.</p> <p>13. Create a spreadsheet.</p> <p>14. Perform calculations and analyses on data using a spreadsheet.</p> <p>15. Manipulate data elements.</p> <p>16. Manage interrelated data elements.</p> <p>17. Analyze interrelated data elements.</p> <p>18. Generate reports showing interrelated data elements.</p> | <p>B13-B14</p> <p>Create spreadsheets</p> <p>Calculate interest and other formulas</p> <p>B15-B18</p> <p>Create programs with lists/arrays</p> | <p>B13-B14</p> <p>Statistics – charts and tables</p> <p>Algebra – solving equations, substituting data into formulas</p> <p>B15-B18</p> <p>Algebra – solving equations, substituting data into formulas</p> | <p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 7.SP.5; 8.SP.1;</p> | <p>S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.MD.1; S.CP.1; F.BF.2</p> |
| <p>V. SYSTEMS</p> <p>A. Describe the nature and types of business organizations to build an understanding of the scope of organizations.</p> <p>1. Describe the types and functions of businesses.</p> <p>2. Explain the functions and interactions of common departments within a business.</p> | | | | |
| <p>VII. LEADERSHIP AND TEAMWORK</p> <p>A. Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p> | | | | |

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| | <p>3. Employ teamwork skills to achieve collective goals and use team members' talents effectively.</p> <p>5. Conduct and participate in meetings to accomplish work tasks.</p> | | | | |
| | <p>VIII. ETHICS AND LEGAL RESPONSIBILITY</p> <p>A. Know and understand the importance of professional ethics and legal responsibilities.</p> <p>2. Interpret and explain written organizational policies and procedures to help employees perform their jobs according to employer rules and expectations.</p> | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>A. Employ information management techniques and strategies in the workplace to assist in decision-making.</p> <p>2. Describe the nature and scope of information management.</p> <p>3. Maintain records to facilitate ongoing business operations.</p> <p>H. Access and use Internet services when completing IT related tasks to service and update IT systems.</p> <p>1. Demonstrate the use of an Internet connection.</p> <p>I. Install and configure software programs to maintain and update IT systems.</p> <p>6. Document procedures, using clear and effective notes, for future use.</p> <p>M. Recognize and analyze potential IT security threats to develop and maintain security requirements.</p> <p>6. Document security procedures.</p> <p>O. Provide IT support and training to maintain proper network functioning.</p> <p>1. Provide Help Desk service to computer users within the organization.</p> <p>2. Provide training for basic computer use within the organization.</p> | | | | |
| 2 | ETHICS, LEGAL, COPYRIGHT, SAFETY | | | | |

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| | <p>IV. INFORMATION TECHNOLOGY APPLICATIONS</p> <p>B. Employ technological tools to expedite workflow.</p> <p>1. Use information technology tools to manage and perform work responsibilities.</p> <p>C. Demonstrate Digital Citizenship</p> <p>1. Identify legal and ethical issues related to the use of information and communication technologies (e.g., properly selecting and citing resources)</p> <p>2. Discuss possible long-range effects of unethical uses of technology (e.g., virus spreading, file pirating, hacking) on cultures and society</p> <p>3. Discuss and demonstrate proper netiquette in online communications</p> <p>4. Identify ways that individuals can protect their technology systems from unethical or unscrupulous users</p> <p>5. Create appropriate citations for resources when presenting research findings</p> <p>6. Discuss and adhere to fair use policies and copyright guidelines</p> | | | | |
| | <p>VI. SAFETY, HEALTH AND ENVIRONMENTAL</p> <p>A. Implement personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.</p> <p>1. Assess workplace conditions with regard to safety and health.</p> <p>2. Select appropriate personal protective equipment as needed for a safe workplace/jobsite.</p> <p>3. Employ a safety hierarchy and communication system within the workplace/jobsite.</p> <p>4. Implement safety precautions to maintain a safe worksite.</p> <p>B. Complete work tasks in accordance with employee rights and responsibilities and employers obligations to maintain workplace safety and health.</p> <p>1. Identify rules and laws designed to promote safety and health in the workplace.</p> <p>2. State the rationale of rules and laws designed to promote safety and health.</p> <p>C. Employ emergency procedures as necessary to provide aid in workplace accidents.</p> | | | | |

