# CMPT 125 – Introduction to Computing Science and Programming II

**Semester:** Summer 2024
**Instructor:** Dr. Yonas T. Weldeselassie (Ph.D.)
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**Office Hours:** **Every TBD**

## PREREQUISITES

CMPT120 (with a minimum grade of C-)

## OBJECTIVES

This course is a rigorous introduction to computing science using C++, intended for students who have already taken CMPT 120 as an introduction to programming and algorithms. Students will learn basic principles of algorithm design and software development, memory management, fundamental algorithms, formally analyzing the running time of algorithms, abstract data types and elementary data structures, object oriented programming and software design, specification and program correctness, reading and writing files, and debugging tools. The topics covered in the course with a weekly schedule are as follows (subject to change):

- **Week 1**
  - Information representation and storage
  - Introduction to C++ using MSVC
- **Week 2**
  - C++ Basics
  - Variables, conditional statements, loops
- **Week 3**
  - Modular programming
  - Static arrays, strings, functions
- **Week 4**
  - Recursion and recursive functions
  - Divide and conquer algorithms
- **Week 5**
  - Pointers and References
  - Dynamic arrays
  - Memory management
- **Week 6**
  - Introduction to object oriented programming
  - C++ structs
- **Week 7**
  - Introduction to object oriented programming
  - C++ classes
  - Operator overloading

- **Week 8**
  - Revision Session
  - Midterm Exam (25%)
- **Week 9**
  - C++ STL (vectors)
  - Container classes
  - Copy constructor, assignment operator, and destructor
- **Week 10**
  - Inheritance
- **Week 11**
  - Polymorphism and late binding
  - Introduction to abstract data types
- **Week 12**
  - Abstract data types (ADT)
  - Stacks, queues, linked lists, trees, binary search trees
- **Week 13**
  - Finite state automata
  - Theory of computation

**REQUIRED TEXT**

Problem Solving with C++, 9th Edition, Walter Savitch, Addison-Wesley, 2012, 9780133591743

**Reference book**: Absolute C++, 5th Edition, Walter Savitch, Addison Wesley, 2012

**COURSE ASSESSMENT**

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|---|---|
| Quizzes: | 10% |
| Assignments: | 20% |
| Midterm Exam (Week 8): | 25% |
| Final Exam: | 45% |
| Total: | 100% |

**NOTE: Final and Midterm Exams** (70% of course total)

***Students must attain an overall passing grade on the weighted average of exams in the course in order to obtain a clear pass (C- or better). Moreover students who do not obtain a passing grade in the final exam may not obtain a pass (D or better).***

## Course Software

The course will use Microsoft Visual C++ 2010 Express Edition IDE that is already installed on the FIC lab computers. Therefore you are advised to get the same software and install it on your laptop computers. For detailed steps on how to get and install Microsoft Visual C++ 2010 Express on your own computer, please refer to the course Moodle page. Of course, you may also use a different compiler (such as Xcode for Mac or a different version of Visual C++) if you cannot use the course software for any reason; *however any course assessment work will be tested and marked using Microsoft Visual C++ 2010 Express Edition compiler and therefore it is your responsibility to always test your work on Microsoft Visual C++ 2010 Express Edition compiler before submission*.

## Course Organization and Communication

Your active engagement with the instructor during class times is important. Moreover, we will heavily rely on electronic communication during the semester.

This includes:

1. **Moodle:** Course lecture notes, lab work practice questions, and any other supporting materials will be uploaded on to Moodle.
2. **Email:** We will use our FIC email accounts for any and all communications. For this reason you are required to attend to your FIC email account regularly in order to get any announcement from the instructor on time. Moreover if you would like to communicate with the instructor, then it must be sent from your FIC email account. In your email subject, write the course title (CMPT 125) and your class number. Emails sent from non-FIC email accounts will not get a response.

## Course Assessment Details

### Quizzes (10%)

There will be two quizzes during the semester. These quizzes will be open book and typically be problem solving and programming or analysis questions which will be posted onto Moodle and that you will need to work on a computer and submit your solution through Moodle. **The dates and times for the quizzes will not be announced before hand and they will be performed either during lab sessions or lecture times depending on the circumstances.** In order to be familiar with Moodle submission, we will have practice quiz before the actual quizzes start.

### Assignments (20%)

There will be four to five assignments during the semester. Each assignment problem statement will be uploaded on Moodle with a clearly stated due date and time for submission. You will be required to submit your assignment solutions

through Moodle. Moodle will not allow you to submit after the due date and time. Late submission of assignments through email or hard copies is not accepted.

Assignments are individual work. Each student must write his/her own code and submit. Submitting the same solution like any other student, past or present, is prohibited.

