Data Structures II
CSC 430
Spring 2012
Credits: 3

Class hours: 2
Lab hours: 2

Course Description:
This course will introduce the student to more complex data structures. Topics will include the manipulation of trees, graphs and multi-linked structures; and the design and analysis of searching and sorting algorithms.

Prerequisites: Basic skills- ENG 095; ESL 095; ACR 095; MAT 056; CSC 330 (Data Structures I)

Student Learning Outcomes

After completing this course, students will be able to:

- **Outcome:** Describe and implement algorithms for several branching structures: heaps, trees and graphs.
  **Assessment:** Programming questions in exams and programming projects.
- **Outcome:** Describe, design and implement several sorting algorithms.
  **Assessment:** Programming projects and exam questions.
- **Outcome:** Compare the efficiency of the different sorting algorithms in terms of Big-O complexity and space requirements.
  **Assessment:** Short essay questions in exams.
- **Outcome:** Discuss the performance of different searching and hashing algorithms in terms of Big-O notation.
  **Assessment:** Short essay questions in exams.

General Education Outcomes and Assessment

- **Quantitative Skills:** Students will use quantitative skills and concepts and methods of mathematics to solve problems
  **Assessment:** Use formulas and concepts of mathematics to solve problems in programming assignments
- **Information and Technology Literacy:** Students will collect, evaluate and interpret information and effectively use information technologies
  **Assessment:** Use a high-level computer programming language to create application software

Required Text & Readings:

Textbook: C++ Plus Data Structures, Fourth Edition
Author: Nell Dale
Publisher: Jones and Bartlett
ISBN: 0763741582

Other Resources: Flash drives are recommended.

Use of Technology (if applicable):

Evaluation & Requirements of Students:
First Examination  25%
Second Examination  25%
Third Examination  25%
Homeworks  25%
Total  100%

Outline of Topics:

1. Binary Search Trees. Insertion, Deletion, Traversal and Height Balancing
2. Heaps and Priority Queues
3. Graphs. Adjacency Matrix and Adjacency List
4. Graph Algorithms: Depth First Search, Breath First Search, Shortest Path
5. Sorting Algorithms: Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Heap Sort, Quick Sort And Radix Sort. Comparison Of The Efficiency Of The Sorting Algorithms In Terms Of Big-O And Space Requirements
7. Hashing. Design And Implementation Of A Hashing Function And A Collision-Resolution Algorithm For A Hash Table
8. Efficiency Of Searching And Hashing Algorithms In Terms Of Big-O

College Attendance Policy:

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

Academic Adjustments for Students with Disabilities:

Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

BMCC Policy on Plagiarism and Academic Integrity Statement:

Plagiarism is the presentation of someone else’s ideas, words or artistic, scientific, or technical work as one’s own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC’s web side, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).