CS 5010: FUNDAMENTALS OF PROGRAMMING

| Semester Hours: | 3.0 | | Contact Hours: | 3 |
| Coordinator: | Robert Green |
| Text: | Readings provided by instructor |
| Author(s): | Varied |
| Year: | Varied |

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. Prerequisites: Admission to MS in CS program or permission of instructor.

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
- I can analyze relevant research and communicate my findings.

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)
  o Data Types, Functions, Conditional Statements
  o Arrays and Loops
  o File Operations
  o Recursion

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

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