**Midterm Exam (25%)**

There will be a paper based midterm exam on Week 8. This midterm exam will test the course materials discussed from Week 1 to Week 7. The exact date and time for the midterm exam will be announced as we get closer to the test date. The midterm exam is NOT open book.

**Final Exam (45%)**

There will be a paper based final exam at the end of the semester. This final exam will test all the course materials discussed throughout the semester. The exact date and time of the final exam is scheduled and announced by FIC. The final exam is NOT open book.

## *Notes*

- ***Every student is required to submit his/her own original work for any assessment of the course (quizzes, assignments, test, midterm exam, and final exam). Even if you are a repeat student, you still are required to submit original work. Any work that is not original comprises academic misconduct. If the instructor suspects any academic misconduct, then the instructor reserves the right to re-examine the student on a one to one basis and take further actions together with FIC administration.***
- ***Every student is required to answer any assessment problem using the materials discussed in the course up to the time of the assessment. This means that submitting C++ language features that are not discussed in our course YET will get zero mark.***
- ***Your marks of assessments will be recorded on Moodle in a timely manner. Please check your marks regularly. If there is any error, then contact the instructor immediately. All mark concerns except for the final exam MUST be resolved before the end of the last week of the semester.***

## GRADE DISTRIBUTION

Grade distribution is not pre-determined and may vary from semester to semester.

## MAKE-UP EXAMS

Make-up opportunities for missed assessments such as **Quizzes, Test or Midterm Exam** are generally not available. In case of extenuating circumstances where a student is unable to sit for an assessment, the student is required to communicate

with the instructor and also with FIC student success team in order to explain the circumstances and get support. Under such circumstances either a make-up assessment will be provided or the weight of the missed assessment will be transferred to the final exam at the sole discretion of the instructor. Extenuating circumstances do **NOT** include not feeling well, headache, stomach-ache, nervousness, cold, etc., misunderstanding the instructions about the exam date or time, public transit issues, pleasure related travelling, flying back home, or commitments scheduled by a student in advance.

## ACADEMIC INTEGRITY POLICY

Academic Integrity refers the values on which good academic work must be founded: honesty, trust, fairness, respect and responsibility. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the college community and compromise the worth of work completed by others.

Students found to have breached the regulations related to any form of academic misconduct including but not limited to plagiarism and cheating will be subject to the following measures:

- First Offence: Awarded 0 for the assessment and given a permanent record on their file
- Second Offence: Awarded 0 for the course, regardless whether the offence was committed in the same course or another course
- Third Offence: Risk expulsion from FIC and the cancellation of Study Permit

It is solely the student's responsibility to be aware of Academic Integrity Policy and consequences of violating it. The policy is available at: http://85401dc13f6ba5867f46-aacfababc729cd49a24606938417f53d.r33.cf6.rackcdn.com/FIC_Academic_Integrity_Policy.pdf

### In Class Discipline Policy

I expect every student to be considerate for other students and the session and avoid any disturbance during class sessions. In particular, I strictly require you to either silent or switch off your cell phone whenever you join a class session. Any disturbance during class sessions will be handled as follows

1. First offence: I will give you a verbal warning.
2. Second offence: I will report you to advising with the intention of expelling you from the class if any further disturbance occurs.
3. Third offence: I will request FIC expel you from the class.

**Final Exam Information**

Please note that the final exam schedule will not be released until later in the semester. Please make sure to check the schedule on your FIC email and student portal. If you do not see your exam scheduled please contact me directly.

**How Can I do well in this course?**

First and foremost, you need to understand that CMPT 125 is not a programming course. Instead, it is about problem solving with the help of computers. As such it entails three fundamental issues:

1. You need to understand a given problem,
2. You need to know how to solve the problem by hand on paper using pen and pencil, and
3. You need to know the C++ programming language in order to solve the problem using a computer.

The first part requires continuous practice with different problems in order to develop problem understanding skills. As such I will provide several practice questions every week and you must solve the problems I provide in order to achieve this. You must also read the reference book and solve the practice problems in the book to help you further in this endeavour.

The second part requires you to have a notebook, pen and pencil ready all the time in order to think and solve problems on paper. It also requires continuous practice in order to develop your problem solving skills infinitesimally; starting with very simple problems and going up to solving very complicated problems by the end of the semester. The practice problems I provide every week start with simple ones and go to more difficult ones. As such you need to solve all the problems in order to climb the ladder of problem solving skills smoothly.

Finally, the third part requires spending quite a lot of time on a computer. Generally speaking the lab computers are available for you whenever the rooms are free. However, in order to do much more practice at home, I strongly recommend you to have a laptop and install in it Microsoft Visual C++ 2010 Express Edition and use your laptop as your main practice machine.If you need help with installing **Microsoft Visual C++ 2010 Express Edition**, consult the IT SQUAD available at the front desk.

Good luck and welcome to CMPT 125!