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| | <p>1. Use knowledge of First Aid procedures as necessary.</p> <p>2. Use knowledge of CPR procedures as necessary.</p> <p>3. Use safety equipment as necessary.</p> <p>D. Employ knowledge of response techniques to create a disaster and/or emergency response plan.</p> <p>1. Complete an assessment of an emergency and/or disaster situation.</p> <p>2. Create an emergency and/or disaster plan.</p> | | | | |
| | <p>VIII. ETHICS AND LEGAL RESPONSIBILITIES</p> <p>A. Know and understand the importance of professional ethics and legal responsibilities.</p> <p>1. Apply ethical reasoning to a variety of workplace situations in order to make ethical decisions.</p> <p>2. Interpret and explain written organizational policies and procedures to help employees perform their jobs according to employer rules and expectations.</p> <p>3. Explain legal issues faced by IT professionals.</p> | | | | |
| | <p>X. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>C. Know and understand the importance of employability skills.</p> <p>1. Identify and demonstrate positive work behaviors and personal qualities needed to be employable.</p> | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>I. Install and configure software programs to maintain and update IT systems.</p> <p>2. Verify that software to be installed is licensed prior to performing installation.</p> <p>M. Recognize and analyze potential IT security threats to develop and maintain security requirements.</p> <p>1. Describe potential security threats to information systems.</p> <p>2. Identify the range of security needs and the problems that can occur due to security lapses.</p> <p>3. Assess security threats.</p> <p>Q. Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.</p> <p>1. Describe the role of computer forensics</p> | | | | |

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| | <p>investigators.</p> <p>2. Demonstrate the effective use of basic computer applications relating to forensics investigations.</p> <p>3. Identify criminal activity in relationship to cyber crime, the Internet, and Internet trafficking.</p> | | | | |
| 3 | CAREER AND Employability (ENTREPRENEURSHIP) | | | | |
| | <p>I. ACADEMIC FOUNDATIONS</p> <p>A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities.</p> <p>5. Use correct grammar, punctuation and terminology to write and edit documents.</p> | | | | |
| | <p>II. COMMUNICATIONS</p> <p>D. Exhibit public relations skills to increase internal and external customer/client satisfaction.</p> <p>2. Identify organization's products and services (including own strengths as an agent of the company).</p> | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</p> <p>1. Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate).</p> <p>3. Identify, write and monitor workplace performance goals to guide progress in assigned areas of responsibility and accountability.</p> <p>4. Conduct technical research to gather information necessary for decision-making.</p> | <p>A1</p> <p>All computer programs solve problems</p> <p>Logic Puzzles/Logic Groups</p> | <p>A1</p> <p>Algebra – Solving equations</p> <p>Logic – Math symbols and math sequences</p> | <p>6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4</p> | <p>A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6; F.BF.2</p> |
| | <p>IV. INFORMATION TECHNOLOGY APPLICATIONS</p> <p>A. Use Personal Information Management (PIM) applications to increase workplace efficiency.</p> <p>1. Manage personal schedules and contact information.</p> <p>2. Create memos and notes.</p> | | | | |

