




COMP 6481 Programming and Problem Solving Course Outline – Winter 2024

Instructor	<p>Section W: Dr. Abdelghani Benharref - Office: H_961-13 E-mail: abdelghani.benharref@concordia.ca Tel: (514) 848-2424 ext. 5890 <u>Lecture:</u> Wednesday-Friday 11:45 AM - 1:00 PM at MB_S2..210 <u>Office Hours:</u> 1) Wednesday 1:00 PM – 2:30 PM; 2) Friday 3:30 PM – 5:00 PM Or by appointment.</p>
Instructor & Coordinator	<p>Section DD: Dr. Aiman Hanna - Office: ER_1103 E-mail: contact@AimanHanna.com Tel: (514) 848-2424 ext. 7878 <u>Lecture:</u> Monday 2:45 PM - 5:30 PM at H-531 <u>Office Hours:</u> 1) Thursday 3:30 PM – 4:30 PM; 2) By appointment anytime.</p> <p>Fastest Way to Communicate: through the Replied App (only on iOS) @Comp346 https://testflight.apple.com/join/Iz107cTp  Click here for details.</p>

Tutorials:

Tutorial	Time	TA Name
DA	Tu 5:45PM - 6:45PM @ MB 3.285	Pouria Alikhanifard - pouryafard75@gmail.com
DB	Tu 8:45PM - 9:35PM @ H 523	Gurpreet Nanda - gurpreetnanda96@gmail.com
DC	Tu 5:45PM - 6:45PM @ MB 2.285	Gurpreet Nanda - gurpreetnanda96@gmail.com
DD	Tu 8:45AM - 9:35AM @ H 523	Snehl Sharma - snehlsharma0308@gmail.com
WA	Tu 10:15AM - 11:05AM @ H 561	Peter Sakr - peter.l.sakr@gmail.com
WB	We 10:15AM - 11:05AM @ MB 2.285	Peter Sakr - peter.l.sakr@gmail.com
WC	Th 10:15AM - 11:05AM @ CL 239	Reza Jebeli - rezajebeli97@gmail.com

This course is offered solely in-person, and all lectures, tutorials, PODs, and labs take place at Concordia campus.

Background Knowledge

You should have some previous experience of programming in Java such as that provided in COMP 248 or a similar course. In particular, you should have a good understanding of expressions, statements, methods, parameters, and arrays. You should also know the basic concepts of objects, classes, and packages.

Course Objectives

The main objectives of this course are:

1. Understanding the constructs and the important aspects of Object-Oriented Languages and Object-Oriented Programming;
2. Gaining strong experience with designing and coding more sophisticated, robust and modular software applications;
3. Gaining strong experience with problem analysis, problem solving, algorithms, and data structure, and additionally being able to code such algorithms/solutions with ease.

In general, the course covers two distinct, yet quite related, subjects that can be described as: *Coding* and *Problem Analysis & Solving*! Consequently, and in relation to the first subject, the course covers higher-level subjects of Object-Oriented programming, including the design of classes, inheritance, composition, polymorphism, static and dynamic binding, abstract classes, exception handling, file I/O, recursion, interfaces, inner classes, and linked lists. In relation to the second subject, the course covers data structure, abstract data types (i.e. stacks, queues, double-ended queues, etc.), trees, priority queues, dictionaries, heaps, hash tables, searching, sorting, search trees, and graphs, with a specific focus on time and space complexities and asymptotic notation.

Textbooks

During the course you will be using multiple sources; however, the two following text books are particularly required:

- 1) M.T. Goodrich, R. Tamassia, Michael H. Goldwasser. *Data Structures and Algorithms in Java*, 6th edition. John Wiley & Sons, 2014. ISBN 978-1-118-77133-4. (Note: 5th edition is ok.)

The book is available at the bookstore or can be rented as eTextbook.

Textbook URL: <http://ca.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002900.html>

From this textbook we target the coverage of these sections: 3.1 to 3.4, 4.1 to 4.3, 5.1 to 5.6, 6.1 to 6.2, 7.1 to 7.3, 8.1 to 8.4, 9.1 to 9.4, 10.1 to 10.3, 11.1 to 11.3, 12.1 to 12.4, 14.1 to 14.7, and 15.1 to 15.2. Due to time limitations, you may be required to read some of these subjects on your own.

You also need to study chapters 1 and 2 that will not be covered in class lectures.

Tentative Schedule based on the Goodrich et al. textbook

The schedule is **tentative** and might change anytime.

Chapter	Topic
⇒	Introduction
4	Algorithm Analysis (4.1 to 4.3)
5 + 15	Recursion (5.1 to 5.6, 15.1 to 15.2)
6	Stacks and Queues (6.1 to 6.2)
3 + 7	Vectors, Lists, Iterators and Sequences (3.1 to 3.4, 7.1 to 7.3)
8	Trees (8.1 to 8.4)
9	Priority Queues and Heaps (9.1 to 9.4)
10	Maps, Dictionaries and Hash Tables (10.1 to 10.3)
11	Search Trees (11.1 to 11.3)
12	Sorting (12.1 to 12.4)
14	Graphs (14.1 to 14.7)

- 2) Walter Savitch, *Absolute Java* 6th Edition or later. Addison Wesley.

