Data Structures

CS 246 - 040

Department of Physical and Computer Sciences

Medgar Evers College

COURSE SYLLABUS

Instructor:	Professor Reid	Term:	Spring 2020
Office:	512	Class Schedule:	Tue 4:00 PM - 5:40 PM Thu 4:00 PM - 5:40 PM
Phone:	(718) 270-6433	Class Location:	C09
Email:	jermainereid@mec.science	Lab Location:	Advance Computing Lab
Website:	TBA	Office Hours:	By Appointment

I. Welcome!

Welcome to Data Structures.

II. University Course Catalog Description

This course introduces the different ways that data is organized and stored in computer memory and the relevant procedures used in the manipulation of that data. The idea of abstract data types (ADTs) is first introduced, and then reinforced through the characterization of fundamental data structures in the discipline - stacks, queues, and trees. Other topics are recursive algorithms, dynamic storage, and complexity. Algorithms for searching and sorting are also implemented.

III. Course Overview

This course is arguably the most important course that a computer science major will take. It provides the essential building blocks utilized in software design, implementation and analysis. The course begins with a review and practice of iterative problem-solving. Students will deepen their understanding of object-oriented design and programming. Students will also be introduced to data structures including lists, stacks, queues and trees. The course will also cover sorting algorithms, recursion, dynamic allocatiom, and an introduction to algorithmic complexity.

IV. Course Objectives

By the end of the course, students will be able to:

1. Demonstrate a familiarity with major algorithms and data structures.
2. Analyze common computing operations performed on a variety of data structures using asymptotic and amortized analysis as appropriate.
3. Choose an appropriate data structure based on application requirements.
4. Use and/or modify major data structures and algorithms in a complex application.
5. Understand and formulate recursive solutions to problems.

V. Course Prerequisites

CS244 - Object Oriented Programming

VI. Course Credits

3 credits; 4 class hours.

VII. Required Texts and Materials

Data Structures and Other Objects Using C++, 4th Edition, Michael Main and Walter Savitch
ISBN-10 : 0-132-12948-5

VIII. Supplementary (Optional) Texts and Materials

To be announced on Blackboard/email and in class.

IX. Grading

1) Grade Breakdown:

Assessment	Overall Points
Assignments	20 pts
Exams	80 pts
Labs	60 pts
Projects	40 pts
Total Needed	200 pts

2) There will be a total of four (4) assignments, twenty (20) labs, four (4) exams, and a project.
3) Letter Grade Table:

Grading Scale (%)	
97 – 100	A+
93 – 96.9	A
90 – 92.9	A−
87 – 89.9	B+
83 – 86.9	B
80 – 82.9	B−
76 – 79.9	C+
65 – 75.9	C
0 – 64.9	F

Additional criteria may affect your grade.

X. Grade Dissemination

Via email or a private conference.

XI. Course Policies

i Grades

Late Work Policy There will be **NO** make-up for exam and labs. Late assignments are penalized a point each day it is late.

Extra Credit Extra credit will be provided in the form of additional question/task(s) on labs and assignments. Extra credit is void on late submissions.

Incompletes An "INC" grade is given **ONLY** when the student has at least 120 points at the end of the semester due to missing work. The student will have up to 3 weeks to resolve the INC before it becomes an F. Over three (3) absences forfeits the possibility of receiving an incomplete.

ii Technology and Media

Classroom Device/Laptop/Smartphone Usage Classroom computers and laptops usage is only allowed during all lectures to access lecture material from Blackboard and/or email, and to work on class activities; however, smartphones are pohibited.

iii Student Expectations

Attendance Policy: All students have the responsibility to arrive on time, attend class regularly, and to participate fully in the work of the course. Students who miss class are responsible to find out what was discussed and learn the material that was covered on the missed day(s). The instructor is not responsible for teaching missed material under any circumstances. Assigned readings, problems and programs should be completed before class.

Disability Access Medgar Evers College and its Office of Services for the Differently-Abled is committed to ensuring that individuals with disabilities receive reasonable accommodations under the guidelines of the Americans with Disabilities Act. Any student who may require accommodations due to a documented disability should notify the instructor at the start of the semester.

Professionalism Academic integrity and respect for the dignity of the individual are essential in any educational endeavor. In scholarly endeavors, all participants must commit themselves to truthfulness and honesty in the search for new insight and knowledge. In addition, honesty, integrity and respect in all interactions with colleagues, peers, teachers and support staff are essential professional attributes.

Academic Conduct Plagiarism is derived from the Latin word meaning to "kidnap". In modern terms, it is more analogous to "theft". A more formal definition employed for purposes of federal research grants is the "... appropriation of another person's ideas, processes, results, or words without giving appropriate credit" 42 CFR § 93.103 ©. In other words, if you present someone else's work as your own, you are stealing from that person and, in academic circles, this is a very serious violation of the principles of academic integrity, respect for others, and professionalism. This definition applies regardless of the medium from which you plagiarize and whether or not the source of the copied material is itself copyrighted. Since homework assignments are to be completed individually unless otherwise specified, you will be, in fact, plagiarizing if you submit any assignment that is copied or partially copied from another student, and you will be severely penalized.

Furthermore, if a student is caught using any electronic device or trying to cheat in any way during an exam or a quiz, the student will be removed from the class and will receive a grade of zero (0).

XII. Schedule

The schedule, together with assignments, are subject to change. Announcements made in class and on Blackboard/Email override the schedule in case of conflicts.

Week	Topic	Sections
$1-3$	Review: ∘ Programming Fundamentals ∘ OOP Concepts	TBA
4	Generics & Big-O: ∘ Template Functions & Classes ∘ Container Classes ∘ Runtime Analysis	TBA
5	Dynamic Structures: ∘ Pointers & Dynamic Arrays ∘ Linked Lists	TBA
6	Elementary Data Structures: ∘ Stacks ∘ Queues	TBA
7	Recusion: ∘ Recursive Functions, Searching & Sorting	TBA
8	Hashing: ∘ Hash Tables & Functions	TBA
9	Trees: ∘ Trees & Binary Trees ∘ Tree Traversals	TBA
10	Graphs: ∘ Graph Matrices ∘ Adjacency Lists ∘ Breadth-First & Depth-First Search	TBA
11	Graph Algorithms: ∘ Elementary Graph Algorithms ∘ Minimum Spanning Trees	TBA
$12-14$	Advance Design & Analysis Techniques: ∘ Dynamic Programming ∘ Greedy Algorithms	TBA