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| | <p>B. Employ technological tools to expedite workflow.</p> <ol style="list-style-type: none"> 1. Use information technology tools to manage and perform work responsibilities. 6. Search for information and resources. 12. Deliver presentations with supporting materials. | | | | |
| | <p>V. SYSTEMS</p> <p>A. Describe the nature and types of business organizations to build an understanding of the scope of organizations.</p> <ol style="list-style-type: none"> 4. Demonstrate understanding of the impact of IT on businesses. <p>C. Implement quality control systems and practices to ensure quality products and services.</p> <ol style="list-style-type: none"> 2. Integrate IT into various types of business models 3. Diagnose and make necessary corrections or improvements to a technical system in a business, industry, or simulated work place setting. | | | | |
| | <p>VII. LEADERSHIP AND TEAMWORK</p> <p>A. Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p> <ol style="list-style-type: none"> 2. Employ organizational and staff development skills to foster positive working relationships and accomplish organizational goals. 4. Establish and maintain effective working relationships with all levels of personnel and other departments in order to accomplish objectives and tasks. | | | | |
| | <p>VIII. ETHICS AND LEGAL RESPONSIBILITIES</p> <p>A. Know and understand the importance of professional ethics and legal responsibilities.</p> <ol style="list-style-type: none"> 2. Interpret and explain written organizational policies and procedures to help employees perform their jobs according to employer rules and expectations. | | | | |
| | <p>IX. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>A. Know and understand the importance of employability skills.</p> <ol style="list-style-type: none"> 1. Identify and demonstrate positive work | | | | |

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| | <p>behaviors and personal qualities needed to be employable.</p> <ol style="list-style-type: none"> 2. Manage resources in relation to the position (i.e. budget, supplies, computer, etc). 3. Develop a personal career plan to meet career goals and objectives. 4. Identify and explore career opportunities in one or more career pathways to build an understanding of the opportunities available in the cluster. 5. Recognize and act upon requirements for career advancement to plan for continuing education and training. 6. Continue professional development to keep current on relevant trends and information within the industry. 7. Examine licensing, certification and credentialing requirements at the national, state and local levels to maintain compliance with industry requirements. 8. Examine employment opportunities in entrepreneurship to consider entrepreneurship as an option for career planning. <p>B. Demonstrate skills related to seeking and applying for employment to find and obtain a desired job.</p> <ol style="list-style-type: none"> 1. Use multiple resources to locate job opportunities. 2. Prepare a résumé. 3. Prepare a letter of application. 4. Complete an employment application. 5. Interview for employment. 6. List the standards and qualifications that must be met in order to enter a given industry. 7. Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer. 8. Maintain a career portfolio to document knowledge, skills and experience in a career field. 9. Demonstrate skills in evaluating and comparing employment opportunities in order to accept employment positions that match career goals. 10. Identify and exhibit traits for retaining employment to maintain employment once secured. | | | | |
| 4 | INFORMATION TECHNOLOGY FUNDAMENTALS (C) | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills</p> | B5 Debugging and | B5 Math Practices – Error | | N.Q.1; N.Q.2; N.Q.3; S.ID.6 |

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| | <p>(analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation. 4. Conduct technical research to gather information necessary for decision-making.</p> <p>B. Use product/service design processes and guidelines to produce a quality IT product/service. 5. Maintain the reliability of new products/services. 6. Demonstrate the use of design and color principles.</p> | <p>Maintaining Computer Programs</p> | <p>Checking</p> | | |
| | <p>IV. INFORMATION TECHNOLOGY APPLICATIONS B. Employ technological tools to expedite workflow. 5. Access and navigate Internet (e.g., use a web browser). 6. Search for information and resources. 7. Evaluate Internet resources for reliability and validity. 12. Deliver presentations with supporting materials. 22. Manage computer operations. 23. Manage file storage. 24. Compress or alter files. 25. Operate computer driven equipment and machines. 26. Use installation and operation manuals. 27. Troubleshoot computer driven equipment and machines. 28. Access support as needed to maintain operation of computer driven equipment and machines.</p> | <p>B22 and B27 Debugging and Maintaining Computer Programs</p> | <p>B22 and B27 Math Practices – Error Checking</p> | | <p>N.Q.1; N.Q.2; N.Q.3; S.ID.6</p> |
| | <p>X. TECHNICAL SKILLS C. Demonstrate knowledge of the hardware components associated with information systems. 1. Explain the fundamentals of operating systems. 3. hardware 5. Use available reference tools as appropriate. 6. Describe the function of CPUs.</p> <p>D. Compare classes of software associated with the development and maintenance information systems to develop software and maintain computer systems. 1. Explain the key functions and applications of software.</p> | <p>C1-C6 Developing code which is concise, uses memory efficiently and performs garbage collection</p> | <p>C1-C6 Algebra – Simplification of equations</p> | <p>6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4</p> | <p>A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6</p> |

