Brooklyn College
Department of Computer and Information Science

CISC 3110 (CIS 15) Advanced Programming Techniques
4 hours; 4 credits

A second course in programming. Advanced programming techniques emphasizing reliability, maintainability, and reusability. Module design and multi-file programs. Abstract data types. Objects, classes, and object-oriented design. Storage class and scope. Addresses, pointers, and dynamic storage allocation. Test suites, test drivers, and testing strategies; debugging, assertions, and an introduction to formal techniques. Recursion and function parameters. (Not open to students who are enrolled in or have completed Computer and Information Science 3130 [22].)

Objectives

Students will be able to:

1. Trace and write programs using object-oriented programming techniques.
2. Discuss, and program effectively with, the relative merits and consequences of compile-time and run-time memory allocation.
3. Use effectively the programming environment offered by a Unix-like system.
4. Implement recursive solutions to problems and demonstrate how recursion is implemented by tracing changes in the runtime stack.

Syllabus

Week 1: Course Overview: software design, tools; UNIX fundamentals (**Unix book, Gaddis[1-8]**)

Week 2: Intro to Pointers, Quiz on prerequisite material (**Gaddis Chapter 9**)

Week 3: Pointers and Strings (**Gaddis Chapter 10**)

Week 4: Using Objects and Classes; the Gaddis string class (**Gaddis Chapter 10**)

Week 5: 2d arrays, Arrays of Pointers, Structuring Data (**Gaddis Sections 7.8 and 9.10, Chapter 11**)

Week 6: EXAM 1; File Operations (**Gaddis Chapter 12**)

Week 7: Class Definition (**Gaddis Chapter 13**)

Week 8: Class Definition (cont.) (**Gaddis Chapter 13**)

Weeks 9 and 10: Advanced Class Definition (**Gaddis Chapter 14**)

Week 12: Specification and Testing; Review (Handout)

Week 13: EXAM 2; Recursion (**Gaddis Chapter 19**)

Week 14: Exceptions, Templates, the STL (**Gaddis Chapter 16**)

Required Textbooks

Gaddis, T., Walters, J. and Muganda, G. *Starting Out with Gaddis: Early Objects*, 6th edition, Addison Wesley, 2007. (**Gaddis**)

Peek, J, Todino-Gonquet, G. and Strang , J., *Learning the Unix Operating System*, 5th edition, O.Reilly, 2001 (**U**)

Recommended Books

Just Enough UNIX. by *P.K.* Anderson.

The Practice of Programming. by Brian W. Kernighan and Rob Pike. Addison-Wesley.