

Programming Language Concepts

COP 4020 Section 9982 Class Number 23532

Class Periods: T 8 [03:00 to 03:50 PM EST]; TR 9 [04:05 to 04:55 PM EST];

Location: MCCC 100 | Zoom [see Zoom Conferences and daily Modules in Canvas]

Academic Term: Fall 2021

Instructor:

Pete Dobbins

pjd@cise.ufl.edu

352.294.6685

Virtual Office Hours [VOH]: M 3 – 3:50 PM EST, W 11 AM – 12 PM EST, R 5:10 – 6 PM EST

- All office hours will be held virtually via Zoom.
- Here is Pete's Zoom room: <https://ufl.zoom.us/j/4755418272>.
- VOH will begin Monday, August 30, 2021.
- During the **first week of classes, Wednesday, August 25, 2021 4th period** [11 AM – 12 PM EST] I will hold VOH to get things kicked off. If you any questions, please swing by the Zoom session and we will chat.

Outside of VOH The **best way** to contact me will be through our **MS Teams** chat.

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact the course staff through the course MS Teams chat. Announcements will be posted in MS Teams. Everyone will be added to our Team after drop/add has ended. Within our Canvas course shell you will find the VOH schedule (Modules/General Course Info/Weekly VOH Schedule) and Zoom links for each staff member.

- Benjamin
- rock
- Grant
- Max

Course Description

Introduces programming language principles, including language constructs, design goals, run-time structures, implementation techniques and exposure to a wide variety of programming paradigms. (M) 3 credit hours

Course Pre-Requisites / Co-Requisites

Prerequisite: COP 3530

Course Objectives

This course will discuss how programming languages are constructed and analyze the methodology used to create existing languages. Topics included are: lexical analysis, scanning, programmatic semantics, code generation, and different types of programming languages. Due to the nature and complexity of this field of study, the course will be time consuming and requires serious dedication on the part of each student. Be careful not to fall behind, success in this course requires consistent effort and practice.

Materials and Supply Fees

There are no materials or supply fees for this course beyond the textbook. See the *Required Textbook* section below for purchasing details.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	
2. An ability to apply engineering design to produce solutions that meet specified needs with	

consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course. Note this course is not tracked as part of the ABET process at this time.

Required Textbooks and Software

- <https://craftinginterpreters.com/>
- See Canvas Modules/Project/Project Setup

Recommended Materials

- Programming Language Pragmatics, 4th Edition, Michael L. Scott, 2016, Morgan Kaufmann, ISBN 10 | 13: 0124104096 | 978-0124104099.
- Concepts of Programming Languages, 12th Edition, Robert W. Sebesta, 2018, Pearson, ISBN 10 | 13: 0134997182 | 978-0134997186.

Course Schedule

Here is a general schedule for the semester. Please refer to the Canvas *Modules* for final details about each topic, exact dates, and the specific schedule we implement this semester. Note, under Modules, individual lectures are listed using the format: **year / month / date | L##: General Topic**.

Dates	Week	Topics
2021 / 08 / 22 - 08 / 28	1	Introduction, OOP
2021 / 08 / 29 - 09 / 04	2	Regular Expressions, Testing
2021 / 09 / 05 - 09 / 11	3	Lexical Analysis
2021 / 09 / 12 - 09 / 18	4	Data Streams, <i>peek</i> and <i>match</i> , CFGs
2021 / 09 / 19 - 09 / 25	5	Parsing
2021 / 09 / 26 - 10 / 02	6	Parsing
2021 / 10 / 03 - 10 / 09	7	Semantic Analysis
2021 / 10 / 10 - 10 / 16	8	Semantic Analysis
2021 / 10 / 17 - 10 / 23	9	Semantic Analysis
2021 / 10 / 24 - 10 / 30	10	Naming, Scoping, Binding
2021 / 10 / 31 - 11 / 06	11	Naming, Scoping, Binding
2021 / 11 / 07 - 11 / 13	12	Type Systems
2021 / 11 / 14 - 11 / 20	13	Java Class Files, Generating Byte Code

2021 / 11 / 21 - 11 / 27	14	Java Class Files, Generating Byte Code
2021 / 11 / 28 - 12 / 04	15	Memory
2021 / 12 / 05 - 12 / 11	16	Review
2021 / 12 / 12 - 12 / 18	17	Final Exams Week

Attendance Policy, Class Expectations, and Make-Up Policy

GENERAL

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Additional policies can be found here: <http://www.cise.ufl.edu/~pjd/admin/policies/course.html>. You are expected **know and follow** all of these policies. In order to be successful in this course, you should attend and participate in our live lecture. There is no replacement to the experience of seeing the material presented during lecture.