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| | <p>F. Summarize basic data communications components and trends to maintain and update IT systems.</p> <ol style="list-style-type: none"> 1. Explain data communications procedures, equipment and media. 2. Explain data transmission codes and protocols. 3. Explain the differences between local and wide area networks. 4. Summarize data communication trends and issues. <p>G. Describe Internet protocols.</p> <ol style="list-style-type: none"> 1. Describe Internet protocols. 2. Explain Domain Name Server (DNS). 3. Summarize Internet security issues and systems available for addressing them. <p>H. Access and use Internet services when completing IT related tasks to service and update IT systems.</p> <ol style="list-style-type: none"> 2. Troubleshoot Internet connection problems. 3. Explain the components of Internet software. 4. Install Internet software for use on an operating system. 5. Describe virus protection procedures. 6. Explain cookies and adware on an internet connected computer system. <p>I. Install and configure software programs to maintain and update IT systems.</p> <ol style="list-style-type: none"> 1. Verify that hardware and software system components are compatible prior to performing installation. 3. Perform installation accurately and completely, using available resources as needed. <p>J. Demonstrate knowledge of Web page basics to build an understanding of Web page design and functioning.</p> <ol style="list-style-type: none"> 1. Explain the features and functions of Web browsing software. 2. Explain the features and functions of Web page design software. 4. Describe how bandwidth affects data transmission and on-screen image. 5. Compare the benefits of internal and external Web hosting. <p>K. Employ IT knowledge and procedures when configuring or modifying an operating system to ensure optimal system functioning.</p> <ol style="list-style-type: none"> 2. Use operating system principles to ensure optimal system function. 3. Use available reference tools as | | | | |
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| | <p>appropriate.</p> <p>L. Perform standard computer backup procedures to protect IT information.</p> <ol style="list-style-type: none"> 1. Explain the need for regular backup procedures. 2. Configure, perform and maintain backup procedures. <p>N. Maintain computer systems to ensure optimal IT system functioning.</p> <ol style="list-style-type: none"> 4. Configure systems to provide optimal system interfaces. | | | | |
| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>C. Identify and analyze system and software requirements to ensure maximum operating efficiency.</p> <ol style="list-style-type: none"> 1. Identify the potential importance and impact of new IT technologies. 2. Assess the potential importance and impact of new IT technologies. 3. Explain new and emerging classes of software. 4. Summarize elements and types of information processing. 5. Explain measurement techniques for increased productivity due to information systems implementation. | | | | |
| 5 | LOGIC AND PROBLEM SOLVING (B) | | | | |
| | <p>I. ACADEMIC FOUNDATIONS</p> <p>B. Demonstrate mathematics knowledge and skills required to pursue the full range of post-secondary education and career opportunities.</p> <ol style="list-style-type: none"> 1. Identify whole numbers, decimals, and fractions. 2. Demonstrate knowledge of basic arithmetic operations such as addition, subtraction, multiplication, and division. 3. Demonstrate use of relational expressions such as equal to, not equal, greater than, less than, etc. 4. Apply data and measurements to solve a problem. 5. Analyze Mathematical problem statements for missing and/or irrelevant data. 7. Analyze data when interpreting operational documents. | <p>B1 Programs that utilize arithmetic - solve quadratic formula, slope, amortization, ...</p> <p>Orders of Operations for Computer Programming.</p> <p>Programs that utilize</p> | <p>B1 Arithmetic (add, subtract, multiply, divide) – whole numbers , fractions, decimals</p> <p>Percents (read and write, compute, convert both fraction to percent and percent to fraction)</p> | <p>6.EE.2; 7.NS.1; 7.NS.2; 7.NS.3; 6.NS.2; 6.NS.3; 6.NS.5; 6.RP.2; 6.RP.3; 7.EE.2; 7.EE.3</p> | <p>A.APR.1; A.APR.7; N.RN.3; N.Q.1; S.CP.1; F.BF.2</p> |