The book is available in 2 formats:

Hard Copy: ISBN: 978-0-13-404167-4 & Digital Copy: ISBN: 978-0-13-394783-0

From this textbook we target the coverage of materials from Chapter 4 to Chapter 16.

Tentative Schedule based on the Savitch textbook

Chapter	Topic
4, 5 & 6	Review of Classes, Objects & Arrays
7	Inheritance
8	Polymorphism and Abstract Classes
9	Exception Handling
10	File I/O & Serialization
13	Interfaces & Inner Classes
14	Generics
15 & 16	Linked Data Structures

Course Structure & Details of the Course Components

In addition to the lectures, the course has:

- i) **A Weekly Laboratory, where it is mandatory to attend.** During this laboratory time (over 11 weeks), you will have:
 - a. **8 mini-lab projects**
 - You must attempt all 8 mini-labs. Out of the 8 mini-labs, two will be marked at random; however heavy marks will be deducted for any missing lab regardless of whether, or not, that lab is marked.
 - b. **3 programming exams**
 - You must attempt all 3 programming exams.
 - c. **Part of the Final Exam (See details below, in point # iii).**

➔ **IMPORTANT**: You are NOT allowed to have your cellular phone, or any other electronic devices, during the lab. Consequently; you must either find a place to leave your phone (i.e. a locker) before entering the lab, or alternatively must leave the phone along with your ID with the lab instructor at the start of the lab.

- ii) **Assignments** – there will be 3 to 4 assignments (weight of each assignment depends on the difficulty of the assignment). These assignments play a major role in your learning of the various topics covered in this course. You will need to attempt all assignments. Each of these assignments will include a theoretical component and a programming component. Not all parts of an assignment will be marked. Each assignment will clearly specify which parts will, or will not, be marked. Nonetheless, you must attempt and submit all questions regardless of that. Full details will be specified on each of the assignments.

For all programming components of your assignments, you need to use Java version 8.0 or later.

Submission format: All assignment-related submissions must be adequately archived in a ZIP file using your ID(s) and last name(s) as file name. The submission itself must also contain your name(s) and student ID(s). Use your “official” name only - no abbreviations or nick names; capitalize the usual “last” name. Inappropriate submissions will be heavily penalized. Only electronic submissions over Moodle will be accepted. Students will have to submit their

assignments individually for the theoretical component. For the programming component, one copy per group is to be submitted (in case groups are allowed by any of the assignments). Assignments must be submitted in the right submission folder of the assignments. **Assignments uploaded to an incorrect submission folder will not be marked and result in a zero mark. No resubmissions will be allowed.**

Criteria used in evaluation of assignments:

- Correctness and Testing: the program should conform to the specification given in the assignment. This includes the proper handling of special cases and error conditions and the providing of correct results. The submitted test cases take into consideration special cases and error conditions.
- Design: the program should be constructed from coherent, independent, and decoupled functions. A function should usually access only its own parameters and local variables.
- Style: the program should be general-purpose and well-organized.
- Documentation and Layout: The documentation should consist of a well-annotated program and clearly formatted output. Helpful identifiers and a clear layout are part of documentation. The documentation should include the description of your design and the algorithm implemented.
- Efficiency: The program must implement the most appropriate method.
- Program-User Interface: The program should be easy to use.

IMPORTANT: For the programming part of each assignment, a demo for about 10 minutes will take place with the marker. THERE WILL BE A DEADLINE TO BOOK YOUR DEMO SLOT, AND YOU MUST BOOK YOUR DEMO PRIOR TO THAT TIME. You (or both members if working in a group) must attend the demo and be able to explain their program to the marker. Different marks may be assigned to teammates based on this demo. The schedule of the demos will be determined and announced by the markers, and students must reserve a time slot for the demo (only one time-slot per group; or zero mark is given).

Now, please read very carefully:

- If you fail to demo, a zero mark is assigned regardless of your submission.
- If you book a demo time, and do not show up, for whatever reason, you will be allowed to reschedule a second demo but a penalty of 50% will be applied.
- Failing to demo at the second appointment will result in zero marks and no more chances will be given under any conditions.
- If you book more than one time-slot for the demo (notice, it is one slot per team), a zero mark will be given (not even 50%).

- iii) **Final Exam.** A final exam will take place at the end of the term. This is very much like a written exam, which will examine your understanding of the materials covered during the entire term. The exam may include multiple choice questions (with negative marks for wrong answers), questions with detailed answers, short coding, and True/False questions requiring a short justification. The exam will take place during the final examination period at the end of the term, which is set by the University. However, a part of that final exam *may* take a place at

the lab during the lab hours prior to the written exam. If this is the case, more details will be provided to you at that time.

Grading Scheme

The table illustrates the components of the course and their corresponding weights (%).

Component	%
Assignments	10%
8 Mini-Labs (2 marked at random)	20%
3 Programming Exams	40%
Final Exam	30%

Now please read carefully (rather *very* carefully): In order to pass the course, you must:

- 1) **Pass the assignments (50% or more)**
 - 2) **Pass at least two of the three programming exams; and**
 - 3) **Pass the final exam (50% or more).**
- ⇒ **Please notice that you must attend all labs!**

There are no make-ups/alternates for missed mini-labs, exams or assignments.