LECTURE

Live lectures will be *presented synchronously using* two modalities, ***in-person*** in MCCC 0100 and ***virtually*** through Zoom, during **T 8th** period [03:00 to 03:50 PM EST] and **TR 9th** period [04:05 to 04:55 PM EST]. Select the *Zoom Conferences* menu option in Canvas to join the synchronous virtual modality.

Here are course specific points of significance for our lecture process this semester:

- You are responsible for all material covered during lecture.
- Lecture attendance will not be taken (attendance is not mandatory).
- Lectures **will be recorded** and posted in Canvas under Modules (see the disclaimers and notice that follow).

Disclaimer #1: many Zoom sessions are being held campus-wide to deliver courses and the demand for recorded materials is high. It is possible there will be delays while completing the recording and posting (distribution) process. *I will post live lecture recordings as soon possible [under the corresponding Canvas Module],* however if you want to ensure that you see the lecture as soon you are able, you should participate in the synchronous live lecture.

Disclaimer #2: the Zoom platform records these sessions and I cannot guarantee they will not experience errors in the recording process. I have not observed this to be a significant problem. However, you should always be aware that attending the live lecture session is always the best way to ensure you are able to view the complete lecture content.

Notice: Our lectures will be audio visually recorded for students in the course to reference after the live recorded session. Students who choose to participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated. A textual “chat” feature is also available during lecture. “Chats” sent through the public channel may be recorded. If you do not wish for you “chat” to be recorded, you must send it through the private channel directly and only to the instructor. Please note, since lecture is a public setting, private chats may or may not always be answerable during the live lecture. VOH are provided throughout the week to accommodate any private discussions that cannot be handled during a lecture session.

MAKE-UP/LATE WORK

Makeups or extensions for graded class activities are provided given appropriate documentation is presented in a timely fashion. Excused absences must be consistent with University policies in the undergraduate catalog (<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>) and meet University requirements regarding excused absences. There are very few events which would impede your participation in a graded activity

warranting an exception, that you would not be aware of well before [at least a few hours] the start of the activity. The Dean of Students Office (www.dso.ufl.edu) provides rules, guidance, and approval for excuse documentation. Once an excuse has been approved by DSO, appropriate documentation will be provided to your instructors.

In place of late submissions, makeups, or extensions on project assignments, you are allowed to drop multiple project milestones (see below for details).

Late homework: No work can be accepted after a solution is posted. If a solution has not been posted and you submit one day late, there will be a **penalty of up to 50%** on the graded work. No work that is two days late can be accepted. Note, if the assignment is due at 11:59 PM, then at 12:00 AM the work is one day late.

Evaluation of Grades

Activity	Due Date	Comments	Total Grade Percentage											
Homework	HW1 – Supplements Lexing	2021 / 09 / 11	5% each	10%										
	HW2 – Supplements Parsing	2021 / 09 / 25												
Participation	Activities throughout the semester; 1% per activity.		10%											
Project	Part 1: Lexer	2021 / 09 / 18	7.5% each for the highest 4 scores [2 drops]	30%										
	Part 2a: Parser [Expressions]	2021 / 10 / 02												
	Part 2b: Parser [Complete]	2021 / 10 / 09												
	Part 3: Interpreter	2021 / 10 / 30												
	Part 4: Analyzer	2021 / 11 / 20												
	Part 5: Generator	2021 / 12 / 04												
	Final Evaluation [(re)-submit all parts]	2021 / 12 / 14	<table border="1"> <tr> <td>Lexer</td> <td>7%</td> </tr> <tr> <td>Parser</td> <td>12%</td> </tr> <tr> <td>Interpreter</td> <td>12%</td> </tr> <tr> <td>Analyzer</td> <td>12%</td> </tr> <tr> <td>Generator</td> <td>7%</td> </tr> </table>	Lexer	7%	Parser	12%	Interpreter	12%	Analyzer	12%	Generator	7%	50%
Lexer	7%													
Parser	12%													
Interpreter	12%													
Analyzer	12%													
Generator	7%													
			Total	100%										

Project Assignments

We will have a semester project split into 6 graded milestones (**5 Parts** w/ **Part 2** being *split* into **2a** and **2b**) building to the final submission evaluation. Your two lowest project milestone scores [Part 1 through Part 5, including distinctly Part 2a and Part 2b] will automatically be dropped. However, the following parts of the project will require the previous part's completion. The final project evaluation will evaluate the complete project [incorporating both the complete interpreter and compiler].

You may submit any project as many times as you need, however *no late submissions will be accepted for grading*. Dropping two project milestones provides you with flexibility should undocumented, and thus unexcused, exceptions arise.