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| | <p>C. Demonstrate science knowledge and skills required to pursue the full range of post-secondary and career education opportunities.</p> <p>1. Evaluate scientific constructs including conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, and variables.</p> <p>2. Apply scientific methods in qualitative and quantitative analysis, data gathering, direct and indirect observation, predictions, and problem identification.</p> | <p>relational operators</p> <p>C1-C2 All programs use scientific constructs.</p> | <p>C1-C2 Logic (all)</p> | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</p> <p>1. Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate).</p> <p>4. Conduct technical research to gather information necessary for decision-making.</p> | <p>A1 All computer programs solve problems</p> <p>Logic Puzzles/Logic Groups</p> | <p>A1 Algebra – Solving equations</p> <p>Logic – Math symbols and math sequences</p> | <p>6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4</p> | <p>A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6; F.BF.2</p> |
| | <p>IV. INFORMATION TECHNOLOGY APPLICATIONS</p> <p>B. Employ technological tools to expedite workflow.</p> <p>1. Use information technology tools to manage and perform work responsibilities.</p> <p>7. Evaluate Internet resources for reliability and validity.</p> <p>27. Troubleshoot computer driven equipment and machines.</p> <p>28. Access support as needed to maintain operation of computer driven equipment and machines.</p> | | | | |
| | <p>IX. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>B. Demonstrate skills related to seeking and applying for employment to find and obtain a desired job.</p> <p>7. Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer.</p> | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>C. Demonstrate knowledge of the hardware components associated with information systems.</p> | <p>Number conversions – students convert and write programs</p> | <p>Logic – Math symbols and sequences, algorithms</p> | <p>6.NS.1; 6.EE.2; 7.NS.1; 7.NS.2; 7.NS.3; 6.NS.2;</p> | <p>A.APR.1; A.APR.7; N.RN.3; N.Q.1; F.BF.2</p> |

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| | <p>2. Explain the role of number systems in information systems.</p> | <p>to convert to and from different number systems. (Ex. Binary, Decimal, Hexadecimal, ...)</p> <p>Programs that utilize different number types (Ex, integer, float (decimal point), ...)</p> | <p>Arithmetic (add, subtract, multiply, divide) – whole numbers , fractions, decimals</p> | <p>6.NS.3; 6.NS.5; 7.EE.3</p> | |
| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>F. Produce (code) a computer application to demonstrate proficiency in developing an application using the appropriate programming language.</p> <p>4. Summarize program development methodology.</p> <p>5. Explain basic software systems implementation.</p> | | | | |
| 6 | <p>BEGINNING APPLICATION DEVELOPMENT (E,F) (CODING)</p> | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>B. Use product/service design processes and guidelines to produce a quality IT product/service.</p> <p>3. Create products/services using reliability factors.</p> | <p>B3 Developing code which is concise, uses memory efficiently and performs garbage collection</p> | <p>B3 Algebra – Simplification of equations</p> | <p>6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4</p> | <p>A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6</p> |
| | <p>X. TECHNICAL SKILLS</p> <p>C. Demonstrate knowledge of the hardware components associated with information systems.</p> <p>4. Describe elements and types of information processing.</p> | | | | |

