COMPUTER PROGRAMMING 2
COURSE CODE: 5051

COURSE DESCRIPTION: This course of study is designed to emphasize the fundamentals of computer programming. Topics include computer software, program design and development, and practical experience in programming, using modern, object-oriented languages.

OBJECTIVE: Given the necessary equipment, software, supplies, and facilities, the student will be able to successfully complete the following core standards for courses that grant one unit of credit.

PREREQUISITE: Computer Programming 1 using same language

COMPUTERS REQUIRED: One computer per student

COURSE CREDIT: 1 unit per course

RECOMMENDED GRADE LEVEL: 10-12

Course Suggestions:

Students planning to major in Computer Science or Computer Engineering would more likely use Java. According to the State Standards Committee, movement is away from C++ and toward Java. XML, C#, COM, and other newer technologies such as .NET could also be addressed as time, interest, and teacher training permit. This may vary across the state, and local advisory committees should be involved in deciding which language(s) to offer in a particular district/school.

A. SAFETY

Effective professionals know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Review school safety policies and procedures.
2. Review classroom safety rules and procedures.
3. Review safety procedures for using equipment in the classroom.
4. Identify major causes of work-related accidents in office environments.
5. Demonstrate safety skills in an office/work environment.

B. STUDENT ORGANIZATIONS

Effective professionals know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

C. TECHNOLOGY KNOWLEDGE

Effective professionals know the academic subject matter, including the ethical use of technology as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation.
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, and other elements for personal use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business-related information.
7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.

D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate punctuality.
2. Demonstrate self-representation.
3. Demonstrate work ethic.
4. Demonstrate respect.
5. Demonstrate time management.
6. Demonstrate integrity.

7. Demonstrate leadership.
8. Demonstrate teamwork and collaboration.
9. Demonstrate conflict resolution.
10. Demonstrate perseverance.
11. Demonstrate commitment.
12. Demonstrate a healthy view of competition.
13. Demonstrate a global perspective.
14. Demonstrate health and fitness.
15. Demonstrate self-direction.
16. Demonstrate lifelong learning.

E. PROFESSIONAL KNOWLEDGE

Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate effective speaking and listening skills.
2. Demonstrate effective reading and writing skills.
3. Demonstrate mathematical reasoning.
4. Demonstrate job-specific mathematics skills.
5. Demonstrate critical-thinking and problem-solving skills.
6. Demonstrate creativity and resourcefulness.
7. Demonstrate an understanding of business ethics.
8. Demonstrate confidentiality.
9. Demonstrate an understanding of workplace structures, organizations, systems, and climates.
10. Demonstrate diversity awareness.
11. Demonstrate job acquisition and advancement skills.
12. Demonstrate task management skills.
13. Demonstrate customer-service skills.

F. COMPUTER SYSTEMS

1. Define what a computer is and its purpose.
2. Define basic computer terminology.
3. Define basic programming terminology.
4. Identify basic hardware and software components.
5. Explain the flow of data and instructions through the computer system.
6. Identify components of the programming development environment.
7. Describe the concept of OOP (object-oriented programming).

G. PROGRAM DOCUMENTATION

1. Describe the purpose and value of the program.
2. Define the input for the program.
3. Define the output of the program.
4. Define variables and constants associated with the program using descriptive names and appropriate data types associated with the program.

5. Describe the scope of variables.

H. PROGRAMMING DESIGN

1. List in sequence the steps for developing a program.
2. Develop an algorithm (pseudocode) for a program.
3. Key the program.
4. Save the program.
5. Execute the program.
6. Debug the program for errors (e.g., syntax, run-time, and logic).
7. Run the program to test the logical validity of an application program given appropriate data.

I. PROGRAMMING

1. Write a program that uses built-in functions to perform calculations on mathematical, business, and/or advanced mathematical data.
2. Write a program that incorporates current Windows Application Standards (e.g. access keys, tab order, focus).
3. Describe the purpose/function of an array (e.g., single, multidimensional).
4. Describe the purpose/function of a structure.
5. Write a program that uses arrays/structures to store data.
6. Write a program that uses color, graphics, animation, and/or sound.
7. Describe the purpose/function of a class.
8. Write a program that uses a class.
9. Write a program that creates an external file for data storage and manipulation.
10. Differentiate between various types of sorting algorithms (e.g., linear, bubble, selection, insert, binary).
11. Write a program that uses appropriate sorting algorithms.
12. Write a program using advanced features (e.g., multiple windows, splash screens, menus, dialogs).
13. Write a program that integrates a spreadsheet.
14. Write a program that integrates a database.
15. Write a program that integrates a word processing document.
16. Write an advanced macro for application software.
17. Describe the purpose/function of Web controls.
18. Write a Web application program that includes appropriate input validation.