

Course Syllabus – CIS4930

Performant Programming in Python

Contact Information

Course Instructor

Jeremiah Blanchard jjb@eng.ufl.edu

Teaching Assistants

Jennifer Cremer (Ferby) jcremer3@ufl.edu

Nikita Soni nsoni2@ufl.edu

Course Description

This course focuses on utilizing the flexibility of an interpreted / scripting language (such as Python) paired with features made available through low-level bindings (such as threading, process manipulation, and computational libraries in machine code) to build software that is extensible, robust, and performant. To this end, in this course we will explore several features that afford programmers the flexibility of programming in python while utilizing high-performance bindings for input-output processing, platform-specific enhancements, networking, audio-visual features, and matrix computation.

Course Objectives

By the end of the semester, successful students should be able to:

- Identify potential performance bottlenecks within a software system
- Write flexible scripting-language source code to handle non-critical sections
- Access existing high-performance features made available in typical scripting frameworks
- Build high-performance modules in low-level languages and bind them to scripting engines
- Design, develop, and deploy performant software using a mix of flexible and performant sources

Course Materials

Recommended: *Python Crash Course, 2nd Edition*, Eric Matthes, 2019. No Starch Press.
ISBN-13: 978-1593279288

Mobile Computing Requirement

The College of Engineering requires students to have a mobile computing device (standard laptop or Chromebook) with 802.11 WiFi capability. **Students are required to bring their mobile computing devices to class for in-class assignments!**

Code Submissions

Functionality is key to success in software development and computer science, so it is **extremely important** that the guidelines are followed. Failure to follow these instructions will result in penalties.

- 1) Code must compile / run in debug and release mode. Debug information should never be released in the final version of a software project. **Projects that do not compile AND run will be marked zero.**
- 2) Include only and exactly those files specified by the documents in submission. If the project has naming or organization error(s), its grade will be **zero**.

Student Teams

Most software requires many disparate skillsets. Few students will have all these skills; instead, student should form groups with the goal of create well-rounded teams.

All students will be responsible for completing peer reviews that, on their honor, are correct and accurate. Students will also be required to utilize GitHub or another source control system that may be used to task review and consideration. Students are also required to track features and issues using a professional tool (e.g., Trello and/or GitHub issues).

Based on peer reviews, instructors will intervene to correct behavior as necessary to maintain well-functioning teams. All team members are expected to contribute to the project on equal terms; as such, grade adjustments may be made if it is determined by faculty that student(s) are not acting productively as part of the team.

Finally, students are expected to be available during regular business hours (EDT) to contribute to the team's efforts, meetings, and necessary communications. Teams are expected to meet, at a minimum, on a weekly basis, but more frequent meetings are recommended for the health of the projects. Meetings are not required to be formal, but to build community, communication channels, and rapport; for example, some students may choose to engage in a short formal meeting each week but meet informally for co-working on other days.

Course Schedule & Grading

This is a rough topical overview of what we will cover (subject to change) and the course grading:

Mod.	Topic
00	Syllabus
01	Python Fundamentals
02	Object Oriented Programming
03	Data Manipulation / Storage
04	Development Tools
05	Processes & Concurrency
06	Audio-Visual Features
P1	Midterm Presentation
SB	Summer Break
07	Mathematics & Computation
08	Databases & Frameworks
09	Global Interpreter Lock (GIL)
10	Optimized Variants (e.g., Cython)
P2	Final Presentations

Grade Category	Pct	Letter	Range (%)
<u>Milestones</u>		A	93 – 100
Pitch	5%	A-	90 – 92
Design Prototype	10%	B+	87 – 89
Production Release	20%	B	83 – 86
		B-	80 – 82
<u>Classroom Activities</u>		C+	77 – 79
Syllabus Quiz	1%	C	73 – 76
Presentation - Midterm	8%	C-	70 – 72
Presentation - Final	12%	D+	67 – 69
Exercises (6-Drop-1)	35%	D	63 – 66
		D-	60 – 62
<u>Professionalism</u>			
Presentation Reviews (2)	4%		
Peer Evaluations (4)	4%		
Interaction	1%		
Total	100%		

NOTE: In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). For more information on grades and grading policies, please consult [the catalog](#).