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| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>D. Demonstrate the effective use of tools for software development to develop software applications.</p> <ol style="list-style-type: none"> 1. Employ tools in developing software applications. 2. Apply language specific programming tools/techniques. 3. Demonstrate use of computer-aided software engineering (CASE) tools. <p>F. Produce (code) a computer application to demonstrate proficiency in developing an application using the appropriate programming language.</p> <ol style="list-style-type: none"> 2. Demonstrate proficiency in developing an application using an appropriate programming language. | <p>D1-D3 and F2 All programs</p> <p>D3 Flowcharts, IPO Charts, Project Planning, Integrated Development Environment</p> | <p>D1-D3 and F2 Logic (all)</p> <p>Algebra – Using equations</p> <p>Math Practices – problem solving, algorithms, ...</p> <p>Arithmetic (add, subtract, multiply, divide) – whole numbers , fractions, decimals</p> <p>D3 Statistics – Charts and Tables</p> | <p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 7.SP.5; 8.SP.1; 6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4; 6.NS.1; 6.EE.2; 7.NS.1; 7.NS.2; 7.NS.3; 6.NS.2; 6.NS.3; 6.NS.5; 7.EE.3</p> | <p>S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.MD.1; S.CP.1; A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; N.Q.1; N.Q.2; N.Q.3</p> |
| 7 | ADVANCED APPLICATION DEVLEOPMENT (DATABASE, FILES) (J) | | | | |
| | <p>IV. Information TECHNOLOGY APPLICATIONS</p> <p>B. Employ technological tools to expedite workflow.</p> <ol style="list-style-type: none"> 15. Employ technological tools to expedite workflow. 16. Manage interrelated data elements. 17. Analyze interrelated data elements. 18. Generate reports showing interrelated data elements. | <p>B15-B18 Create programs with lists/arrays</p> | <p>B15-B18 Algebra – solving equations, substituting data into formulas</p> | <p>6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4</p> | <p>A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6</p> |
| | <p>X.TECHNICAL SKILLS</p> <p>N. Maintain computer systems to ensure optimal IT system functioning.</p> <ol style="list-style-type: none"> 1. Implement queries and reports to provide access to critical system information. | | | | |

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| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>J. Develop and maintain a database to store information.</p> <ol style="list-style-type: none"> 1. Explain database development processes. 2. Create, populate, and maintain a database. 3. Perform database interfacing with web applications. | <p>J1-J3 Create databases</p> <p>Create programs that interface with databases</p> | <p>J1-J3 Statistics – Charts and Tables</p> <p>Algebra – Solve equations</p> | <p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 7.SP.5; 8.SP.1</p> | <p>S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.MD.1; S.CP.1</p> |
| 8 | LEADERSHIP AND TEAMWORK | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</p> <ol style="list-style-type: none"> 2. Employ critical thinking and interpersonal skills to resolve conflicts with staff and/or customers. | | | | |
| | <p>IV. INFORMATION TECHNOLOGY APPLICATION</p> <p>B. Employ technological tools to expedite workflow.</p> <ol style="list-style-type: none"> 19. Facilitate group work through management of shared schedule and contact information. 20. Facilitate group work through management of shared files and online information. 21. Facilitate group work through instant messaging or virtual meetings. | | | | |
| | <p>V. SYSTEMS</p> <p>A. Describe the nature and types of business organizations to build an understanding of the scope of organizations.</p> <ol style="list-style-type: none"> 3. Summarize the importance of cross-functional teams in achieving IT project goals | | | | |

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| | <p>VII. LEADERSHIP AND TEAMWORK</p> <p>A. Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p> <ol style="list-style-type: none"> 1. Employ leadership skills to accomplish organizational goals and objectives. 2. Employ organizational and staff development skills to foster positive working relationships and accomplish organizational goals. 3. Employ teamwork skills to achieve collective goals and use team members' talents effectively. 4. Establish and maintain effective working relationships with all levels of personnel and other departments in order to accomplish objectives and tasks. 6. Employ mentoring skills to inspire and teach others. | | | | |
| | <p>IX. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>A. Know and understand the importance of employability skills.</p> <ol style="list-style-type: none"> 1. Use information literacy skills when accessing, evaluating and disseminating information. 2. Describe the nature and scope of information management. | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>A. Employ information management techniques and strategies in the workplace to assist in decision-making.</p> <ol style="list-style-type: none"> 1. Use information literacy skills when accessing, evaluating and disseminating information. 2. Describe the nature and scope of information management. <p>B. Employ planning and time management skills and tools to enhance results and complete work tasks.</p> <ol style="list-style-type: none"> 4. Use project-management skills to improve workflow and minimize costs. | | | | |
| 9 | <p>PROGRAMMING FUNDAMENTALS AND SYNTAX (D)</p> | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>D. Compare classes of software associated with the development and maintenance</p> | | | | |

