Programming Fundamentals II
COP 3503C
Class Periods: MWF, period 10, and 5:10 pm – 6:00 pm
Location: CAR 0100
Academic Term: Spring 2023

Instructor:
Laura Melissa Cruz Castro (Ph.D.)
cruzcastrol@ufl.edu
Office Hours: MW, 10:00 am –1:00 pm, Discord or CISE 358.

Teaching Assistant/Peer Mentor:

Cameron Brown	cbrown14@ufl.edu
Aarti Kalamangalam	akalamangalam@ufl.edu
Daniel Marzo	danielmarzo@ufl.edu
Blake Thacker	blakethacker@ufl.edu
Rishabh Srivastav	rsrivastav@ufl.edu
Gabriela Taboada	gtaboada@ufl.edu
Remington Ewing	rewing@ufl.edu
Nymish Chintanippu	nchintanippu@ufl.edu
Prateek Kumar Goel	prateekgoel@ufl.edu
Gabriel Isenberg	g.isenberg@ufl.edu
Jason de Jesus li	jasondejesus@ufl.edu
Bruce Maddux	madduxbruce@ufl.edu
Meghana Gontu	mgontu@ufl.edu
Alex Johnson	alexjohnson@ufl.edu
Maeson Vallee	valleemaeson@ufl.edu
Diego Aguilar	aguilar.diego@ufl.edu
Diego Fernando Santos Gonzales	dsantosgonzalez@ufl.edu
Micah Gant	micah.gant@ufl.edu
Ayush Kumar	ayushkumar@ufl.edu
Srikruth Reddy Puram	s.puram@ufl.edu
Paul Grau Jr	pgrau@ufl.edu
Pranali Suhas Narkar	pnarkar@ufl.edu
Shreyas Varude	svarude@ufl.edu
Sagan Sutherland	s.sutherland@ufl.edu
Nikhil Kulkarni	n.kulkarni@ufl.edu
Sai Navaneeth Reddy Sudula	sudulas@ufl.edu
Amarneni Akhil Kumar	aamarneni@ufl.edu
Aseem Baranwal	a.baranwal@ufl.edu
Kidane Chinn	kidanechinn@ufl.edu

Course Description
This course is a reinforcement of concepts covered in COP3502, as well as a look at some more advanced programming topics. In addition, we will look at creating programs which may be a bit more complex than those you have worked on in the past, and strategies for dealing with applications as they increase in complexity and/or size.

In the same way that you learn core programming concepts such as variables, loops, and functions, this course will cover similar core topics as from the field of visual arts: How to store visual data, how to draw that data to the screen, the basic building blocks of 2D and 3D graphics as well as the tools used to create assets for use in games and interactive applications. We will build a visual vocabulary which will be directly applicable to projects in this semester, as well as other courses you may take in the future.

Course Pre-Requisites / Co-Requisites

COP3502C is a prerequisite for this course. In addition, it is expected that you understand basic programming concepts such as conditionals, loops, functions, and classes.

Course Objectives

1. Build and execute C++ programs from command-line and from within an IDE
2. Fix problems in an application by utilizing debugging tools and processes
3. Utilize testing in the development of software applications
4. Read and write data from binary and text files
5. Implement classes which adhere to the concepts of object-oriented programming, including abstract and derived classes
6. Examine the uses of dynamic memory allocation
7. Utilize pointers in the creation of memory-efficient data structures such as linked lists, stacks and queues
8. Demonstrate the use of templates to create generic classes
9. Demonstrate an ability to solve large programming problems by breaking them into smaller pieces

Materials and Supply Fees

Required Textbook

Programming in C++, Frank Vahid and Roman Lysecky

Available through zyBooks. This book also includes access to zyLabs, which are used for many programming assignments in the course.

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: UFLCOP3503CCruzSpring2023
3. Subscribe

The fee for the required book is $77 dollars.