Final grades will be rounded to the nearest whole percentage point. Grades will not be “bumped up”, and no additional credit will be offered at the end of the term – so **do not ask!** Any request for a final grade increase, via “bumping” or “extra credit” will not receive a reply and **will result in a deduction of 1% of the student's final grade.**

Professionalism & Expectations

Students are expected adhere to the following guidelines in this course:

Grading

Students should act with honor and honesty in all assignments. Sharing / copying, “borrowing” of code structure, discussing code structure, looking at code from another student or providing such code, and plagiarism, in addition to other dishonest behaviors, are all considered academic dishonesty. Absolutely no information regarding assignment solutions may be shared by students except at a conceptual level. If students implement algorithms from other sources, they must cite those sources, and this should be done only when explicitly allowed by the assignment’s directions. Students may not directly copy code from the Internet or other sources under any circumstances. Any student found to have violated these rules, whether a provider or receiver or unauthorized help, will be given a zero and referred to the Honor Court. **When in doubt, ask.**

Grade reviews must be requested within one week of a grade being posted. After two weeks, no grade will be revisited. In the event of a grade review, the entire assignment will be reviewed.

All assignments are due by the time listed on Canvas. Projects and homework may be submitted late with a cascading deduction: one (1) business day late for 10% penalty; two (2) for 30% penalty; or three (3) for 60% penalty. Quizzes and tests may not be submitted late for credit except with instructor approval for extenuating circumstances (see below). We will not make personal exceptions.

Group projects must be completed and submitted on teams. Class projects cannot be completed individually. If members of student teams stop participating or drop the course, it is the responsibility of remaining team members to alert instructors so that teams can be reformed or adjusted as necessary.

Attendance

Class participation is required. Though attendance will not be taken, students are expected to watch lectures and will be graded on their participation in and evaluation of class presentations by students in other teams. Students who fail to review lectures and/or attend discussions forfeit their opportunity to attend office hours unless the absence is excused by the instructor.

Students should facilitate learning of others without distraction. Students should refrain from watching videos; playing games; talking; sleeping; howling; biting toe nails; screeching like a banshee; and other distracting behaviors during course meetings.

Students should be present for all assessments. Make-ups will not be given except in extenuating circumstances. For make-up consideration students will be required to submit written documentation from a reputable source as evidence. For any planned event (such as a wedding), students must contact the instructor at least two weeks in advance for consideration. Please note that there is no guarantee that requests will be accommodated. Social, networking, and club events are considered at the discretion of the instructor. This two-week standard applies to university and personal events alike!

Students should visit office hours for project help and grade questions. Online students should make plans to chat with a TA during scheduled office hours or try to arrange an appointment with the TA or instructor. Do not send private messages to or tag (“@”) instructors or TAs, and do not email instructors or TAs about project help. *Emailed project / exercise questions will not receive a response!* We try to answer questions when possible in chat, but to get personalized help, visit or make arrangements.

Please allow 48 business hours for a response by email and remember that we will not respond to requests for project help. The instructor and TAs have many responsibilities and will respond to messages as is practical, but it can take some time, especially during the busy parts of the term.

Important correspondence (other than project help) should be engaged via email. In particular, the chat system is helpful for simple questions and allows students to help one another, but students should not expect a response to important questions via chat. Please allow 48 business hours for a response; the instructor and TAs have many responsibilities and respond to messages as efficiently as is practical.

Student Assistance

The following services are available to students requiring assistance:

Accommodations for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- Career Resource Center, Reitz Union, 392-1601, Career development assistance and counseling
- University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling
- SHCC mental Health, Student Health Care Center, 392-1171, personal counseling
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.

Software Use Policy

All faculty, staff and student 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.

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
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.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@ufl.edu

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