Finally, you must notice that there is **no fixed**, a priori relationship between the numerical percentage and the final letter grades for this course.

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

Plagiarism

The most common offense under the [Academic Code of Conduct](#) is plagiarism which the Code defines as “*the presentation of the work of another person as one’s own or without proper acknowledgement.*”

This could be:

- material copied word for word from books, journals, internet sites, professors course notes, etc.
- material that is paraphrased but closely resembles the original source.
- the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student.
- a solution or Java code purchased through one of the many available sources.

Plagiarism does not refer to words alone; it can also refer to copying images, graphs, tables, and ideas. Presentation is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

In Simple Words:

Do not copy, paraphrase or translate anything from anywhere without saying where you obtained it!

Important Lecture Guidelines (Section DD)

Laptops are **STRICTLY PROHIBITED** during the lectures. Other communications devices, such as cellular phones, communication watches, and text/video messaging devices, tablets, pads, and similar devices are also **STRICTLY PROHIBITED**. The usage of any of these materials during the class will result in you being asked to immediately leave the class.

Website and other Resources

Additionally, a mailing list will be established for the course. You should subscribe to this mailing list **ASAP**. For details on how to subscribe, please link to: [Comp6481-w23](#).

Some resources for the course will be available online through your instructor's webpages. The webpages will contain announcements related to the class, pointers to documents, your theory and lab assignments, etc.

For sections W (Dr. Benharref), please use the Moodle website available through [Concordia Course Web Sites](#).

For Section DD (Dr. Hanna) the webpage for the course is: www.AimanHanna.com (follow Concordia links afterwards). Other material may be available on Moodle as well.

In addition, the faculty web pages have a wealth of information pertaining to our computer systems and software, which includes simple user guides, and answers to many standard questions. You should explore these help pages. Begin your exploration from the URL: <http://www.encs.concordia.ca/helpdesk/faq/faq.php>

In Case the Course has to Switch to Online Delivery!

Due to the uncertainty of the current pandemic times, pressing situations may force the course to switch to online delivery. If this is the case, there are few important matters that you should be aware of. More concrete details will also be given at such time.

- 1) You must have all equipment, tools, software, etc. that are needed for a remotely delivered course.
- 2) Lectures and Tutorials: These components, or only part of them, will be switched to online delivery. In such cases, the online delivery may be through pre-recorded videos, or through live online delivery. Your instructor will fully inform you about the delivery method.
- 3) In case the lectures are delivered live, [there will be no recordings for these live lectures.](#)
- 4) Labs: Labs are likely to remain in-person even in the event the class is switched to online delivery.
- 5) **EXAMS:**

[In case of switching to online delivery, exams may still take place in-person. If this is not possible, then exams will take place over The Concordia OnLine Exams \(COLE\) system. Additionally, you may be called for a follow-up oral exam afterwards. The exam will be proctored, through live Zoom invigilation with enabled lock-screen \(which is the most likely way that the exam will take place\), or through auto-proctoring. Please read very carefully the Addendums below, which provide the full details of such exams. You must make sure that you read this information very carefully.](#)

Addendum 1 – Zoom invigilation

This course will be taught and all assessments will be completely online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform with **online live proctoring** (also known as invigilation). More information about the COLE system may be found at the [COLE website](#).

Please note the following with respect to online live proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard Time.
- That your image, voice and screen activity *may* be recorded throughout the duration of the exam.
- That you must show your Concordia University Identification card to validate your identity. Alternative government-issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made (if one is made) will only be viewed by authorized university personnel (no external entity has authorization to review the recording).
- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).

- For your online examination(s), you will need to download the appropriate browser lockdown technology and use Zoom. Protocols for entering the examination will be provided by your professor.
- That you should enter the virtual test site and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements **are advised that they will need to drop the course**. More information can be provided on the next or alternative offering of this course by consulting the Department. Students are advised to check the drop deadline (DNE) of the term.

Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsdinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. Visit the [COLE website](#) for more information.

Addendum 2 – Auto-proctored timed assessments

This course will be taught and all assessments will be completely online. A midterm and/or a final online exam are planned to be provided with **online live proctoring** (see Addendum 1 above). Nonetheless; if this could take place for some reason, then the exams will be alternatively be provided through the Concordia Online Exams (COLE) platform with **online proctoring** (also known as auto-proctoring). More information about the COLE system may be found at the [COLE website](#).

Please note the following with respect to online live proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.
- That your image, voice and screen activity will be recorded throughout the duration of the exam.
- That you must show your Concordia University Identification card to validate your identity. Alternative government-issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made will only be viewed by authorized university personnel (no external entity has authorization to review the recording).

- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very strongly recommended to enter the virtual test site found at the [COLE website](#) and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements **are advised that they will need to drop the course**. More information can be provided on the next or alternative offering of this course by consulting the Department. Students are advised to check the drop deadline (DNE) of the term.

Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsdinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. Visit the [COLE website](#) for more information.