Recommended materials

Think Like a Programmer, An Introduction to Creative Problem Solving
Anton Spraul, ISBN: 978-1593274245

This is a book that focuses not on how to write code in any one language, but instead looks at how to get into the programming mindset. Programming is about solving problems and thinking about those problems in ways you might not have done before.

A good text editor. We often have to view or edit files containing all sorts of data, and simple editors like Notepad insufficient. There is a lot of them out there, use whichever you prefer. A few popular ones:

Notepad++
Atom
Sublime Text
Vim

Course Schedule

Day of the week	Date	Topic
M	9-Jan	Intro to the course
W	11-Jan	Python to C++ (Essentials)
F	13-Jan	Building C++ Lab (demo)
M	16-Jan	**Martin Luther King Day (NO CLASS)**
W	18-Jan	Classes
F	20-Jan	Classes (demo)
M	23-Jan	Pointers
W	25-Jan	References
F	27-Jan	Pointers and references (demo)
M	30-Jan	Heap and Stack
W	1-Feb	Dynamic memory
F	3-Feb	Linked lists (intro to project)
M	6-Feb	Templates
W	8-Feb	Operator overloading
F	10-Feb	Templates (demo)
M	13-Feb	Inheritance
W	15-Feb	Polymorphism
F	17-Feb	Inheritance and polymorphism (demo)
M	20-Feb	File I/O and Binary file I/O
W	22-Feb	Exam review

F	24-Feb	Make up time for exam
M	27-Feb	File I/O
W	1-Mar	Binary file I/O
F	3-Mar	File I/O and Binary file I/O demo
M	6-Mar	command line compiling
W	8-Mar	Project 2 overview
F	10-Mar	command line (demo)
M	13-Mar	**Spring Break (NO CLASS)**
W	15-Mar	**Spring Break (NO CLASS)**
T	16-Mar	**Spring Break (NO CLASS)**
F	17-Mar	**Spring Break (NO CLASS)**
M	20-Mar	maps
W	22-Mar	iterators
F	24-Mar	maps and iterators (demo)
M	27-Mar	Libraries
W	29-Mar	Installing SFML
F	31-Mar	Project 3 (explain)
M	3-Apr	Function pointers
W	5-Apr	Functors and lambda expressions
F	7-Apr	Function pointers, functors, and lambda (demo)
M	10-Apr	SFML demo
W	12-Apr	Exam review
F	14-Apr	Make up time for exam
M	17-Apr	SFML demo
W	19-Apr	SFML demo
T	20-Apr	Project
F	21-Apr	Project
M	24-Apr	Project
W	26-Apr	What's next?

Attendance Policy, Class Expectations, and Make-Up Policy

Lecture attendance is not mandatory, but it is expected that you attend—and you are ultimately responsible for the concepts covered on any given day. Class days will include some combination of lecture material, coding demonstrations, and generally some Q&A at the end afterward. Lectures will be recorded for later review, and links to lectures will be posted.

Lab hours are not mandatory. However, students that **attend at least 6 lab hours during the semester will have +10 points of extra credit at the end of the semester.**

Deadlines

Deadlines in this course are final, and submissions after the deadline will not be accepted. Ultimately, it is your responsibility to ensure that assignments are completed on time, and according to specifications. Students are given ample time in this course to complete each assignment. If you wait until the last day to start something, and something goes wrong on that last day, it is not my responsibility. (I've been there before as a student, and I had to live with the consequences.)

Exceptions can be made for significant hardships as dictated by university policy (e.g., medical issues, hurricanes, death in the family, etc.) In addition, students may be granted one (1) single exception to this, according to the following section.

Late pass:

You may turn in one (1) assignment up to 24 hours after the deadline, with a grade penalty of 10% of the final score for the assignment (so a 100 would become a 90, a score of 50 would become a 45, etc.). This is only applicable to **one assignment** within the 24-hour period following the deadline. You may use this opportunity only once throughout the entire semester, and you must fill the following form in order to use your pass:

This policy is intended to reduce the impact of some "catastrophic mistake" on your part. Realize the day after a deadline that you submitted the wrong file? Forgot to include one of your code files in the submission? Fell asleep and napped right through the deadline? Use this, and make an effort to avoid repeating that same mistake (either in this course, or in a future course).

