

## **Data Structures with C++ (CSC 240), Fall 2021**

**Meeting Times:** T, TH 9:30 – 10:45

**Meeting Place:** Derby 239

**Professor:** David Sonnier

**Office:** Derby 208

**Phone:** 307-7270

**Office Hours:** MWF: 3:00 – 3:50, TTH 1:30 – 2:30

**Required Text:** *C++ Programming: Program Design Including Data Structures*, 5<sup>th</sup> Edition, by D. S. Malik (Primary Textbook), *Data Structures and Problem Solving Using C++*, 2<sup>nd</sup> Edition, by Mark Allen Weiss (electronic copy available) and *The Rook's Guide to C++* (electronic copy available)

**Objectives:** During the semester we will begin by learning the syntax and object-oriented features of the C++ programming language. We will then proceed through applications using basic data structures, such as lists, stacks, queues, and trees. Students will conduct an analysis of the complexity of various algorithms, and see how that complexity may depend on the underlying data structure. Students will be able to describe how it is that the data structures selected for implementation of a program can have a tremendous impact on the computational complexity of the program.

Specific Learning Outcomes:

- Solve common computational problems
- Explain the basic hardware operations
- Explain storage and computational limitations
- Know common classes of data structures and algorithms, their benefits/limitations, and how to implement them

**Grades:**

- Quizzes: 10%
- Homework: 10%
- Programs: 40%
- Tests: 20%
- Final Exam: 20%

Quizzes will be frequent, and may cover concepts previously discussed as well as reading assignments. It is your responsibility to ensure that you understand all of the material covered, and to ask questions about any concepts that you do not understand. There will be three tests in addition to the quizzes. Test “make-ups” will only be allowed if

arrangements have been made prior to the scheduled time for the test. If you are sick the day of the test, please leave a message on my phone before the scheduled time and we can make arrangements when you return. Work must be done independently on all quizzes and tests. The final exam is comprehensive.

**Class Attendance Policy:**

Students are expected to attend all class periods for the courses in which they are enrolled. They are responsible for conferring with individual professors regarding any missed assignments. Faculty members are to notify the Registrar when a student misses the equivalent of one, two, three, and four weeks of class periods in a single course. Under this policy, there is no distinction between “excused” and “unexcused” absences, except that a student may make up work missed during an excused absence. A reminder of the college’s attendance policy will be issued to the student at one week, a second reminder at two weeks, a warning at three weeks, and notification of administrative withdrawal and the assigning of an “F” grade at four weeks. Students who are administratively withdrawn from more than one course will be placed on probation or suspended.

**Disabilities:**

Students seeking reasonable accommodations based on documented learning disabilities must contact Danell Hetrick in the Morrow Academic Center at (870) 307-7021 or at [danell.hetrick@lyon.edu](mailto:danell.hetrick@lyon.edu).

**Harassment, Discrimination, and Sexual Misconduct:**

Title IX and Lyon’s policy prohibit harassment, discrimination and sexual misconduct. Lyon encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to Lai-Monte Hunter, Title IX Coordinator and Vice-President for Student Life, or Sh’Nita Mitchell, Title IX Investigator and Associate Dean for Residence Life, about what happened so they can get the support they need and Lyon can respond appropriately. Lyon is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource (Chaplain, Counselor, or Nurse). As a faculty member, I am required to report possible Title IX violations and must provide our Title IX coordinator with all relevant details. I cannot, therefore, guarantee confidentiality.

**COVID Policy**

Masks are mandated for all students in classrooms, laboratories and studios. They remain optional for all persons on the Lyon campus in all other locations and outside. Participation in community surveillance testing is mandatory. Vaccines are strongly encouraged for all faculty, staff, and students. Vaccines are not, however, mandated for Lyon College community members.

**Honor Code:**

All graded work in this class is to be pledged in accordance with the Lyon College Honor Code. The use of a phone for any reason during the course of an exam is considered an honor code violation.

There will be a number of programming assignments during the semester. Programs are due at the beginning of the class period on the due date. Once class begins, the program will be considered late if it has not been turned in. Late programs will be worth zero points.

Make a note of any collaboration at the top of the first page of programs or homework assignments you turn in. Programming assignments are individual efforts. You may seek assistance from another student or me, but you may not copy someone else's solution. If you are having trouble finishing an assignment, it is far better to do your own work and receive a low score than to go through an honor trial and suffer the penalties that may be involved.

What is cheating on a programming assignment? Here are a few examples:

- Having someone else write your program, in whole or in part
- Copying a program someone else wrote, in whole or in part
- Collaborating with someone else to the extent that your programs are identifiably very similar, in whole or in part
- Turning in a program with someone else's name on it

What is not cheating? Here are some examples:

- Discussing (in general terms) topics and concepts involved in an assignment
- Asking someone for help with a specific error message or bug
- Getting help with the specifics of language syntax
- Utilizing information given to you by the instructor

Again, assistance you receive must be clearly explained in the comments at the beginning of your program. If you have any questions about this, please ask or review the policies relating to the Honor Code.

**Important dates:**

October 4-5: Fall Break

October 6: Midterm grade reports due

October 13: Last day to drop a course and receive a "W" grade

November 24-28: Thanksgiving

December 3: Last day of class

December 6-10: Final exams

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*C++ Programming: Program Design Including Data Structures*, 5<sup>th</sup> Edition  
by D. S. Malik.

<b>Lesson</b>	<b>Date</b>	<b>Chapter/Section</b>
1	17-Aug	1-3 Introduction, Types, I/O
2	19-Aug	4-5 Branches, Loops, <b>Program 1</b>
3	24-Aug	6-7 Functions
4	26-Aug	8-10 Arrays, Structures, Records
5	31-Aug	11 Classes
6	2-Sep	11 Classes, <b>Program 2</b>
7	7-Sep	12 Inheritance
8	9-Sep	12 Inheritance
9	14-Sep	<b>Program 3</b>
10	16-Sep	<b>Test 1</b>
11	21-Sep	13 Pointers
12	23-Sep	13 Introduction to Lists <b>Program 4</b>
13	28-Sep	14 Overloading and Templates
14	39-Sep	15 Exception Handling
15	7-Oct	16 Recursion
16	12-Oct	<b>Program 5</b>
17	14-Oct	17 Linked Lists
18	19-Oct	17 Linked Lists
19	21-Oct	<b>Program 6</b>
20	26-Oct	18 Stacks
21	28-Oct	<b>Program 7</b>
22	2-Nov	18 Queues
23	4-Nov	<b>Program 8</b>
24	9-Nov	<b>Test 2</b>
25	11-Nov	20 Binary Trees
26	16-Nov	20 Binary Trees, <b>Program 9</b>
27	18-Nov	21 Graphs
28	23-Nov	21 Graphs
29	30-Nov	<b>Program 10</b>
30	2-Dec	Review
	TBD	Final Exam