PETERS TOWNSHIP SCHOOL DISTRICT

CORE BODY OF KNOWLEDGE

C++

GRADES 10 - 12

For each of the sections that follow, students may be required to analyze, recall, explain, interpret, apply, or evaluate the particular concepts being taught.

COURSE DESCRIPTION:

This course is designed to teach students how to write algorithms (complex) and code programs using procedural and object-oriented programming in C++. Some of the concepts that the students will learn to code in C++ are: arithmetic operations, comparing, loops, nested loops, functions, data files, records, arrays, multidimensional arrays, sorting, parameters, pointers, and classes. This class will give a solid foundation in C++ and will prepare the student for the AP Computer Science – Java course.

STUDY SKILLS:

- Stay current with all class work and assigned projects
- Adequately prepare for quizzes and exams through the development of study skills
- Utilize online resources to problem solve

UNIT THEMES:

1. INTRODUCTION TO COMPUTERS

- History of computers
- Primary components
- Basics of microcomputer architecture

2. HOW COMPUTERS ARE PROGRAMMED

- Explain how data instructions are coded inside a computer
- Basics of the binary numbering system
- High and low level languages
- Assemblers, interpreters, compilers, and operating systems
- The programming process

3. ENTERING, COMPILING, AND RUNNING A PROGRAM

- Structure of a C++ program
- Accessing the text editor, entering the source code and compiling/linking
- Debugging source program

- Run a C++ program

4. VARIABLES / CONSTANTS, CIN AND COUT

- Variable types and constants
- Declaration of variables and constants
- Initializing variables and constants
- Cin statement
- Cout statement
- Formatting input and output
- Data types
- Case sensitivity
- Syntax

5. MATH OPERATIONS

- Assignment and arithmetic operators
- Increment and decrement variables
- Order of operations
- Mixed data types
- Overflow, underflow, and floating-point errors

6. STRINGS AND SCREENS (I/O)

- C++ strings
- Character arrays
- Streams
- Header files
- Input/output statements

7. DECISION MAKING PROGRAMS

- Relational and logical operators
- Conditional structures

8. LOOPS

- For. While, and do loops
- Break and continue statements
- Nesting loops

9. FUNCTIONS

- Structured programs
- Functions
- Scopes of local and global variables
- Parameters

10. POINTERS, ENUM, AND STRUCTURES

- Pointers
- Enum data types
- Structures

11. DATA FILE BASIS

- Data files
- Sequential and direct access
- Open, close, write to, read from, and append data files
- Using multiple files simultaneously

12. OBJECT-ORIENTED PROGRAMMING

- Principles of object-oriented programming
- Objects and classes
- Inheritance
- Constructors / destructors

13. STRING FUNCTIONS, ARRAYS, AND VECTORS

- String functions
- String classes
- One dimensional arrays
- Declaring, initializing, searching, and sorting
- Vectors

14. MULTIDIMENSIONAL ARRAYS AND MATRICES, LINKED LIST, STACKS, QUEUES, AND TREES

- Multidimensional arrays
- Declaring, initializing, searching, and sorting
- Matrices

15. RECURSION

- Recursive calls

MATERIALS:

Textbook: C++ by Diane Zak from Course Technology (Cengage Learning)

Revised September 2014