FORDHAM UNIVERSITY THE JESUIT UNIVERSITY OF NEW YORK	**Department of Computer and Information Sciences** **Fordham University**

CISC 2200/5006: Data Structures – Fall 2022
Syllabus

REMINDER: The information presented in this syllabus is subject to expansion, change, or modification during the semester.

Instructor: Mohamed Rahouti, Ph.D.	Email: mrahouti@fordham.edu	Class Times: • Monday and Wednesday at 1pm-2:15 pm (in-person) Location: • Leon Lowenstein Bldg. 311

Office hours: Monday 11:30 – 12:30pm, Wednesday 4:00 – 5:00pm or by appointment.
Instructor's Office: 610C
Course website: Blackboard
TA (Grader): Shadman Sakib

Required Text: "C++ Plus Data Structures", 6th edition, Nell Dale, Chip Weems, and Tim Richard. Published by Jones & Bartlett Learning.
Note: Reading will be assigned from the textbook and class notes will be posted on Blackboard.

Additional reference book: "Data Structures and Algorithm Analysis", 3.2 Edition, C. A. Shaffer, free pdf file Amazon Link

Course Description:
A survey of the major types of structures in programs used to handle data. Methods for data organization and access will be covered across data structures and studied for their memory footprints and temporal efficiencies. This course builds on principles in discrete mathematics and in fundamental programming practices.

Prerequisites:
CISC2000/2010 Computer Science II and Lab

Course Objectives:
Upon completion of this course, students should be able to:
- Implement a data structure as a C++ class (or class template).
- Analyze (intuitively) and compare time complexity of algorithms (that iterates through a list, that has a nested loop, and that of binary search).
- Make use of various data structures as implemented in C++ STL.
- Identify what data structure to use in solving a particular problem and understand the implication on performance.
- Design and implement recursive algorithms, trace through recursive algorithms' execution, and verify recursive algorithms using the three questions approach (i.e., mathematical induction).
- Understand function and class template.
- Implement a data structure as class template and use C++ STL.

Attendance and class participation:
It is important to attend every class, and to arrive on time. Two unexcused/unexplained absences are permitted for the semester. Please actively participate in class since this will make the course more interesting for everyone! Ask questions if you are unsure about something.

Course assignments:
There will be about 5-8 assignments for the course – including lab assignments. The assignments will usually be announced at least a week before they are due. Assignments must be completed by their due date in order to be accepted.
Submissions turned in late will be penalized, and no submission is accepted one week after its due date. You can write to the instructor to ask for an extension of up to seven days for reasons such as illness, heavy workload, or other reasons. The maximum number of extensions per person is three.

- Instructions on programming assignment submissions: TBA.
- Written assignments must be submitted either in class or uploaded to the corresponding link on Blackboard.
- Emails will be sent to students once an assignment is graded and returned.

Academic honesty:
All work produced in this course must be your own. You are encouraged to discuss the assignment problems with other students generally, but must write all parts of each assignment submission yourself. Copying of assignments is never acceptable and will be considered a violation of Fordham's academic integrity policy. Violations of this policy will be handled in accordance with university policy which can include automatic failure of the assignment and/or failure of the course. See Fordham's Undergraduate Policy on Academic Integrity for more information.

Exams:
There will be one mid-term exam -- the exact date will be announced at least 3 weeks in advance of the exam. There will be 4-6 short quizzes held throughout the semester. Each quiz will be announced 1 or 2 class sessions ahead. There will also be a final exam.

Timing conflicts:
If you have a significant issue and cannot complete an assignment on time, or cannot attend class on a certain day, let me know as early as possible -- I tend to be reasonable in such cases with sufficient notice. Examples of significant issues include personal illness (with a doctor's note) or a religious holiday on an announced exam day. In general, let me know of any significant issues that affect your performance early on.

Grading:
The percentages given below are guidelines for both the student and instructor and may be changed as needed to reflect circumstances in the course. Any changes that occur during the semester will be minor.

Participation	10%
Homework/Labs	30%
Quizzes	15%
Midterm	20%
Final exam	25%

Modules and key topics:
A tentative list of course modules:

- Introduction to ADT, C++ Review (e.g., array, pointers, and makefiles), dynamic memory allocation and linked list
- List: implemented using array
- List: implemented using linked list
- Stacks, Queues
- Trees, binary search trees
- Priority queue and heap
- Hashing

Besides data structures such as arrays and lists, stacks and queues, trees and BST, priority queue (heap), and hash tables, this course will also cover the following algorithms/topics:

- Sorting – selection, insertion, bubble
- Searching – linear and binary; Tree traversal (in-order, pre-order, post-order)
- Recursion

- Running time and space complexity, Big-O and Omega notations

Course Grading Scale:

The grade for this course will be determined based on the students' performance and participation in class, grades on homework assignments, surveys, and performance on exam. Exam will be a mixture of objective and subjective questions, designed to determine the student's depth of understanding of the subject matter covered in the course. Knowledge gained through homework and other out-of-class studies will also be assessed on the written exam. The grading scale (%) used along with the grading criteria is as follows:

Grading Scale (%)				
[90 100]	[80 90]	[70 80]	[60 70]	[0 60]
A	B	C	D	F

Finally,

Any or all information in this document is subject to change or modification by the instructor during the semester.