In addition, one quiz will be removed from your final grade calculation. However, no other exceptions without appropriate excuse will be made. Please contact me directly with the appropriate documentation if you have a life struggle or event. Sometimes, I will ask you to contact the dean of students to get approval.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Labs	210	21%
Projects	350	35%
Quizzes	200	20%
Debugging survey	40	4%
Midterm Exam	100	10%
Final Exam	100	10%
Total	1000	100%

Grading Policy

At the end of the semester, your final grade percentage is the result of this formula:

FinalPercentage = PointsEarned/1000

That percentage translates to a final letter grade based on this scheme:

Grade	Range
A	100 % to 93%
A-	< 93 % to 90.0%
B+	< 90.0 % to 86%
B	< 86 % to 83%
B-	< 83 % to 80%
C+	< 80% to 76%
C	< 76 % to 73%
C-	< 73 % to 70%
D+	< 70 % to 66%
D	< 66 % to 63%
D-	< 63 % to 60%
E	< 60 % to 0.0%

Grading challenges:
If a mistake was made on one of your grades, or if you feel a question on an exam was in error, you have **one (1) week to bring it to my attention.** This is to avoid a wave of requests for changes to be made at the end of a semester, long after that part of the class has passed.

CODE POLICY:
In this course, students are expected to write their own code for all assignments. You are the one who is being tasked with coming up with a solution to the various programming problems in this course—not your friend, not your roommate, not a stranger on the Internet. The reasoning behind this is that later in your educational career (or if you end up in industry) it will be expected that you are capable of solving problems on your own, if and when the need arises. Even in a team-based environment, each member of that team must be capable of carrying their own weight.
Unless otherwise noted, there are no group or collaborative assignments in this course. When working on assignments, discussion of those assignments with your classmates is not only inevitable, but it is strongly encouraged! (We often learn very effectively in social environments.) That said, you should discuss the problem in high level terms, not telling someone else (or being told) how to write the code. Here are some examples of what could be considered acceptable and unacceptable:

ACCEPTABLE:
- Talking about the problem
- Using a whiteboard (or paper, or something similar) to draw out the problem
- Looking at someone else's code to help them identify or fix a bug, AFTER you have already completed that portion for yourself

UNACCEPTABLE:
- Splitting an assignment's work into multiple parts with other students
- Asking someone to send you their code
- Copying someone else's code into your own submission

- Giving another student your code for ANY reason—once you send your code to someone else, you have no control over where it ends up
- Giving another student step-by-step instructions on how to structure a solution to a problem—it's their job to write their code, not yours
- Looking up solutions to problems and using those solutions yourself verbatim
- Viewing solutions to the problems and mimicking those solutions—ask me, or one of the assistants in this course, for help

Consequences of the Honor Code Violation:

If you are not capable of completing an assignment on your own, that's okay. Lots of things in life can take time to really "click" for us, and we all learn at different rates. Under no circumstances should you ever consider cheating—that is, submitting someone else's work as your own—as an option. The consequences for doing so will be far worse than if you simply did not do the assignment.
Students will complete this course with honor and integrity, or not at all. Submissions which are believed to be not entirely a student's own work will be reported to administration for disciplinary action. Students who commit any of the unacceptable acts listed above will also be reported. In ALL cases, I will recommend the following sanctions be imposed on that student or students:

1. **A failing grade (an 'E') for the course**
2. **That you not be allowed to drop the course for any reason**

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations,

clinical presentations such as patient history, academic exercises involving student participation solely, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall*,* 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*: https://distance.ufl.edu/state-authorization-status/#student-complaint.*