Completing the project does not require that you work in a group. Optionally, you are allowed to work in a group of size 2. Prior to Tuesday, September 7, 2021 at 11:59 PM EST, groups are self-managed [you select to work individually or pick your project partner; complete the Group Signup Quiz in Canvas]. After Tuesday, September 7, 2021 at 11:59 PM EST, I will randomly assign anyone not within a group into a group. Random assignments might lead to you being in a group or by yourself. Group signup (for both individual and partnered work) will begin after drop/add has ended. Signing up to define your group structure (again for both individual and partnered work) will be your first participation activity (see below).

When working in a group, it is each student's responsibility to manage their individual effort. If you find your group is not working effectively, you are allowed a one-time shift to working individually. This request must be made after Sunday, October 3, 2021 at 11:59 PM EST and before Monday, November 1, 2021 at 11:59 PM EST.

Homework

Homework activities will be *completed individually*. They will be assigned and submitted through Canvas. There will be two homework assignments, supplementing your work on the project.

Participation

Your participation in the course will be evaluated by your completion of *participation activities*. There are 12 participation activities. Each activity is worth 1 participation point (1%), therefore to earn full participation credit, you are only required to complete 10 of the 12 activities. The 2 additional activities are provided so that you have flexibility in choosing which activities will show your participation.

To earn participation points for submitted code, your code must compile and not crash when executed.

The participation activities are:

- Completing the Group Signup Quiz, to work with a partner or individually on the project (see following slides) [1 participation point available].
- Making a reasonable attempt and submission to the project milestone test submissions [reasonable evaluated by >50% on the test; max 1 per milestone; in total, 6 participation points are available; HWs and Final Project Evaluation test submissions are not included].
- Submitting a reasonable attempt for all 6 of the graded project milestones [reasonable evaluated by >60% on the milestone; recall, the milestones are Project Parts 1, 2a, 2b, 3, 4, and 5 and the due date for each is provided above; This does not include the Final Project Evaluation; in total, 1 participation point is available].
- Answering challenge exercises [assigned in lecture; there will be 3 exercises; 1 point for each exercise completed; in total, 3 participation points are available].

Grading Policy

The range used to calculate your final letter grade in our course will be no harsher than this grading scale provided in the following table. Your final point total will be calculated using the percentages given in the *Evaluation of Grades* section. The percent you earn on each activity will be multiplied by the grade points associated with that activity.

Grade Points	Letter Grade	Highest	Lowest
4.00	A	100+	92.00
3.67	A-	91.99	89.00
3.33	B+	88.99	86.00
3.00	B	85.99	82.00
2.67	B-	81.99	79.00
2.33	C+	78.99	76.00
2.00	C	75.99	72.00
1.67	C-	71.99	69.00
1.33	D+	68.99	66.00
1.00	D	65.99	62.00
0.67	D-	61.99	59.00
0.00	E	58.99	0.00

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Re-Grade Requests

All grading/re-grading issues **must** be resolved within **1 week** of the graded work being returned. You must return exams/projects/quizzes to the person grading the activity in question, along with a **printed (not handwritten) attachment** stating the reasons for the re-grade. Do not write anything on the exam itself or detach (un-staple) the pages from each other. If you do so, your exam/project/quiz will not be re-graded. Note, when requesting a re-grade, the whole exam/project/quiz is subject to the re-grade, not just the portion you specify. We will be happy to discuss the solution and answer any questions, however no change will be made after the allotted week has passed.

Disclaimer

This document is subject to change at the discretion of the instructor, based on unforeseen circumstances (such as pandemics, hurricanes, sub-freezing temperatures... this is Florida after all, rifts in the fabric of time, and so on) occurring during the semester. Any such change would be introduced in order to better accommodate *you* due to the circumstances being experienced.

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/> (352.392.8565, <https://disability.ufl.edu/>). 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.

Once registered, the DRC provides documentation to instructors. Students should contact instructors to ensure documentation has been received as well as to discuss accommodation specifics so that everything can be setup. Students with disabilities should follow this procedure as early as possible in the semester, delaying may affect the ability to schedule the accommodation. All exams, quizzes, and so on administered through the DRC office must follow the course exam structure, being completed on the same date and time as the course exam.

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.ua.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.ua.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 solely student participation, 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 Conduct 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. 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** (<https://titleix.ufl.edu/>) 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/>.

COVID-19

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](https://coronavirus.uflhealth.org/screen-test-protect-2/frequently-asked-questions/covid-19-exposure-and-symptoms-who-do-i-call-if/) (<https://coronavirus.uflhealth.org/screen-test-protect-2/frequently-asked-questions/covid-19-exposure-and-symptoms-who-do-i-call-if/>) for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

Academic Resources

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

Career Resource 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: <http://www.distance.ufl.edu/student-complaint-process>.