NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

COURSE SYLLABUS

Course Title: Introduction to Logic and Programming **Course #:** CSC* 104

Course Description: 4 Credits. Study of computer programming and logic as applied to real world problems with solutions designed and implemented in the C programming language. Topics include set theory, Boolean algebra, truth tables, logic to program translation, basic algorithm development, generic selection and repetition, data types and memory variables, and the use of common programming tools.

Pre-requisite/Co-requisite: None

Goals: Students are expected to

- Understand basic concepts of set theory for decision making
- Create graphical flow diagrams to represent program code
- Use one or more programming environments
- Understand and apply basic C programming data types, expressions, and control structures such as sequence, selection and iteration
- Understand and apply simple data structures such as arrays in software development
- Apply problem-solving and C language skills to develop working C programs

Outcomes: Upon successful completion of this course students will be able to:

1) Demonstrate an understanding of basic computing terms and components
   a) Identify basic functions of the computer
   b) Identify basic components of the computer
   c) Describe how algorithms are designed
   d) Describe the use of memory

2) Demonstrate the concepts used in programming
   a) Demonstrate the evaluation of expressions
   b) Describe how operators are used and how operations are performed
   c) Demonstrate the use of sentinels including
   d) Counters
   e) Flags
   f) Accumulators
   g) Describe the iterative process of using loops
   h) Explain how Input and Output are accomplished
   i) Explain the types of errors that occur and how they are handled
   j) Explain how comments are used

3) Demonstrate the use of sets to evaluate and reduce expressions
   a) Explain basic set concepts
   b) Explain the Universal set
   c) Explain Empty sets
   d) Demonstrate set union
   e) Demonstrate set intersection
   f) Demonstrate set complement
   g) Demonstrate Boolean set properties
   h) Explain the use of subsets

4) Demonstrate the use of Venn Diagrams
   a) Explain the use of Single Variable Venn Diagrams
   b) Explain the use of 2 Variable Venn Diagrams
   c) Explain the use of 3 Variable Venn Diagrams
   d) Explain the problems with graphical representation beyond 3 variables
   e) Demonstrate set reduction basics
   f) Explain n Variable Representation
   g) Demonstrate set reduction through mapping

5) Demonstrate the use of connectives to develop complex expressions
   a) Explain the use of Conjunction
   b) Explain the use of Disjunction including
   c) Inclusive Disjunction
   d) Exclusive Disjunction
   e) Explain the use of Negation

6) Demonstrate the use of Truth Tables
   a) Explain the concept and use of Equivalence
   b) Explain the concept and use of Tautologies and Contradictions
   c) Demonstrate the relationship of Truth Tables to Flowcharts
   d) Demonstrate the use of flowcharts in programming

7) Demonstrate expression representation through Natural Language Translation
   a) Identify connectives in sentence structure

8) Demonstrate the use of logic in problem solving
   a) Identify the use of logic in database problems
   b) Identify the use of logic in game theory