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| | <p>information systems to develop software and maintain computer systems.</p> <ol style="list-style-type: none"> Describe the range of languages used in software development. Summarize how data is organized in software development. Explain new and emerging classes of software. <p>J. Demonstrate knowledge of Web page basics to build an understanding of Web page design and functioning.</p> <ol style="list-style-type: none"> Compare and contrast clients and servers. | | | | |
| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>F. Produce (code) a computer application to demonstrate proficiency in developing an application using the appropriate programming language.</p> <ol style="list-style-type: none"> Explain programming language concepts. Describe the range of languages used in software development. | | | | |
| 10 | NEEDS ASSESSMENT/PROJECT PLANNING (A,B) | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>B. Use product/service design processes and guidelines to produce a quality IT product/service.</p> <ol style="list-style-type: none"> Summarize the process of IT product/service design. Plan for products/services using reliability factors. Develop time and activity plans to achieve objectives. | <p>B2 Debugging and Maintaining Computer Programs</p> | <p>B2 Math Practices – Error Checking</p> | | <p>N.Q.1; N.Q.2; N.Q.3; S.ID.6</p> |
| | <p>V. SYSTEMS</p> <p>B. Employ project management knowledge to oversee IT projects.</p> <ol style="list-style-type: none"> Implement project methodologies to manage information system projects. Define scope of work to achieve individual and group goals. Develop time and activity plans to achieve objectives. | | | | |

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| | <p>IX. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>A. Know and understand the importance of employability skills.</p> <ol style="list-style-type: none"> 1. Identify and demonstrate positive work behaviors and personal qualities needed to be employable. | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>B. Employ planning and time management skills and tools to enhance results and complete work tasks.</p> <ol style="list-style-type: none"> 1. Develop goals and objectives. 2. Prioritize tasks to be completed. 3. Develop timelines using time management knowledge and skills. 4. Use project-management skills to improve workflow and minimize costs. <p>E. Identify and compare new IT trends and technologies to build an understanding of their potential influence on IT practices.</p> <ol style="list-style-type: none"> 1. Explain measurement techniques for increased productivity due to information support implementation. 2. Identify new IT technologies. 3. Assess the potential importance and impact of new IT technologies in the future. <p>M. Recognize and analyze potential IT security threats to develop and maintain security requirements.</p> <ol style="list-style-type: none"> 4. Develop plans to address security threats. 5. Implement plans to address security procedures. | | | | |
| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>A. Identify and analyze customer software needs and requirements to guide programming and software development.</p> <ol style="list-style-type: none"> 1. Gather data to identify customer requirements. 2. Conduct needs analysis. 3. Develop software requirements and specifications. 4. Analyze requirements/specifications using current approaches. 5. Use available reference tools as appropriate. <p>B. Create and use IT-based strategies and project plans when solving specific problems to</p> | <p>A1-A2 Gather information for programs to solve problems</p> <p>B3 and F6 Flowcharting</p> | <p>A1-A2 Statistics</p> <p>B3 and F6 Statistics – Table and Charts</p> | <p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 7.SP.5; 8.SP.1</p> | <p>S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.MD.1; S.CP.1</p> |

