CS 2010: PROGRAMMING FUNDAMENTALS

Semester Hours: 3.0  Contact Hours: 3
Coordinator: Jadwiga A. Carlson
Text: Starting Out With C++ from Control Structures to Objects
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Year: 2015

SPECIFIC COURSE INFORMATION

Catalog Description:

Problem solving and algorithm development. Basic programming concepts including elementary data types, arrays, strings, files, control structures, and functions. Searching and sorting algorithms. Testing and debugging strategies. Prerequisite: Math placement score of 32 or MATH 1200 or MATH 1210 or higher.

Course type: REQUIRED

SPECIFIC COURSE GOALS

- I can explain the fundamental concepts of procedural programming
- I can use a high-level language to write programs to solve problems
- I can analyze problem requirements in order to understand what type of data and processes are involved in the system
- I can design a solution using a modular approach and organize program code to implement the design
- I can debug programs and verify that the output of a program satisfies the problem requirements
- I can implement algorithms to search and sort an array
- I can implement simple recursive functions

STUDENT OUTCOMES ADDRESSED BY THIS COURSE

- B.1 Analyze a given problem, and identify and define the computing requirements appropriate to its solution
• B.2 Use current techniques, skills, and tools in computing practice
• B.3 Apply mathematical foundations, algorithmic principles, and computer science theory as appropriate in modeling and solving real-world problems
• B.5 Apply design and development principles in the construction of software systems of varying complexity
• B.7 Contribute effectively to professional teams in order to accomplish a common goal

LIST OF TOPICS COVERED

• Introduction (1 week)
  o Computers, programs, C++
  o Problem solving*
  o Algorithms*
  o Computer science as a career
• Data types and introductory concepts (2)
  o String, double, int
  o Assignment statement
  o Evaluating expressions
  o Simple I/O
  o Testing/debugging*
  o Documentation standards*
• Selection statements (2)
  o Relational and logical operators
  o If/else
• Loops (3)
  o FOR-loops
  o Algorithms: processing list of values to find total, average, largest, smallest
  o Introduction to file I/O
• Functions and parameter passing (3)
• Arrays (4)
  o Algorithms: simple sorting and searching

* Emphasized throughout course