Bergen Community College
Computer Science, Engineering, and Information Technologies Department
CIS165 Course Syllabus

Instructor: _____ Phone: _____

Email: _____ Office hours: _____

Course Title: CIS-165 Fundamentals of Programming
Prerequisites: MAT-048 or MAT-160 or equivalent by testing
Credits/Hours: 3 Credits 4 Hours
General Education Course: Yes

Course Description: **Fundamentals of Programming** is an introduction to computer systems and structured programming techniques. Topics considered include an introduction to the components of a computer system; problem solving and algorithm design; standard data types and declarations; fundamental control statements; arrays and strings; data sorting; and files. Applications are selected from various fields of study.

Student Learning Outcomes:

Upon satisfactory completion of the course, the student will:

1. be able to describe the components of a computer and the relationships between them;
2. be able to identify the components in the fundamental structure of a C++ program;
3. be able to identify the standard scalar data types, naming rules, and declaration forms and be able to incorporate them into C++ programs;
4. know the standard fundamental input and output functions and be able to incorporate them into C++ programs;
5. understand each of the C++ operators and standard functions and be able to use them in C++ programs;
6. recognize the standard format for program control statements and be able to apply them in writing process statements;
7. be able to apply structured programming techniques when designing and writing a program;
8. understand the structure of one-dimensional arrays and be able to use them in the representation of processing of data;

Course Grade/ Evaluation The student will be evaluated using a variety of methods which may include, but are not limited to, some of the following: Quizzes, exams, written assignments, programming assignments, and projects.

Textbook: Starting Out with C++ Brief Version, 7th Edition Update, Tony Gaddis
Pearson, 2012, ISBN 13: 978-0-13-277289-1, ISBN 10: 0-13-277289-2

Course Content:

1. Introduction to Hardware & Software:
   - hardware components of a computer
   - systems software and applications software
   - programming language
2. Program Development:
   - Overview of the program development process
   - System routines, the preprocessor, and the linker
   - Problem specification
   - Algorithm design and representation
   - Source code, object code, and the compiler
   - Syntax errors, run-time errors, logic
3. Interaction with the Computer System
   - Formatting a disk
   - Sign-on and sign-off procedures
   - Creating, editing, and saving a source code file
   - Compiling and executing a program
   - Printing a text file
4. Identifiers
   - Keywords, standard identifiers, and programmer-defined identifiers
   - Variables and symbolic constants
   - Standard scalar data types
   - String data type
   - Literal constants
5. Program Structure: Heading Section & Declaration Section

- General structure of a C++ program
- Heading section
- Comment statements
- Declaration section
- Typedef
- The main( ) function

6. Program Structure: Input Section
   - Streams and the iostream library
   - Insertion and extraction operators
   - Manipulators without arguments
   - String input

7. Program Structure: Output Section
   - Unformatted output
   - Fstream library and file I/O
   - Writing program output to a disk file

Exam 1: Topics 1 through 7

8. Program Structure: Process Section
   - Operator terminology, precedence classes, and associativity
   - Arithmetic operators
   - Increment and decrement operators
   - Side effects and sequence points
   - Implicit and explicit type conversions - type cast operator
   - Assignment operators and assignment statement
   - String copy function
   - Standard mathematical library functions

9. Formatted Output
   - Manipulators with arguments
   - ios format flags
   - Output design
   - Creating a program template

10. Conditions and Boolean Expressions:
    - Simple conditions and compound conditions
    - Relational, equality, negation, and logical operators
    - Short circuit evaluation
    - Precedence and associativity of operators
    - String compare function
    - Representing conditions by Boolean expressions

11. Selection Control Structures
    - If statement and nested if statement
    - Compound statements
    - Conditional operator
    - Switch statement
    - Break statement
    - Program testing and debugging - structured walk-throughs

Exam 2: Topics 8 through 11

12. Repetition Control Structures: do-while and for statements
    - Do-while statement
    - Input validation
    - For statement
    - Table generation

13. Repetition Control Structures: while statement
    - While statement
    - Continue statement
    - Program testing and debugging - structured walk-through

14. Structured Data Types: One-dimensional Arrays
    - Terminology and storage
    - Declaration form - use of typedef
    - Array input
    - Array output

14. Processing One-dimensional Arrays
    - Mean component of an array
    - Maximum and minimum component of an array

- Sorting array components
- Searching an array
- Other fundamental array processing algorithms

Final Exam

08/2016 dw