CS 5010: FUNDAMENTALS OF PROGRAMMING

Semester Hours: 3.0  
Coordinator: Robert Green  
Text: Readings provided by instructor  
Author(s): VARIOUS  
Year: Various

SPECIFIC COURSE INFORMATION

Catalog Description:
This course provides a review of fundamental concepts in programming (procedural programming, object oriented programming, data structures, and algorithms). Cannot be counted towards MS in CS. Prerequisite: Admission to MS in CS program or permission of instructor. Approved for distance education.

Course type: REQUIRED

SPECIFIC COURSE GOALS

- I am able to design, implement, and use complex data structures.
- I am able to understand, implement, and use complex algorithms.
- I can use fundamental procedural and object-oriented programming techniques.
- I am able to implement a software solution to a computing problem.

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
LIST OF TOPICS COVERED

- Review of Fundamentals of Programming (~5 Weeks)
  - Data Types, Functions, Conditional Statements
  - Arrays and Loops
  - File Operations
  - Recursion

- Review of Object-Oriented Programming (~5 Weeks)
  - Classes, Encapsulation, Inheritance, and Polymorphism
  - Template/Generic Classes
  - Pointers and Dynamic Memory
  - Operator Overloading

- Review of Algorithms & Data Structures (~5 Weeks)
  - Linked Lists
  - Searching & Sorting algorithms
  - Stacks, Queues, Trees, and other data structures
  - Big-O Notation