COURSE IDENTIFICATION

Course Code/Number: CSIS 240

Course Title: C++ Programming

Division: [x] Applied Science (AS)   [ ] Liberal Arts (LA)   [ ] Workforce Development (WD)

[ ] Health Care (HC)   [ ] Lifetime Learning (LL)   [ ] Nursing   [ ] Developmental

Credit Hour(s):   Three (3)

Effective Date: Spring 2015

Assessment Goal Per Outcome: 70%

COURSE DESCRIPTION

This course will be taught using the **ACM CS1 Model.** This course begins the development of discipline in program design, in style and expression, in debugging and testing, especially for larger programs using the C++ programming language. It will introduce the student to fundamentals of the C++ language, simple C++ data structures, algorithmic analysis, basic aspects of string processing, recursion, and internal search/sort methods.

MINIMUM REQUIREMENTS/PREREQUISITES AND/OR COREQUISITES

There are no prerequisites.

TEXTS

The official list of textbooks and materials for this course is found on *my*Neosho.

http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx

GENERAL EDUCATION OUTCOMES

1. Practice Responsible Citizenship through:

- identifying rights and responsibilities of citizenship,
- identifying how human values and perceptions affect and are affected by social diversity,
- identifying and interpreting artistic expression.
2. Live a healthy lifestyle (physical, intellectual, social) through:
   - listing factors associated with a healthy lifestyle and lifetime fitness,
   - identifying the importance of lifetime learning,
   - demonstrating self-discipline, respect for others, and the ability to work collaboratively as a team.
3. Communicate effectively through:
   - developing effective written communication skills,
   - developing effective oral communication and listening skills.
4. Think analytically through:
   - utilizing quantitative information in problem solving,
   - utilizing the principles of systematic inquiry,
   - utilizing various information resources including technology for research and data collection.

COURSE OUTCOMES/COMPETENCIES (as Required)

Upon successful completion of the course the student should be able to:

1) Describe the fundamentals of computer science
   a. Describe the hardware components of a typical computer system, including CPU, RAM, ROM, secondary storage, and I/O.
   b. Discuss the different levels of programming languages, including machine, assembly, and high-level languages.
   c. Explain the use of a compiler in translating and running C++ programs.
   d. Discuss the general structure of a C++ Program.
   e. Describe how to enter, compile, debug, and execute a C++ program.
   f. Define the concepts of data abstraction and abstract data types (ADTs).
   g. List and describe the six major steps of the software development life cycle.

2) Understand and be able to describe object oriented and structured programming.
   a. Identify the difference between structured versus object-oriented programming using C++.
   b. Explain the relationship between a class and its objects.
   c. Discuss the concept of object behavior.
   d. Discuss the OOP concepts of behavior and inheritance.
   e. Construct C++ classes and objects.
   f. Describe classes at the abstract as well as the implementation level.
   g. Describe private versus public class members.

3) Use structured design tools to document program logic.
   a. Plan a problem solution using algorithms.
   b. Discuss the attributes required for a good computer algorithm.
   c. Describe the role of pseudocode in problem solution planning.
   d. Discuss the concept of problem abstraction.

e.   Define the concepts of stepwise refinement and modular programming.
f.   List the steps required to test and debug a program.
g.   Describe the different types of programming errors, including syntax errors, type errors, logic errors, and run-time errors.
h.   Discuss what good program documentation must include.
i.   Describe numeric overflow errors.

4) Analyze, design, code, document and test C++ programs using the most common features and standards of the language.
   a.   Define functions and their use in C++ programs.
   b.   List and describe the primitive data types in C++.
   c.   Use the Standard C++ Library for the *string* class.
   d.   Define constants and variables in a C++ program.
   e.   Define string objects in a C++ program.
   f.   Discuss fixed decimal versus exponential format of floating-point numbers.
   g.   Display information using the C++ *cout* object.
   h.   Create a C++ program from a set of algorithms.
   i.   Use the *cout* object to display information.
   j.   Format a text display.
   k.   Use the *cin* object for keyboard input.
   l.   Use the *get()* and *getline()* functions for keyboard input.
   m.   Read and write disk files.
   n.   Design and implement user-friendly programs.
   o.   Discuss simple character input.
   p.   List and describe the standard arithmetic operators provided by C++.
   q.   List the order of precedence used for arithmetic operators in C++.
   r.   Use the standard mathematical function provided by the *math.h* header file.
   s.   Call the standard math functions.
   t.   Describe the increment/decrement operators in C++.
   u.   Discuss pre-increment/decrement versus post-increment/decrement when used within arithmetic expressions.
   v.   Describe simple and compound assignment operators in C++.
   w.   List and describe the common Boolean relation operators and logical operators used in C++.
   x.   Describe C++ decision control structures of **if**, **if/else**
   y.   Compare strings.
   z.   Uses nested **if** and **if/else**. Structures.
   aa.   Describe how functions are used to pass data within a program.
   bb.   Define pretest, posttest, and fixed repetition iteration control structures.
   cc.   Define the C++ iteration control structures of **while, do/while,** and **for**.
   dd.   Detect an infinite loop condition.
   ee.   Construct functions in C++.
   ff.   Describe the difference between a non-void function and a void function.
   gg.   Call non-void functions versus void functions.
   hh.   Define one-dimensional arrays in C++.
   ii.   Access one-dimensional arrays using direct assignment, reading/writing, and loops.

jj.   Search an array for a given element.
    kk.   Sort an array.