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| | <p>deliver a product that meets customer specifications.</p> <ol style="list-style-type: none"> 1. Define scope of work for the programming project. 2. Utilize interpersonal skills necessary to work on a software development team. 3. Design project plan. <p>E. Design a software application using the software development process to deliver a product to the customer.</p> <ol style="list-style-type: none"> 1. Describe software development processes and methodology. 2. Create design specifications for a computer application. 3. Describe trade-offs involved in design choices. 4. Summarize the use of the principles of effective information management, information organization and information-retrieval skills when designing a software application. 5. Explain computing/networking hardware and software architecture. <p>F. Produce (code) a computer application to demonstrate proficiency in developing an application using the appropriate programming language.</p> <ol style="list-style-type: none"> 6. Develop software requirements/specifications. | | | | |
| 11 | DEBUG AND SOFTWARE TESTING (G) (QUALITY ASSURANCE) (H) | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>B. Use product/service design processes and guidelines to produce a quality IT product/service.</p> <ol style="list-style-type: none"> 4. Test new products/services for reliability. | B4 Debugging and Maintaining Computer Programs | B4 Math Practices – Error Checking | | N.Q.1; N.Q.2; N.Q.3; S.ID.6 |
| | <p>V. SYSTEMS</p> <p>C. Implement quality control systems and practices to ensure quality products and services.</p> <ol style="list-style-type: none"> 1. Describe quality control standards and practices common to the workplace. | | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>I. Install and configure software programs to maintain and update IT systems.</p> <ol style="list-style-type: none"> 4. Resolve problems with installation if they | N2 and N3 Debugging and Maintaining | N2 and N3 Math Practices – Error Checking | | N.Q.1; N.Q.2; N.Q.3; S.ID.6 |

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| | <p>occur.</p> <p>K. Employ IT knowledge and procedures when configuring or modifying an operating system to ensure optimal system functioning. 4. Document procedures and actions.</p> <p>N. Maintain computer systems to ensure optimal IT system functioning. 2. Ensure that system is functioning optimally. 3. Fix and document system problems.</p> <p>P. Identify and describe quality assurance concepts to develop an understanding of the requirements for quality IT products/services. 1. Explain the history and standards of key quality management initiatives. 2. Explain the terminology, role and benefits of quality within an organization. 3. Summarize the elements of a quality management system.</p> | Computer Programs | | | |
| | <p>XI. PROGRAMMING AND SOFTWARE DEVELOPMENT PATHWAY</p> <p>F. Produce (code) a computer application to demonstrate proficiency in developing an application using the appropriate programming language. 7. Resolve problems with integration.</p> <p>G. Implement software testing procedures to ensure quality products. 1. Develop a software test plan. 2. Perform testing and validation. 3. Document test results. 4. Develop software testing audit trails.</p> <p>H. Perform quality assurance tasks to produce quality products. 1. Summarize software quality assurance (QA) procedures. 2. Perform software quality assurance tasks to produce a quality software product.</p> | G1-G4 and H1-H2 Debugging and Maintaining Computer Programs | G1-G4 and H1-H2 Math Practices – Error Checking | | N.Q.1; N.Q.2; N.Q.3; S.ID.6 |
| 12 | PROGRAM MAINTENANCE (I) (ENHANCEMENTS) | | | | |
| | <p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>B. Use product/service design processes and guidelines to produce a quality IT product/service.</p> | B5 Debugging and Maintaining | B5 Math Practices – Error Checking | | N.Q.1; N.Q.2; N.Q.3; S.ID.6 |

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| | 5. Maintain the reliability of new products/services. | Computer Programs | | | |
| | <p>X. TECHNICAL SKILLS</p> <p>I. Install and configure software programs to maintain and update IT systems.</p> <p>5. Perform customization as requested.</p> <p>K. Employ IT knowledge and procedures when configuring or modifying an operating system to ensure optimal system functioning.</p> <p>1. Configure/modify system as needed.</p> <p>5. Configure systems to provide optimal system interfaces.</p> | | | | |
| | <p>XI. NETWORK SYSTEMS PATHWAY</p> <p>I. Perform maintenance and customer support functions to maintain software applications.</p> <p>1. Analyze software technical support needs.</p> <p>2. Perform customer service.</p> <p>3. Perform software maintenance activities.</p> | | | | |