Data Structures for Engineers: Course Number: CS-04225-2
Rowan University, Spring Semester, 2016 (Jan 20 – May 09)
Meeting Times: Mon: 5:00 PM – 6:15PM (Wilson Hall 212)
Wed: 5:00 PM – 6:15PM (Wilson Hall 212)

Instructor: Prof. Mohamed S. Mansaray
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Text: Data Structures and Other Objects Using C++ (Fourth Edition)
Authors: Michael Main & Walter Savitch

ISBN-13: 978-0-13-212948-0
Publisher: Addison Wesley (2011)

Prerequisites:
In order to take this course, you need to have successfully completed CS 04103 (Computer Science and Programming). In addition, you should be comfortable with programming in a high level language, and you should be familiar working with data types, conditional statements, loops, functions and parameters, and classes.

The programming language used in this course is C++. If you are a transfer student with no experience in C++, or somehow did not take a formal programming course in C++, you will need to teach yourself the language before the first assignment is due.

Course Description:
This course will acquaint engineering students with abstract data types (ADTs) and their use in stacks, queues, lists, trees, and graphs. The student will be exposed to implementing ADTs in the previous data structures, as well as arrays and linked lists. The topics of Big-O notation, searching algorithms, sorting algorithms, and recursion will also be covered.

Course Objectives:
At the end of the course the successful student will gain understanding of the following:
- The use of abstract data types and objects in common data structures.
- The use and analysis of sorting and searching algorithms
- The use of Big-O notation for the analysis of algorithms
- The ability to create, test and debug programs written as solutions to problems of some complexity using procedural and object oriented programming principles.

Requirements And Expectations:
During the course of the semester there will be two exams given. There will also be a number of quizzes that cover the course readings and lectures, and will be given approximately every two weeks. Assignments will consist largely of lab (i.e., programming) projects. For ALL programming assignments you will be expected to email it to me by the due date, no assignments will be accepted after the due date. All programs are expected to compile and run without errors and produce the desired output. All work must be your own; the rules for **Academic Honesty** are not to be violated (**see Rowan College Student Handbook or the**

Course Schedule for more details.). **Anyone that violates the rules is subject to a zero for the assignment/test and an F for the course.**

Students Accommodation Policy

Your academic success is important. If you have a documented disability that may have an impact upon your work in this class, please contact me. Students must provide documentation of their disability to the Academic Success Center in order to receive official University services and accommodations. The Academic Success Center can be reached at 856-256-4234. The Center is located on the 3rd floor of Savitz Hall. The staff is available to answer questions regarding accommodations or assist you in your pursuit of accommodations. We look forward to working with you to meet your learning goals.

Attendance Policy:

Attendance is critical in a course such as this, since much of the work is cumulative All students are expected to attend all classes. Due to the accelerated nature of this course, it is extremely difficult to catch up on missed material. Consequently, frequent absences will adversely affect your grade. If you miss a lecture class (non-exam), it will be your responsibility to determine what you missed and to make up the work. If you miss a lab session (non-exam), you will have to complete the missed lab on your own time in one of the open labs. Attendance is **REQUIRED**, however, at scheduled testing sessions. Multiple lateness or absences will affect your grade by up to **10%** of your final grade. In any case, please extend the courtesy to me and let me know (preferably by email) if you will be absent or late.

If you are absent when an assignment is due or a test is administered, the responsibility is on **YOU** to provide documentation, as a first step in determining if you can make up the missed assignment. This can be in the form of a tow truck receipt, doctor's note, etc. As a reminder the University's Infirmary is free, and will provide documentation of your illness.

Grading Procedure:

Attendance/Participation	10% of course grade [60]
Quizzes	20% of course grade [120]
Homework	15% of course grade [90]
Midterm Exam	25% of course grade [150]
Final Exam/Group Project	30% of course grade [180]

Grading Scale:

94 - 100	A	73 - 76	C
90 - 93	A–	70 - 72	C–
87 - 89	B+	67 - 69	D+
83 - 86	B	63 - 66	D
80 - 82	B–	60 - 62	D–
77 - 79	C+	Below 60	F

Course Outline:

This information is tentative and subject to change based upon class needs and progress

- Introduction, programming principles: Chapters 1,2,3
- Pointers and Nodes: Chapter 4
- Linked Stacks and Queues: Chapter 5
- Stacks: Chapter 7
- Queues: Chapter 8
- Recursion: Chapter 9
- Trees: Chapters 10 & 11
- Searching: Chapter 12
- Sorting: Chapter 13
- Graphs: Chapter 15
- Time permitting: advanced topics in trees and graphs

Classroom/Lab policy:

With the exception of emergency response personnel, the use of cell phones and mobile devices are not permitted to be used in the classroom. However, laptops for NOTE TAKING ONLY are permitted.

No food or drinks of any type are permitted in the labs.

Email Policy:

Communicate with me (mansaray@rowan.edu) only through your Rowan University email ID. Any other email ID is treated as spam, and will not get to me. You should also get in the habit of checking your email frequently (especially just before classtime) to see if you need to get any news or notes before class

Document Submissions:

Assignments may be sent through email or the online learning component. Assignments must be in one or more of the following formats: RTF, MS Word 2003-2007 (DOC or DOCX), or Adobe Acrobat (PDF). Submissions of any other format will result in a 0 for the assignment. Multiple assignments may be zipped up prior to submission. Zipped assignments must be in the .ZIP format. Submissions of any other format will result in a 0 for the assignment.

Modifications to this Syllabus:

The instructor reserves the right to modify this syllabus at any time. There are a multitude of reasons as to why a syllabus would need to be amended. In any case, the students will be given ample and reasonable notification of any changes to the syllabus.

Important Web Sites:

Check out the **academic calendar** at
http://www.rowan.edu/studentaffairs/registrar/schedules/registration/
Here is a great place to get information on registration, drop/add, term breaks, exam schedules, etc.

Check out the **student campus portal** at http://cp.rowan.edu/
Here is where you can log on and check email, get your grades, access student recourses, access handbooks and course catalogs, etc.

Check out the **policy on academic honesty** at http://www.rowan.edu/studentaffairs/main_office/Publications/Infoguide.pdf This Rowan University's site regarding its academic honesty policy.

Approximate Schedule (As of January 20, 2016):

Spring Break: Monday, March 14 – Saturday, March 19, 2015

Please complete each reading assignment before that evening's class.

Week 1	Introduction & Syllabus Biographies Programming Principles and Precepts Assignment of Lecture / Recitation Teams Review of Objects and Classes
Week 2	Abstract Data Types and C++ Classes
Week 3	Pointers, Nodes, and Dynamic Arrays
Week 4	Linked Lists: methods and implementations Lists and Strings
Week 5	Stacks: methods and implementations
Week 6	Queues: methods and implementations
Week 7	Midterm Exam
Week 8	Container Classes Iterators Templates
Week 9	Recursion: Design, principles, and implementations
Week 10	Binary Trees
Week 11	Multiway Trees (B-Trees, Red-Black Trees, AVL Trees)
Week 12	Searching and Sorting Big-O notation Graphs and Set Theory
Week 13	Final Project Presentations (Week 1 of 2)
Week 14	Final Project Presentations (Week 2 of 2) Final Exam Review
Week 15	Final Exam