5)   Use reference manuals, help tools, and debugging tools to solve problems.
        a. Look up C++ topics in Help.
        b. Find and use examples from the textbook

MINIMUM COURSE CONTENT

The following topics must be included in this course. Additional topics may also be included.

    A.   Getting acquainted with computers, programs, and C++.
    B.   Problem solving, abstraction, and stepwise refinement.
    C.   Data: Types, classes, and objects.
    D.   Input and output objects.
    E.   Simple windows I/O.
    F.   Nuts and bolts: Standard stuff in C++.
    G.   Simple graphics.
    H.   Decisions, decisions, decisions.
    I.   Looping Operations: Iteration.
    J.   Software paradigms.
    K.   Functions in-depth.
    L.   The structure paradigm.
    M.   One-dimensional arrays.
    N.   Classes and objects.
    O.   Additional topics as time allows.

STUDENT REQUIREMENTS AND METHOD OF EVALUATION

<u>INSTRUCTIONAL METHODS</u>

1.   Explanation of important concepts by the instructor. Illustration of specific concepts may be made by the use of overhead projector, chalkboard, or audio-visual material.

2.   Coding and testing of C++ programming assignments on a microcomputer using a Visual C++ compiler.

3.   Class discussion and cooperative programming efforts.

STUDENT REQUIREMENTS

The final grade in this course will be determined programming assignments and exams. Details of grading breakdown will be found in the course gradebook.

GRADING SCALE

- A: 90 to 100%
- B: 80 to 89.9%
- C: 70 to 79.9%
- D: 60 to 69.9%
- F: below 60%

Details of grading breakdown will be found in the course gradebook.

ASSESSMENT OF STUDENT GAIN

The purpose of assessing student learning at Neosho County Community College is to ensure the educational purposes of the institution are met and appropriate changes are made in program development and classroom instruction to allow for student success. The instructor(s) of this course will determine the methods of assessment most appropriate and complete an assessment report at the end of the course.

Pre-assessment ideally begins at the beginning of the course when the instructor and the student determine through conference and observation the skill level of the student. Post-assessment to determine gain in competency will be measured at the end of each unit of study and at the end of the course.

<u>**Attendance Policy**</u>

1. NCCC values interactive learning which promotes student engagement in the learning process. To be actively engaged, the student must be present in the learning environment.

2. Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-eighth of the total course duration, (which equates to one hundred (100) minutes per credit hour in a face-to-face class) the instructor has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified.   Please refer to the Student Handbook/Academic Policies for more information

3. Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in

advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

ACADEMIC INTEGRITY

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

ELECTRONIC DEVICE POLICY

Student cell phones and other personal electronic devices not being used for class activities must not be accessed during class times unless the instructor chooses to waive this policy.

NOTE

Information and statements in this document are subject to change at the discretion of NCCC. Students will be notified of changes and where to find the most current approved documents.

ACCOMMODATIONS

If you are a student with a disability who may need accommodation(s), in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, please notify the Dean of Student Services in the Student Services Office, Sanders Hall, 620-432-0304, on the Chanute Campus, or the Dean for the Ottawa and Online Campuses, 785-248-2798, on the Ottawa Campus as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.

NON-DISCRIMINATION POLICY

The following link provides information related to the non-discrimination policy of NCCC, including persons with disabilities. Students are urged to review this policy.

http://www.neosho.edu/Departments/NonDiscrimination.aspx

SEXUAL MISCONDUCT POLICY (TITLE IX)

At NCCC, it is the responsibility of an instructor to help create a safe learning environment in the classroom, including both physical and virtual classrooms.   All instructors are considered mandatory

reporters at NCCC, therefore any information regarding sexual misconduct that is shared by a student in one-on-one meetings with the instructor must be reported to appropriate personnel at the College. Instructors will keep the information private to the greatest extent possible, but it is not confidential. Generally, climate surveys, classroom writing assignments or discussions, human subjects research, or events such as Take Back the Night events do not provide notice that must be reported to the Coordinator by employees, unless the reporting party clearly indicates that they wish a report to be made.

The following link provides information related to the sexual misconduct policy of NCCC, including resources, reporting options, and student rights. Students are urged to review this policy.

http://www.neosho.edu/TitleIX.aspx

COURSE NOTES