NORMANDALE COMMUNITY COLLEGE **9/28/2011**
COMMON COURSE OUTLINE
CSCI 1113, INTRODUCTION TO C/C++ PROGRAMMING FOR SCIENTISTS AND ENGINEERS

I. EFFECTIVE DATE OF OUTLINE

Spring Semester, 2010. To be reviewed by the department each time the course is offered.

II. CATALOG DESCRIPTION

A. CSCI 1113
B. Introduction to C/C++ for Scientists and Engineers
C. 4 Credits
D. Offered Spring Semester
E. Prerequisites: MATH 1510, Calculus I
F. Programming for scientists/engineers. C/C++ programming constructs, object-oriented programming, software development, fundamental numerical techniques. Exercises/examples from various scientific fields.

III. OUTLINE OF MAJOR CONTENT AREAS

A. Variables, Assignment, Data Types, I/O, Arithmetic Operations
B. Boolean Expressions, Branching and Looping Mechanisms
C. Function Basics, Simulation Using Random Numbers
D. Root Finding, Numerical Integration
E. Streams and File I/O
F. One- and Two-Dimensional Arrays, Matrices
G. Structures and Classes
H. Classes: Operator Overloading, *friend* Functions
I. Strings, *string* Class
J. Pointers and Dynamic Arrays, Linked Lists
K. Standard Template Library: *vector* Class, *list* Class, Iterators
L. Classes: Inheritance and Polymorphism

IV. LEARNING OUTCOMES

Upon successful completion of CSCI 1113, students will be able to:

A. Design C++ computer programs that are thoroughly documented and tested, generally of high quality, and incorporating all principles of good design.
B. State and apply the rules of the C++ programming language.
C. Analyze problems and design a programming solution to them.
D. Use numerical techniques such as numerical root finding and matrix manipulation in solving scientific and engineering problems.

V. METHODS USED FOR EVALUATION OF STUDENT LEARNING

The instructor will choose from among various evaluation techniques including – but not limited to – in-class testing, take-home testing, assignments, quizzes, attendance, group or individual projects, and research. The instructor will also choose a method for end-of-the-semester evaluation.

VI. SPECIAL INFORMATION

A. Students will need access to the computers and a C++ development environment in the Normandale Community College Computer Center or on another system of their choice.