

CMSC 123 Data Structures

INSTITUTE OF COMPUTER SCIENCE, UPLB – 2nd SEMESTER 2007-08

Catalog Course Description

<i>Course code</i>	CMSC 123
<i>Course title</i>	Data Structures
<i>Course description</i>	Abstract data types and implementations of data structures; arrays, stacks, queues, linked lists, mappings, trees, sets and graphs; internal and external searching and sorting; dynamic storage management
<i>Prerequisite course</i>	(CMSC 21 and CMSC 57) or COI
<i>Semester offered</i>	Second semesters
<i>Credit</i>	3 units
<i>Hours per week</i>	2 hours lecture + 3 hours laboratory

Course Goals

At the end of the course, the student should be able to:

- identify data structures and algorithms appropriate for a given problem;
- design alternative implementations of a data structure;
- construct correct and efficient algorithms; and,
- analyze the running time of programs.

Course Outline

1. Introduction
 - a. Abstract Data Types (ADTs) and data structures
 - b. Running time of a program
2. Basic ADTs
 - a. List ADT
 - b. Stack ADT
 - c. Queue ADT
 - d. Mappings
3. Trees
 - a. Basic concepts and terminology
 - b. Non-binary trees and their implementations

- c. Binary trees and their implementations
 - d. Binary Search Trees
 - e. AVL trees
 - f. Heaps and Priority Queues
4. Sets
 - a. An ADT for Sets with simple operations
 - b. Simple implementations of Sets
 - c. The Dictionary
 - d. The Hash Table data structure
 - e. Tries
 - f. Balanced trees
 - g. Sets with MERGE and FIND operations
 5. Graphs
 - a. Graph terminology and representations
 - b. Traversals and Shortest Path problems
 - c. Connected components and Spanning trees
 - d. Graph matching
 6. Internal Sorting
 - a. The Internal Sorting model
 - b. Some simple sorting schemes
 - c. Quicksort
 - d. Heapsort
 - e. Binsort
 7. Data Structures and Algorithms for External Storage
 - a. A model for external computation
 - b. External sorting algorithms
 - c. File structures
 - d. External search trees
 8. Memory Management
 - a. Memory management issues
 - b. Garbage collection
 - c. Storage allocation
 - d. Storage compaction

* *Laboratory topics – running time computation, list, stack, queue, BST, AVL, heap, hash table, graph problems, sorting*

Course Materials/References

1. ALBACEA EA, 2005. Introduction to Data Structures and Algorithms, 2nd edition.

2. WEISS MA, 1993. Data Structures and Algorithm Analysis in C.
3. CORMEN TH, et al, 2001. Introduction to Algorithms, 2nd edition.

Course Requirements and Assessment

Your grade will be computed based on your performance in the following:

PRE-FINAL GRADE

- Lecture 60%
 - First lecture exam (25%)
 - Second lecture exam (25%)
 - Lecture quizzes (10%)
- Laboratory 40%

FINAL GRADE

80% pre-final grade + 20% final exam

The passing mark is 55%.

Grading scale:

95 -100: 1.0	70 - 74: 2.25
90 - 94: 1.25	65 - 69: 2.5
85 - 89: 1.5	60 - 64: 2.75
80 - 84: 1.75	60 - 64: 2.75
75- 79: 2.0	< 55: 5.0

Important Dates

First lecture exam

Jan. 23, 2008 (7:30 – 9:00 PM, ICS LH3 & LH4)

Second lecture exam

Mar. 26, 2008 (7:30 – 9:00 PM, ICS LH3 & LH4)

Final examination week

Mar. 28 – Apr. 4, 2008

Christmas vacation

Dec. 20, 2007 – Jan. 1, 2008

Last day of classes

Mar. 26, 2008

Academic Integrity

Integrity is expected of every student in academic work. The work you submit must be your own.

We subscribe to the Code of Academic Integrity.

Conduct prohibited by the Code consists of all forms of academic dishonesty, including, but not limited to: cheating, fabrication, facilitating academic dishonesty, plagiarism, deception, and misrepresentation. Any attempt to commit an act prohibited by the Code shall be subject to sanctions on the same extent as completed acts.

Students found guilty of violating the code are subject to any one or a combination of the following: written warning, loss of credit for the work involved, reduction of grade, failing grade, suspension, expulsion, or other sanctions imposed by the University Council.

Teaching Staff

Lecturer:

- Giovanni A. Flores, Asst. Professor 1
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Laboratory Instructors:

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